

Climbing up the Waste Hierarchy: The Devil is in the Details

By

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Abstract

According to the United Nations, the global human population generates an estimated 2.24 billion tons of Municipal Solid Waste (MSW) each year. The waste sector is having a significant impact on the triple planetary crisis of climate change, biodiversity loss and pollution. Although high-income countries only account for 17 percent of the world's population, these same countries generate 34 percent of the world's waste. Canada is only second to the United States in its per capita production of MSW, and is therefore a significant contributor to the triple planetary crisis. The Government of Canada recognizes the Waste Hierarchy (WH) as an instrument used to strategize and improve waste management practices. Best practices for the environment, human health and well-being prioritize waste reduction, reuse and repair while minimizing landfilling, energy recovery, and recycling. Three manuscripts using the WH as a common thread make up the chapters of this thesis. The first manuscript describes how waste is both governed and managed in Kingston, Ontario, Canada and gathers information from government websites, primary literature and semi-structured interviews with multiple stakeholders. An actualized WH for the City of Kingston is created to provide a visualization of the missing actions needed to impact the waste crisis. The second manuscript explores, through participatory observation, how landfill waste is reduced at a Kingston community arts and music festival. The limitations of scaling up the festival organizational structure to much larger festivals is discussed. The third manuscript, using the allegory of the (high-income earning) Three Little Pigs, explores the inaction of the straw-housers, the techno-fixes and circular economies of the wood-housers, and the implementation of a sustainable, shrinking economy through degrowth of the stone-housers to solve the waste

crisis. A common thread throughout this research is that a stronger adherence to the WH is needed in all aspects of waste management. In order to reign in the amount of waste produced in high-income countries, top-down governing promoting reduce/reuse/repair initiatives needs to coincide with bottom-up responsible reduced consumption (ie: degrowth). Only in this way will we be able to climb the Waste Hierarchy and alleviate the current waste crisis.

Co-authorship

Chapter 3 was coauthored with Dr. Myra J. Hird and will be published as:

Hird, M.J. and G. Dee. (Forthcoming). Mother Earth and her three little wasteful pigs: Waste reduction through degrowth. In H. Corvellec (ed), *Waste as Critique*, Oxford University Press.

This chapter is reproduced with the permission of my coauthor and Oxford University Press. I contributed to writing the Abstract, the sections dealing with the waste hierarchy, the Wood House section, the Conclusions, and ensured all references in the manuscript were complete.

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I would like to start by acknowledging that Queen's University is situated on the traditional Anishinaabe and Haudenosaunee Territory. To acknowledge this traditional territory is to recognize its longer history, one predating the establishment of the earliest European colonies. I thank these nations for their care and stewardship over this beautiful land.

I would like to thank Dr. Myra Hird for helping to propel me up the very steep learning curve that marked my journey from being a limnologist to becoming a social scientist. It has been a rough journey, but I am so very thankful for everything that I have learned in these last few years. I would also like to thank Drs. Kyla Tienhaara and David McDonald for their insightful assistance with my original proposal. My mom, Aline, my husband Steve, and my son Eric, provided endless support as I re-entered graduate school. It was definitely interesting to start university again in the same year that my son was a freshman at University of Toronto. I am also thankful to fellow grad students Jessica Herrera, Rayane Azani, Lydia Addae-Boahene, Micky Renders and Hillary Predko for their camaraderie, especially after the COVID pandemic restrictions. It meant so much to have conversations with like-minded people, to bounce ideas off each other, and to be able to laugh with a wonderful group of women. Lastly, thanks to Colin Khan, the most amazing grad student administrator, for his ability to provide me with confidence, his ability to answer all questions and his incredible resourcefulness.

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List of Abbreviations and symbols

CE: Circular Economy

IC&I: Industrial, commercial, and institutional

KARC: Kingston Area Recycling Centre

MSW: Municipal solid waste

RPRA: Resource Productivity and Recovery Authority

SPAF: Skeleton Park Arts Festival

WH: Waste Hierarchy

General Introduction

The Earth is undergoing multiple crises including climate change, biodiversity loss and pollution. In 2012 the United Nations Environmental Programme declared that we had additionally entered a global waste crisis that is only getting worse (United Nations, 2012). The Sustainable Development Goals Report (United Nations, 2022) states that root causes of the planetary crises are unsustainable patterns of consumption and production, and that reducing waste would improve resource efficiency. Currently, the global human population generates an estimated 2.24 billion tons of Municipal Solid Waste (MSW) each year (United Nations, nd), a quantity that is estimated to increase annually, and a reason that the waste sector is having and will continue to have a significant impact on the multiple planetary crises. The world's cities and metropolises are struggling to cope with the mounting problem of MSW amid increasing urbanization and "significant investment is needed in the development and maintenance of waste management infrastructure, especially in low- to middle-income countries" (United Nations 2022: p51). It should be noted that although high-income countries only account for 17 percent of the world's population, these same countries generate 34 percent of the world's waste (Kaza et al., 2018). A prime example is Canada – a country that is only second to the United States in its per capita production of MSW and is therefore a significant contributor to the multiple planetary crises (Statista, 2023).

The development of waste management infrastructure that governments prioritize (sanitary landfills, incineration plants with waste to energy output, recycling plants, etc.) is wholly dependent on what level of the Waste Hierarchy (WH) they are concentrating on. Also

known as the ladder of Lansink (Lansink, 2017) the WH was originally illustrated as a 5-rung ladder with the categories Prevent, Reuse, Recycle, Incineration, and Disposal from top to bottom and was intended to symbolize the best to worst ways of dealing with globally rising volumes of waste. The hierarchy has been modified by many governments and organizations to meet their specific needs (for instance the Government of Canada WH includes 6 rungs from the top down: Prevention/Reduce, Reuse/Repair, Remanufacture/Refurbish, Recycle, Energy Recovery, and Landfill) (Government of Canada, 2021). The most common forms of managing waste in low-income countries are open dumping and incineration while in middle-income countries landfills are the most common final disposal method, with sorting plants and recycling becoming more common (Kaza et al., 2018). All of these methods of waste management only target the bottom most rungs of the WH. In high-income countries entrenched and regulated modes of governing waste are currently disposal (landfill, the bottom most rung of the WH), incineration (in the form of waste to energy plants, one rung up from the bottom in the WH) and diversion (recycling, a middle rung of the WH) (Bulkeley et al., 2007; Pollans, 2017; Kaza et al., 2018; Hird 2021).

The motivation for this project is to better understand how the City of Kingston, Ontario, once touting on its website that its goal was to become the most sustainable city in Canada, is interacting with the WH. In order to alleviate the waste crisis, legislation is needed which aims at the highest rungs of the WH (prevention/reduction, reuse/repair). However components within the city, such as non-profit organizations, businesses and corporations also may strongly influence waste reduction in the absence of legislation. I am presenting a manuscript-style thesis with three individual manuscripts to discuss the various and intricate

ways that governing entities, institutions, businesses, organizations and citizens within the City of Kingston interact with the WH.

The aim of the first manuscript is to compare the WH (as published by the Government of Canada) to actual practices within the City of Kingston and to create a WH based on those practices. In the first manuscript, I begin by describing both the general governance and management of waste in Canada and the province of Ontario. I compare legislation at the federal and provincial levels to the four modes of governance presented by Bulkeley et al. (2007). I then move on to the City of Kingston as a case study to expose specific details of waste management and to compare city targets to the various rungs of the WH. I performed semi-structured interviews with assorted stakeholders in the industrial, commercial, and institutional sectors, as well as City employees to determine what rungs of the WH were being employed to manage waste. I gathered information from government websites and primary literature to determine both past and future strategies to deal with waste. I also gathered information through participant observation of several waste reduction initiatives within the city and describe the importance of both bottom-up community organization and top-down governance.

The aim of the second manuscript is to compare waste management practices at a local festival to best practices according to primary literature and the WH and to determine if these practices can be scaled up to larger festivals. This manuscript describes how music and arts festivals around the world are greening themselves and reducing the amount of waste produced onsite. The Skeleton Park Arts Festival, a small annual festival in Kingston, is the case

study and I used participatory observation over two years of the festival to explore the importance of volunteer labor in reducing landfill waste.

The aim of the third manuscript is to demonstrate that the 17 percent of the human population living in high-income countries needs to enact the greatest amount of change in terms of their consumption and waste management, and that degrowth is the most effective means by which to do so. The third manuscript, co-authored with Dr. Myra Hird, uses the allegory of the (high-income earning) Three Little Pigs and the Big Bad Wolf to analyze waste management literature and determine best practices for solving the waste crisis. The first little pig builds a straw house, which represents business as usual (dependency on landfill, incineration, and recycling). The second little pig builds a wood house, which represents easy fixes within the constraints of a capitalistic economy based on continued growth and overconsumption such as offsets, carbon capture, techno-fixes, Extended Producer Responsibility and Circular Economies. The third little pig builds a brick house which represents the most solid way forward – degrowth. As predicted by the well-known fable, The Big Bad Wolf, who represents the global crises, is able to blow down the straw and wood houses whose practices adhere to the lowest rungs of the WH, but is not capable of destroying the brick house, poised at the apex of the WH.

References:

Bulkeley, H., Watson, M., & Hudson, R. (2007). Modes of governing municipal waste. *Environment and Planning A*, 39(11): 2733-2753.

Government of Canada. (2021). 'Reducing Municipal Solid Waste'. Accessed on July 30 2023. <https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/municipal-solid/reducing.html>

Hird, M. (2021). *Canada's Waste Flows*. McGill-Queen's University Press.

Kaza, S., Yao, L., Bhada-Tata, P. & Van Woerden, F. (2018). *What a Waste 2.0: A global snapshot of solid waste management to 2050*. Urban Development Series. Washington, D.C.: World Bank. DOI:10.1596/978-1-4648-1329-0.

Lansink, A. (2017). *Challenging Changes – Connecting Waste Hierarchy and Circular Economy*. The Netherlands: LEA Nijmegen.

Pollans, L.B. (2017). Trapped in Trash: Modes of governing and barriers to transitioning to sustainable waste management. *Environment and Planning*, 49(10): 2300-2323. DOI: 10.1177/0308518X17719461

Statista. (2023). 'Daily municipal solid waste generation per capita worldwide in 2018, by select country'. Accessed 22 September 2023. <https://www.statista.com/statistics/689809/per-capital-msw-generation-by-country-worldwide/>

United Nations. (2022). The Sustainable Development Goals Report. Accessed 30 September 2023. <https://unstats.un.org/sdgs/report/2022/>

United Nations. (2012). The global garbage crisis: No time to waste. Accessed 12 October 2022. <https://www.unep.org/news-and-stories/press-release/global-garbage-crisis-no-time-waste>

United Nations. nd. International Day of Zero Waste 30 March. Accessed 30 September 2023. <https://www.un.org/en/observances/zero-waste-day>

Chapter 1. Waste Governance: Slowly Moving Up the Waste Hierarchy

1.1 Abstract

The Waste Hierarchy (WH) is a tool used to determine how to govern waste, prioritizing reduction/prevention of waste generation as the most important action to take, followed by reuse/repair, remanufacture/refurbish, recycle, energy recovery, and landfill. Though governments at all levels (federal, provincial, municipal) will tout the WH as the correct order in which to reduce waste generation, the legislative instruments that these governments utilize focus on disposal (landfill, incineration) and diversion (recycling, composting), actions found on the lower rungs of the WH. What is desperately needed is for new legislative instruments that attack waste generation from the top rungs of the WH – reduction, reuse, and repair. In the absence of top-down legislation, there has been an upwelling of bottom-up organizations attempting to fill this void to help solve the waste crisis. Through detailed literature searches, participant observations and key informant interviews I describe how waste is both governed and managed in the City of Kingston. I compare waste legislation to the 4 modes of governing described by Bulkeley et al. (2007) (disposal, diversion, eco-efficiency, and waste as resource) and determine how the different rungs of the WH are prioritized within the City. Comparing the City of Kingston's actualized WH to the WH model provides a visualization of the missing actions needed to impact the waste crisis.

1.2 Introduction

When learning the 3 R's we always learn them in a particular order: Reduce, Reuse, Recycle. This order is based upon the Waste Hierarchy (WH), a tool used to determine how to govern

waste (Lansink, 2017). The federal government of Canada has published a WH illustrating that the reduction of waste is seen as the most preferred option, followed by reuse, refurbishing, recycling, recovery, and ending with the least preferred option of landfilling (Government of Canada, Reducing Municipal Solid Waste, 2021b) (Figure 1). The WH is illustrated as an upside-down triangle because reduction should be “the first priority... both at the manufacturing level and by consumers and institutions” (ibid). Municipal solid waste (MSW) consists of household garbage, recyclable and compostable materials, as well as waste material from businesses, institutions and construction and demolition sites. Currently, the global human population generates 2 billion tonnes of MSW every year (Kaza et al., 2018) with Canadians being the biggest per capita producers of waste worldwide (Statista, 2023).

This chapter will argue that waste is not governed in relation to the WH, but seemingly in direct opposition to it. Most governments continue to govern waste in such a way as to preference disposal of existing waste instead of legislating ways in which waste production can be reduced (Gille, 2007) spending much of their time, energy and finances on what is the least desirable, though most globally dominant option (Bulkeley et al., 2007; Pollans, 2017; Hird, 2021). The only way to resolve our waste crisis is to move the governance of waste up the WH.

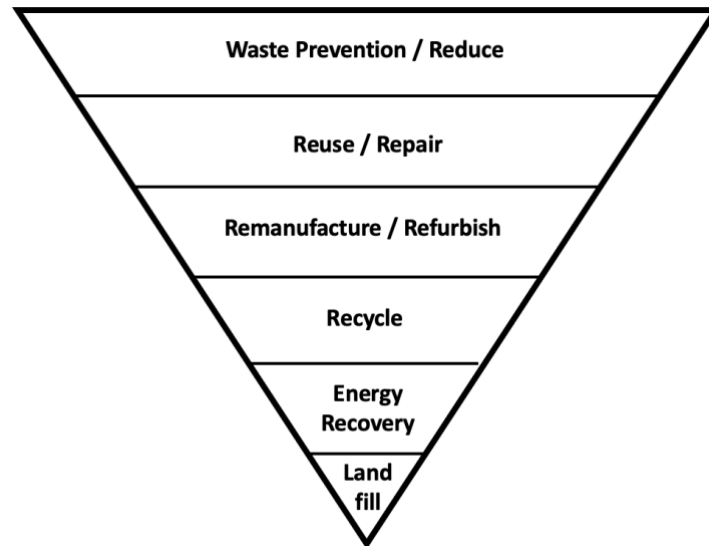


Figure 1. Waste Hierarchy. Adapted from the Government of Canada (2021b). Areas correlate to preference, with the widest bars being the most preferred strategy.

1.2.a. Theoretical Framework

According to Bulkeley et al. (2007), there are four modes in which municipal solid waste is currently being governed. Each of these four modes of governing is defined by its objectives, the programs, policies and technologies required, as well as the entities being governed (ibid, Table 1). According to the authors, disposal (the bottom rung of the WH) is the first mode. Open dumping (putting all waste in one general area which is open to the elements) is the norm in many poor, rural and Indigenous communities, however in the urban cities of high income countries disposal has become landfilling (putting waste either in a large hole or mound and then covering it up), sanitary landfilling (where waste ‘cells’ are lined, leachate is collected, and expelled methane used as an energy source) or incineration (where heat is used to produce energy, and environmental air and water protections are met). It is estimated that less than two thirds of globally generated waste is managed in an environmentally safe manner

(Kaza et al., 2018). The governing agencies for disposal are local authorities, and the required technologies are landfills, the weekly collections of organized curbside waste, and the transportation, in trucks, of that waste to landfills or incineration plants. In terms of the WH, disposal not only encompasses the bottom rung of landfill, but now also potentially includes the next rung of energy recovery in the forms of methane, heat and electricity. Pollans et al. (2017) describe the disposal mode as dominant and fully entrenched. Governments have long seen waste as a “manageable object” (Moore, 2012) to be collected, transported, and disposed of. As urban centers have grown, management of waste has often been contracted out to private companies who not only possess the trucks and the workforce, but who often also own the landfills, incineration centers, and landfill gas-to-energy facilities. Waste Management, the largest such company, has a global net worth of \$67.2 billion USD. Transitioning away from such a profitable managing system within a capitalistic society will be very difficult.

Table 1. Modes of governing municipal solid waste and their equivalent level on the Waste hierarchy (adapted from Bulkeley et al. 2007).

Mode	Governmental Technology	Governed Entities	Waste Hierarchy equivalent
Disposal	Dustbins, weekly collections Landfill sites Contracts	Municipal waste Ratepayers	Landfill Energy Recovery (waste to energy - incineration)
Diversion	Performance targets New policy instruments Education campaigns	Individuals as passive citizens Differentiated waste streams	Recycling Energy Recovery (anaerobic digestion)
Eco-Efficiency	Kerbside collections New technologies Reuse and reduction practices	Individuals as active citizens Differentiated waste streams	Reuse / Repair Remanufacture / Refurbish
Waste as Resource	Provision of alternative infrastructures and collections	Individuals as community members Waste as a resource	Reuse / Repair Remanufacture / Refurbish

Bulkeley et al. (2007) state that the second mode used to govern municipal solid waste is diversion. In this instance, the objective is to reduce the environmental impact of landfills, and the governing agencies vary from local authorities to much larger governing bodies, such as the European Union. Diversion in waste management has become synonymous with recycling and composting, found on the third from the bottom rung of the WH. Pollans et al. describe the diversion mode as incremental, supported by regulations such as mandatory recycling and composting and state that it is the “easiest mode to adopt through operational changes” (2017: p9). Governmental technologies used for diversion include the setting of diversion targets (percent of MSW removed from the direct disposal waste stream), new policy instruments (such as the distribution of sorting containers and the implementation of mandatory waste sorting) and education campaigns (signage, school programs and municipal videos to teach the citizenry how to effectively sort its MSW). Individuals within this mode are considered by Bulkeley et al. to be *passive citizens* in terms of their response to waste governance. Sorting waste is certainly an activity which takes time and resources (such as water). When citizens acquiesce to this activity and willingly follow top-down directives, they are considered passive. Globally only 19 percent of municipal waste is recovered through recycling and composting however, in high-income countries this value rises to 35 percent (Kaza et al., 2018). Of the material that is recycled, it should be noted that “recycling only reduces disposal *if and to the extent that* it displaces primary production” of that material (Zink and Geyer, 201). No material is infinitely recyclable. There will always be a loss of yield due to contamination, degradation, or the inefficiencies of the recycling processes. Even the most highly recyclable material,

aluminum, has a 2 percent yield loss per cycle (Boin and Bertram, 2005). Another reason diversion (recycling) is only considered to be an incremental benefit to disposal is that many recyclable materials will be turned into products that are not themselves recyclable – for this reason diversion only delays the inevitable final outcome of disposal. The perception that an object will be recycled has been shown to increase consumption of that object (Catlin and Wang, 2013) and explains why companies engage in greenwashing their products. Within a capitalistic system that is based on consumption and continued economic growth, the presumption of recycling is a lucrative, positive economic force (see Hird 2021, 2022 for more details).

The last two modes of governing described by Bulkeley et al. (2007) are eco-efficiency and waste as resource, both of which have the reduction of environmental impacts of waste as their main objectives. These last two modes fall into the categories of reuse, repair, remanufacture, and refurbish, the higher rungs of the WH. Eco-efficiency, which is governed by local authorities, waste contractors and community-waste-sector organizations requires **active citizens** who seek out specific waste reductive services such as repair shops or diaper washing services (ibid). Eco-efficiency is considered visionary by Pollans et al. (2017) because it requires new technologies to increase reuse and reduction practices but is currently limited by insufficient funding. Pollans (2017) considers energy recovery from waste, such as incineration, to be a visionary mode of governance, but I do not agree. Incineration produces fly ash which accounts for 1-5 percent by weight of the original waste material (Assamoi and Lawryshyn, 2012; Assi et al., 2020), is laden with hazardous heavy metals (arsenic, cadmium, chromium, lead, nickel, selenium) and potentially dioxins (Huber et al., 2016), and must be disposed of as

hazardous waste (see Hird 2021, 2022 for further details). Calling incineration eco-efficient seems inappropriate and since producing energy from incinerated waste is a financially rewarding industry, earning in excess of \$20 billion US per year (Makarichi et al., 2018), it is definitely not limited by insufficient funding.

Though recyclable materials which are bought and sold according to economic factors of local or global markets may seem to fit into the waste as resource mode, that is not what Bulkeley et al. (2007) are referring to. Bulkeley et al. describe the mode of waste as resource as being governed by non-governmental organisations and networks and the governed entities to be community groups working in solidarity with each other, not industrial market forces and multinational corporations. The grassroots governing of waste as a resource is why Pollans et al. (2017) considers this mode to be aspirational, having as a major barrier the current lack of policies, regulations or infrastructure and the inability of community groups to access decision making at the legislative level.

Governments must legislatively move up the WH and not continue to be stuck on the dominant mode of disposal and the incremental mode of diversion, the bottom three rungs. This chapter will use the City of Kingston as a case study to describe the modes of governing waste in a city whose goal was to be the most sustainable city in Canada. The entrenched modes of top-down regulations concerning disposal and diversion are clearly laid out in the way that the city is engaging citizens, yet there is growing evidence of bottom-up community organization around eco-efficiency and using waste as resource.

