

**Examining the Role of and Potential for Indigenous and Social Learning through
Community-Based Solid Waste Management in Canadian First Nation Communities**

by

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ABSTRACT

The literature on municipal solid waste (MSW) management on First Nations in Canada outlines numerous challenges requiring attention. Learning among community members about the existing systems can be important for improving MSW management in communities. This study examined the role of and potential for Indigenous learning and social learning theory in managing MSW in First Nations and how learning can result in lasting outcomes.

A social constructivist worldview guided the research and provided participants the opportunity to share their lived experiences with MSW management in their communities, which have been influenced by interactions with other community members and their history. A qualitative, multiple-case study of Peguis First Nation and Heiltsuk Nation was employed, utilizing semi-structured interviews, workshops, and participant observation as data collection methods. Fifty-two participants were involved in the research, including: Hereditary Chiefs, Elders, community leaders/members who spearheaded MSW management initiatives, community members participating in initiatives, and staff in charge of community programs.

The data shows that Indigenous learning and social learning occurred among participants in both communities through processes, such as discussions with close family members, ceremonies, band meetings, and discussions with waste management employees. Moreover, learning resulted in behavioural and attitudinal changes, including reusing materials, reducing waste generation and recycling, avoiding complex packaging, and feeding food to animals instead of treating it as waste. Additionally, cultural factors such as avoiding waste, taking care of each other, protecting/taking care of the land, and connection to the land were also found to impact MSW management in both communities. Collective action outcomes also manifested themselves in the form of encouraging community members, friends, and family to clean up their spaces and

participating in community clean-ups. The study suggests incorporating concepts of MSW management in traditional ways of learning, such as ceremonies and storytelling, to create awareness and understanding of the issues. There is also a great need to embark on educational and outreach programs to encourage community members to participate in waste diversion programs, particularly in Peguis First Nation.

DEDICATION

This thesis is dedicated to the memory of my late mother, Mrs. Gladys Assuah.

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CHAPTER ONE

1.1 Background and Problem Statement

The increasing generation of municipal solid waste (MSW)¹ is a global environmental concern that requires urgent and appropriate management solutions. It is estimated that the current 1.3 billion tonnes of waste generated per year globally could rise to approximately 2.2 billion tonnes by 2025 (Hoornweg & Bhada-Tata, 2012). It is also common knowledge that per-capita waste generation in low-income or middle-income countries, comparative to their high-income counterparts, is higher. Waste generation and management is also considered more of an urban problem than a rural concern, because of increasing urbanization (Hoornweg & Bhada-Tata, 2012).

However, in industrialized countries such as Canada, MSW continues to be a major concern for rural First Nations² (Bharadwaj, Nilson, Judd-Henrey, & Ouellette, 2006; Bharadwaj, Judd-Henrey, Parenteau, Tournier, & Watson, 2008; Zagozewski, Judd-Henrey, Nilson, & Bharadwaj, 2011; Oyegunle, 2016). Compared to municipalities that are responsible for waste collection, transportation, and management, many First Nations lack the infrastructure, financial resources, and capacity, among other things, to effectively manage the waste they generate (Bharadwaj et al., 2006; Doyle, 2016; Oyegunle & Thompson, 2018). Such communities are therefore often left with poor waste management practices such as open dumping, open-air burning of waste, littering, and operating unsanitary landfills (e.g., Bharadwaj et al., 2006; Zagozewski et

¹ Environment Canada defines MSW to include recyclables and compostable materials, as well as garbage from homes, businesses, institutions, and construction and demolition sites (<https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/municipal-solid/shared-responsibility.html>).

² “First Nations is a term used to describe [Indigenous peoples](#) in Canada who are not [Métis](#) or [Inuit](#). First Nations people are original inhabitants of the land that is now Canada, and were the first to encounter sustained European contact, settlement and trade” (<https://www.thecanadianencyclopedia.ca/en/article/first-nations>).

al., 2011; Oyegunle & Thompson, 2018). These waste management practices can have dire impacts on human health and the environment (Zagozewski et al., 2011; Wilson et al., 2015).

Bharadwaj et al. (2006) point to the lack of policies and regulations for First Nations environmental management, as well as the lack of clarity of First Nations' role in environmental review processes as contributing factors to their waste management challenges. For instance, while some municipalities have promulgated laws to ban open burning or restrict the types of materials that can be burned in Canada (Wagner & Arnold, 2008; Government of Canada, 2015), the practice is still ongoing in some First Nations. The federal government, through Indigenous Services Canada (ISC), has in fact rarely promulgated the legislation and regulation required to deal with challenges that, for instance, on-reserve First Nations face in relation to MSW and other environmental issues (Office of the Auditor General of Canada, 2009).

Moreover, ISC has done little to enforce existing environmental regulations on reserves, such as those dealing with inspecting, monitoring, and ensuring compliance of landfill regulations, and the burning of waste (Bharadwaj et al., 2008; Office of the Auditor General of Canada, 2009). According to the Auditor General's 2009 report, unlike on-reserve First Nation communities, off-reserve communities have environmental regulations enforced by municipalities and provinces. Additionally, there have not been clear federal government plans or commitments to help reverse the poor trend of waste management in First Nations, even though the federal government, through the ISC (formerly Indigenous and Northern Affairs Canada), has authority and is responsible for land management, including environmental management, in most of these communities (Report of the Auditor General of Canada, 2009).