1.3. Methods

I examined the waste management practices within the City of Kingston, from 2006 to present day. I used a thorough literature search as well as archival research to examine City Council web-based documents, such as the budget, Integrated Waste Management Plans, and Focus Group results. I gathered information from Statistics Canada and developed graphs for Canada, and Ontario. I gathered City of Kingston waste statistics through the Resource Productivity and Recovery Authority website. I used participant observation, and I gathered observational data from waste processing centre tours and while volunteering at events such as the Skeleton Park Arts Festival, Queen's waste audit, and the inaugural Sustainability Hub sponsored by the city of Kingston and Queen's University. I applied for permission through the Queen's University General Research Ethics Board (GREB) and received permission to conduct interviews. I used key informant interviews to determine waste management practices within the City of Kingston. I interviewed key informants, including Karen Santucci, the Director of Public Works and Solid Waste, and a member of the Solid Waste Department of the City of Kingston who is responsible for contracting Kingston's recyclables to various private companies. Interviews were semi-structured and lasted for an hour. I reasoned that apart from the City of Kingston itself, the largest employers within the City would be responsible for the largest percentage of IC&I generated waste. An online search determined that the largest employers included (in descending order of number of employees) the Kingston Canadian Forces Base, Queen's University, Kingston General Hospital, Limestone District School Board, Correctional Services of Canada, Providence Care, Hotel Dieu Hospital, INVISTA, Empire Life Insurance Co., St. Lawrence College, and J.E. Agnew Food Services. I contacted each of these employers through their

websites or by written letter, asking for information about how their waste was sorted (garbage/recycling/compost), who collected their waste, and the final destination of that waste. I gathered data included in tables and graphs from interviews and email communications with the respondents of these queries.

1.4. How Municipal Solid Waste is Governed / Managed at the Federal and Provincial Levels

In Canada, as in 70 percent of global waste governance, the laws pertaining to collection and disposal of MSW are written by local governments (Kaza et al., 2018; Sawell et. al, 1996). The federal government does manage MSW at federally owned facilities through the National Parks Act and the Indian Act, as well as transports MSW both internationally and between provinces and territories, yet it is not responsible for the laws governing siting, licensing, and monitoring of waste disposal facilities (Sawell et. al, 1996). For this reason, regulations vary from province to province and territory to territory and those regulations are often based on regional and political factors (ibid) such as geography, population density, the political party in power, economic ties with neighbouring states, etc.. As stated by Hird (2022) whether “in relatively rich or poor countries, poor and/or racialized communities are far more likely to live on or near waste sites” and therefore, “waste is a profound and enduring *symptom* of the inequalities of poverty, race and gender” (p84, p92 respectively).

Given that the disposal of waste may have serious impacts on the environment, the Canadian Council of Ministers of the Environment (CCME) which was established in the 1980s, does provide federal guidelines for the following: MSW incinerators; waste diversion and reduction targets; a National Packaging Protocol (developed in 1989, and ended in 2000); a

Canada-wide Strategy for Sustainable Packaging (approved in 2009); the Canada-wide Action Plan on Zero Plastic Waste (Phase 1 in 2019, and Phase 2 in 2020); and the Canada-wide Action Plan for Extended Producer Responsibility (in 2009) (Sawell et al., 1996; CCME, 2022b). Zero Plastic Waste would move waste governance far up the hierarchy; however, the Action Plan currently only calls to prohibit the manufacture and import for sale in Canada of 5 plastic items by December 20, 2023: plastic check-out bags, cutlery, foodservice ware, stir sticks and straws (CCME, 2019). These items may all be manufactured, imported and sold for export until December 20, 2025, and constitute a fraction of plastic waste. No other items are currently being considered for addition to the list (Government of Canada, Single Use Plastics Prohibition, Regulation 2023-04-18, 2023). It should be noted that the CCME acknowledged that “nearly ninety percent of Canada’s plastic waste is not recycled or recovered” (CCME, 2019). The regulatory instruments being considered for all other plastic items include Extended Producer Responsibility (EPR) and public diversion (CCME, 2022a). What are instead needed are stronger regulations to force companies to stop producing single use plastics as a first step to greater plastics regulations.

The major mode of waste governance in Canada is disposal, with 72 percent of generated MSW being landfilled (Kaza et al., 2018, p236). The amount of disposed waste in Canada has increased from 24.1 Mt in 2002 to 26.1 Mt in 2020 (Statistics Canada (2023)). When normalized for population growth, Environment and Climate Change Canada (ECCC)(2022) reports that between 2002 and 2018 the amount of solid waste disposal per person decreased by 10 percent (from 2.1 to 1.9 kg/person/day) (Figure 2). The second mode

of governance, diversion, has led to a 24 percent increase in recycled and composted waste in Canada from 2002 to 2018 (0.58 to 0.72 kg/person/day, respectively) (Figure 2).

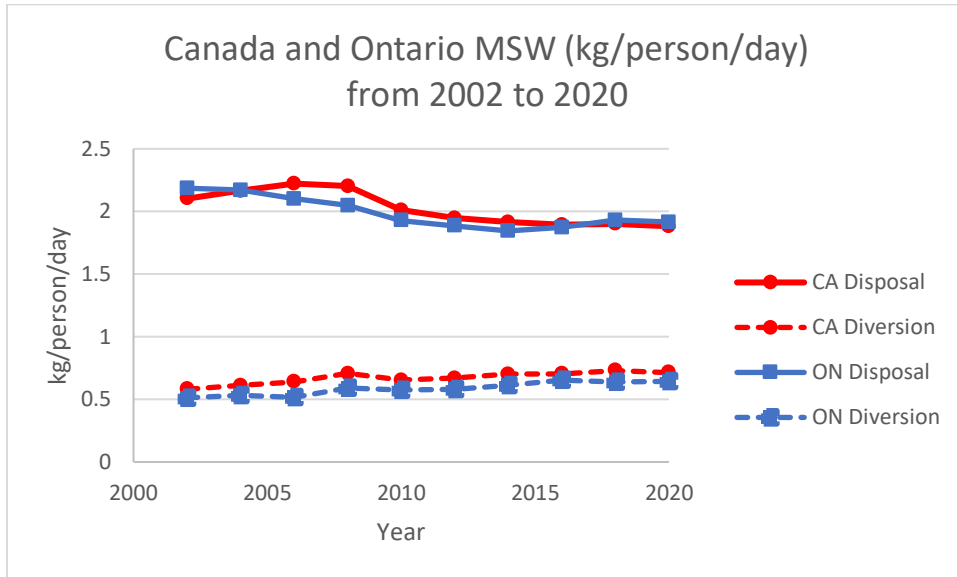


Figure 2. Canada and Ontario MSW. Amount of municipal solid waste that is disposed of (landfill or incineration) in kg/person/day or diverted (recycled or composted) in both Canada and Ontario. Sources for the data come from: Statistics Canada (2023), , Statistics Canada (2022a), Statistics Canada (2022c), Statistics Canada (2021a).

Ontario follows the Canadian trend for modes of waste governance. The current major modes are disposal and diversion, with disposal waste being about five times the weight¹ of diverted waste. Ontario does not dispose of all its waste within the borders of the province; currently 4 percent of the waste produced in Ontario is shipped to New York state, and 23

¹ When discussing incinerated waste, it is often stated that the volume of waste is reduced by 90 percent (as per Government of Canada, Municipal solid waste management in Canada, 2021). However, the most common metric used when discussing waste is weight. The reason for this is that volume can be easily manipulated by compaction of waste, however the weight of compacted or uncompacted waste is constant. The economy surrounding waste is also based on weight. Garbage trucks are weighed before and after entering waste management facilities and fees (such as tipping fees) are based on the weight of the waste being transported or deposited.

percent is shipped to Michigan (Ontario Waste Management Association, 2021), a state whose legislators have tried to stop such shipments since 2004 (Bartkowiak, 2020). Most residential waste produced in Southern Ontario is collected by garbage trucks that are either city/municipality owned or owned by private companies (Clarke & Meyer-Robinson, 2021). Since most landfills are far from large population centers, garbage is often brought to transfer stations, tipped, and then picked up by larger trucks that take it to landfills (ibid).

In terms of disposal, Ontario has 805 active landfills owned by a variety of government or private organizations (Ontario Waste Management Association, 2021). Municipalities, the Ministry of Natural Resources and Forestry, and First Nations own 76 percent of active Ontario landfills while private companies own 24 percent (ibid). The province also has 266 municipally owned transfer stations (Statistics Canada (2022b)). The amount of disposed waste per capita in Ontario declined by 12 percent from 2002 to 2014 (from 2.2 to 1.9 kg/person/day, ECCC, 2022), and then stabilized over the next 4 years (Figure 2).

Municipally owned waste assets in Ontario that deal with the second mode of governance, diversion, include the following: 44 aerobic composting facilities, 31 materials recovery facilities, 6 anaerobic digestion facilities, and 2 energy from waste (EfW) facilities (Statistics Canada (2022b)). When normalized for population growth, the amount of diverted waste in Ontario increased by 25 percent between 2002 and 2018 (from 0.51 to 0.64 kg/person/day, ECCC, 2022) (Figure 2).

The management of waste is an expensive endeavor. According to Statistics Canada (2021b), the total expenditures in 2018 for the waste management industry in Ontario were \$1.323 billion, up from \$592 million in 2002. The largest fraction of that cost is collection and

transportation, accounting for 40 percent of expenditures in 2018 (ibid). The next highest expenditure is operation of disposal facilities, accounting for 11 percent of expenditures. The increase in population density due to urbanization as well as the shift, mostly in residential waste, from the dominant mode of disposal in landfills to the incremental mode of diversion through recycling and composting has led to a massive increase in the need to transport waste. Where we once transported waste to small, local landfills we are now transporting waste to enormous commercial landfills, with 60 percent of Ontario's disposal capacity located in only 7 landfills throughout the province (Ontario Waste Management Association, 2021). Whereas the transport of disposal waste is at most a 3-step process (site of generation, transfer station, final destination), diverted waste gets transported to multiple destinations. First diverted material needs to be collected from homes and businesses, usually separately from disposal waste, meaning that a separate set of trucks are running the same routes to collect a different waste stream. Diverted waste is then brought to local material recovery facilities for sorting and baling, and then is transported, often great distances, for processing which is often a multi-step endeavor, before being put back into circulation. Though recycling is higher on the WH than landfilling, there are high environmental and economic costs (Gille, 2007; MacBride, 2013; Zink and Geyer, 2019).

The only legislative movement aimed at a mode of governance that is not disposal or diversion is the right to repair, an example of the eco-efficiency mode. At the federal level, "Budget 2023 announces that the government will work to implement a right to repair, with the aim of introducing a targeted framework for home appliances and electronics in 2024" (Government of Canada, Budget 2023, p37). The federal government plans to work closely with

provinces and territories to advance this right. Working with the Ontario government may prove problematic as the Ford government voted down a right to repair bill in May of 2019. Liberal MPP Michel Coteau's Bill 72: An Act to Amend the Consumer Protection Act 2002 sought to require brand holders such as cellphone manufacturers to provide consumers with the tools needed to repair their electronic products (Wilkinson, January 2020). Brand holders would be allowed to charge customers for these resources, but at limited rates. The Ford government voted down Bill 72, siding with the tech companies instead of the public.

In the next section, I will use the City of Kingston as a case study to determine how a city which is straining to be sustainable is managing waste relative to the WH and where the visionary mode of eco-efficiency and the aspirational mode of waste as resource are being implemented.

1.5. General Governance in the City of Kingston

Legislating specific targets has become the main basis of governing MSW (Bulkeley et al., 2007) and has been the focus in Kingston since 2002, when the City sought to improve the 38 percent diversion rate of the time (Hird et al., 2014). The goal to increase diversion to 65 percent of waste through recycling, leaving only 35 percent of waste to be disposed of through landfilling was set as early as 2006 (Table 2). Although the Solid Waste Services Department of the City of Kingston is responsible for the operation of an 'integrated solid waste management system' based on the WH according to the Information Report to Environment, Infrastructure & Transportation Policies Committee (City of Kingston, 2019), the City continues to concentrate on the dominant mode of disposal and the incremental mode of diversion (Table 2).

The main services of curbside waste, recycling and organics collection and the operation of the Kingston Area Recycling Centre (KARC) do not include any mention of programs to reduce waste (City of Kingston, 2019). It is only this year (2023) that the City has hosted its first Sustainability Hub, promoting repair and reuse. Waste is being managed in more sustainable ways by IC&Is as well as grassroots organizations; however, there is currently no legislation by which to govern waste according to the top two tiers of the WH. The targets set in 2006 for city residents to reach 65 percent household waste diversion have yet to be met in 2023, a clear indication that waste management should be taken in new directions.

Table 2. Timeline of projected changes in policy to the Integrated Waste Management System of the City of Kingston.

Year	City of Kingston Waste Management Strategies / Policies / Goals / Approved practices	Notes
2006	Goal – to reach 65 percent household waste diversion by 2012 ¹	In 2006 the residential waste diversion rate was 45 percent.
2007 to 2009	Development of Integrated Waste Management Plan (IWMP) ¹	The IWMP identified the following waste management hierarchy: <ol style="list-style-type: none"> 1. Prevention/ Avoidance (reduction of waste through behavioral/ technological change) 2. Enhanced design for reduction or reuse 3. Product reuse 4. Material recycling, composting and anaerobic digestion 5. Resource recovery (recovery of fuels/materials for secondary use) 6. Thermal treatment with energy recovery 7. Landfill with energy recovery 8. Landfill or thermal treatment without energy recovery

2009	Approval of the following waste management practices ¹ : a) Dual stream recycling b) Separated organics and yard waste collection c) Residual waste processed for material/energy recovery d) Remaining garbage landfilled	The top three components of the waste hierarchy identified in 2007-2009 are being completely neglected.
2012	Any further consideration of item “c) Residual waste processed for material/energy” approved in 2009 was paused ¹ .	The city determined that “Kingston does not manage enough residual waste to make an alternative residual processing technology viable”.
2015	The city reset its goal to 60 percent household waste diversion by 2018, and 65 percent household waste diversion by 2025 ¹ .	From 2012 to 2014 the average household waste diversion rate was 54 percent. In 2015 60 percent diversion of household waste was reached.
2018	A waste audit of 110 households in 11 sampling areas was performed. ²	The waste audit concluded that the average household sets out 5.9 kg of weekly bagged garbage which contains 14.7 percent divertible recyclables and 34.5 percent divertible organics.
2019	The city chooses 10 approaches to further manage waste and consults with focus groups to determine which to pursue further ¹ .	The following approaches were chosen. If focus groups strongly rejected an approach it was eliminated from further consideration. a) Increase the cost of garbage bag tags b) Eliminate the existing one ‘free’ bag per week (eliminated: this would penalize large families) c) Enforce the use of clear garbage bags to prohibit recyclables and organics in the garbage stream d) Reduce garbage collection from weekly to bi-weekly e) Limit the number of tagged bags per household (eliminated: would not result in significant change) f) Reduce the number of ‘two bags of garbage weeks’ from 3 to 2 per year (eliminated: would not result in significant change) g) Increase the size of the recycling bins (eliminated: collection staff hand sort recyclables at the curb which would not be possible with larger bins)

		<ul style="list-style-type: none"> h) Compulsory use of green (organics) bins at multi-residential properties (eliminated: poor support from multi-residential owners/managers). Opt-in program available. i) Eliminate fees and charges for schools to participate in the green bin program (implemented in June 2019) j) Provide two size options for green bins (45L or 80L) (implemented)
2022	Survey given to residents to rank the last remaining options for new waste management strategies.	<p>The current options being proposed are:</p> <ul style="list-style-type: none"> a) Weekly clear bag waste collection b) Bi-weekly clear bag waste collection c) Bi-weekly waste collection and increased bag tag fees

¹City of Kingston. (March 6, 2019). Information Report to Environment, Infrastructure & Transportation Policies Committee. Report Number EITP-19-003. Archived.

²Waste audit: (2cg. December 2018. Report: Single Family Curbside Waste Audit. Retrieved on Jan 21, 2023.

https://www.cityofkingston.ca/documents/10180/33443635/Projects_SolidWaste_WasteStrategies_KingstonSingleFamilyCurbsideAudit.pdf/2c3b5795-56a2-4f47-a853-2ab59b432ce5

1.5.a. Disposal Mode

The City of Kingston is responsible for weekly residential garbage collection. Once collected, this waste is dropped off at Waste Management of Canada for transfer to final disposal locations (personal communication, member of the Solid Waste Department of the City of Kingston in 2021). Each household is entitled to one free bag of waste (paid for out of their property taxes, Hird, 2021), and any subsequent bag must have a paid bag tag on it (\$2.00 per tag). Waste collection from IC&I's is done by a small number of stakeholders: the City of Kingston, Environmental 360 Solutions, Waste Connections and Waste Management (Table 3). Most of the MSW collected in Kingston is transported by large capacity diesel trucks to three

Ontario landfills: Twin Creeks Landfill in Alvinston, 490 km west, Eastern Ontario Waste Handling Facility in Moose Creek, 205 km northeast, and Cornwall Landfill, 175 km east (see Table 3 for details) and was responsible for generating 165 tonnes of CO₂ eq emissions² in 2020.

As noted in Table 1, the governed entities in the City of Kingston are the ratepayers – specifically individual residents. In order to come up with new waste management strategies, and to find the path of least resistance with residents, the City held four focus group sessions in which 26 participants, who had signed up on-line to volunteer their time, discussed and voted on various strategies presented to them by the City of Kingston’s Solid Waste department (Table 2, 2019 list) – none of which included the upper rungs of the WH. In 2021, the City produced 0.39 kg/person/day of residential waste up from the 0.36 kg/person/day produced in 2015, an 8 percent increase.

Table 3. Garbage waste stream in the City of Kingston

Customer	Service	Contractor	Notes
City of Kingston	Garbage collection – Residential (Whole city)	City of Kingston	Disposal location: Waste Management of Canada Transfer Station ¹ , then to final disposal location Contract details: Collected by city staff and vehicles
City of Kingston	Garbage disposal – Residential (Whole city)	Waste Management Canada	Disposal location: Twin Creeks ² Environmental Complex (Watford, On), Moose Creek ³ landfill is an alternate Contract details: Waste Management provides transfer, transportation and disposal of municipal solid waste from the

² Calculation was based on the production of 20,425 tonnes of disposal waste (including 13 percent of diverted waste which gets landfilled), using the average distance to the three landfills, one way transportation of waste, 37 tonne capacity of diesel trucks with 41.5 L/100 km fuel efficiency and transport emissions of 2263 g/L CO₂, 0.14 g/L CH₄, 0.082 g/L N₂O (Resource Productivity & Recovery Authority, 2020, Assamoi & Lawryshyn, 2012).

			Kingston Transfer Station to Twin Creeks Landfill
City of Kingston Facilities	Garbage collection	Environmental 360 Solutions	Disposal location: Various – not defined in contract Contract details: Contract to provide containers and collection of garbage at various City facilities
City of Kingston IC&I (BIA ⁴ and Princess Street south of Concession)	Garbage collection	City of Kingston	Disposal location: Waste Management Transfer Station Contract details: Business can sign up for garbage collection only for their business. Maximum of 6 bags. Fees apply. Collected by City staff and trucks
Agnew Foods (Tim Horton's)	Garbage collection (multiple locations)	Waste Connections	Disposal location: Garbage to Moose Creek landfill Contract details: Switched to Environmental 360 Solutions in 2022 due to cost.
Corrections Canada	Garbage collection	Waste Management	Disposal location: Waste Management Transfer Station
Limestone School District	Garbage collection (from 60-65 sites)	Waste Management	Disposal location: Waste Management Transfer Station
Providence Care Health Network	Garbage collection	Waste Management	Disposal location: Moose Creek landfill
Queen's University	Garbage collection	Waste Management (previously Green For Life).	Disposal location: Waste Management Transfer Station and Cornwall ⁵ landfill Contract details: 3 years, with 2 year extensions

¹Waste Management of Canada Transfer station is within the City of Kingston

²Twin Creeks Environmental Complex is 490 km West of the City of Kingston

³Moose Creek landfill is 205 km northeast of the City of Kingston

⁴Business Improvement Area

⁵Cornwall landfill is 175 km west of the City of Kingston

1.5.b. Diversion Mode

The province of Ontario and the City of Kingston classify diverted waste as recyclables and organics, according to the Resource Productivity and Recovery Authority (2020). Bulkeley et al. (2007, and Table 1) state that the governed entities in the diversion mode of governing are citizens who have passively agreed to differentiate waste streams. Residents of the City of Kingston have been sorting their recycling since the early 1990s and in 2009 the City approved a separate organics waste stream. Recyclable materials are collected weekly by City and contracted workers and brought to KARC where they are sorted, baled and sold to recyclers or brokers³. Organics are collected weekly from the residents of the whole city by the City of Kingston and dropped off at Tomlinson Organics in Joyceville, 20 km away, for outdoor aerobic composting (Table 4).

In 2015, City Council set out to divert 65 percent of its residential waste from landfill by 2025, with an interim goal of 60 percent by 2018 (City of Kingston, 2019). Of the waste generated in 2021, 60.2 percent was diverted (equivalent to 28,246 tonnes) (Resource Productivity & Recovery Authority, 2021). The diversion rate of residential waste in the city of Kingston is approximately 60 percent (Figure 3), rising 4 percent from 0.56 kg/person/day in 2015 to 0.58 kg/person/day in 2021. Kingstonians enthusiastically divert a larger percentage of their residential waste than do average residents of Ontario or Canada (Figure 3). These data indicate that diversion is the major mode of waste governance in Kingston.

³ Brokers can be an important intermediary between the materials recovery facility (MRF) and recycling companies. Prices for commodities such as plastics, metals, glass, and paper are constantly changing, making it difficult for MRF managers to get the best return on their goods. Selling their packaged bales to brokers can improve profits, even though brokers claim a share of those profits.