The foregoing underscores the need to find appropriate solutions for waste management in First Nations. The 2016 federal budget announced \$409 million over five years to directly support

on-reserve solid waste management (ISC, 2016). As a result, programs and initiatives are being rolled out in various First Nations and projects eligible for the funding include: planning; capacity building and training; programs and partnerships; infrastructure, construction, and operation; and decommissioning of waste sites (Doyle, 2016; Lindsay, 2019). Solid waste management challenges, however, still persist in many First Nations across Canada (Oyegunle & Thompson, 2018).

Zagozewski et al. (2011) suggest community-based approaches to finding solutions to MSW management in First Nations because of the heterogeneity among First Nations and their unique waste management requirements. Community-based approaches to managing the environment have been touted as capable of yielding “context-appropriate innovations and more effective implementation of plans and implementation strategies...” (Wisner & Mitchell, 2005, p.1). Thus, through a community-based approach, First Nations could incorporate their knowledge, culture, and way of life into locally-developed strategies and solutions for waste management. Further, community-based approaches in environmental management tend to be participatory in nature, allowing those that are impacted by environmental management decisions to be involved in decision-making processes.

The literature also establishes that learning is a critical dimension of community-based approaches to managing the environment and natural resources. Social learning, for example, has been encouraged in environmental management because of the potential of such learning to facilitate joint problem solving, deal with complexities and uncertainties that characterize environmental management, and render sustainable outcomes (Keen, Brown, & Dyball, 2005; Sinclair, Diduck, & Fitzpatrick 2008). In fact, the uncertainties and complex nature of environmental management decisions require learning among collaborators in order to arrive at

better outcomes (Keen et al., 2005). Social learning provides the platform to achieve this, as it offers opportunities for people involved in managing their environment to share ideas and deliberate on them, and to reflect on what they share on the road to making decisions to improve the environment (Buck et al., 2001; Muro & Jeffrey, 2008; Rodela, 2011; Cundill & Rodela, 2012a).

Indigenous³ (First Nation, Inuit, and Metis) learning, which involves observing, experiencing at first-hand, reflecting, making meaning, sharing/teaching, and acting, is critical to consider in this context (Augustine, 1997; Kaminsky, 2012). As a unique learning process that embodies the knowledge, values, traditions, and culture of Indigenous peoples, Indigenous learning is considered experiential in nature, as “the first principle of Indigenous learning is a preference for experiential knowledge” (Battiste, 2002, p.15). Social learning and Indigenous learning could therefore provide the environment within which community members share and reflect on their first-hand experiences regarding MSW management, which could act as a platform for finding and implementing appropriate solutions.

1.2 Research Purpose and Objectives

The purpose of this research was to investigate the role of and potential for learning in the management of MSW in First Nations in Canada and ways that such learning can encourage best management practices and illuminate the place of learning in creating lasting, sustainable solutions. To accomplish this, the following specific objectives were set:

³ Indigenous is used in the context of this thesis to encompass First Nation, Inuit, and Métis peoples in Canada. The term Indigenous learning is used to emphasize how Indigenous people generally learn or Indigenous ways of knowing as explained in the literature, particularly in the Canadian context. Some of this literature uses the term Aboriginal learning; however, Indigenous learning has been used throughout the document for consistency. Aboriginal is maintained for institutions that used the term, for instance, The Royal Commission on Aboriginal Peoples.

1. To examine solid waste management practices among First Nations in Canada in order to identify leading practices and communities;
2. To examine cultural elements/factors (ideas, social norms, beliefs, values, traditions, etc.) that impact solid waste management practices in these communities;
3. To investigate whether learning has led to behavioral and attitudinal changes about how solid waste should be managed;
4. To explore the relationship between social learning (individual and collective components) and Indigenous learning in relation to the learning outcomes identified; and,
5. To examine collective action and community change that emerged from learning about solid waste management.

Addressing these objectives involved in-depth qualitative research underpinned by thinking about a community-based approach to research. A social constructivist approach allowed for participants to share their lived experiences about MSW management, developed through interactions with others in the community. A case study strategy of inquiry was used, focusing on two cases – Peguis First Nation in Manitoba, and the Heiltsuk Nation (also known as Bella Bella) in British Columbia. The data collection methods included semi-structured interviews, a community workshop, and participant observation. Semi-structured interviews were audio recorded after permission was granted by participants, and were transcribed. Field notes were kept during participant observation, as well as photos of solid waste infrastructure and facilities. The workshop provided opportunities for participants to discuss and deliberate on key issues that were identified in semi-structured interviews and participant observation. All information obtained was coded using NVivo software with themes grounded in the data and the literature. A detailed description of the research methods is provided in Chapter 3.

1.3 Significance of the Research

This research has both theoretical and practical significance. Indigenous learning was examined in the context of natural resources and environmental management (NREM), establishing a theoretical basis for incorporating Indigenous ways of learning and knowing or Indigenous learning in managing MSW – a research gap that has not been explored. This research has also contributed to understanding the relationships between two different worldviews: social learning, which is a Western theoretical worldview; and Indigenous learning, a non-Western learning approach. This has resulted in unravelling the similarities and differences between the two, as well as understanding how they reinforce each other theoretically. Furthermore, this research has established that social learning is applicable in a cross-cultural context, even though the theory is directly influenced by Western notions of learning.