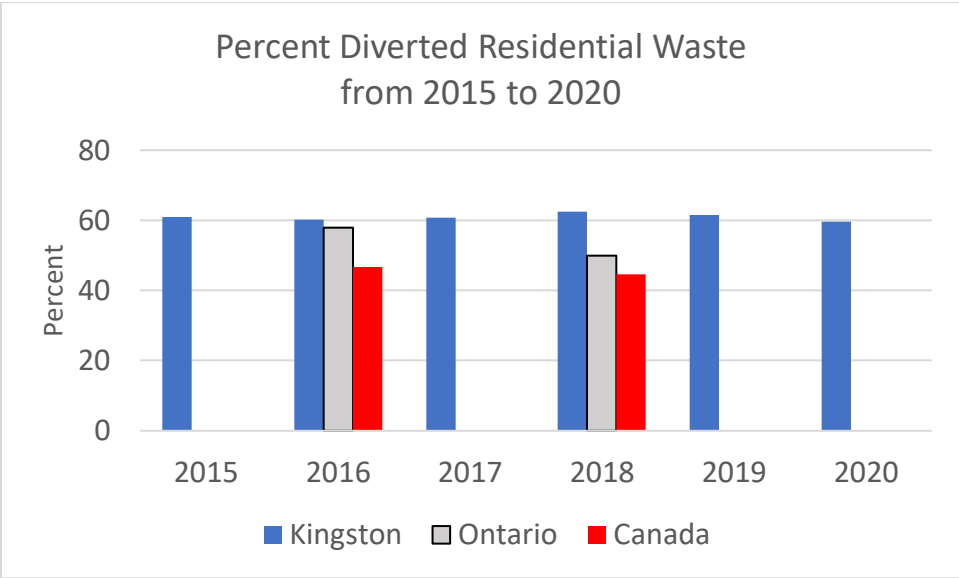


Figure 3. Diverted Residential Waste. The percent of diverted residential waste in the City of Kingston (blue), Ontario (grey) and Canada (red) from 2015 to 2020. Ontario and Canada data were only available for 2016 and 2018.

Sources for the data come from: Resource Productivity & Recovery Authority, Statistics Canada (2022a), Statistics Canada (2022c), Statistics Canada (2021a).

Recycling is on the fourth tier of the Government of Canada WH (Figure 1), the reason being that a great deal of energy and resources are required for recycling materials such as plastics, paper, metals and glass (Gille, 2007; MacBride, 2013; Zink and Geyer, 2019). As stated by MacBride (2013, p83), although the process of recycling waste is progress, “this progress is one of state program building and associated economic activity, not material progress in reducing waste”. Most materials collected in Kingston are turned into something very different from the parent material, and often into something that is not itself recyclable (Table 5). It should also be noted that although KARC is by name a Recycling Center, no recycling actually occurs there. KARC is simply a sorting station where materials are baled and then sold to

companies which are often quite far away (Table 5, Hird and Kuyvenhoven, 2020), and in some cases are only the first destinations in the recycling process. Also, KARC sends approximately 13 percent of the material it receives to landfill because those materials are either not recyclable or too soiled to be accepted (Member of Solid Waste Services Department, written communication, January 7, 2022). Greenhouse gas production was calculated for transportation from KARC to the average first destinations of these materials and it was found that a minimum of 111 tonnes of CO₂ are produced per year to transport diverted materials collected in Kingston (Table 6).

Table 4. Organics waste stream in the City of Kingston

Customer	Service	Contractor	Notes
City of Kingston	Organics collection – Residential (Whole city)	City of Kingston	Disposal location: Tomlinson Organics ¹ , Joyceville Contract details: Collected by city staff and vehicles
City of Kingston	Organics processing – Residential (Whole city)	Tomlinson Organics	Disposal location: Tomlinson Organics. Contract details: Accepts collected source separated organics (SSO), yard waste and residential drop off materials for processing into compost using outdoor windrows. Contract duration: April 1, 2019 - March 30, 2024, with option for 1 year extension
City of Kingston Facilities	Organics collection	Environmental 360 Solutions	Disposal location: Various – not defined in contract Contract details: Contract to provide containers and collection of organics at various City facilities Contract duration: 2021-2023
Agnew Foods (Tim Horton's)	Organics collection (multiple locations)	Waste Connections	Disposal location: Tomlinson Organics Contract details: Switched to Environmental 360 Solutions in 2022 due to cost.

Corrections Canada	Organics collection	Manco	Disposal location: Various
Limestone School District	Organics collection (from various sites)	Waste Management	Disposal location: Tomlinson Organics
Providence Care Health Network	Organics collection	Waste Management	Disposal location: Tomlinson Organics
Queen’s University	Organics collection	Waste Management	Disposal location: Tomlinson Organics Previous contract with Green For Life.

¹Tomlinson Organics is 20 km west of the City of Kingston

Table 5. Recycling waste stream in the City of Kingston

Customer	Service	Contractor	Notes
City of Kingston	Recycling collection – Residential (City Central)	City of Kingston	Disposal location: Kingston Area Recycling Centre (KARC) (then sorted and sold to recyclers or brokers for recycling) Contract details: City staff and vehicles collecting recycling boxes on alternating blue (glass, plastic, metal, polystyrene foam)/grey (mixed paper, newspaper, cardboard, stretchy plastic film) box schedule
City of Kingston	Recycling collection – Residential (City East/West)	Environmental 360 Solutions	Disposal location: KARC Contract details: Collection on alternating blue/grey schedule Contract duration: July 2021 - July 2027, early termination clause in effect should it be required as part of Ontario’s transition to Extended Producer Responsibility program
City of Kingston	Recycling processing – Residential, IC&I and other municipal	Emterra Environmental	Disposal location: KARC – produce sorted recycling bales for recyclers or brokers Contract details: Site operation, sorting and shipping of recyclable materials at KARC

			Contract duration: October 1 2018 - June 30, 2020 with option to renew annually until 2025
City of Kingston Facilities	Recycling collection	Environmental 360 Solutions	Disposal location: Various – not defined in contract Contract details: Contract to provide containers and collection of recycling at various City facilities Contract duration: 2021-2023
Agnew Foods (Tim Horton's)	Recycling (bottles, cans, cardboard) collection (multiple locations)	Waste Connections	Disposal location: KARC Contract details: Switched to Environmental 360 Solutions in 2022 due to cost.
Corrections Canada	Recycling collection	Waste Management	Disposal location: KARC Contract details: Collect cardboard and comingled
Limestone School District	Recycling collection (from various sites)	Waste Management	Disposal location: KARC Contract details: Collect paper (including juice boxes, coffee cups and mixed paper), plastics and metal
Providence Care Health Network	Recycling collection	Waste Management	Disposal location: Brockville Waste Management Transfer Station Contract details: Collect cardboard, paper, plastics, glass, e-waste, hazardous waste, construction waste and scrap metal
Queen's University	Recycling collection	Waste Management (previously Green For Life).	Disposal location: Brockville Waste Management Transfer Station Contract details: Collect paper, cardboard, plastics, glass, metal, batteries.
Queen's University	Recycling collection	Terracycle	Disposal location: Facilities in Canada Contract details: Pre-paid boxes used to collect disposable face masks. Used in Chemistry department for plastic gloves.

Table 6. Recycling waste streams – quantities, destinations and GHG produced to transport the materials to their first destinations.

Material Group	Quantity 2020 (tonnes)^a	Destination(s)	Average minimum distance (km)^b	End uses for Recycled Materials	GHG produced (Tonnes of CO₂)^c
#1 PET Plastic (pop bottles, water bottles)	501 t	Quebec, Northeastern United States	145 km	Fleeces, polyesters.	5.20 t
#2 HDPE Plastic Bottles (soft plastic jugs, laundry detergent bottles)	148 t	Southwestern Ontario, Quebec, Northeastern United States	222 km	HDPE piping and stiffeners for luggage.	2.35 t
#3-#7 Mixed Plastics (other plastic food and beverage containers)	229 t	Southwestern Ontario	471 km	Plastic pellets for manufacturing or resorted for further processing.	7.72 t
Aluminum (pop cans, aluminum foil)	213 t	United States.	68 km	New beverage containers	1.04 t
Steel	299	Southwestern Ontario	375 km	New steel containers	8.02 t
Paper (newspaper, office paper, shredded paper, flyers, envelopes)	3,142 t	Ontario (Napanee), (Quebec infrequently)	136 km	Recycled paper products, paper towels, cardboard	30.57 t
Corrugated Cardboard, Boxboard (cereal and cracker boxes with glossy coating)	2,006 t	Ontario, Sold to broker with unknown/variable final destination	270 km	Boxboard, newspaper, paper towels, molded pulp	38.75 t
Polycoat (food and beverage cartons, coffee cups)	87 t	Northeastern United States	68 km	Pencils, pens, or separated into fibers and plastics for	0.42 t

				further processing.	
Stretchy plastic bags	82 t	Southwestern Ontario or sold to broker with unknown/variable final destination	375 km	Plastic filament	2.20 t
Glass	639 t	Quebec, Ontario	325 km	Aggregates, industrial abrasives, blasting material	14.86 t
Polystyrene foam	6 t	Quebec and Indiana	552 km	Receipt cores, grading materials	0.24 t
Totals	7,352 t		3,007 km		111.37 t

^a Information for products, destinations and tonnage provided by Member of Solid Waste Services Department, written communication, January 7, 2022

^b The average minimum distance from Kingston, ON was calculated as the sum of distances to the companies noted or to the border of neighbouring provinces or countries, and then divided by the number of distances in the sum.

^c The amount of carbon dioxide produced to haul the quantities of recycled material were calculated as follows: Heavy line haul tractors produce 49 g CO₂/ton-mile (TransportPolicy.net, 2018) which translates to 71.54 g CO₂ /tonne-km

1.5.c. Eco-efficiency and Waste as Resource Modes

The eco-efficiency mode of governing, relies on active citizens seeking out ways to reduce their environmental impacts through established waste contractors, local authorities and community-waste-sector organizations (Bulkeley et al., 2007). Waste as resource mode relies on individuals as community members, relying on nongovernmental organisations and networks to reduce their environmental impacts while also benefiting socially and economically (ibid). In both these modes, top-down and bottom-up approaches to waste minimization meet and work together. The Resource Productivity and Recovery Authority has a column in its Residential Waste Diversion Rates tables titled 'Residential Reuse'. The entry for Kingston for

2020 and 2021 is 0 percent. Although there are actually quite a few organizations and businesses that are implementing eco-efficiency and waste as resource programs their statistics are not collected or analyzed by the City. One reason this type of data is not being collected is that there are no set federal, provincial, or city targets that are in need of being attained. Since there are no regulations for waste reduction, there are no city-wide programs to collect, publish or disseminate this information. As was communicated to me by a KARC employee, they (employees of KARC) are only “legislatively required to provide and promote diversion programs”.

The eco-efficiency mode may be utilized by agents with expertise in certain areas who are trying to achieve performance targets. An example of this is the encouragement of customers to use reusable cups by fast food chains such as Tim Horton’s, and Starbucks who sell reusable cups which their customers may bring in to be filled. This practice fits within the neoliberal capitalistic system – in order for customers to act sustainably, they first must purchase (consume) a reusable item and then exhibit customer loyalty to the brand in order to reuse that item. McDonald’s is new to the practice of encouraging reusables and their customers may bring in *any* clean reusable cup for filling. This is a much more sustainable and user-friendly business model. In 2019 Queen’s University started a reusable food container initiative that has really taken off now that students are back on campus and pandemic restrictions have been lifted. Of the approximately 200,000 single use containers that are normally used every semester, over 110,000 reusable containers were used in the 2022 fall semester, reducing the number of single use containers by half (personal communication, member of Queen’s University Facilities).

Another example of eco-efficiency is the Kingston Repair Café, a neighbourhood initiative which was started in the summer of 2017 by a group of volunteer fixers. The Repair Café has recently partnered with the Kingston Frontenac Public Library to offer a new program: Repair It!, in which the volunteer fixers teach community members how to repair their broken items, and in March of 2023, the Repair Café partnered with the Alma Mater Society of Queen's University and the City of Kingston for the inaugural Sustainability Hubs. For two afternoons in March several sustainability oriented groups from Queen's University, Repair Café volunteers and members of Cycle Kingston gathered to help community members repair furniture, small appliances, clothing and bicycles, they gave out new energy efficient lightbulbs in exchange for donated used or inefficient bulbs, and they rented out tools. The program was so successful that student leaders hope to make it a monthly occurrence during the 2023-2024 academic year. The governmental technology of the Repair Café and Sustainability Hub are to create agency through mutual learning and support. These grassroots bottom-up movements are getting increased support from City officials through grants and networking connections. Thus, the active citizenry is forming partnerships with industry and governing bodies to move the management of waste up the hierarchy from disposal and diversion to repair and reuse, modes of governing that Pollans et al. (2017) referred to as visionary.

There are several businesses within the city of Kingston that promote reuse as well as waste reduction. The Keep, and Harlowe Green, are refilleries which allow customers to purchase items such as cleaning supplies and toiletries in reusable containers. Other eco-efficient businesses include Limestone Creamery, an organic farm, which supplies milk in

returnable/reusable glass bottles, and Mumma Duck's Diaper Services which provides laundering services for cloth diaper users.

Waste as resource is a mode of governance based on the rationale of increased sustainability, waste minimization and the reuse of materials. An example involves the Kingston community working as a collective while being connected to a national network, in this case the Buy Nothing Project. There are three local chapters of the Buy Nothing Project, organized through Facebook groups and separated by geographic locations throughout the city. Members of these groups donate goods and services to each other but may only do so within the confines of their geography. The main objective is to reduce waste and find new homes for articles that are no longer needed or wanted, or to borrow articles for short periods of time (like tools for example). Members may post what they are looking for or what they are donating, and recipients are generally chosen using random number generators. The Buy Nothing chapters are connected to larger national groups in terms of their philosophies but are organized and put in motion by local individuals interacting, helping, teaching, and communicating with other local individuals. There are no set targets to be met, there is simply the desire to act sustainably within one's local community. The City of Kingston participates in waste as resource governing – but only for 2 days a year. Giveaway Days, similar in philosophy to the Buy Nothing Project, are on the city calendar and on these days individuals are encouraged to place items by the curb, free to be picked up by those who would want them.

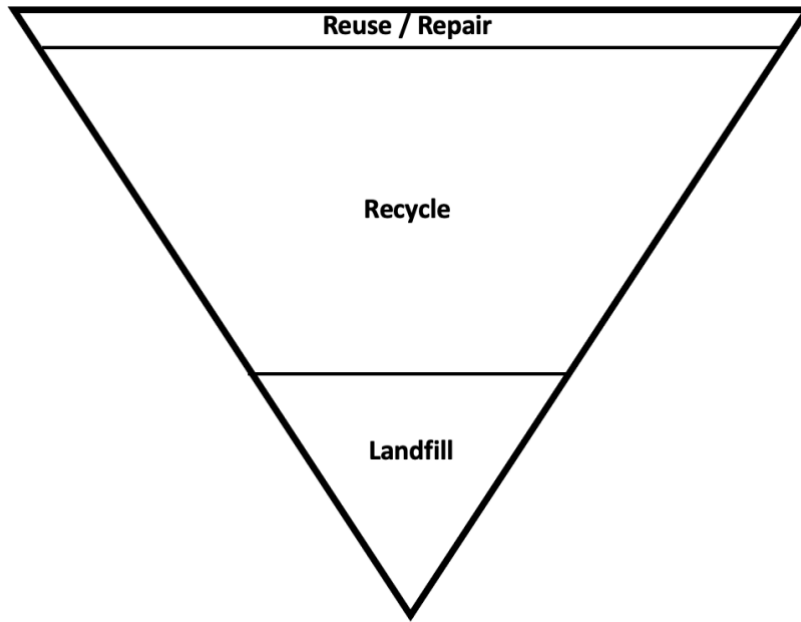


Figure 4. Kingston waste hierarchy diagram. Bars for Waste Prevention/ Reduce, Remanufacture/ Refurbish, and Energy Recovery are lacking because they do not factor into the governance of waste in Kingston. Area is correlated to waste management practices. Adapted from Zhang et al., 2022.

1.6. Conclusions

The Government of Canada website titled Reducing Municipal Solid Waste states that we “need to rethink how we purchase, use and throw out used items to reduce the costs and environmental impacts of waste management” (Government of Canada, 2021b). However, this same page states that waste should be seen as a “valuable resource to increase the economic benefit from recycling and diversion”. These two statements are at odds with each other, especially when taken in the context of an economic system based on capitalistic growth and development. When comparing the Government of Canada’s WH (Figure 1) to the WH currently in use by the City of Kingston (Figure 4), it is clear that the major mode of governing corresponds to diversion (recycling) of waste. This mode of waste management falls in step

with the idea of maximizing economic benefit from waste which has a tendency to produce a positive feedback loop - the more waste is created, the greater the potential economic benefit. What we need to do instead, if we are going to follow best practices for the environment, human health, and well-being that are touted by the WH in Figure 1, is to STOP producing material that becomes waste. Waste prevention is the ultimate goal. As stated by Hird (2021, p83), what we need is a “fifth mode of governance, one that begins with waste as an upstream issue, and prioritizes critical reflection on overconsumption and an economics based on relentless growth”. The federal government acknowledges that climbing the WH is difficult and will require a new way of thinking. Many groups within the City of Kingston have already started moving in the right direction. Only by recognizing and promoting reduce/reuse/repair initiatives can the City of Kingston aspire to reach the top rungs of the WH.

1.7. References

Assamoi, B., & Lawryshyn, Y. (2012). The environmental comparison of landfilling vs. incineration of MSW accounting for waste diversion. *Waste Management*, 32: 1019-1030

Assi, A., Bilo, F., Zanoletti, A., Ponti, J., Valsesia, A., La Spina, R., Zacco, A., & Bontempi, E. (2020). Zero-waste approach in municipal solid waste incineration: Reuse of bottom ash to stabilize fly ash. *Journal of Cleaner Production*, 245: 118779. DOI:

10.1016/j.jclepro.2019.118779

Bartkowiak, D. Jr. (2020). How much trash does Canada send to Michigan landfills? *Click on Detroit*. Accessed on April 10, 2022.

<https://www.clickondetroit.com/features/2020/02/13/how-much-trash-does-canada-send-to-michigan-landfills/>

Boin, U.M.J., & Bertram, M. (2005). Melting standardized aluminum scrap: A mass balance model for Europe. *Journal of the Minerals*, (August): 26-33.

Bulkeley, H., Watson, M., & Hudson, R. (2007). Modes of governing municipal waste. *Environment and Planning A*, 39(11): 2733-2753.

Canadian Council of Ministers of the Environment. (2019). *Canada-Wide Action Plan on Zero Plastic Waste*. Accessed July 15, 2022. https://ccme.ca/en/res/1589_ccmecanada-wideactionplanonzeroplasticwaste_en-secured.pdf

Canadian Council of Ministers of the Environment. (2022a). *A Roadmap to Strengthen the Management of Single-Use and Disposable Plastics*. Accessed on May 19, 2023. <https://ccme.ca/en/res/sudproadmapen.pdf>

Canadian Council of Ministers of the Environment. (2022b). *Waste*. Accessed July 15, 2022. <https://ccme.ca/en/current-activities/waste>

Catlin, J.R., & Wang, Y. (2013). Recycling gone bad: When the option to recycle increases resource consumption. *Journal of Consumer Psychology*, 23(1): 122-127.

City of Kingston (2019). Information Report to Environment, Infrastructure & Transportation Policies Committee. Report Number EITP-19-003. Accessed July 15, 2022.

<https://www.cityofkingston.ca/documents/10180/32418499/Environment-Infrastructure-Transportation-Policies-Committee-Meeting-01-2019-Report-EITP-19-003-Waste-Diversion-Rate.pdf/3ff264ef-0bdc-4ba6-858a-3f90e20901ef>

City of Kingston. (2022). City Council. Accessed July 21, 2022.

<https://www.cityofkingston.ca/city-hall/city-council>

City of Kingston. (2022). Departments. Accessed July 21, 2022.

<https://www.cityofkingston.ca/city-hall/departments>

City of Kingston By-Law Number 2021-33. (2021). A By-Law to Approve the 2021 General Municipal Operating Budget. Accessed July 22, 2022.

<https://www.cityofkingston.ca/documents/10180/139635/Operating+Budget+Bylaw+2021-33.pdf/3de026bc-3c7b-1a57-60e2-6454757fd9ba?t=1643907079247>

Clarke, T., & Meyer-Robinson, R. (2021). The economic impact of Ontario's waste management sector. The Conference Board of Canada. Accessed July 13.

<https://www.owma.org/down/eJwFwQEKgCAMAMAXTZvpsH6zmVKUKU0Ien13!xhdV2v1u>

E4d@Ayjs!HKX7v5VZNatbFgEocOZPIIPmMAibRAIkCFZKbMZPpWfs6xF@U=/OWMA%20-

[0-](#)

[%20Economic%20Impact%20of%20Ontario%27s%20Waste%20Management%20Sector%20-%20Final%202021.pdf">%20Economic%20Impact%20of%20Ontario%27s%20Waste%20Management%20Sector%20-%20Final%202021.pdf](#)

Environment and Climate Change Canada. (2022). Canadian Environmental Sustainability Indicators: Solid waste diversion and disposal. Consulted on July, 07, 2022. Available at: www.canada.ca/en/environment-climate-change/services/environmental-indicators/solid-waste-diversion-disposal.html.