Practically, this research is a contribution to the very limited literature on waste management in First Nations communities across Canada. As a result, the data from this research has the potential to impact and inform waste management practices, planning, and policies in First Nations and isolated rural communities across Canada. Moreover, this research has identified essential factors to consider when introducing solid waste management initiatives and/or programs in First Nations communities, such as designing appropriate community resources and community-specific information dissemination strategies. Finally, this research challenges the current practices in First Nations, emphasizing the need for clear solid waste management policies and regulations regarding dealing with environmental protection. A detailed description of these contributions is discussed in Chapter Seven.

1.4 Organization of the Thesis

This thesis is organized into seven chapters. In this first chapter, I have described the challenges of waste management in First Nations and established the need to examine the role social learning and Indigenous learning could play in the solid waste management initiatives that are being pursued. In Chapter Two, relevant literatures on waste management, Indigenous learning, and social learning are reviewed and discussed. The theoretical linkages between these three areas are highlighted, providing an in-depth justification for conducting the research. In Chapter Three, the approach to conducting the research, including methods and analysis is outlined. My worldview, which impacted or influenced how the research was set up, the strategy of inquiry, and case study approach are all discussed in this chapter. As well, the chapter establishes the approach taken for conducting ethical research in First Nations and some of the strategies to achieve this.

Data from the two case studies are presented and discussed in the next three chapters. In Chapter Four, data are presented on the solid waste management systems in the two First Nations, as well as the cultural factors that are impacting solid waste management. Chapter Five presents data on and discusses Indigenous and social learning, highlighting their similarities and differences. In Chapter Six, learning outcomes, behavioural, attitudinal, and collective actions resulting from learning are presented. In the final chapter, conclusions and recommendation are provided. This chapter also provides information on a conceptual model for solid waste management that is applicable in First Nations.

CHAPTER TWO

Social learning, Indigenous Learning, and Solid Waste Management

2.1 Overview of Solid Waste Management in Canada and on First Nation Communities

As an industrialized country, Canada is one of the largest producers of non-hazardous MSW in the world (Bruce, Asha, and Ng, 2016). The total non-hazardous waste disposed of in public and private facilities in 2016 was approximately 24,940,747 tonnes, representing a 0.70% increase in waste disposal rate from a 2014 figure of 24,766,650 (Statistics Canada, 2020). Out of the total tonnes of waste disposed in 2016, residential solid waste constituted 10,225,943 tonnes, while non-residential components amounted to 14,714,804 tonnes (Statistics Canada, 2020). Canada also generates 1.94 kg of waste per capita per day, which is 1.2 kg (171.43%) more than the world figure of 0.74 kg per capita waste per day (Kaza, Yao, Bhada-Tata, and Van Woerden, 2018).

Typically, provinces and territories are responsible for solid waste regulations in the country, while municipal authorities either directly manage the waste or contract them to waste management companies. These are the two common levels of MSW management in North America (Zhu, Huang, Sun, & Huang, 2016). Thus, the various provinces and territories are responsible for promulgating laws, plans, and programs to manage waste. The federal government, on its part, controls the transboundary movement of hazardous waste and recycling materials among provinces and internationally, as well as provides funding towards building major infrastructure, solid waste pilot projects, and community waste management activities (Government of Canada, 2018).

The management of MSW takes various forms throughout Canada, but typically involves recycling and disposal options as a minimum. However, here in Canada and many other parts of

the world, the concept of Zero Waste continues to gain traction as an important approach to managing waste, because of its goal to conserve “all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health” (Zero Waste International Alliance, n.d). Zero Waste Canada was founded on the principles of the Zero Waste International Alliance and it works with and engages businesses, community organizations, and government entities in Canada to transition from the current linear economy to a circular economy (Zero Waste Canada, 2019).

In order to achieve its goals, the Zero Waste International Alliance has developed the Zero Waste Hierarchy which describes the most desirable and best methods for managing waste to less desirable methods that negatively impact the environment (Zero Waste Canada, 2019). This hierarchy is intended to guide the actions and decision-making of everyone involved with waste management, from policymakers to individuals. The current hierarchy was revised in 2018 and has seven parts grouped into three components or sets of waste management methods as shown in Figure 2.1. The first component is made up of the most desirable methods of managing waste; that is, rethink/redesign, reduce, and reuse in an order of importance. The next component, which is the next set of desirable methods, includes recycling/composting, materials recovery, and residuals management (including landfill). At the bottom of the hierarchy is the unacceptable method, which includes incineration and waste-to-energy methods (Figure 2.1). The methods of MSW management embedded in the Zero Waste Hierarchy provide important guidelines to communities and businesses when planning their MSW programs.

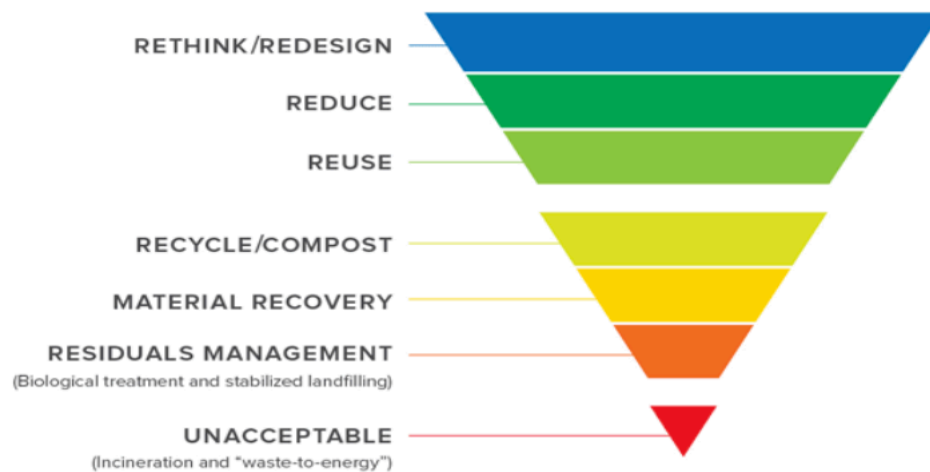


Figure 2.1 The Zero Waste Hierarchy 7.0. Source: Zero Waste Waste Canada, 2019.

Unlike waste management in Canadian provinces and territories, regulations and policies for solid waste management on First Nation communities are the responsibility of the federal government. As well, existing solid waste management laws and regulations often apply differently on reserves and off-reserve communities (Edgar & Graham, 2008; Office of the Auditor General of Canada, 2009), with regulations stronger in the latter than the former, resulting in a patchwork of different management programs. In general, there is shared responsibility between the federal and provincial governments in managing the environment off-reserve, which does not happen on reserves because of “gaps in the environmental management regime that applies on-reserve due to issues related to jurisdiction” (Edgar & Graham, 2008, p. 2). The Auditor General’s Report notes that, “...While regulations under the Indian Act require a permit issued by ISC to operate a landfill site or burn waste on reserve lands, the Department has issued few permits and is not equipped to conduct inspections, monitor compliance, and enforce the regulations” (p. 2). That is to say, the federal government, which is responsible for regulating the environment in reserve communities, has failed to use its authority to promulgate legislation or enforce existing

ones to protect the environment in these communities. This partly accounts for the existence of poor solid waste management practices on reserves. Bharadwaj et al. (2006) and Oyegunle (2016) report that the common solid waste management practice on reserves continues to be the open dumping of waste with its obvious negative health and environmental consequences. They also note that there is yet to be an “inventory documentation, and classification of First Nations landfills in Canada” (Bharadwaj et al., 2006, p.36).

In 2016, the federal government’s budget announcement included an item to directly support communities with “\$409 million over five years, starting in 2016–17 to improve how garbage and waste is managed on reserves” (ISC, 2016). As a result, some programs have been and are being rolled to attempt to address First Nations solid waste issues under the theme First Nations Solid Waste Management Initiative (FNSWMI). Funding for the program is expected to end in the 2020-2021 fiscal year (Figure 2.1). In British Columbia, for instance, 69 out of the about 200 First Nations are participating in the FNSWMI according to Lindsay (2019). Some of the projects and initiatives that are being pursued in the province include: embarking on programs such as recycling, composting, and hazardous waste management; construction or upgrade of transfer stations; operational and maintenance funding for newly constructed or upgraded sites; development of a Zero Waste Education Toolkit for schools; community waste awareness and education; and provision of grants to First Nations (e.g., Zero Waste Grants, Earth Day Grants) (Lindsay, 2019).

Similarly, in Quebec, roughly 120 projects were completed in the 2016-17 and 2017-18 fiscal years (ISC, 2018). These projects consisted of 47 studies of all sorts, 36 infrastructure projects, and 34 equipment purchases for projects. As at 2018, funding had benefitted about 33

communities, four tribal councils, and the First Nations of Quebec and Labrador Sustainable Development Institute (ISC, 2018).

National Program Background - Budget 2016

Budget 2016 introduced \$409 million dollars over five years to support solid waste management on reserve lands

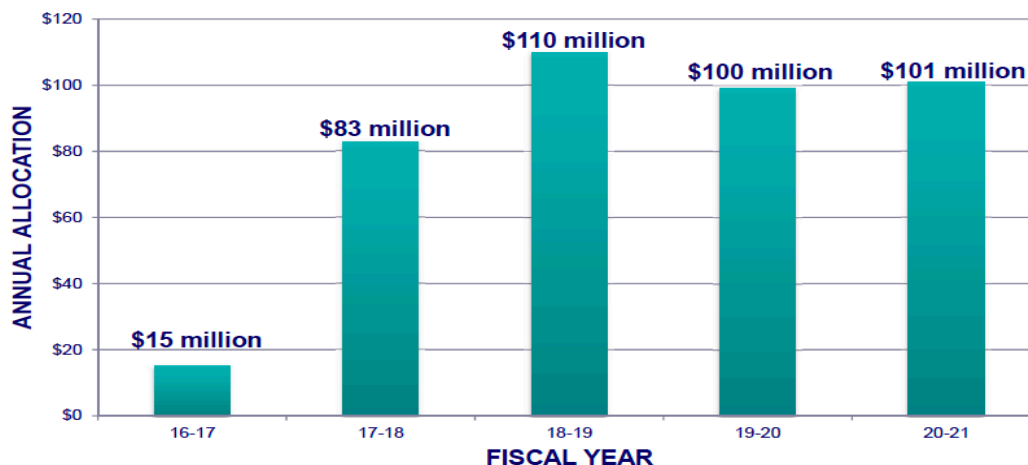


Figure 2.2. Budget for First Nations Waste Management Initiative. Source: Lindsay (2019), Hurley, Dorland, & Werner (n.d).