Environmental Commissioner of Ontario. (2017). Beyond the Blue Box: Ontario's fresh start on waste diversion and the circular economy. Accessed on August 17, 2022. <https://www.auditor.on.ca/en/content/reporttopics/envreports/env17/Beyond-the-Blue-Box.pdf>

Government of Canada. (2021a). *Municipal solid waste management in Canada*. Accessed on May 19, 2023. <https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/municipal-solid/environment.html>

Government of Canada. (2021b). *Reducing Municipal Solid Waste*. Accessed on August 17, 2022. <https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/municipal-solid/reducing.html>

Government of Canada. (2023). *Budget 2023: A Made-in-Canada-Plan*. Accessed on May 2, 2023. <https://www.budget.canada.ca/2023/pdf/budget-2023-en.pdf>

Government of Canada. (2023). *Single-use Plastics Prohibition Regulations – Overview*. Accessed on May 19, 2023. <https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/reduce-plastic-waste/single-use-plastic-overview.html>

Gille, Z. (2007). *From the cult of waste to the trash heap of history: the politics of waste in socialistic and postsocialist Hungary*. Bloomington: Indiana University Press.

Hird, M.J. (2021). *Canada's Waste Flows*. McGill-Queen's University Press.

Hird, M.J. (2022). *A Public Sociology of Waste*. Bristol University Press.

Hird, M.J., & Kuyvenhoven, C. (2020) 'Waste Transportation and the Downstream-Recycle, Upstream-Reduce Equation: Waste's Management Within Neoliberal Capitalism' in R. Ek and N. Johannson (eds.) *Perspectives on Waste from the Social Sciences and Humanities: Opening the Bin*, Cambridge Scholars Press, pp. 79-97.

Hird, M.J., Loughheed, S., Rowe, R.K., & Kuyvenhoven, C. (2014). Making waste management public (or falling back to sleep). *Social Studies of Science*, 44: 441. DOI: 10.1177/0306312713518835

Huber, F., Glasenbauer, D., Mallow, O., Ledereer, J., Winter, F., & Fellner, J. (2016). Thermal co-treatment of comubustible hazardous waste and waste incineration fly ash in a rotary kiln. *Waste Management*, 58: 181-190. DOI: 10.1016/j.wasman.2016.09.013

Kaza, S., Yao, L., Bhada-Tata, P., & Van Woerden, F. (2018). *What a Waste 2.0: A global snapshot of solid waste management to 2050*. Urban Development Series. Washington, D.C.: World Bank. DOI:10.1596/978-1-4648-1329-0.

Lansink, A. (2017). *Challenging Changes – Connecting Waste Hierarchy and Circular Economy*. The Netherlands: LEA Nijmegen.

Macbride, S. (2013). *Recycling Reconsidered. The present failure and future promise of environmental action in the United States*. The MIT Press, Cambridge, Massachusetts.

Makarichi, L., Jutidamrongphan, W., & Techato, K. (2018). The evolution of waste-to-energy incineration: A review. *Renewable and Sustainable Energy Reviews*, 91: 812-821. DOI: 10.1016/j.rser.2018.04.088

Moore, S.A. (2012). Garbage matters: Concepts in new geographies of waste. *Progress in Human Geography*, 36(6): 780-799.

Ontario Waste Management Association. (January, 2021). *State of waste in Ontario: Landfill report*. Accessed January 20, 2023.

https://www.owma.org/download/eJwFwQEKgCAMAMAXqeGmab!ZKynKIDYIen13u!qQxTk5rIOUHRUClhp9@aZXLpFmPhQjUkbDgNVggs0UzMVA8JI59gF8tGOtP8LsFOU=/OWMA%20Landfill%20Report%202021%20_FINAL_lowres.pdf

Pollans, L.B. (2017). Trapped in Trash: Modes of governing and barriers to transitioning to sustainable waste management. *Environment and Planning*, 49(10): 2300-2323. DOI: 10.1177/0308518X17719461

Resource Productivity & Recovery Authority. (2020). 2020 Residential Waste Diversion Rates by Municipal Program. Accessed July 23, 2020. <https://rpra.ca/wp-content/uploads/2020-Residential-Waste-Diversion.xlsx>

Resource Productivity & Recovery Authority. (2021). 2021 Residential Waste Diversion Rates by Municipal Program. Accessed March 21, 2023. <https://rpra.ca/wp-content/uploads/2020-Residential-Waste-Diversion.xlsx>

Sawell, S.E., Hetherington, S.A., & Chandler, A.J. (1996). An overview of municipal solid waste management in Canada. *Waste Management*, 16 (5/6): 351-359.

Statista. (2023). 'Estimated annual waste per capita of the leading waste producing countries worldwide as of 2019*'. Accessed 22 September 2023.

<https://www.statista.com/statistics/1168066/largest-waste-producing-countries-worldwide-per-capita/>

Statistics Canada. (2021a). Table 38-10-0033-01. Materials diverted, by source, inactive [Data Table]. DOI: <https://doi.org/10.25318/3810003301-eng>

Statistics Canada. (2021b). [Table 38-10-0036-01 Local government characteristics of the waste management industry](#) [Data Table]. DOI: <https://doi.org/10.25318/3810003601-eng>

Statistics Canada. (2022a). Table 17-10-0005-01. Population estimates on July 1st, by age and sex [Data Table]. DOI: <https://doi.org/10.25318/1710000501-eng>

Statistics Canada. (2022b). Table 34-10-0237-01. Inventory of municipally owned solid waste assets, by urban and rural, and population size, Infrastructure Canada [Data Table]. DOI: <https://doi.org/10.25318/3410023701-eng>

Statistics Canada. (2022c). Table 38-10-0138-01. Waste materials diverted, by type and by source [Data Table]. DOI: <https://doi.org/10.25318/3810013801-eng>

Statistics Canada. (2023). Table 38-10-0032-01. Disposal of waste, by source [Data Table]. DOI: <https://doi.org/10.25318/3810003201-eng>

Stewardship Ontario. (July 30, 2009). Final consolidated Municipal Hazardous or Special Waste Program Plan, Volume 1. Accessed Feb 9, 2023. <https://stewardshipontario.ca/wp-content/uploads/2013/03/Consolidated-MHSW-Program-Plan-Volume-1-July-30-clean.pdf>

TransportPolicy.net. (2018). *Canada: Heavy-Duty: GHG*. Accessed February 10, 2023. <https://www.transportpolicy.net/standard/canada-heavy-duty-ghg/>

Wilkinson, S. (2020). *When will Canadians have the right to repair?* The Monitor. Canadian Centre for Policy Alternatives. Accessed on May 2, 2023. <https://policyalternatives.ca/publications/monitor/when-will-canadians-have-right-repair#:~:text=In%20part%20inspired%20by%20activism,replacement%20parts%2C%20software%20and%20other>

Zhang, C., Hu, M., Di Maio, F., Sprecher, B., Yang, X., & Tukker, A. (2022). An overview of the waste hierarchy framework for analyzing the circularity in construction and demolition waste

management in Europe. *Science of the Total Environment*, 803. DOI:

10.1016/j.scitotenv.2021.149892

Zink, T., & Geyer, R. (2019). Material recycling and the myth of landfill diversion. *Journal of*

Industrial Ecology, 25(3): 541-548. DOI: 10.1111/jiec.12808

Chapter 2: Shiny Happy Festivals

2.1. Abstract

With the knowledge that outdoor festivals involving food and drink generate a tremendous amount of waste each year, festival organizers and performing artists are attempting to provide 'greener' experiences for their patrons. This includes replacing single use items with either reusable, recyclable or compostable items, reducing plastic packaging, and sorting their waste streams to reduce contamination. Many of these activities require the help of volunteer labor. Through participant observation, I detail my role as a volunteer with the Skeleton Park Arts Festival over 2 years. In the first year I was part of the waste diversion team and volunteered for the duration of the three-day festival. In the second year, in my attempt to reduce the amount of waste that was diverted, I became the food vendor co-ordinator and again worked with the waste diversion team during the three-day festival. In this manuscript I describe how my volunteering fits into the theoretical framework of environmental volunteerism, how a literature search of waste reduction at festivals supports the activities at Skeleton Park, and the limitations to scaling up this organizational framework.

2.2. Introduction

In 2012, the United Nations Environmental Programme declared that we had entered a global waste crisis that is only getting worse (United Nations, 2012). Urbanization, economic growth, tourism and population size (in high-income countries) have been identified as determinants of municipal solid waste generation (Zambrano-Monserrate et al., 2021). Over 81 percent of 40 million Canadians live in urban areas, tourists spent over \$20 billion in Canada in 2022

(Statistics Canada, Table 36-10-0230-01), and Canada had the strongest economic growth in the G7 in that same year (Government of Canada, Economic Overview). It therefore follows that Canadians, along with citizens of the United States, and Australia are three of the top global producers of daily municipal solid waste per capita (Zambrano-Monserrate et al., 2021). This chapter will focus on the waste that is produced by a specific aspect of tourism - people attending music and arts festivals - as well as the dependence on volunteers to reduce that waste.

Researchers in Australia and Canada have found that outdoor festivals involving food and drink generate a tremendous amount of waste every year (Laing and Frost, 2010; Zelenika et al., 2018, respectively). In an article discussing festival waste management in Canada and New Zealand, Dodds et al. (2022) outline three major drivers and two major barriers to reducing festival waste. According to Dodds and her colleagues one major driver for reducing festival waste is corporate social responsibility. Many companies now openly share their ESG (Environment, Social, Governance) practices on their websites, in advertisements, and on social media in an effort to inform consumers about their strategies to achieve net zero emissions (the amount of greenhouse gases produced compared to the amount of greenhouse gases removed from the atmosphere). Often the path to net zero involves offsets which provide either carbon capture and storage or prevent carbon release beyond business as usual. Offsetting⁴ may be achieved by taking advantage of developing technologies (anaerobic digestion, direct air carbon capture and sequestration, landfill methane recovery), or natural

⁴ No matter how much reduction is achieved at a festival, there will always be an ecological footprint associated with the event. Offsets are used to create a net-zero emissions event, however they can also be used as a crutch for events that are only giving a semblance of being green without actually investing in reduction efforts.

systems which store carbon (land preservation, tree planting, regenerative agriculture).

Polonsky et al. (2010) discuss how offsets are not always properly regulated and may amount to greenwashing, so individuals should investigate how companies claiming to be offsetting their emissions or claiming to be net zero are achieving these targets. In order to offset the CO_{2eq} produced during a festival, one must first calculate it. Sandra and Alessandro (2021) use Life Cycle Assessment to examine a three-day Italian street food fair and determine that the fair generated 0.043 kg of waste and 16 kg CO_{2eq} per visitor, with 5,210 visitors attending the fair. Having calculated the environmental impact of the fair, the authors state that the next step will be to implement regenerative practices in a degraded forest area to sequester enough carbon to offset the loss caused by the fair.

Dodds et al. (2022) state that another major driver to reducing waste is the financial benefit. Wong et al. (2015) note that attendees were willing to pay more for a festival that they perceive to be 'green' and that waste management contributes to their perception of a 'green' festival. Producing smaller quantities of landfill waste in itself is a financial benefit to festival organizers since that would reduce the cost of hauling the waste away.

The last major driver discussed by Dodds et al. (2022) is the competitive advantage that a green festival will have at attracting artists, vendors and festival goers. Studies by Laing and Frost (2010) as well as Hazel and Mason (2020) call for a partnership between key stakeholders (the local community, visitors, performers, sponsors, venues, waste managers) to work together to stage green events. A current rallying cry in the music industry is "No Music on a Dead Planet" (Trapunski, October 24, 2022), a pledge to climate action organized by the non-profit Music Declares Emergency. This organization provides information to artists, promoters,

managers, and venues on how to be more sustainable and claims that thousands of artists from around the world have endorsed the pledge to taking urgent action to achieve net zero by 2030.

Dodds et al. (2022) also discuss several barriers to reducing festival waste. According to the authors, one major barrier is a lack of resources (money, people, infrastructure). Zelenika et al. (2018) report that organizers at the British Columbia Apple Festival had to pay \$30 for each organics bin, \$5 for each recycling bin, but garbage bins were free. This payment system needs to be turned on its head to encourage better waste management. Apart from having the proper receptacles for attendees to sort waste into, research shows that having volunteers assist in the sorting significantly reduces contamination of the waste streams. In their experiment, Zelenika et al. compare the contamination of bins collecting organics, recyclables, paper and garbage at the Apple Festival, which was attended by approximately 10,000 visitors over 2 days. The treatments in the experiment are bins with visual 2-D signs, bins with actual 3-D sample items (such as cups and plates) taped to their lids, and bins with volunteers who instruct attendees as to how to sort their waste. The authors state that instructions from volunteers reduce contamination in the paper bins by 97 percent, in the organics and recyclables bins by 96 percent, and in the garbage bins by 84 percent. Since contaminated bins would have their contents designated as garbage, volunteers significantly reduce the amount of waste going directly to landfill and increase the amount of waste being recycled and composted.

The second major barrier to reducing festival waste, according to Dodds et al., is knowledge on both the part of organizers and attendees. As noted above, attendees given

personal instructions as to how to sort waste significantly reduce contamination of waste streams. Progress is being made to inform organizers as well. In their development of a conceptual model to increase greening in the events sector, Mair and Jago (2010) target managers of tourism events such as festivals. The pioneering not-for-profit, Julie's Bicycle, founded in 2007, is specifically mobilising the arts and culture community to take action on the climate and ecological crises. The organization developed Creative Green Tools that festival managers may use to keep track of and reduce their carbon footprints over time. The recently launched Creative Green Tools Canada is a free and user-friendly online interface used to calculate environmental footprints (Trapunski, October 24, 2022), and is being used to monitor a large variety of sustainability factors (waste, energy use, water use, transportation to and from festivals, etc.), provide up to date information to festival managers, and help them determine the most effective ways to increase sustainability. Impacts may be lessened if venues have sustainable action plans or are encouraged to enact sustainable practices by the artists who book the venues. Stadiums that host yearly events such as the American Super Bowl tout their sustainable initiatives, some of which remain long after the games have been played. Venues such as the O2 in London have done such things as eliminate beef burgers, reduce single use plastic cup use, and are powered by renewable energy. If the ecological footprint of a venue is calculated, then that venue may set targets to reduce its footprint over time. Having that information is key, which is why models like the one developed by Mair and Jago (2010) as well as organizations such as Creative Green Tools and Music Declares Emergency can provide such an essential service.

Once footprints are calculated and targets are set to reduce those footprints, the issue becomes how to pay for the necessary changes. One resource that many festivals seem to use is volunteer labor. In this chapter I will discuss my volunteer activities at a local music and arts festival over 2 summers, how my volunteering fits into the theoretical framework of environmental volunteerism, how I hoped to increase reduction as opposed to diversion, and the limitations to scaling up this organizational framework.

2.2.a. Theoretical Framework

I first started volunteering to reduce waste as a graduate student at Lehigh University in Bethlehem, PA in 1990. At that time, some of the sociodemographic factors associated with volunteers in the United States did not strongly apply to me (Rotolo and Wilson, 2006). A high school degree is strongly associated with volunteerism, but higher degrees are not. In terms of age, being middle aged is more strongly associated with volunteerism than being in my mid 20s. My race (white) and gender (female) are very strongly associated with volunteerism, as is working in the public sector. Though I was a teaching assistant in a university, the school in question was a private institution, so the public/private sector factor is slightly blurry. According to Rotolo and Wilson, people who work in the public sector are more likely to volunteer because they have a more pro-social motivation to do so. My affinity for teaching places me strongly in the realm of public sector jobs, even though I was doing so from a private sector institution. So apart from my age and educational background, I fit strongly into the mould of someone who would volunteer their time to a particular cause.

While studying environmental volunteering, Measham and Barnett (2008) present six motivations for this specific sector: contributing to community, social interaction, personal development, learning about the environment, a general ethic of care for the environment, and an attachment to a particular place. In 1990 I had recently moved from Montréal, where I grew up, to Bethlehem, where I was studying for a PhD in Biology. I was an 8-hour drive from home and living in a foreign country. Contributing to my new community and finding people with whom I could interact were very strong motivators for me. I have always had a general ethic of care for the environment, so that would have also been a motivator. My current situation mirrors that of 1990 in several ways. My family and I moved to the outskirts of Kingston, Ontario in August of 2020 – right in the midst of the COVID pandemic – and I enrolled at Queen’s University to start a Master’s in Environmental Studies. Our first 14 days in our new home were spent in isolation, and my first academic year was spent at home, being a student and teaching assistant over Zoom. I did indeed crave social interaction and the need to get to know my community. Prior to returning to Canada, I was a teacher of Environmental Science for 14 years, so it was crucial to stay up to date on the climate crisis and to be able to convey timely information to my students. Learning about the environment had become a daily activity for me. This continued learning increased my ethic of care and provided personal development. I would say that the one motivator I did not yet have was an attachment to this new place – although I was very interested in building that attachment.

Measham and Barnett (2008) further propose that there are 5 modes of environmental volunteer activity: activism (trying to pro-actively bring about change), education (increasing awareness through learning), monitoring (assessing environmental factors over time),

restoration (rehabilitating ecosystems) and promoting sustainable living (by reducing ecological footprints). I am not an activist. I did attend a few climate strikes while at Queen's, but I am more of a follower and did so to support the students who organized the event (some of whom happened to be students I had taught). I am most definitely an educator, but I would say that education would be more of a motivator for me than a mode of volunteering. My volunteer activities have been more about 'doing' than teaching, although I will always take the opportunity to answer questions and try to teach by example. I have volunteered to help with a few waste audits, which would fall under the mode of monitoring, but these volunteer opportunities were rare. Restoration as a mode is not something I have had the opportunity to delve into. I would have gladly helped pick up waste during 'clean up days' but those type of opportunities were mostly cancelled during the pandemic. The last mode mentioned by Measham and Barnett is the one that I believe fits me best – to promote sustainable living. Waste reduction is a very important aspect of sustainable living, and that is where I have put the greatest amount of my volunteer effort.

I have been interested in reducing waste for decades. Actually, I really *should* have been interested in reducing waste, but the reality is that I have mostly been interested in *diverting* waste away from landfill: i.e., recycling. Prior to coming to Queen's, I had never heard of the waste hierarchy (discussed in Chapter 1). I did know my 3 R's (Reduce, Reuse, Recycle) but did not grasp the importance of their order. I now understand that to have an impact on the amount of waste being produced, the first priority is to reduce potential waste, with recycling being further down the waste hierarchy. I have also come to understand that although recycling may be very effective in theory, in practice it is much less effective than 'advertised',

and in some cases, it would be more environmentally sound to landfill material than to recycle it (Hird, 2021).

Next, I will discuss my personal experience at a small music and arts festival in Kingston, Ontario, Canada. I will describe my role as a volunteer waste sorter and use published research to analyse the actions taken by myself and the event organizers to divert waste from landfill. I will examine what worked as well as potential improvements for not only waste diversion but, more importantly, waste reduction in the future. The actions taken at this small festival may be scaled up to benefit waste reduction at much larger festivals and improve the green aspect of festivals for participants and managers alike. The waste stream I was involved with was primarily related to food and beverage service ware provided to festival participants by festival food vendors, as well as service ware that participants brought in from outside the festival. Waste produced by artists at the event, vendors preparing their food, and waste collected from the rented port-o-potties are not included in this study.

2.3. Case Study: Skeleton Park Arts Festival

The Skeleton Park Arts Festival (SPAF) started as an annual community picnic in McBurney Park, Kingston and evolved into an annual music and arts festival in 2005. In the early years, students from the local Calvin Park school took on the challenge of making SPAF a waste-free event. Friends and neighbours helped by volunteering and loaning their home recycling bins in the hopes that festival participants would sort their garbage. Within hours of the festival starting, it became obvious that festival attendees were not sorting their garbage, so students, friends and neighbours patrolled the bins and did the sorting themselves. The next year, these

invested individuals decided to remove all garbage bins from the park and create one central depot with a sign: "Got Trash? Let us help you sort things out!". The Whole Earth festival in California uses a similar 'alternative system of waste management' in which they remove all trash receptacles and direct festival patrons to waste collection locations where volunteers receive and sort all waste, resulting in less sorting time, less management of recovery receptacles and less grounds cleanup (Tchobanoglous et al., 2006). As SPAF grew in size and attracted more people, it became untenable for the residents to continue to use their own recycling bins, so they started renting bins from the Kingston Area Recycling Centre (KARC). And then came OSKAR - the Off-Site Kingston Area Recycler (Figure 5) - a mobile diversion trailer with built-in bins for all the recyclable waste streams (paper, plastics, metals, organics). OSKAR was available for bookings from KARC for a fee of only \$62 to cover drop-off and pick-up of the trailer by the City. OSKAR has been used for the last three years of the festival, providing festival organizers with a vessel into which all diverted waste streams could be deposited.

The current SPAF waste plan is to 1) communicate with food and drink vendors to minimize their service ware, 2) direct all participants to one central waste deposit location, using good signage, 3) use volunteers to collect, sort, rinse, and place all waste either into OSKAR or in a trash bin, , and 4) have a KARC representative at a booth next to OSKAR who answers questions about waste diversion. It has taken years to create this organizational framework, and when implemented has resulted in a remarkably small volume of landfill waste compared to diverted waste. For the last few years, festival organizers have prided themselves on accumulating only 1-2 bags of landfill trash for the entire festival.