There are also efforts in the private sector to get involved and assist with managing solid waste in First Nations. For example, ten stewardship organizations in British Columbia came together in 2017 to form the BC First Nations Recycling Initiative (FNRI) to provide support to First Nations interested in starting recycling programs in their communities (BC First Nations Recycling Initiative, 2019). The FNRI supports upcoming community clean-up initiative with resources and transports materials for recycling, engages with and presents information to communities on BC's recycling program, as well as supports First Nations' strategy to join the organization. Additionally, the Indigenous Zero Waste Technical Advisory Group (IZWTAG), formerly Solid Waste Working Group, located in British Columbia, is an organization that exists

to provide First Nations with the needed technical services and support to be stewards of their territory and environment (IZWTAG, n.d).

Moreover, a toolkit for Manitoba First Nations and Northern communities has been prepared by the Green Action Centre (and funded by ISC) “to help communities assess their needs, guide them through the planning process, and provide an overview of how to implement a waste management program specific to their community and location” (Green Action Centre, 2017). Additionally, as part of the FNSMNI project in Manitoba, community pathfinders have been employed to assist communities with their waste diversion programs and efforts.

Also, through the Community Infrastructure Partnership Project funded by ISC, the Federation of Canadian Municipalities facilitated a national pilot program aimed at First Nations-municipal solid waste management partnerships from 2016 to 2018 (Federation of Canadian Municipalities (FCM, 2016). Under the project, the FCM provided “facilitation and capacity building services to six First Nations-municipal partnerships” (FCM, 2016). Through such initiatives, First Nations communities will have the opportunity to learn and to build their capacity to manage their waste, as well as learn to work on building a common solid waste management strategy with municipalities.

It is important to highlight that the literature regarding First Nations solid waste management in Canada is scant. There are very few peer-reviewed studies available to researchers, ISC, and any other agency interested in solid waste management in First Nations communities. For instance, Bharadwaj et al. (2006), arguably, published one of the early papers on solid waste management in First Nations. In this paper, the authors highlighted challenges that First Nations, who are connected to the land, face in dealing with solid waste management on their territories, and the broader issues of environmental degradation in First Nations. Lack of inventory on active

and inactive dump sites, lack of infrastructure, and the remoteness of communities were identified by the authors. They noted further that as a result of the above-mentioned factors, open dumping and burying waste were common solid waste practices in communities. For their part, Bharadwaj et al. (2008) emphasised these challenges and others, such as unregulated landfills when they assessed the existence of dioxins and furans in soil, groundwater, and ash as a result of solid waste incineration in Mistawasis First Nation in Saskatchewan. The study found evidence that waste incineration in the community's active disposal site released furans and dioxins – toxic and harmful chemical pollutants – into the soil and ash.

Through a community-based participatory research initiated by the Saskatoon Tribal Council Health and Family Services Inc., Zagozewski et al., (2011) examined current and past waste disposal practices and their impact on human and environmental health in three Saskatchewan communities: Mistawasis First Nation, Muskeg Lake Cree Nation, and Muskoday First Nation. Similar to the studies described above, this study also highlighted challenges in First Nations waste management, such as lack of diversion programs, open-air dumping, burning, and a regulatory lapse as it relates to landfill management. The authors, therefore, emphasized the “need for long-term sustainable funding to support community-based waste disposal and management strategies and the development of First Nations centered and delivered educational programs to encourage the adoption and implementation of waste reduction, reutilization and recycling activities in these communities” (Zagozewski et al., 2011, page 9).

Further, Oyegunle and Thompson (2018), through a qualitative case study inquiry, examined solid waste management in two fly-in communities in Manitoba – Garden Hill First Nation and Wasagamack First Nation – and found that open dumping and burning were the predominant waste management approach utilized in both communities. Soil samples taken and

examined revealed that burning produced arsenic, zinc, copper, and lead that exceed Canadian soil environmental guidelines and industry guidelines. These chemical compounds were also found to pollute the land and water. The authors noted further that recycling programs and waste collection services were absent, as was access to a sanitary landfill.

While the above primary research (except Bharadwaj et al., 2006) and publications give some insight into First Nations waste management issues and highlight the challenges communities face, they are a handful and do not provide the sort of information and analysis needed for effective policy and best practices interventions. Thus, the lack of data and literature leaves a large research gap that need attention by researchers, academics, and practitioners. For example, it is important for research to examine whether waste management approaches that work in settler communities will work effectively on First Nations (Zagozewski et al., 2011). Similarly, the effectiveness of solid waste governance systems in dealing with the issues and concerns raised in the above papers would be helpful in understanding how to approach management of solid waste in First Nations. Moreover, there is the need for research into the sorts of learning that communities are undertaking about their programs and that of other communities to help them improve on their own systems.