On June 18th and 19th of 2022, I spent the weekend being one of many volunteers to gather and sort waste at SPAF. I was asked if I would represent Sustainable Kingston at the Festival by being a volunteer, and when I found out that one of the volunteer positions was waste collection and sorting, I put myself down for all the time slots during the weekend event. Why did I spend over 16 hours asking festival participants for their trash? The short answer is that I wanted to make a difference. I also wanted to make connections in the community after so many months of COVID restrictions. Here was an in-person event where I could not only meet and talk to people, but assist with waste diversion, and help the festival achieve its goal of only producing one bag of landfill waste. At the end of the festival, I let the organizers know that I was coming back the following year to volunteer again. In the winter of 2023, I was asked if I would be the volunteer food co-ordinator. Since my interest was in waste reduction, would I be willing to co-ordinate step (1) of the SPAF waste plan: communicate with potential food vendors, explain the guidelines to reducing waste at the festival, and book the vendors who accepted those guidelines? I agreed to this volunteer position. Two of the conversations I wanted to have with potential vendors involved the packaging in which they serve their food or beverages, and their portion sizes. I was hoping vendors would consider having variable portions of food for sale to decrease the amount of food waste produced. Dávid (2009) discuss that overconsumption at festivals is a factor influencing food waste, while Martinho et al. (2018) state that when 'proper' portions of food (enough for an average adult) are served at a festival canteen, food waste is reduced. I spent the next few months communicating with several food vendors, explaining our guidelines and eventually found the four that participated

in the 2023 Festival. I also spent most of July 24th and 25th volunteering at the waste diversion station.



Figure 5: OSKAR – the Off-Site Kingston Area Recycler.

2.3.a. Outline of the Duties of a Volunteer

My duties as a volunteer waste sorter during the festival were as follows. I stood behind a row of tables separating festival participants from access to OSKAR. As people walked by, I asked them for any trash they might have. I then sorted the trash into the 4 waste streams: 1) clean paper (not contaminated by food or liquids), 2) glass, plastics or metals, 3) organics, and 4) landfill trash. Any liquids in cups or bottles were emptied on the ground and spray bottles with

water were used to rinse out contaminants prior to placing containers in the correct OSKAR bin. I sifted through leftovers in food containers in search of plastic cutlery or ketchup packets that needed to be discarded (landfill trash) before putting the rest into the organics bin. I also told any dog owners who were wandering around with dog poop bags and concerned expressions on their faces that I would happily take their bags and put them in the trash (some expressed that they would rather throw the bags out themselves, so they came behind the tables and used the trash can). I sometimes had to intercept participants who were attempting to put things into the bins, take their trash, and thank them for their contributions. This was done to ensure that all trash was correctly sorted. I did also answer some questions from the public about how to sort trash and where some of the material went, but most of those questions were referred to the representative from KARC who was at a booth right next to OSKAR.

Things that had to be sent to landfill in 2022 included dog waste, used diapers, unrecyclable art supplies, plastic cutlery, polylactic acid (PLA) plastic compostable cups and lids, condiment packets, and a variety of small sundry items (for example the plastic sleeves surrounding reusable water bottles that were given out at the event). The quantity of PLA plastic alone filled a garbage bag and this was because one food vendor who sold coffee used plant-based compostable cups for their cold drinks. The vendor was under the impression that the PLA plastic cups could be composted in Kingston, but that is not the case. PLA plastic does not break down under the outdoor windrow conditions used at the local composting facility, so even though the material is potentially compostable, it is not compostable in our geographic area. Often this type of material is much more expensive than the polyethylene terephthalate (PETE) plastics that may be recycled, and we explained this to the vendor. All of the other items

filled only one more bag, so the festival did meet its goal. As the food vendor coordinator the next year, I helped to ensure that the returning vendor who had supplied the PLA plastic products was told she could not bring those products back to the festival. After some push-back, the vendor complied. Also, the food vendor who had been selling sandwiches and french fries and providing plastic ketchup and vinegar packets as well as plastic cutlery did not return. This food vendor had been selling their food in large paper clamshell containers and provided fries with every meal, regardless of whether attendees wanted them or not. Food waste from this one vendor had filled up our organics bin. The food vendors who did participate in the Festival in 2023 either used wooden cutlery or sold finger food, and served all their food in paper containers without lids. One food vendor even asked us to sort out their used chop sticks because they got recycled at a plant in Toronto, Ontario. In 2023 the amount of landfill trash collected was less than 1 garbage bag and the OSKAR bin we 'fed' the most was the organics bin.

One of the things I noticed had been missing in 2022 was an educational component to the waste sorting. Hazel and Mason (2020) state that festivals may be agents for change by delivering strong educational messages. Dodds et al. (2022) state that festivals may play a role in environmental education by integrating teachable moments into the festival experience, and Zelenika et al. (2018) show that using volunteers offers a teaching opportunity to give feedback to people on how to sort their waste. In 2023 waste diversion volunteers allowed attendees who wanted to sort their own waste to come behind the tables where they were instructed as to how to sort their waste. Also, there was a basket of all the various containers provided by the participating food vendors on one of the tables, and a sign that read: "Do you know how to

recycle each of these items?” . We would ask people if they wanted to ‘play the recycling game’ and see if they knew what bin to put things into. We also made them aware of the PLA plastic cups and let them know that those could only be sorted into trash. In this way we attempted to make waste sorting an educational experience for those who were interested in learning more.

2.3.b. Extra Volunteering Activities

When I wasn’t at the sorting station, I would wander around the festival grounds with a blue recycling bin and collect any waste that had been discarded on the grounds. Apart from the sorting station, the only other trash bins on the grounds were those that were put next to hand-washing stations. Three of these were by the port-o-pottys, and one was by the food court. These bins were only supposed to collect paper towels, which would go into the composting stream. On top of each bin lid was a large sign stating, “Paper Towels Only”. While wandering through the grounds, I would visit each of these bins and make sure that paper towels were the only thing in them. If I found any other trash items, I would remove them so that when someone looked into one of these bins all they would see would be paper towels and hopefully they would realize that they should not to put anything else in there. Bär et al. (2022) explain that the “Broken Windows” theory, when related to waste management at a festival, should induce volunteers to clear away any misplaced garbage immediately to prevent further garbage from accumulating.

2.3.c. Improvements for Future Festivals

The use of reusable dishware at the Whole Earth Festival (Tchobanoglous et al., 2006) significantly reduces waste volume, but also requires a group (of volunteers) to wash dishes according to local health codes. SPAF organizers deemed this step too difficult to implement in 2023. Instead SPAF attendees were encouraged to bring their own reusable cups or containers, and all food vendors had agreed to serve any attendees food or beverages in their own containers. Since a large proportion of people who come to this festival live in the neighborhood, this would not have been a huge imposition. I only noticed one man eating food from a vendor on a reusable plate during my time at the festival.

Next, I will describe how the organics collected in the City of Kingston are turned into compost and how the local composting facility has accumulated what they term “legacy piles” – mountains of discarded, non-compostable waste that had contaminated the organics waste stream. Until these piles are trucked off to a sanitary landfill, it is important not to continue to add to the mountains of materials discarded in the local composting process.

2.4. Case study: Tomlinson Organics Composting Facility

The City of Kingston started the Green Bin program in 2009, providing a green composting bin with weekly pick-up to all residents who lived in a single-family home. All organics food waste from the City of Kingston, including the waste produced at SPAF, is taken to the Tomlinson Organics composting site in Joyceville, Ontario. By 2011, 83 percent of Kingston residents surveyed said that they composted their kitchen and or yard waste, making Kingston the city with the third highest rate of composting in Canada (Shouldice, July 17, 2013; Statistics Canada,

Composting by households in Canada). Of those residents surveyed in 2011, 59 percent said that they used a curbside collection method (Statistics Canada) meaning that 24 percent composted on their own.

The majority of composting sites in North America, including Tomlinson Organics, employ open (aerobic) windrow composting, a low impact form of composting that requires little energy and yields a product that may be used to ameliorate soils (Wilson et al., 2004). If the food waste does not require long distance transport to the composting site, windrow composting is a much more environmentally friendly solution than landfilling (Abu et al., 2021). Since Tomlinson is only 20 km east of Kingston compared to the landfills which are hundreds of kilometers away, the City has indeed chosen an efficient way to divert organic waste. However, if the food waste is contaminated with other waste, such as plastics, the quality of the resulting compost is reduced which has implications as to its use (to ameliorate farm soils vs city landscaping). Brinton, Jr. (2005) report that on average, 35 percent of all foreign content in North American compost was plastic material, and that plastics were found to make up to 5 percent of all tested compost fractions. Braun et al. (2021) state that plastics occur in all their German compost samples, with microplastics making up 9 to 44 percent of all items. They estimate that with the recommended application of 7 tons of compost per hectare per year in Germany, that agricultural soils receive 84,000-320,000 plastic items per hectare annually. In order to improve compost quality and reduce plastic contamination, it is important that food waste be free of plastic items.

I toured the Tomlinson Organics facility (Figure 6) on May 11, 2022. The first stop was in the tipping building where I noticed that the material on the tipping floor was heavily

contaminated with a variety of plastics (Figure 7). Unlike the Kingston Area Recycling Centre, which has the capacity to sort recyclables prior to their being baled and sold, Tomlinson only has a tipping floor under a tent with no sorting capabilities. Mixed in with the organic material were many plastic bags, the plastic mesh on discarded paper potato bags, and assorted unidentifiable plastic items. Material from the tipping floor is taken directly to the windrows where yard waste is added to reduce the moisture content of the mix. Tomlinson Organics utilizes outdoor windrows with circulating forced air to carry out the decomposition of the organic matter brought to the facility. Organic material is dumped into long rows between concrete walls where air is pumped from below to ensure that the piles remain well oxygenated. The material within a windrow is periodically moved to an adjacent windrow and turned to increase decomposition. Aerobic digestion takes place over a series of weeks, breaking down the organic material into compost. The last step of the windrow process is to sieve the compost through a trommel, allowing for any contaminants to be strained out. These non-decomposable contaminants, consisting of multiple types of plastics as well as rocks and metals, are deposited on legacy piles on the property (Figure 8). Since unwanted materials are only screened out of the windrows after months of decomposition, many of the plastics within the windrows could have started to break down and degrade as well, contaminating the compost material with pieces too small to be screened out and discarded within the legacy piles.

Some of the legacy piles were so old that a variety of vegetation (grasses, bushes, small trees) was growing out of them. These large mounds of discarded materials were heavily contaminated with plastic film that could be seen blowing in the breeze. The legacy piles had

no underlying lining system and were not periodically covered in topsoil the way that a sanitary landfill would be. Looking at these piles, it was easy to imagine that they could be a significant contribution to plastic pollution. Plastic film could become dislodged and blow away. Plastics on the outside of the piles exposed to the elements could undergo photodegradation and potentially release volatile organic compounds (Wojnowska-Baryla et al., 2022). Plastics could also break down into microplastics, which could become airborne or be leached out after a rain event or after snowmelt in the spring. Microplastics have the ability to absorb pollutants onto their surfaces and may become vectors of those pollutants to the environment (ibid). The plastics on the inside of the legacy piles will most likely remain unchanged over time, but those which are exposed to sunlight, wind and rain become a source of pollution (ibid).

The largest component of diverted material at the Skeleton Park Arts Festival was the organics component. In 2022, this component consisted of a lot of food waste and craft paper food container waste. In 2023, there was a lot less food waste, and even though almost all food packaging was kraft paper containers, these were much smaller than the ones used the previous year and did not have lids. Thanks to the efforts of the waste diversion volunteers, the sorted food waste collected at SPAF was free of plastic contamination. The only opportunity to speak to attendees about plastic contamination in the organics waste stream in 2023 occurred when people brought in coffee cups with lids made of PLA plastic from outside the festival grounds. Volunteers provided a 'teachable moment' to let these attendees know that even though their lids were potentially compostable, placing them in the organics stream in Kingston would actually contaminate that stream. Most attendees thanked us for this

information and some even stated that they would share this information with the coffee vendor.



Figure 6: Tomlinson Organics, Joyceville, Ontario. Source: Google maps, satellite view, unknown year, labels added by author. There are currently more legacy piles than pictured.



Figure 7: Tipping floor at Tomlinson Organics composting centre, 11 May 2022.



Figure 8: Legacy pile at Tomlinson Organics composting centre, 11 May 2022.

2.5. Discussion

This paper is concerned with the greening of festivals, the waste that is produced, and the use of volunteers to accomplish the goal of reducing waste stream contamination and thereby reducing the amount of landfill waste. There are several UK non-profit organizations whose aim it is to help festival organizers reduce their carbon footprint. One such organization, Powerful Thinking (inspired by Julie’s Bicycle), reports environmental impact related to UK music festivals and states that the average onsite carbon footprint (not including travel to and from the festival) is due to energy generation (65 percent of emissions) and waste (35 percent

of emissions) (Powerful Thinking, 2015). In order to reduce waste, some UK festivals do not allow food vendors to use plastic food service ware, while others use only reusable food service ware that is washed and put back into circulation onsite. At SPAF food vendors must sign an agreement that they will 1) not provide plastic cutlery, 2) serve their food or beverages in containers that are either recyclable or that are compostable within the City of Kingston (no PLA plastic), and 3) serve attendees in their reusable containers if those were presented. Breaching this agreement would remove vendors from the list for the following year. Hazel and Mason (2020) state that festival patrons are more likely to attend a festival that has strong environmental practices and that the local community and patrons are an integral part of what makes a festival a success. In the case of the Skeleton Park Arts Festival, the local community, patrons and organizers are all involved in how the festival is run. Organizers have been able to recruit about 100 local volunteers each year, 30 of whom help to collect and sort waste during the 2-day event. The City of Kingston sends a waste representative from KARC to interact with and answer questions posed by festival goers. This representative is a useful resource to the waste diversion team when items from outside the festival grounds are handed in, and they also provide an educational component to waste diversion for the community at large. Ironically, this representative gives out little (plastic, individually wrapped) toy recycling bins and trucks to passing children – a practice not in line with the waste reduction goals of the festival.

For a small, local festival, (attracting approximately 4,500 yearly participants) SPAF has done an impressive job of managing waste. According to Dodds and Walsh (2019) larger festivals have a greater tendency to divert waste, possibly because of infrastructure, control

and available funds, while small festivals usually face a lack of resources (both financial and human). In 2022, SPAF had a revenue of \$256,825 (89 percent of which came from grants) while the total expenses amounted to \$248,044, leaving the festival in the black that year. I will speak to the resource of humans below. Dodds and Walsh go on to say that music festivals have higher waste diversion than other festivals, possibly because they tend to be outside in green spaces, and that they seem to garner a strong volunteer commitment. There was certainly no lack of volunteers at SPAF; however, there is no data available to determine the amount of waste generated per attendee. SPAF is free and open to the public, so there are no ticket sales to help generate attendance records, and the 3 separate components of OSKAR (plastics and metals, fibers, organics) are not separated and weighed when they return to KARC. My observations concerning a reduction in recyclable waste from 2022 to 2023 are purely qualitative. Finally, Dodds and Walsh (2019) state that waste diversion is greater in western Canadian provinces (Alberta and BC), and that there is specifically less responsibility on waste management at Ontario festivals. The organizers of SPAF should therefore be proud of their waste management system and should share their methods with other festival organizers in the province.

I understand that volunteering may be seen as “a technology of government the purpose of which is to align individual conduct with neoliberal capital’s double injunction of market rationality and social responsibility” (Vrasti and Montsion, 2014). Volunteering may aid in the acquisition of marketable skills and business contacts and may increase an individuals’ earnings (Day and Devlin, 1998), all factors that are important to me as someone new to a community and with no current full-time employment. However, I am also learning to

advocate for myself and have conversations with organizers about the possibility of turning volunteer positions into paid ones. As I acquire marketable skills, the expectation is that I be paid for the time spent and work done within my community. The difficulty lies in finding funding.

Monetary funds are required to promote reuse and a reduction among all waste streams. Organizations should not run on the power of volunteers, though so many do (Meals on Wheels, animal rescues, farmers markets, many festivals). Queen's University and the City of Kingston put together a Sustainability Hub which included a repair café run by volunteers. A more equitable system will be implemented by the government of France in October of 2023 when it sets aside €154m in a five-year fund to financially incentivize people to repair their clothes and shoes (Willsher, 2023). The goals of providing a repair bonus (people will be able to claim back between €6-€25 for the cost of repairs) are to support workers and retailers who offer repairs, to create new jobs, to reduce waste in the fashion industry and to promote a more circular economy.

The Skeleton Park Arts Festival would not be able to proceed if it were not for the small army of volunteers who perform innumerable tasks. Prior to the festival, volunteers recruit artists, crafters and community organizations, coordinate with food vendors for both the food court area and the backstage area, coordinate with the city to receive all necessary permits, and provide information to the community about upcoming events. During the festival volunteers help with everything from parking, security, site management, face painting, waste collection, stage management, hospitality, as well as providing assistance and selling merchandise at the information booth. The volunteer pool in 2023 during the festival was

about 71 females and 31 males, and the age of the volunteers ranged from young high school students to senior citizens. The province of Ontario does require 40 hours of volunteer service in order to graduate high school, a program started in 1999 in an 'attempt to halt the declining civic engagement of young people, and to encourage wider participation in community' (Henderson et al., 2007). The volunteer coordinator is a teacher at a local school, which enables her to recruit students. However, most of the volunteers were adults who were not there due to any provincial requirement. Most of these people were members of the community who lived around the park and who have been associated with the festival since its inception. I am somewhat of an outlier within the volunteer pool because I do not live in Kingston, am not an artist or musician, and have no ties to this community. Although I truly enjoy volunteering during the festival itself, I must admit that I considered leaving my voluntary position of food vendor coordinator several times when what was being asked of me felt overly stressful (if I had not succeeded in finding enough food vendors or had not ensured that they had completed all city health requirements for vendor participation, I could have affected the enjoyment of festival attendees).

SPAF would not be able to produce only one bag of landfill waste were it not for the waste diversion volunteers. Understanding the importance of these volunteers in the organizational framework of SPAF makes me realize that in order to scale this particular framework up to a larger festival a greater number of organizers would be needed to manage a greater number of volunteers. However, if festival sponsors undergo a paradigm shift akin to the repair bonus provided in France and provide a participation bonus to festival patrons who also help with festival proceedings, then the necessary army of volunteers turns into an army of

paid participants. This is something that is being attempted by Cloud 9, a Toronto based organization whose goal is to 'empower youth with the passion and skills to build sustainable communities for the 21st century' (Cloud 9, 2023, Who Are We). One of the tickets available for their 2023 Electronic Music and Eco Art Festival is a Volunteer Pass which provides the purchaser a \$75 discount to the festival in exchange for 1 hour of training and 4 hours of volunteer work. This is the type of mindset needed to dislodge neoliberal practices.

2.6. Conclusion

Much work is being done to study and reduce the amount of waste generated at festivals. Stakeholders vary greatly and include members of the tourism industry, organizers, managers, performing artists, and participants. Many of these individuals travel substantial distances to spend hours or days on the festival grounds. For many of these stakeholders, it is important for the festivals to be green. Organizers have realized that recruiting a large number of volunteers may significantly impact enjoyment of participants, rate of recycling, and reduction of waste stream contamination. Volunteers may also provide a teachable moment for participants, educating them about sustainable measures taken to reduce the festivals' carbon footprint. As the case study has shown, the actions of both participants and volunteers may have environmental implications on the communities bordering the composting facilities which service the festival grounds. The effects of greening festivals may spread far beyond the festivals themselves, and should therefore be encouraged, celebrated, and most of all, financially supported.

2.7. References

Abu, R., Ab Aziz, M.A., Che Hassan, C.H., Noor, Z.Z., & Abd Jalil, R. (2021). Life cycle assessment analyzing with GaBi software for food waste management using windrow and hybrid composting technologies. *Jurnal Teknologi (Sciences and Engineering)*, 83(6): 95-108. DOI:

<https://doi.org/10.11113/jurnalteknologi.v83.17199>

Bär, S, Kormann, L., & Kurscheldt, M. (2022). How nudging inspires sustainable behavior among event attendees: A qualitative analysis of selected music festivals. *Sustainability*, 14,

6321. DOI: <https://doi.org/10.3390/su14106321>

Braun, M., Mail, M., Heyse, R., & Amelung, W. (2021). Plastic in compost: Prevalence and potential input into agricultural and horticultural soils. *Science of the Total Environment*, 760.

DOI: <https://doi.org/10.1016/j.scitotenv.2020.143335>

Brinton, Jr. W.F. (2005). Characterization of man-made foreign matter and its presence in multiple size fractions from mixed waste composting. *Compost Science & Utilization*, 13(4): 274-280.

City of Kingston. (2022). OSKAR. Accessed on October 8, 2022.

<https://www.cityofkingston.ca/resident/garbage-recycling/waste-tools/oskar>

Cloud 9. (2023). Who Are We. Accessed on August 10, 2023. <https://www.no9.ca/who-we-are>

Dávid, L. (2009). Events and tourism: an environmental approach and impact assessment. *Journal of Tourism Challenges and Trends*, 2: 101-113.

Day, K.M., & Devlin, R.A. (1998). The payoff to work without pay: volunteer work as an investment in human capital. *Canadian Journal of Economics*, 31(5): 1179-1191.

Dodds, R., & Walsh, P.R. (2019). Assessing the factors that influence waste generation and diversion at Canadian festivals. *Current Issues in Tourism*, 22(19): 2348-2352. DOI: <https://doi.org/10.1080/13683500.2018.1461813>

Dodds, R., Grima, J., & Novotny, M. (2022). Sustainability gets thrown in the trash: Comparing the drivers and barriers of festival waste management in Canada and New Zealand. *Event Management*, 26: 1145-1159. DOI: <https://doi.org/10.3727/152599522X16419948390961>

Government of Canada. (2023). Economic Overview. Accessed on June 20, 2023. <https://www.budget.canada.ca/2023/report-rapport/overview-apercu-en.html>

Hazel, D. and Mason, C. 2020. The role of stakeholders in shifting environmental practices of music festivals in British Columbia, Canada. *International Journal of Event and Festival Management*, 11(2): 181-202. DOI: <https://doi.org/10.1108/IJEFM-07-2019-0037>

Henderson, A., Brown, S.D., Pancer, S.M., & Ellis-Hale, K. (2017). Mandated community service in High School and subsequent civic engagement: The case of the “double cohort” in Ontario, Canada. *Journal of Youth and Adolescence*, 36: 849-860

Hird, M.J. (2021). *Canada’s Waste Flows*. McGill-Queen’s University Press.