2.2 Social Learning

Social learning theory originates from development psychology and was first explained by its proponent, Albert Bandura, in 1977. Bandura's research indicated that people learn by continually observing and imitating role models in a social context (Bandura, 1977). By doing this, the observer's behaviour is impacted and influenced by what they learn in the process (Hanna, Crittenden, & Crittenden, 2013). Social learning has been conceptualized and applied differently in many fields such as natural resources and environmental management (NREM) (Webler,

Kastenholz, & Renn, 1995; Cundill & Rodela, 2012a); however, what, how, and why people learn is conceived of differently than Bandura's original thinking.

Social learning has been variously defined and conceptualized in the NREM literature following its first use in the 1990s (Webler et al., 1995; Maarleveld & Dangbégnon, 1999). For instance, Webler et al. (1995) define social learning as “the process by which changes in the social condition occur - particularly changes in popular awareness and changes in how individuals see their private interests linked with the shared interests of their fellow citizens” (p. 445). Thus, Webler and associates do not only emphasize learning through observation and imitation like Bandura in a social context; instead, they highlight potential changes in an individual's interests or perspectives about resources because of similar and divergent interests that others involved in managing the resource hold. As the authors envision, individuals, in spite of their different interests, must work together to agree on collective action to solve shared NREM problems/challenges (Webler et al., 1995).

Schusler, Decker, & Pfeffer (2003) expand on this conceptualization of social learning when they define the concept as “learning that occurs when people engage one another, sharing diverse perspectives and experiences to develop a common framework of understanding and basis for joint action” (p. 311). This conceptualization provides a sense of the context within which social learning occurs (i.e., engaging and sharing information with one another) and the potential outcome of the process. Deliberation is highlighted by Schusler and colleagues as important to social learning, because through deliberations people raise their concerns and opinions regarding managing the resource to help build the needed understanding for collective action (Newig, Günther, & Pahl-Wostl, 2010; Cundill & Rodela, 2012a). To Keen et al., (2005), social learning is “the collective action and reflection that occurs among different individuals and groups, as they

work to improve the management of human and environmental inter-relations” (p.4). The three conceptualizations of social learning outlined above highlight that parties engaged in resources management must negotiate among themselves and collectively agree on actions regarding how to manage the resource or deal with NREM problems that they face by considering the interests/perspectives of all at the table.

However, Reed et al. (2010) have claimed that the many conceptualizations and definitions of social learning makes its applicability challenging and therefore sought to ‘correct’ the misconceptions that have come to be associated with social learning in the NREM context. Grounded in research on the social learning literature, Reed et al. (2010) define social learning as “a change in understanding that goes beyond the individual to become situated within wider social units or communities of practice through social interactions between actors within social networks.” The authors argue that to make a claim that social learning has occurred, there needs to be a change in understanding of NREM problems or issues being dealt with, and this change must not only occur among those individuals involved (e.g., community representatives), but spread to the groups they represent through social interactions (e.g., person-to-person interactions).

Social learning has been widely applied in specific natural resources and environmental management fields/areas, including forest management (e.g., Buck, Wollenberg, & Edmunds, 2001; Eguny, Reed, & Sinclair, 2016; Assuah & Sinclair, 2019); conservation planning and management (e.g., Schusler et al., 2003; Knight, Cowling, & Campbell, 2006); water resources management (e.g., Pahl-Wostl et al., 2007), impact assessment (e.g., Webler, Kastenholz, & Renn, 1995), among others. Cundill and Rodela (2012a) opine that conceptualizations of social learning actually apply differently in three key NREM approaches/paradigms, including; adaptive management, collaborative management, and adaptive co-management. Hence, I have found in

both reading the literature and through applying social learning concepts in my research that applying social learning in practice is largely dependent on how it is conceptualized in any of these management paradigms.

In the adaptive management literature, social learning is viewed as involving a repeated process of planning, experimenting/taking action, monitoring, observing and learning from outcomes, planning and taking further action (Holling, 1978; Lee, 1993; Armitage, Marschke, & Plummer, 2008). This learning occurs at the level of managers and scientists/experts, who constantly experimented with new management methods to deal with uncertainties and complexities that natural systems exhibited (Cundill & Rodela, 2012a, 2012b). The realization here was that interventionists or command and control approaches fail to adequately respond to environmental challenges and it is through a ‘learning by doing’ approach that managers test decisions made, learn from the resulting outcomes, and improve on those decisions (Lee, 1993; Armitage et al., 2008).

In the collaborative management literature, social learning is explained as involving interactions and deliberations among interested parties in NREM (e.g., resource users, managers, government, etc.) (Schusler et al., 2003; Keen et al, 2005; Keen., Brown, & Dyball, 2012). These conceptions are influenced by participatory democracy, rights-based approaches, and deliberative democracy (Cundill & Rodela, 2012b). Further, Cundill & Rodela (2012a) distinguish adaptive management from collaborative management in the following way: “In contrast to adaptive management, where learning was largely seen to take place in the domain of managers and scientists, and through experimentation, in the collaborative management literature the focus of learning came to bear on deliberative processes involving stakeholders” (p.9). Thus, in the

collaborative management literature, there is a broader conceptualization of who is involved and learns.