Hoorweg, D., Bhada-Tata, P., & Kennedy, C. (2013). Environment: Waste production must peak this century. *Nature*, 502: 615-617.

Laing, J. & Frost, W. (2010). How green was my festival: Exploring challenges and opportunities associated with staging green events. *International Journal of Hospitality Management*, 29: 261-267. DOI: <https://doi.org/10.1016/j.ijhm.2009.10.009>

Mair, J., & Jago, L. (2010). The development of a conceptual model of greening in the business events tourism sector. *Journal of Sustainable Tourism*, 18(1): 77-94. DOI: <https://doi.org/10.1080/09669580903291007>

Martinho, G., Gomes, A., Ramos, M., Santos, P., Gonçalves, G., Fonseca, M., & Pires, A. (2018). Solid waste prevention and management at green festivals: A case study of the Andanças Festival, Portugal. *Waste Management*, 71: 10-18. DOI:

<https://doi.org/10.1016/j.wasman.2017.10.020>

Measham, T.G., & Barnett, G.B. (2008). Environmental volunteering: motivations, modes and outcomes. *Australian Geographer*, 39(4): 537-552. DOI:

<https://doi.org/10.1080/00049180802419237>

Polonsky, M.J., Landreth Grau, S., & Garma, R. (2010). The new greenwash? Potential marketing problems with carbon offsets. *International Journal of Business Studies*, 18(1): 49-54.

Powerful Thinking. (2015). The show must go on report. Available at: https://www.powerful-thinking.org.uk/wp-content/uploads/The_Show_Must_Go_On_Nov-2015.pdf (Last accessed 10 October 2022).

Rotolo, T., & Wilson, J. (2006). Employment sector and volunteering: The contribution of nonprofit and public sector workers to the volunteer labor force. *The Sociological Quarterly*, 47: 21-40.

Sandra, N., & Alessandro, P. (2021). Sustainability of local food festivals: A framework to estimate environmental impacts. *Journal of Environmental Accounting and Management*, 9(3): 205-217. DOI: <https://doi.org/10.5890/JEAM.2021.09.002>

Shouldice, A. (2013). Kingston near top for composting. Whig Standard, July 17. Accessed on June 23, 2023. <https://www.thewhig.com/2013/07/17/kingston-near-top-for-composting>
Source: <https://www150.statcan.gc.ca/n1/pub/16-002-x/2013001/article/11848-eng.htm>

Tchobanoglous, G., Karagiannidis, A., Leverenz, H., Cadji, M., & Antonopoulos, I.S. (2006). Sustainable waste management at special events using reusable dishware: The example of Whole Earth Festival at the University of California, Davis. *Fresenius Environmental Bulletin*, 15(8): 822-828.

Tennant-Wood, R. (2003). Going for zero: A comparative critical analysis of zero waste events in Southern New South Wales. *Australian Journal of Environmental Management*, 10: 46-55.

Trapunski, R. (2022). The music industry changes its tune on climate change. *Corporate Knights*, October 24, 2022. Accessed June 19, 2023.
<https://www.corporateknights.com/category-culture/the-music-industry-changes-its-tune-on-climate-change/>

United Nations. (2012). The global garbage crisis: No time to waste. Available at:
<https://www.unep.org/news-and-stories/press-release/global-garbage-crisis-no-time-waste>
(Last accessed 12 October, 2022).

Vrasti, W., & Montsion, J.M. (2014). No good deed goes unrewarded: the values/virtues of transnational volunteerism in neoliberal capitol. *Global Society*, 28(3). DOI:

<https://doi.org/10.1080/13600826.2014.900738>

Willsher, K. (12 July 2023). Stitch in time: France to help pay for clothes to be mended to cut waste. *The Guardian*. Accessed on July 28, 2023.

<https://www.theguardian.com/environment/2023/jul/12/stitch-in-time-france-to-help-pay-for-clothes-to-be-mended-to-cut-waste>

Wilson, B.G., Haralampides, K., & Levesque, S. (2004). Stormwater runoff from open windrow composting facilities. *Journal of Environmental Engineering and Science*, 3: 537-540. DOI:

<https://doi.org/10.1139/s04-024>

Wojnowska-Baryla, I., Bernat, K., & Zaborowska, M. (2022). Plastic waste degradation in landfill conditions: The problem with microplastics, and their direct and indirect environmental effects. *International Journal of Environmental Research and Public Health*, 19(20): 13223. DOI:

<https://doi.org/10.3390/ijerph192013223>

Wong, I.A., Wan, Y.K.P., & Qi, S. (2015). Green events, value perceptions, and the role of consumer involvement in festival design and performance. *Journal of Sustainable Tourism*,

23(2): 294-315. DOI: <https://doi.org/10.1080/09669582.2014.953542>

Zambrano-Monserrate, M.A., Ruano, M.A., & Ormeño-Candelario, V. (2021). Determinants of municipal solid waste: a global analysis by countries' income level. *Environmental Science and Pollution Research*, 28: 62421-62430. DOI: <https://doi.org/10.1007/s11356-021-15167-9>

Zelenika, I., Moreau, T., & Zhao, J. (2018). Toward zero waste events: Reducing contamination in waste streams with volunteer assistance. *Waste Management*, 76: 39-45. DOI: <https://doi.org/10.1016/j.wasman.2018.03.030>

Chapter 3: Mother Earth and Her Three Little Wasteful Pigs: Waste Reduction through Degrowth

3.1. Abstract

This chapter considers waste as a planetary crisis, and Earth as the porcine mother who sends her over-consuming children out into the world. The first born, hegemonic little pig, dismisses the crisis, swaggering in ever-accelerating capitalist growth. His more mature brother, somewhat concerned about his vulnerability to accelerating environmental catastrophe, builds his house with aspirational concepts like waste as resource and circular economy, and with regulations, transboundary amendments and policies that seek to work within his older brother's burn-baby-burn empire. The youngest pig is tired of her older siblings' telling her 'how things are'. Their settler colonialism, neoliberal capitalism and social injustice have rendered her the most vulnerable, and she is building her shelter against the inhospitable future with what her brothers call 'radical' thinking: degrowth. Drawing on a range of theoretical and methodological traditions, this chapter considers the feasibility of degrowth, and its potential impact on our waste crisis.

3.2. Introduction

Humanity is facing environmental crises whose convergence amounts to, if not species extinction, then a greatly reduced and impoverished survivor society. This chapter considers waste as a major contributor to this confluence, and our responses to its looming environmental, human health and wellbeing, and social justice consequences. Borrowing from

the well known Three Little Pigs fable, we explore the concept of degrowth as an increasingly proffered solution to our planetary waste crisis.

Mother Earth's oldest child - the first little pig - represents our current way of living. Present-focused, insatiably craving immediate gratification and hubristic of his own technological prowess, this little pig lives in the straw house that he built from ever-expanding imperial resource extraction, exerting little effort in acknowledging - let alone dealing with - planetary limits or social justice, swaggering instead in ever-accelerating capitalist growth. This oldest of the porcine siblings confidently reiterates that the solution to the global environmental crisis (the fable's big bad wolf) is to dig more landfills, incinerate and otherwise techno-fix our way out of the global waste crisis. Garbage, the oldest pig confidently asserts, is not trash at all: it is a profit-making resource.

His more mature brother, the second of the three little pigs, sure likes to party with the dwindling number of other privileged porcines of the world, but acknowledges his vulnerability to what is appearing to be an increasingly certain catastrophic future. This second brother's wooden house is built with concepts like green innovation, re-municipalization and circular economy, and with regulations, transboundary agreements, and policies that seek to modify his older brother's burn-baby-burn approach. These adaptations are necessary, thinks big brother number two, and are eminently viable within a growth economy.

The youngest pig - the black sheep of the porcine family (to mix metaphors) - is tired of her older brothers trashing the planet. Their settler colonialism, land grabs, neoliberal capitalism and social injustice has rendered her the most vulnerable to an inhospitable future. She knows that she'll need to build her brick house with what her brothers dismiss as 'radical

thinking': degrowth through reduced extraction, manufacturing, consumption and disposal. Undeterred by her brothers' deriding her efforts as impractical, anarchic, or pure fantasy, this youngest pig knows that degrowth is already afoot. She is galvanizing global efforts to build a civic ecology. Part of the younger generation, this pig is learning from small community initiatives to reuse, refurbish and share products, and social movements such as voluntary simplicity, low technology living, slow shopping, and so on. The youngest pig is re-orienting our understanding of the global environmental crisis away from technological fixes and individual responsibility for post-consumption waste, and towards waste (and its associated environmental crises of climate change, biodiversity loss and so on) as a global social justice issue.

Drawing from a range of (supra) government, industry and non-governmental organization reports, engineering and science waste management literature, and the burgeoning social sciences and humanities waste studies literature, this chapter uses the analogy of the three little pigs to (albeit somewhat crudely) sketch waste as it is currently managed; initiatives that promise to tackle the waste crisis (here, the big bad wolf) while largely adhering to modernity's capitalist political economy; and calls to action that radically inverse capitalism's fundamental axiom in order to de-grow the global economy. The current hegemonic waste management system (straw house) treats waste as a problem resolvable through capitalist venture, technological innovation and post-consumption individual behavioral change. The wood house approach attempts to resolve waste's increasing volumes and toxicity through initiatives such as the circular economy and energy-from-waste that firmly operate within the current economic growth paradigm. The stone house focuses on the waste

hierarchy's apex - refusal, reduce, reuse and refurbish - actions only possible at a global scale through degrowth.

3.3. Our Straw House: The Way It Is

As we write this chapter, forest fires are raging across our home country of Canada.

Uncontrolled and controlled fires burn in the enormous provinces of British Columbia, Alberta, Quebec, and in eastern Canada's Nova Scotia and New Brunswick. Forest fires are, of course, part of nature's routine 'order of things' (Prigogine and Stengers, 1984; Foucault, 1970). But the size, ferocity and early-season timing of these 2023 fires are unusual. Canada's forestry service, climatologists and scientists are sounding a familiar alarm: the fires are the outcome of human caused climate change (Jones et al., 2022). The effects of climate change are cropping up around the globe, from flooding in India, Algeria, and Ecuador, to melting permafrost in Arctic regions, to rapidly submerging communities in Venice or whole nations such as the Maldives, Tuvalu, the Marshall Islands, Nauru and Kiribati (Floodlist, 2023).

Adding to the worryingly long list of global environmental threats is the mounting volume and toxicity of waste. According to the World Bank, we are currently producing over 2 billion tonnes of municipal solid waste (MSW) per year. This figure is set to rise to a staggering 3.4 billion tons by 2050. These numbers mask an even more sobering fact: MSW accounts for only a small fraction of the waste we produce: resource extraction, production, distribution and retail industries produce far more waste than does consumption (Hird, 2021; Lepawsky, 2018; Liboiron, 2014). And even when we just consider MSW, almost seventy percent of that waste is packaging that producers and retailers foist onto consumers (PlasticsEurope, 2018). Plastics

pollution alone has emerged as a serious environmental concern, and is directly connected to climate change because plastics are derived from fossil fuels (EIA, 2023). Over ninety percent of plastics are derived directly from fossil fuels: plastics and fossil fuel production increase in tandem (PlasticsEurope, 2022). Unsustainable plastics production has resulted in a fifteen percent increase in greenhouse gas (GHG) emissions from 2012 to 2018 (CIEL, 2019). Moreover, of the more than 390 Mt of plastics produced globally in 2021, less than ten percent are recycled (PlasticsEurope, 2022). And plastics take between 5 to 1,000 years to degrade into microplastics, which effectively last forever (O'Neill, 2019). According to the World Economic Forum, a truck load of plastics are dumped in the world's oceans every minute (Pennington, 2016) and in 2017, the United Nations declared ocean plastics to be a "planetary crisis" with about 100,000 marine mammals dying annually due to plastics ingestion or entanglement. By 2050, global greenhouse (GHG) emissions from the plastics production and consumption life cycle will account for ten to thirteen percent of our planet's remaining emissions 'budget' (CIEL, 2019, 2020).

The global waste crisis is part of a growing number of environmental, and human health and wellbeing crises: climate change, biodiversity loss, pollution, potable water scarcity, drought, fires, climate refugees, and so on. In order to understand the logic of the increasing calls for degrowth, we need to take stock of our current 'waste maker' (Packard, 1960) society. The extensive literature on the Anthropocene traces the beginning of this (informally accepted) epoch to a number of events or advances (depending on one's politics), including: the Neolithic era's shift to agriculture around 12,000 years ago; large-scale landscape burning and farming; the invention of the steam engine and the onset of the Industrial Revolution; and

the Great Acceleration, which refers to the trifecta of population growth, widespread use of agricultural chemicals, and atomic bomb tests starting in the 1950s. What stitches these various developments together is significantly increasing resource extraction, production, distribution and consumption - and an inevitable increase in waste. Within the latter part of the Anthropocene we observe a dramatic historical shift in dealing with waste from individual cartage and disposal operators to much larger corporations such as Browning-Ferris Industries and Waste Management Incorporated in North America (Crooks, 1993; Davies, 2008; Melosi, 2005). These publicly traded companies are heavily financially invested in all aspects of waste management , including waste containers, collection and haulage vehicles, landfills, and other waste management facilities, garnering enormous profits from municipalities that spend millions in contracts to these industries. Waste management is very big business: for instance, in 2014, Canada's waste management industries earned nearly \$7.1 billion (Statistics Canada, 2017).

As J. B. MacKinnon (2021) points out, no or low economic growth has been the norm for nearly all of human history. As such, the Anthropocene draws our attention to the impact of economic growth on the vastly increased production of waste. Economic growth is the foundation of our contemporary global neoliberal capitalist system. Significantly, capitalism owes much of its global reach and success to settler colonialism and empire. While bulky, using the term (settler)colonial neoliberal capitalism is critical because it is the *convergence* of these distinct structures, forces, policies and practices - that explains the justification of degrowth as halting the environmental, human health and wellbeing devastation that these forces (and their interactions) have wrought. Economic growth is so fundamental to our understanding of how

developed, civilized and advanced a country is that the Gross Domestic Product (GDP) is the almost universally accepted measure of a country's economic success, a point we will return to in a later section.

In response to the rising volumes and toxicity of waste globally, federal governments, supra-national organizations such as the United Nations, and non-governmental organizations have adopted the Waste Hierarchy - a tool used to determine how to best manage waste. Originally illustrated as the 5-rung Ladder of Lansink with the categories Prevent, Reuse, Recycle, Incineration, and Disposal from top to bottom (Lansink, 2017), the ladder symbolized hierarchical - from best to worst - ways of dealing with globally rising volumes of waste. Various national governments as well as organizations such as the Zero Waste International Alliance (2023) have modified the Waste Hierarchy to suit their priorities. For instance, the federal government of Canada has adopted a 6-rung hierarchy illustrated as an upside-down triangle starting with waste prevention/reduce, and followed by reuse/repair, remanufacture/refurbish, recycle, energy recovery, and landfill (Government of Canada, 2021a). Waste prevention appears at the apex because reduction should be "the first priority... both at the manufacturing level and by consumers and institutions" (ibid: p13). No matter the permutation, though, the foundational argument is that we need to 'climb up' the Waste Hierarchy from disposing of waste to preventing or reducing waste in the first place. And while many countries have enthusiastically and officially adopted the Waste Hierarchy, the overarching response to waste remains stubbornly at the bottom (disposal/landfill) and only slightly higher up (recycle).

Plastics and other waste (particularly from extractive industries) are exponentially increasing. This is the case because resource extraction, manufacturing, distribution and consumption are increasing (Arboleda, 2020; Jarrige and Le Roux, 2020) all of which are key to our current capitalist economic system, which depends upon economic growth through product and services growth. As the rather fatalistic saying goes, nothing escapes capitalism's reach. Capitalism captures every aspect of living and dying possible: from necessities such as food, water, clothing and accommodation, to every lifestyle element that we can imagine. Indeed, as soon as a component of 'living well' can be imagined, capitalism figures out a way to commercialize and profit from it. And waste is no exception. Such design developments as planned obsolescence (of quality, desirability and/or function) capitalizes both technological innovation and human psycho-social needs for community to produce constant and increasing discards as so-called product improvements appear (Packard, 1960). Planned obsolescence reveals that waste is entirely purposeful within capitalism, and part of the general rise of what we now call consumer culture, or more generally consumption society (Strasser 1999). As the third little pig gets her say in a later section, the latter term masks an inconvenient truth: consumption society turns out to be a very exclusive society that includes only seventeen percent of the global population. The rest of humanity largely consumes as it has always done; within its means and planetary limits. This does not mean that the majority of people living within planetary boundaries are not living with ever-increasing volumes and toxicity of waste: waste tends to flow from Globalized North to Globalized South through waste exports, and poorer countries lack the resources to construct and maintain landfills rather than

the much cheaper option dumping waste - at considerable human health and environmental cost.

Therefore, neoliberal settler/colonial capitalism structures the way in which we understand waste as a problem, and how to solve this problem. Waste is understood as the inevitable - but controllable - excess of economic growth. And the solution is an entrepreneurial approach to profit maximization through private industries disposing of, and/or recycling waste for profit. This solution cleverly masks the fact that, overwhelmingly and by orders of magnitude, almost all waste is produced before end consumers enter the waste picture. Hird's (2022) term for this, the 'problem of amplification', explains how and why manufacturing and retail industries, as well as governments and (misled) members of the public frame waste as a problem of post-consumer waste, and therefore consumer responsibility. The emphasis on individual responsibility operates within a capitalist rationale to manage waste in ways that do not disturb ever-increasing circuits of mass production and consumption (and therefore industry profit), producing an almost exclusive orientation towards downstream (disposal and recycling) responses to waste (Hawkins, 2006; Kollikkathara et al., 2009; Lynas, 2012). And to suggest anything else is to call for the downfall of society, to invoke chaos out of order, to be 'anti-society'. We are so utterly politically and psychologically tethered to economic growth that the International Energy Association states that it is absolutely feasible to decouple economic growth from climate pollution (i.e. waste), but that degrowing the economy is "unthinkable" (in MacKinnon, 2021: p64). In short, what economists call No Growth Disaster amounts to a scare-mongering equation: no growth = disaster. That is to say, degrowth equates with anarchism and the destruction of the neoliberal capitalist settler colonial global

system. As such, reaching the apex of the Waste Hierarchy while inhabiting the first little pig's straw house remains largely aspirational.

3.4. The Wood House: Which Cake Are We Trying to Have and Eat?

The second little pig is becoming more and more aware of the effects of climate change. In four straight days in July, 2023, the global average daily temperature was the highest in recorded history, and possibly the highest in 100,000 years. Weather is more and more frequently becoming the top news story of the day. Companies are starting to feel the proverbial heat from activists extolling the role that overconsumption plays in the climate crisis, and are redesigning their marketing campaigns to demonstrate responsible environmental policies. More global consumers with the financial means to do so report that they are willing to pay more for environmentally friendly products and may be more likely to purchase products from firms they consider to be socially responsible (de Freitas Netto et al., 2020). This is driving companies to proclaim that they are integrating social and environmental concerns in their business operations, but has also led to companies claiming to have higher environmental performance than they actually do, a form of greenwashing. Yu et al. (2020) found that more than half of the 1,925 companies in 47 countries that they studied, engaged in greenwashing.

Unlike his older brother, the second little pig neither ignores nor explains away the increased flooding, the engulfing fires, and severe heat waves that are now (finally) affecting his privileged way of life. Working within the global neoliberal capitalist system, second brother pig is modifying his senior brother's tacky burn-baby-burn approach with Circular Economy (CE), Green innovation, Extended Producer Responsibility (EPR) and re-municipalization

regulations and policies, and energy-from-waste (EfW) infrastructure designed to seek as much profit as possible from our abundant, and ever-increasing, waste feedstock. Not much has changed with regard to high-level nuclear waste: industry and governments are still attempting to convince communities (remote and/or poor) to accede to permanent storage repositories that must contain this highly toxic waste for hundreds to thousands of years.

One of the ways in which this little pig attempts to improve upon his older brother's strategy of dealing with waste is by reorganizing waste's management and its efficiency. During the 1980s and 1990s, in response to growing claims that local governments were inefficient and therefore costing taxpayers, private waste management companies and governments were pressing the case that public services should be managed by for-profit companies instead of bureaucrats; the capitalist logic being that market competition leads to optimum service and infrastructure efficiency at the lowest competitive cost (Voorn et al., 2021). Waste management and other utilities companies (such as water, electricity, transportation, education and healthcare) promised a superior quality product at lower cost than local government (ibid). Over time, waste management corporations bought out smaller companies until a relatively few corporations now manage waste globally, reducing competition, creating monopolies and providing what some considered less than optimum service (Hird, 2021).

In recent years, this trend is somewhat reversing, with some regions re-municipalizing waste management after experiencing increasing costs of private contracting in exchange for the same, or inferior, services. Re-municipalization advocates argue that when municipalities are untethered from the profit-making imperative that dominates contracts with private companies they can instead focus on sustainability, equity, and service. There are challenges:

most U.S and Canadian landfills are privately owned, which means that municipalities either need to contract with the landfill owners (and pay tipping fees) or construct their own landfill, which is a complex and expensive process and requires community agreement. As well, a long reliance on private waste companies means that municipalities must invest in garbage and recycling trucks and other infrastructure. But some municipalities are tackling these challenges. For instance, Kishimoto and Petitjean (2017) analyzed over 835 cases of re-municipalization between 2000 and 2016, finding that, in 45 of the countries they studied, re-municipalization reduced costs and tariffs, improved conditions for waste management service workers and boosted service quality. The largest sectors exhibiting re-municipalization are energy and water, with far fewer cases in the waste sector (ibid). Although re-municipalization has enabled municipalities to better manage waste diversion (recycling and composting), these changes do not necessarily lead to waste reduction. The second little pig might be very satisfied with how the city handles his sorted garbage, but there is nothing in place to incentivize him to reduce his consumption or decrease his trash-production.