Adaptive co-management highlights the experimentation and learning-by-doing components of adaptive management, and the interaction and deliberative processes that are central to collaborative management (Armitage et al., 2008; Cundill & Rodela, 2012a, 2012b). As Armitage et al. (2008) see it, “adaptive co-management, in particular, is an outcome of the adaptive management and collaborative management experiences in which the learning and linking functions (horizontally and vertically) of governance are emphasized” (p.87). In this management paradigm, social learning is geared towards directing social-ecological systems to achieve sustainable outcomes, as managers and users of a resource learn to build capacity through interaction with the environment and ecological experiences in the long-term (Folke, Colding, & Berkes, 2003; Rodela, 2011; Cundill & Rodela, 2012a).

In the NREM literature, however, social learning has been mainly conceptualized within the collaborative management context through literature that focuses on participation and deliberation/interaction among interested parties in NREM – a central theme in social learning theory. This is because the most common definitions are referenced by scholars in this field, such as by Schusler et al. (2003); Keen et al. (2005); and, Reed et al. (2010) hold this perspective. As a researcher who works in participatory NREM, I made use of these conceptualizations during my Master’s research to understand how communities work to manage community forests. In my Master’s research, I looked for evidence of participatory processes in management as a key element in investigating social learning. I hope to build and expand on this experience in my current research on solid waste management in First Nations communities (see more below).

2.3 Importance of Social Learning in NREM

The important relationship between social learning and NREM continues to be emphasized in the literature. In fact, to some authors (e.g., Keen et al., 2005; Armitage et al., 2008; Muro & Jeffrey, 2008), social learning has become a normative goal of NREM, a goal that they claim could help in better understanding and improving humans' relationship with the environment. It is also established that managing natural resources and the environment is complex and yields uncertain outcomes (Schusler et al., 2003; Berkes, 2009a). Therefore, learning is required among managers and those that are impacted by management decisions to better understand the challenges they face and to improve on decisions that inform management, as well as the resources themselves (Keen et al., 2005; Keen & Mahanty, 2006; Muro & Jeffrey, 2008). According to Röling & Wagemakers (1998, p. 54) "Social learning ... is intended to help improve the quality and wisdom of the decisions we take when faced with complexity, uncertainty, conflict and paradox."

On the one hand, complexities and uncertainties arise from the varied perspectives, knowledge, and views presented by interested parties for making NREM decisions; and, on the other hand, from the resources themselves in terms of how the environment reacts to a management decision for example. As Rodela et al, (2012a) succinctly put it, "Natural systems are complex and dynamic and there is an intrinsic uncertainty about how ecosystems will respond to human interventions" (p. 31). Therefore, social learning provides opportunities for interested parties to learn from each other and about the environment or resource being managed in order to arrive at more dynamic decisions to deal with NREM challenges (Maarleveld & Dangbégnon, 1999; Armitage et al., 2008; Garmendia & Stagl, 2010). For instance, in community forest management, several interests are incorporated into management, including harvesting for log sales and recreational use. Reconciling the economic and social/recreational components in management

involves extensive deliberations and learning to understand and accommodate the many interests in the forest (Assuah, 2015).

Authors such as Rodela et al., (2012a) further argue that social learning has become important in managing resources because of a paradigm shift in management from top-down to bottom-up approaches. Historically, top-down, command and control management approaches rooted in science (e.g., technical solutions) dominated management of natural resources and the environment (Cundill & Rodela, 2012b; Rodela, Cundill, & Wals, 2012). While successful in relatively small-scale environmental issues, this linear approach failed to address environmental challenges that arose on a large scale (Pahl-Wostl, Sendzimir, & Jeffrey, 2009). As a result, there was need for more open and participatory management approaches that incorporate learning to manage and deal with uncertain outcomes (Keen et al., 2005; Keen & Mahanty, 2006; Rodela et al., 2012). Ultimately, social learning aims to “create learning partnerships, create learning platforms and learning ethics that support collective action for sustainable futures” (Keen et al., 2005).

2.4 Social Learning Process, Outcomes, and Learning Loops

The explanations of social learning suggest that it is a process. Some authors (e.g., Schusler et al, 2003; Rist, Chidambaranathan, Escobar, Wiesmann, & Zimmermann, 2007; Fernandez-Gimenez, Ballard, & Sturtevant, 2008; Eguny, Reed, & Sinclair, 2016) that have investigated or applied social learning and have found that a social learning approach to management has resulted in participants increasing their understanding of resource/environmental problems, improving participants’ knowledge about resources/environment, acquiring new skills and information, as well as appreciating perspectives of others. As a group or collective involved in the process, participants have been able to build trust among themselves, changed modes of operations,

developed and implemented long-lasting solutions, as well as developed initiatives or novel ideas to improve resources/environment (Mostert et al., 2007; Pahl-Wostl et al., 2007; Assuah, 2015). Assuah (2014) categorizes these sets of outcomes as individual and collective learning outcomes of social learning.