Indeed, there is nothing in the second little pig's arsenal that focuses on reducing the production of waste (Corvellec, 2014; Svinstedt et al., 2020). Globally, the most popular form of waste disposal is landfilling (and open dumping) (Hird, 2021). Waste has also been burned for millenia, but only recently has incineration's potential energy been collected in order to generate electricity. Energy-from-Waste (EfW) incineration is used primarily in high income and land-constrained countries, increasing from 0.1 percent to 10 percent between 2012 and 2018 (mostly due to China's investment in facilities) and accounts for eleven percent of global waste disposal (Kaza et al., 2018)). In Canada, a country with a population density of four people per

square kilometer, three percent of waste is incinerated (Government of Canada, 2021a), while Japan, an island nation with a population density of 340 people per square kilometer, incinerates eighty percent of generated waste (Kaza et al., 2018).

EfW proponents argue that it reduces the volume of (already produced) MSW by 90 percent, freeing up land that would otherwise be needed for landfilling (Government of Canada, 2021b) while at the same time producing electrical power that would otherwise be generated through coal, oil and/or gas. However, there are downsides to both incineration and EfW. To run, incinerators - whether they do or do not generate electricity - require a constant supply of feedstock: waste. This means that recyclable materials are re-diverted from recycling back to waste when facilities do not have enough waste to continuously operate. Thus, far from encouraging the reduction of waste, incinerators *require* significant amounts of waste to be constantly generated and available to burn. Another significant problem is that when waste, especially plastics, are incinerated they produce toxic chemicals. In effect, incineration creates its own waste, some of it much more highly toxic than the original MSW waste itself. Bottom-ash is typically non-toxic and is, in a few circumstances, used in the construction industry as a road-paving material, reinforcing CO₂ emitting vehicles hegemony. In other circumstances, metals may be gleaned from bottom ash and reused. Fly ash - the ash that collects at the top of the incinerator's chimneys - by contrast, contains hazardous materials such as heavy metals (arsenic, cadmium, chromium, nickel, lead and selenium), dioxins and furans (Huber et al., 2016), and must be disposed of as hazardous waste. In other words, fly ash waste is far more dangerous than the waste that produces it.

As well as the techno-fix promise of EfW incineration, the second little pig advocates that we adjust our current economy. The circular economy (CE) seeks to eliminate waste and pollution by redesigning products such that all materials re-enter the economy post-consumption, giving nature an opportunity to regenerate (Ellen Macarthur Foundation, 2015). As such, the second pig modifies the capitalist economy to emphasize profit from already-consumed materials. According to Lansink, author of the original waste hierarchy (see the previous section), the ladder approach - from the lowest rung of landfilling to the highest rung of waste prevention - stimulates innovation on and between the rungs “forming the solid basis for ecodesign” (2017: p43). Each of these innovations, according to the theory, forms a loop, increasing the circularity of the overall hierarchy. Although some raw materials will always remain essential, and not all waste will be eliminated, the second pig believes that the CE will effectively stem the waste tide. Unsurprisingly, private companies, their consortiums and governments are proclaiming the brave new CE world as balm to the climate crisis. As a recent report published by the Global Commission on the Economy and Climate, an international group of economists, government officials, and business leaders, declared, “We are on the cusp of a new economic era: one where growth is driven by the interaction between rapid technological innovation, sustainable infrastructure investment, and increased resource productivity. We can have growth that is strong, sustainable, balanced, and inclusive” (New Climate Economy, 2018: p18). The Commission maintains that “the objectives of growth, climate action and development are interrelated and complementary” (ibid) and that the CE has the potential to not only radically cut the demand for primary resources but to reduce waste as well.

At this stage, CE remains largely theoretical and aspirational, and there are a number of challenges. For one, virgin materials used to make products remain low-cost compared with CE products (Kirchherr et al., 2018). Theoretically, as companies redesign their products to be more circular, demand will increase and prices will fall, but Lansink (2017) questions whether a rapid and complete transition to a CE is possible within global markets. Kirchherr et al. (2018) also concede that the high upfront investment costs of product redesign, the lack of global regulatory consensus on material use and hesitant company culture to invest in redesign due to lacking consumer interest, all contribute to the stagnation of a CE transition.

CE critics also cite the Waste-Resource Paradox (Greer et al., 2021). By turning waste into a resource, critics argue that the result is increased waste production and not the intended elimination of it - in essence a rebound effect (and hence the paradox). If a waste stream is turned into a commodified resource, then demand for that resource increases and overproduction results. Another major challenge is that the CE relies very heavily on recycling, a process that is entirely for profit, has negative environmental effects, results in a very limited one or two cycles before the product's integrity is too diminished (called 'downcycling') and requires virgin materials (for instance, in plastics manufacturing - see Hird, 2021, 2022). As such, recycling any virgin material is not part of the CE. Environmental burden-shifting may also occur with circularity: if waste-as-resource is used for downcycling (Greer et al. use the example of recycled plastics being turned into material for 3-D printing), then the environmental gains of recycling are compromised by the environmental costs of energy consumption.

The CE may also have social and human health implications when waste is traded on a global scale, which often leads to discrepancies about the definition of waste between nations. Broken electronics in the Global North are considered waste, but in the Global South this same material may be viewed as a source of valuable metals (as well as waste) (Gregson and Crang, 2015; Gregson et al., 2010). The toxic waste left over after metals have been extracted from discarded electronic devices causes both social and environmental harm, compromising the benefits of the CE when assessed at a global scale. Thus, when these factors are considered together, a CE with reduced levels of resource extraction, waste and emissions is far less likely than a shift towards improved recycling and a suboptimal transition from the lower waste hierarchy rungs of landfill and incineration to the slightly higher rungs of material reuse and downcycling. In sum, EfW, CE, re-municipalization and other ‘techno-fix + consumer behavior change = waste reduction’ strategies remain tethered to economic growth and social injustice (for instance, in rare earth materials mining). As such, we are trying to solve problems with the same type of thinking that created these problems.

3.5. A Brick House for the Future We Need Now: Degrowth

We may appreciate the third little pig’s frustration with her brothers. Her older siblings built their straw and wood houses before she was born, convincing themselves and their neighbors that unrelenting economic growth in the service of the privileged is the logical order of things (Foucault [1966]1970). They have, indeed, not only built their houses, but also organized the resources to be extracted for the housing materials and all of the stuff their houses contain (industrial agriculture and food waste, forestry, oil/gas/plastics, land grabs, contaminated post-

extraction sacrifice zones etc.), the labor required to build the houses (immigrant, low wage and seasonal, non-unionized, precarious workplace safety), the financial structure required for home-building (loans, mortgages, gentrification and racial exclusivity etc.): in short, this gilt-edged *beau monde* has rigged a global system to recklessly globally extract, produce, distribute, consume and waste in an endless cycle under the banner of modernity.

Youngest pig knows that this is not the win-win for everyone that her brothers promised: the increasing heat waves, tornadoes, forest fires, hurricanes, flooding, rising sea levels, coral bleaching, melting icebergs, habitat loss, and increasing contamination of land and waters tell a starkly different story. Critically, this green activist makes the connection between these environmental events and social injustice. An increasing number of studies frame waste as a social justice issue, focusing on the association between waste and poverty, for instance where open dumps, landfills, and other waste repositories are proposed and sited (for example, Amegah and Jaakkola, 2016; Furedy, 1993; Mothiba et al., 2017; Parizeau, 2006). As Samantha MacBride and other waste studies scholars point out “industrial zones – the only suitable spots for large-scale processing of recycling as well as garbage transfer, disposal, and incineration – are overwhelmingly near the homes of people of color and sometimes working-class white people” (2012: p125). And far from confined to the globalized south, these open waste sites, and their toxicity, are features of the globalized north (Hird, 2021). Indeed, the contaminating waste - settler/colonial capitalism’s excesses are very unevenly dispersed. We might consider the twenty-three nuclear weapons that the US tested on the Bikini Atoll or the 2,056 nuclear detonations across the globe, most of them exploded on colonized Indigenous lands far away from the capitals of colonizing forces (Arms Control Association, 2020). Or, we might ponder

the Khian Sea ship fiasco, an 11-year attempt by company in Philadelphia to offload a cargo of 14,000 tons of incinerator ash in the Bahamas, Honduras, Panama, Bermuda, Guinea Bissau, the Dutch Antilles, the Dominican Republic, Haiti, Sri Lanka, Morocco, Yugoslavia and Senegal. We could go on (but see Adeola, 2012; Arboleda, 2020; Hird, 2021, 2022; Hird and Predko, 2023; Jarrige and Le Roux, 2020; Nixon, 2011; O'Neill, 2019).

There is, and has long been, sufficient evidence to demonstrate that economic growth causes pollution, and that pollution is a social justice issue (Hird, 2022; Hird and Predko, 2023; Liboiron, 2021; Nixon, 2011). If something seems too good to be true, it means that someone else is paying. Straw-housers either live in denial, are obtusely ignorant, or they don't care. It is the cost of doing business, so long as the cost is off-shored. Wood-housers recognize the problem but like the citizens of Omelas in *The Ones Who Walk Away from Omelas* (Le Guin [1973]2022), the desire to maintain their paradise outweighs the fact that this paradise requires the sacrifice of others (Le Guin [1973]2022). J.B. MacKinnon (2021) makes the important observation that because consumption is relative - a few million are consuming *much* more than several billion - so too is consuming less. In MacKinnon's thought experiment in which the world stops shopping, there is a profound difference depending on how materially wealthy or poor a person is:

In the poorer parts of the world, most households would hardly alter their daily habits, while a minority of wealthier citizens sharply reduce their consumption. In the rich world, the pattern is reversed: a few scarcely notice the difference, while the majority plunge into a torrent of change. (ibid: p41)

And while it is true that the increasing global human population factors into our exponentially increasing waste generation, we are not consuming or wasting the same amounts, nor are we equally experiencing waste's contaminating consequences. For instance, the rich have relatively clean air because they've off-shored manufacturing to poor nations. Wood-housers, then, are much more likely to enthusiastically endorse whatever techno-fix is touted to resolve the problem, from biodegradable fashion and chemical plastics recycling to EfW facilities that promise clean garbage burning, and thus license the continuation of our current global societal metabolism (extraction, production, distribution, consumption, waste). Big engineering promises the citizens of Omelas that they may continue to live in consumptive comfort *and* that the agonized child will suffer no more.

It is the brick-housers - *The Ones Who Walk Away from Omelas* (Le Guin [1973]2022) - that are prepared to move the discourse from the current hegemony of economic growth to one of degrowth. The Gross Domestic Product, the nearly universal measure of economic success since the industrial revolution, is being replaced by the Happiness Index. Leading the way, since 1971 Bhutan has assessed itself through the Gross National Happiness (GNH) index, "based on equitable social development, cultural preservation, conservation of the environment and promotion of good governance" (Kelly, 2012: np). New Zealand and a few other countries have more recently followed suit. The GNH and other initiatives such as the Happy Planet Index signal a move away from economic growth as the only or most important indicator of civilization, progress, and/or wellbeing.

The growing literature on Degrowth is, unsurprisingly, diversifying the concept and its disciplinary and grass-roots interpretations. In broad brushstroke, degrowth refers to the inversion of economic growth. While Degrowth clearly rejects the stow-housers' economic growth at all costs, it also rejects wood-housers' 'greening' of our current global capitalist system. As Fabrice Flipo and François Schneider succinctly put it, "degrowth signals a radical critique of society: it challenges techniques, rather than just calling for their control" (2012: pxxv). Degrowth literature and social movements emphasize that the growth of our global societal metabolism requires the unjust extraction of energy and materials from commodity frontiers on the periphery to past and present colonial centers - peripheries where Indigenous and poor people live (D'Alisa, Demaria and Kallis, 2015). And it is not only the waste of extraction and production but also capitalism's current way of dealing with post-consumption waste: open dumps, landfills, incinerators and EfW facilities are more likely to be sited in, or exported to, regions with less economic, political and social power. Even municipal waste collection, where it exists, is better funded and operated in wealthier neighborhoods. Degrowth, then, necessarily emphasizes the need for a complete overhaul in waste's governance and management.

In general, Degrowth initiatives take one of two forms (with some overlap). Some Degrowth arguments advocate for a global, whole-system, government-led (and therefore top-down) system change. This is well exemplified by the North American Green New Deal (GND). Fashioned after Franklin Roosevelt's New Deal that was designed to lift America out of its Great Depression in 1933, the GND proposes to transition to (among other things) clean energy, green infrastructure, and a socially and environmentally just global system of equity

among peoples and nations. The increasing GND literature (see, for example Chomsky and Pollin, 2020; Cox, 2020; Klein, 2020; Pettifor, 2020; Rifkin, 2019; Wittman, 2023) concentrates on the urgent need to (where possible) transition existing infrastructure, and create new infrastructure to shift rapidly from oil and gas to solar and wind power, at the same time creating 'green collar jobs' (Durning, 1999). While, thus far, the GND has not focused in particular on waste (but see Surak, 2021), we may infer that the GND would support government-led (through regulations and policy) societal metabolism structures and processes that rely on economic degrowth. While reuse and refurbishment deal with materials already produced (and thus would involve regulations preventing things like planned obsolescence), reduction focuses on the extraction and production of goods. We do not want to underestimate the profound impact on waste generation that reduction has: for instance, "[s]hutting down worldwide clothing production for a year would be equal to grounding all international flights and stopping all maritime shipping for the same time period" (MacKinnon, 2021: p157). A GND would also need to consider all of the waste we have already generated, and complex issues such as people who derive their income from waste-picking. While waste-pickers are amongst the poorest people in the world, the waste management industry is a colossal global money-making business, netting over a trillion dollars and climbing (Statista, 2023). Reining in the waste management industry would require supra- and national organizations and governments to cooperate in massively scaled up Basel Convention-type regulations that would prevent waste exports (forcing nations to deal with their own waste problems). The GND would need to move technological innovation away from disposal and limited linear economy mechanisms such as recycling (for instance, chemical plastics) and EfW

that creates linear economy, single-use electricity from burning waste or capturing gas (methane) from landfills. This is a 'devil-in-the-details' issue: GNDs such as that adopted by Los Angeles assert bold ambitions for zero waste and zero waste-water, but it is unclear how much these 'zeros' rely on decidedly non-zero recycling and non-zero linear economy energy.

Degrowth also takes more bottom-up grass roots forms through a diverse set of initiatives scattered throughout various global communities. These vary from grass-roots movements such as Slow Shopping (Fulenwider, 2016), Voluntary and Involuntary Simplicity (Elgin, 2010), Worn Again Technologies (nd), no growth family businesses, and Every One Every Day. There are also a number of think-tank type initiatives such as Low Tech Magazine and the International Centre for Anti-consumption Research. As they relate to waste, these initiatives coalesce around a focus on the apex of the Waste Hierarchy: reduction through decreased consumption, refusal and other means. The great advantage that these bottom-up strategies have is that they are more flexible and adaptable to local contexts. Their disadvantage is that they may remain small, involving dozens or perhaps hundreds of people, who mostly volunteer their time (which means disproportionately women who have sufficient income to engage in volunteer work). The scale-up required to effect global change is immense.

3.6. Conclusions

Fables convey moral lessons: in some iterations, the first two pigs live lavish lives of instant gratification, and pay for their hubris with their lives, as the big bad wolf (climate change; pollution and so on) attacks their vulnerable homes and kills them both. In other - perhaps kinder - versions, the two greedy brothers escape and find shelter with their youngest brother.

In both cases, the third little pig knows the benefits of delayed gratification and frugality and that hard work pays off.

Only in the aftermath - hundreds if not thousands of years from now - will any debriefing of the Anthropocene's hard lessons be possible. The business-as-usual linear profit-driven economy very clearly produces ever-increasing volumes of waste. The techno-fix and individual behavior modification approaches promise sufficient change to avert global environmental catastrophe but their hubris (see Corvellec, this edited collection) reveals that these solutions are also, ultimately, band-aids on the deep wound that is settler colonial neoliberal capitalism. As Greta Thunberg bluntly stated in her speech to the United Nations in 2019, "We are in the beginning of a mass extinction, and all you can talk about is money and fairy tales of eternal economic growth. How dare you!"

In the fable, the third little pig forgoes the luxurious and frivolous play that occupies her older brothers, and this proves to be her saving grace. Over eighty percent of the world's population is already doing this through necessity - living frugally with no need to change at all. It is the privileged middle-and upper-classes who must profoundly change from economic and political growth to degrowth. As the harsher of the two fable versions would have it, the two greedy lazy pigs meet with their comeuppance, as their environment (the wolf) kills them. But the fable is just that: in reality, the privileged are still largely able to shield themselves from environmental harm (Szasz, 2007). In reality, degrowth requires material resources to build infrastructure. Also, degrowth does not resolve the waste we have already created. Degrowth stems the tide of more - and more toxic - waste; and it focuses attention on equitably reducing the highly disproportionate use of resources and their environmental costs.

References

- Adeola, F. (2012). *Industrial Disasters, Toxic Waste, and Community Impact*. New York: Lexington Books.
- Altvater, E., Crist, E., Haraway, D., Hartley, D., Parenti, C., McBrien, J., & Moore, J. (2016). *Anthropocene or Capitalocene? Nature, History, and the Crisis of Capitalism*. PM Press.
- Amegah, A.K., & Jaakkola, J.J.K. (2016). 'Street vending and waste picking in developing countries: a long-standing hazardous occupational activity of the urban poor'. *International Journal of Occupational and Environmental Health*, 22(3): 187-192. doi: <https://doi.org/10.1080/10773525.2016.1209621>
- Arboleda, M. (2020). *Planetary Mind: Territories of Extraction Under Late Capitalism*. London: Verso Press.
- Arms Control Association. (2020). 'The Nuclear Testing Tally'. Accessed 31 December 2020. <https://www.armscontrol.org/factsheets/nucleartesttally>
- Carroll, W.K., & Sapinski, J.P. (2018). *Organizing the 1%: How corporate power works*. Fernwood Publishing.
- CIEL (Centre for International Environmental Law). 2019. 'Plastic & climate: The hidden costs of a plastic planet'. Accessed 7 December 2020.

<https://www.ciel.org/wp-content/uploads/2019/05/Plastic-and-Climate-FINAL-2019.pdf>

CIEL (Centre for International Environmental Law). (2020). 'Convention on plastic pollution: toward a new global agreement to address plastic pollution'. Accessed 14 May 2021.

<https://www.ciel.org/wp-content/uploads/2020/06/Convention-on-Plastic-Pollution-June-2020-Single-Pages.pdf>

Chomsky, N., & Pollin, R. (2020). *Climate Crisis and the Global Green New Deal*. London and New York: Verso.

Collins, S. (2008). *The Hunger Games*. Scholastic.

Corvellec, H. (2014). 'Recycling Food Waste into Biogas, or How Management Transforms Overflows into Flows', in *Coping with Excess: How Organizations, Communities, and Individuals Manage Overflows*, edited by Barbara Czarniawska and Orvar Löfgren, pp: 154-72; Cheltenham(UK): Edward Elgar.

Cox, S. (2020). *The Green New Deal and Beyond: Engine the Climate Emergency While We Still Can*. San Francisco: City Lights Books.

Crooks, H. (1993). *Giants of Garbage: The Rise of the Global Waste Industry and the Politics of Pollution Control*. Toronto: James Lorimer & Company.

D'Alisa, G., Demaria, F. & Kallis, G. (2015). *Degrowth: A Vocabulary for a New Era*. London and New York: Routledge.

D'Amato, A., & Zoli, M. (2012). 'Illegal waste disposal in the time of the mafia: a tale of enforcement and social well being'. *Journal of Environmental Planning and Management*, 55(5): 637-655.

Davies, A.R. (2008). *The Geographies of Garbage Governance: Interventions, Interactions and Outcome*. Milton Park: Routledge.

de Freitas Netto, S.V., Sobral, M.F.F., Ribeiro, A.R.B., & da Luz Soares, G.R. (2020). 'Concepts and forms of greenwashing: a systematic review'. *Environ Sci Eur* 32, 19.

doi: <https://doi.org/10.1186/s12302-020-0300-3>

Durning, A.T. (1999). *Green-Collar Jobs: Working in the New Northwest*. Seattle: Northwest Environment Watch.

EIA. US Energy Information Administration. (2023). 'Frequently Asked Questions'.

<https://www.eia.gov/tools/faqs/faq.php?id=34&t=6>

Elgin, D. (2010). *Voluntary Simplicity, Second Revised Edition*. New York: Harper Collins Publisher.

Ellen MacArthur Foundation. (2015). *Towards a circular economy: Business rationale for accelerated transition*. Accessed on June 21 2023

<https://ellenmacarthurfoundation.org/towards-a-circular-economy-business-rationale-for-an-accelerated-transition>.

Flipo, F., & Schneider, F. (2015). 'Foreword' in G. D'Alisa, F. Demaria and G. Kallis (Eds.) *Degrowth: A Vocabulary for a New Era*. London and New York: Routledge, pp. xxiii-xxvi.

Floodlist. (2023). Home page. Accessed on June 12 2023. <https://floodlist.com/>

Foote, S., & Mazzolini, E. (eds) (2012). *Histories of the Dustheap: Waste, Material Cultures, Social Justice*, Cambridge, MA: MIT Press.

Foucault, M. (1966/1970). *The Order of Things*. Pantheon Books.

Fulenwider, M. (2016). 'The Rising Influence of "Slow Shopping Theory"', Business Today Online Journal. Accessed on 8 August 2023. <https://journal.businesstoday.org/bt-online/2017/the-rising-influence-of-the-slow-shopping-theory>

Furedy, C. (1993). 'Working with the waste pickers'. *Alternatives*, 19(2): 18-23.

Government of Canada. (2021a). 'Reducing Municipal Solid Waste'. Accessed on July 30 2023.

<https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/municipal-solid/reducing.html>

Government of Canada. (2021b). 'Municipal Solid Waste Management in Canada'. Accessed on

July 30 2023. <https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/municipal-solid/environment.html>

Greer, R., von Wirth, T., & Loorback, D. (2021). 'The Waste-Resource-Paradox: Practical dilemmas and societal implications in the transition to a circular economy'. *Journal of Cleaner Production*, 303. doi: <https://doi.org/10.1016/j.jclepro.2021.126831>

Gregson, N., & Crang, M. (2015). 'From Waste to Resource' the Trade in Wastes and Global Recycling Economies'. *The Annual Review of Environment and Resources* 40(105): 151-76.

Gregson, N., Crang, M., Ahamed, F., Akhter, N., & Ferdous, R. (2010). 'Following Things of Rubbish Value: End-of-Life Ships, 'Chock-Chocky' Furniture and the Bangladeshi Middle Class Consumer'. *Geoforum* 41 (6):846-54.

Hawkins, G. (2006). *The Ethics of Waste: How We Relate to Rubbish*, London: Rowman & Littlefield.

Hird, M.J. (2022). *A Public Sociology of Waste*. Bristol University Press.

Hird, M.J. (2021). *Canada's Waste Flows*. McGill-Queen's University Press.

Hird, M.J., & Predko, H. (2023). *Extracting Reconciliation: Inhuman Wastes, Indigenous Lands, and Colonial Reckoning*. Routledge Press (in press).

Huber, F., Blasenbauer, D., Mallow, O., Lederer, J., Winter, F., & Fellner, J. (2016). 'Thermal co-treatment of combustible hazardous waste and waste incineration fly ash in a rotary kiln'. *Waste Management* 58: 181-190. doi: <https://doi.org/10.1016/j.wasman.2016.09.013>

Jarrige, F., & Le Roux, T. (2020). *The Contamination of the Earth: A History of Pollutions in the Industrial Age*. Cambridge, MA: The MIT Press.

Jones, M., Abatzoglou, J., Veraverbeke, S., Andela, N., Lasslop, G., Forkel, M., Smith, A., Burton, C., Betts, R., van der Werf, G., Sitch, S., Canadell, J., Santin, S., Kolden, C., Doerr, S. & Le Quéré, C. (2022). 'Global and Regional Trends and Drivers of Fire Under Climate Change'. *Reviews of Geophysics*, 60(3). doi: <https://doi.org/10.1029/2020RG000726>

Kaza, S., Yao, L., Bhada-Tata, P., & Van Woerden, F. (2018). *What a Waste 2.0: A global snapshot of solid waste management to 2050*. Urban Development Series. Washington, D.C.: World Bank. doi:<https://doi.org/10.1596/978-1-4648-1329-0>

Kelly, A. (2012). 'Gross national happiness in Bhutan: the big idea from a tiny state that could change the world' *The Guardian*, 1 December. Accessed 7 July 2023.
<https://www.theguardian.com/world/2012/dec/01/bhutan-wealth-happiness-counts>

Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., & Hekkert, M. (2018). 'Barriers to the circular economy: Evidence from the European Union (EU)'. *Ecological Economics*, 150: 264-272. doi: <https://doi.org/10.1016/j.ecolecon.2018.04.028>

Kishimoto, S., & Petitjean, O. (2017). *Reclaiming Public Services: How cities and citizens are turning back privatisation*. Amsterdam and Paris: Transnational Institute.

Klein, S. (2020). *A Good War: Mobilizing Canada for the Climate Emergency*. Toronto: ECW Press.

Kollikkathara, N., Feng, H., & Stern, E. (2009). 'A purview of waste management evolution: special emphasis on USA', *Waste Management*, 29(2): 974–85.

Lansink, A. (2017). *Challenging Changes – Connecting Waste Hierarchy and Circular Economy*. The Netherlands: LEA Nijmegen.

Le Guin, U. [1973] (2022). 'The Ones Who Walk Away from Omelas'. In *The Wind's Twelve Quarters*. New York: Perennial Olive Edition, Harper Collins.

Lepawsky, J. (2018). *Reassembling Rubbish: Worlding Electronic Waste*, Cambridge, MA: MIT Press.

Liboiron, M. (2014). 'Solutions to waste and the problem of scalar mismatches', *Discard Studies*, 10 February. Accessed 6 May 2020. <https://discardstudies.com/2014/02/10/solutions-to-waste-and-the-problem-of-scalar-mismatches/>

Liboiron, M. (2021). *Pollution is Colonialism*. Durham, NC: Duke University Press.

Lynas, M. (2012). *The God Species: How Humans Really Can Save the Planet*, London: Fourth Estate.

MacBride, S. (2012). *Recycling Reconsidered*. Cambridge, Massachusetts, MIT Press.

MacKinnon, J.B. (2021). *The Day the World Stops Shopping*. Toronto: Vintage Canada.

Melosi, M.V. (2005). *Garbage in the Cities: Refuse, Reform, and the Environment*, rev edn, Pittsburgh: University of Pittsburgh Press.

Mothiba, M., Moja, S.J., & Loans, C. (2017). 'A review of the working and health conditions of waste pickers at some landfills in the city of Tshwane metropolitan municipality, South Africa'. *Advances in Applied Science Research*, 8: 90-97.

New Climate Economy. (2018). *Unlocking the inclusive growth story of the 21st century: Accelerating climate action in urgent times*. World Resources Institute, Washington, DC.

Accessed July 10 2023.

https://newclimateeconomy.net/Downloaded_Pdf/Global_report/2018/NCE_2018_FULL-REPORT.pdf

Nixon, R. (2011). *Slow Violence and the Environmentalism of the Poor*. Cambridge, MA: Harvard University Press.

O'Neill, K. (2019). *Waste*. Oxford: Polity Press.

Packard, V. (1960). *The Waste Maker Society*. New York: IG Publishing.

Parizeau, K. (2006). 'A world of trash: from Canada to Cambodia, waste is a common problem with common solutions'. *Alternatives Journal*, 32(1): 16-19.

Pennington, J. (2016). 'Every minute, one garbage truck of plastic is dumped into our oceans.

This has to stop', World Economic Forum. Accessed 18 December 2020.

<https://www.weforum.org/agenda/2016/10/every-minute-one-garbage-truck-of-plastic-is-dumped-into-our-oceans/>

Pettifor, A. (2020). *The Case for the Green New Deal*. London and New York: Verso.

PlasticsEurope. (2022). *Plastics - The Facts 2022*. PlasticsEurope AISBL.

PlasticsEurope. (2018). *Plastics - The Facts 2018*. PlasticsEurope AISBL.

Prigogine, I., & Stengers, I. (1984). *Order Out of Chaos: Man's New Dialogue with Nature*.

Toronto: Bantam Books.

Rifkin, J. (2019). *The Green New Deal*. New York: St. Martin's Griffin.

Statista. (2023). 'Market size of waste management worldwide in 2022, with forecasts until

2030'. Accessed 12 July 2023. <https://www.statista.com/statistics/246178/projected-global-waste-management-market-size/>

Strasser, S. (1999). *Waste and Want: A Social History of Trash*. New York: Henry Holt and Company.

Statistics Canada. (2017). 'Waste Management Industry: Business and Government Sectors, 2014'. Ottawa, On: Statistics Canada.

Surak, S. (2021). 'Waste Infrastructures and a Green New Deal: Material Possibilities for a Just and Systematic Transformation' paper presented at the Re-Opening the Bin Conference, May 2021.

Svingstedt, A., Corvellec, H., & Samsioe, E. (2020). 'The Normality of Industrial and Commercial Waste: Economic, Technical and Organizational Barriers to Waste Prevention'. *Detritus* 3(13): 3-11.

Szasz, A. (2007). *Shopping Our Way to Safety: How We Changed from Protecting the Environment to Protecting Ourselves*. Minneapolis: University of Minnesota Press.

United Nations Development Report (nd) *Human Development Index*. Accessed 8 August 2023.
<https://hdr.undp.org/data-center/human-development-index#/indicies/HDI>

Veracini, L. (2010). *Settler Colonialism: A Theoretical Overview*. Hampshire, UK: Palgrave MacMillan.

Voorn, B., Van Genugten, M.L., & Van Thiel, S. (2021). 'Re-interpreting re-municipalization: finding equilibrium'. *Journal of Economic Policy Reform*, 24(3): 305-318.

Wittman, T. (2023). *City-level Green New Deals*, Master of Environmental Studies, Queen's University. Kingston: Canada.

Yu, E.P., Luu, B.V., & Chen, C. (2020). 'Greenwashing in environmental, social and governance disclosures'. *Research in International Business and Finance*, 52. doi: <https://doi.org/10.1016/j.ribaf.2020.101192>

Zero Waste International Alliance. (2023). 'Zero Waste Hierarchy of Highest and Best Use 8.0'. Accessed 4 August 2023. <https://zwia.org/zwh/>

Chapter 4: Conclusions

4.1. Main Findings

The research for this thesis was done within the limits of the City of Kingston, a relatively small 'rural regional' city of 133,000 people (RPRA, 2023). In 2015, Kingstonians were producing an average of 335 kg of MSW per year per capita, while in 2021 that quantity grew to 354 kg (the trend being an increased annual production of 5 kg of MSW per year per capita, Figure 9).

Total Residential Waste per capita from 2015 to 2021

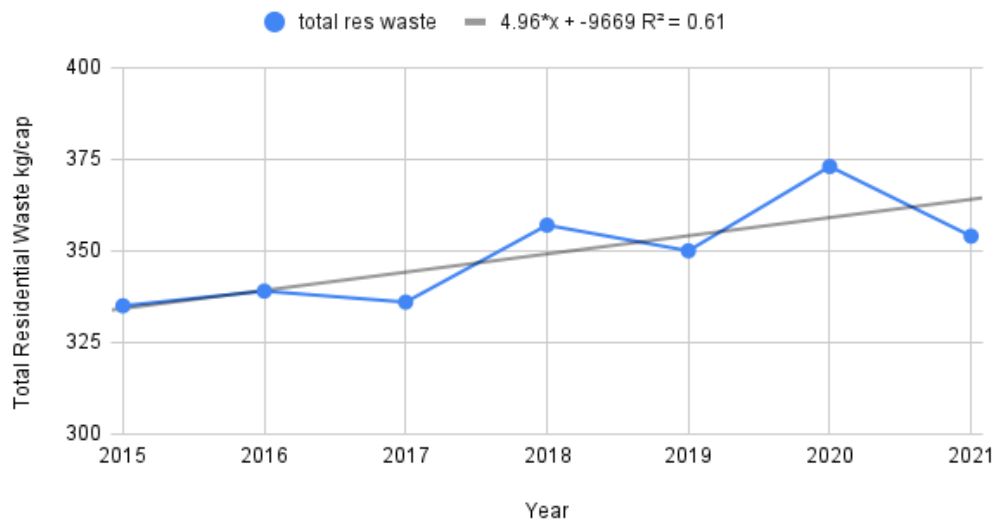


Figure 9: Total Residential Waste per capita in the City of Kingston from 2015 to 2021. Blue line is data, black line is trendline. Equation for the trendline is shown above the graph. Data source: Datacall Reports, Resource Productivity and Recovery Authority, 2023.

According to the WH published by the Government of Canada, (see Figure 1), the apex of the hierarchy is waste prevention and reduction. It is clear from Figure 9 that the waste management strategies employed within the City of Kingston are failing to help residents climb the WH. The legislation leading to the current management system is resolutely focused on a target of 65 percent waste diversion (through recycling and collection of organic matter) with

very little attention being given to reductive practices such as initiatives to reduce/reuse/repair. This management system has led to a WH for the City of Kingston (see Figure 4) which consists of only three rungs: a very thick recycle rung (through sorting of metals, plastics, fibers, glass and organics) a smaller though still substantial landfill rung, and a very thin rung for reuse. This actualized WH is substantially different from the theoretical WH, indicating that the City of Kingston is not utilizing best practices to deal with increasing volumes of waste, as the positively sloped trendline illustrates in Figure 9.

The failure to reduce waste by the City is not indicative of a city-wide reluctance to do so. Many waste reduction initiatives were found throughout the City of Kingston; however these were not being implemented to abide by any municipal legislation, but instead were mostly grass-roots led initiatives implemented to increase sustainability of businesses, organizations and institutions. An example of such an organization was the focus of the second manuscript.

Though the information gathered surrounding the workings of the Skeleton Park Arts Festival were purely qualitative, a reduction in collected waste was observed during the festival in 2023 compared to 2022. The amount of waste destined for landfill produced by the participating public at SPAF is very low (1 to 2 bags of garbage each year). As the food vendor coordinator for the summer of 2023 I was able to play a role in reducing not only the amount of trash destined for the landfill, but also the amount of organic material destined for the composting facility. Vendors in 2023 did not serve over sized portions, gave out their food in small containers that did not have lids (essentially cutting the volume of disposable paperboard containers in half) and did not provide any PLA plastic containers which are neither recyclable

nor compostable in Kingston. The success of the waste diversion program lies entirely in the hands of volunteers who constantly monitor how waste is sorted in order to reduce contamination – a system that works very well but requires a lot of volunteer labor. The importance in reducing contamination was made clear during my tour of the Tomlinson Organics composting facility, where I observed large ‘legacy piles’ which consisted of non-compostable material, much of which was plastic, and which were uncovered and exposed to the elements. This study illustrated how environmental implications of waste and contamination reduction may spread far beyond festival grounds.

The last manuscript, using the moral lesson illustrated in *The Three Little Pigs*, states that only through degrowth will populations in high-income countries be able to alleviate the waste crisis facing the planet. Straw-housers, using a business-as-usual approach based on continued economic growth will only continue to create greater and greater amounts of waste each year. Wood-housers, employing techno-fixes, implementing circular economies and extended producer responsibilities are only applying a band-aid to the situation because they continue to function within a capitalistic system based on overconsumption. It is only the brick-housers who are willing to tear down the neoliberal system in exchange for a system of degrowth who will have any real impact on waste reduction. Only by targeting the highest rungs of the WH can the waste crisis be abated.

4.2. Limitations

The main limitation to understanding how the City of Kingston is interacting with the WH was accessibility to, and availability of, information. One of my goals at the beginning of this

research was to account for as much of the waste generated within the City of Kingston as possible in terms of who was responsible for collecting that waste, and where the waste ended up. Given the number of businesses and festivals occurring in Kingston, reaching out to all was beyond the scope of a Masters thesis. I reasoned that apart from the City of Kingston itself, the largest employers within the City would be responsible for the largest percentage of IC&I generated waste. My initial reasoning and data gathering does provide information on a wide variety of businesses and organizations within the city but is far from complete – for instance I have no data concerning quantities of waste generated by all the grocery stores in the city, nor any information from Kingston’s largest annual festival – the Kingston Fall Fair.

Although there is no municipal legislation to reduce waste, apart from the two designated City of Kingston Giveaway Days, there are many businesses that are using reductive business practices (diaper laundry service, milk in reusable bottles, Queen’s reusable food containers, etc.). I just happened upon those businesses due to community connections and some of the volunteer work I did with Sustainable Kingston. The pandemic put a halt to the Sustainably.eco program run by Sustainable Kingston, a non-profit that helps local businesses and organizations keep track of and reduce their ecological footprints, so current information is not available. Also, there are no publications or websites that promote or distribute current information concerning reductive waste practices in the city. I was encouraged to find that the City of Kingston website has a new page entitled Waste Reduction (City of Kingston, 2023) which promotes actions such as ‘shopping smart’, ‘being mindful of fashion consumption habits’, patronizing repair cafés, and being mindful of resource use during the holidays. Although this addition to the City website is very welcome, the page is difficult to navigate to

(the only way I have been able to get to it is to use “city of Kingston waste reduction” in a search engine) and more links are needed to help visitors access relevant information (such as when and where repair cafés occur).

In terms of festival waste reduction, SPAF already had a well-established published waste management strategy. I only had 6 days of observations (3 days for each of 2 years) at this small local festival. In the first year, my responsibilities were those of a waste diversion volunteer, in which I learned and utilized the festival's waste management protocols. In this first year I could not affect any change. In my second year as a volunteer, I was able to affect some change because I became the volunteer food vendor coordinator. Through this additional position, I was able to sign on food vendors who really bought into waste reduction. Since this festival takes place in a park and is free to the public (has no ticketed events), some waste was brought to the festival grounds from outside vendors who were under no contractual obligations to abide by festival guidelines. This waste was accepted at the waste diversion station and some of the material could not be composted or recycled – thereby increasing the amount of waste produced.

4.3. Future directions

In order to better interact with the top rungs of the WH, new initiatives are needed to reduce waste, new metrics are needed to measure the efficacy of those initiatives, and easily accessible internet platforms are needed to spread all that information. There are many businesses and organizations within the City of Kingston who are already implementing such initiatives, but unless residents know about them, these organizations will not maximize their

potential effects. Residents of Kingston who want to lead more sustainable lives would be well served if there were a central platform with up to date, local information for how to do so. Legislatively, the City of Kingston would better serve its population by funding initiatives that aim to reduce waste instead of legislating that city residents need to use clear garbage bags. Given more time and resources, I would have liked to work with either the City of Kingston, Sustainable Kingston, or the creators of the new Kingston in Focus dashboard to find out if waste reduction initiatives could be posted with up to date information.

It was satisfying to see the incremental decrease in waste production from the first to the second year of my volunteering with SPAF. There is not very much room to further reduce festival waste within the established waste reduction system that is currently in place. In order to make larger impacts in waste reduction, new systems would have to be conceived and implemented. For instance, if the City of Kingston had a Reusable Dish Library (dishes and cutlery that could be used by organizations as needed), then not only could waste be reduced at SPAF, but also at other festivals such as ArtsFest Kingston (where there are no sorting or waste reduction initiatives of any kind). Suggestions have been made for festival goers to bring their own reusables, but that is a mind shift change that may take years to accomplish and would be very difficult to impose on people who happen upon the festival (as opposed to those who plan to attend, and so also plan to bring their own plates/bowls/cutlery). Finding a way to provide volunteers with some form of compensation would also be a good path forward.

I am always searching the literature and the news for innovative ways to reduce waste that have been implemented in other areas and that might work in the City of Kingston. Through information sharing, businesses, municipalities, community groups and other

organizations may provide ways in which to climb up to the top rungs of the WH. Through funding support from the city and momentum towards degrowth the climb will be a lot faster and more successful.

4.4. References

City of Kingston. (2023). Waste Reduction. Accessed on 3 October 2023.

<https://www.cityofkingston.ca/resident/garbage-recycling/household/waste-reduction>

Resource Productivity & Recovery Authority. (2023). Datacall. Accessed 3 October 2023.

<https://rpra.ca/programs/about-the-datacall/#:~:text=of%20Municipal%20Groups->

[,DATACALL%20REPORTS,-Consolidated%20Datacall%20Report](https://rpra.ca/programs/about-the-datacall/#:~:text=of%20Municipal%20Groups-,DATACALL%20REPORTS,-Consolidated%20Datacall%20Report)

Appendix

Appendix A: General Research Ethics Board (GREB) clearance



August 24, 2021

Ms. Gabriella Dee
Queen's University
School of Environmental Studies

Title: "GENSC-118-21 Governing waste: a case study of Kingston, Ontario;" TRAQ # 6034372

Dear Ms. Dee:

The General Research Ethics Board (GREB), by means of a delegated board review, has cleared your proposal entitled "GENSC-118-21 Governing waste: a case study of Kingston, Ontario" for ethical compliance with the Tri-Council Guidelines (TCPS 2) and Queen's ethics policies. In accordance with the Tri-Council Guidelines (Article 6.14) and Standard Operating Procedures (405), your project has been cleared for one year.

You are reminded of your obligation to submit an annual renewal form prior to the annual renewal due date (access this form at <http://www.queensu.ca/traq/signon.html>; click on "Events;" under "Create New Event" click on "General Research Ethics Board Annual Renewal/Closure Form for Cleared Studies"). Please note that when your research project is completed, you need to submit an Annual Renewal/Closure Form in Romeo/traq indicating that the project is 'completed' so that the file can be closed. This should be submitted at the time of completion; there is no need to wait until the annual renewal due date.

You are reminded of your obligation to advise the GREB of any adverse event(s) that occur during this one-year period (access this form at <http://www.queensu.ca/traq/signon.html>; click on "Events;" under "Create New Event" click on "General Research Ethics Board Adverse Event Form"). An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example, you must report changes to the level of risk, applicant characteristics, and implementation of new procedures. To submit an amendment form, access the application by at <http://www.queensu.ca/traq/signon.html>; click on "Events;" under "Create New Event" click on "General Research Ethics Board Request for the Amendment of Approved Studies." Once submitted, these changes will automatically be sent to the Ethics Coordinator, GREB, at University Research Services for further review and clearance by GREB or the Chair, GREB.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Sincerely,

A handwritten signature in blue ink, appearing to read "Dean A. Tripp".

Professor Dean A. Tripp, PhD
Chair, General Research Ethics Board (GREB)
Departments of Psychology, Anesthesiology & Urology
Queen's University