Building on the outcomes or potential outcomes of the social learning process, some authors (e.g., Argyris & Schön, 1996; Maarleveld & Dangbégnon, 1999; King & Jiggins, 2002; Armitage et al., 2008) have discussed learning loops, including single-loop, double-loop, and triple-loop learning. Loop learning originates from the organizational learning literature and is the brainchild of Argyris and Schön (1978, 1996). Single-loop learning is generally explained as involving the development of alternative courses of action or strategies to solve problems or meet set goals to improve outcomes (Maarleveld & Dangbégnon, 1999; Armitage et al., 2008). That is, measuring the expectations of an action against its actual performance, and changing the course of action to meet a goal. For example, assume that the goal of a solid waste management intervention is to recycle (100%) all beer cans in a particular neighbourhood each month. The action taken to achieve this is to provide bi-weekly information to residents to recycle. However, only 30% of beer cans are recycled at the end of the first month. Clearly, there is a mismatch between the action (i.e., bi-weekly information) and the intended goal of 100% recycling every month. Observing this, residents, in addition to the bi-weekly information, are provided with free recycling bins to help achieve the set target. This linear process of finding alternative means to improve outcome is referred to as single-loop learning (Armitage et al., 2008).

Double-loop learning involves questioning the underlying variables or assumptions of actions (Maarleveld & Dangbégnon, 1999). That is, putting to question the beliefs and values that informed actions (Pahl-Wostl et al., 2007). In the example above, double-loop learning can be said

to have occurred when outcomes from actions elicit questions such as: Why are residents not motivated to recycle? Why are recycling bins being provided for free? Why is public education not achieving its goal? In effect, outcomes from actions begin to put those very actions into radical changes. While the goal of single-loop learning is improving management of resources/environment, double-loop learning focuses on renewing, knowing, and understanding actions taken (King & Jiggins, 2002).

According to Armitage et al. (2008), “When learning is characterized by reflection and actions that address the conditions that structure interaction patterns in single and double-loop learning, it is referred to as triple loop learning, i.e., learning to learn” (p. 270). Thus, in triple loop learning the whole system is questioned and, in the example above, questions that arise will include: Why are residents being told to recycle 100% of their beer cans every month? What are the alternatives to recycling of beer cans?

2.5 Indigenous Learning

The term Indigenous learning made its way into the mainstream literature following years of advocacy by Indigenous communities and leaders, researchers, academics, and others working for the recognition of Indigenous ways of knowing. Battiste (2002) allude to colonization and domination of Eurocentric (or Western) ways of writing and knowing as resulting in the neglect of Indigenous knowledge and ways of learning, resulting in a huge deficit in the literature. According to the Canadian Council on Learning (CCL, 2007), “First Nations, Inuit and Métis [Indigenous] have long advocated learning that affirms their own ways of knowing, cultural traditions and values” (p.2). This is because Indigenous learning embodies the knowledge, culture, and traditions of Indigenous people (Battiste, 2002), and is recognized as a holistic lifelong learning process that provides opportunities for community members of all ages to learn (Battiste,

2005; Kaminisky, 2012). Learning focuses on the spiritual, physical, intellectual, and emotional selves of individuals in communities (Battiste, 2005; Cull, Hancock, McKeown, Pidgeon, & Vedan, 2018). To this end, the CCL (2009) describes Indigenous learning as “a fully integrated and potentially all-encompassing process that permeates all aspects of the learner’s life and their community” (p.11).

Although no precise definition of Indigenous learning exists, it is explained as involving individuals observing, experiencing at first-hand, reflecting, making meaning, sharing/teaching, and acting (Augustine, 1997; Kaminsky, 2012). This process restricts intrusion or intervention during the learning process; instead, it encourages individuals to observe, listen, and partake in events or situations (Battiste, 2002). As a result, Indigenous learning is considered experiential in nature, and “the first principle of Indigenous learning is a preference for experiential knowledge” (Battiste, 2002, p.15).

The literature on Indigenous learning suggests that individuals first experience the environment, reflect on it, and make meaning out of their experiences (Augustine, 1997). This is then followed by sharing the outcomes of their experiences with others in the community through, for example, storytelling and other traditional ceremonies (Augustine, 1997; CCL, 2009). According to Battiste (2002), daily observations, ceremonies, and traditions are integral parts of the learning process in Indigenous communities. In this sense, learning becomes a responsibility for individuals in communities, and the knowledge gained is passed on from generation to generation. This knowledge is as a result of several years of interaction with and understanding of the environment, interpreting its signals, signs, and interconnected relationships, and sharing with others (Houde, 2007; Berkes, 2009b; Berkes & Berkes, 2009).

As Berkes (2012) defines it, Indigenous knowledge is “a cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission” (p. 7). Using examples of research from Indigenous communities in North America, Turner and Berkes (2006), identified mechanisms through which knowledge about land and resource management and conservation could be developed, including lessons from the past; language; metaphorical sayings and narratives; lessons from other places; learning from animals; monitoring - building on experiences and expectations; observing ecosystem cycles and disturbance events; trial and error experimentation and incremental modification; learning by association, extension, and extrapolation; and, elaborating and building sophistication. This suggests that Indigenous learning or Indigenous ways of knowing is a lifelong process; experiential in nature; rooted in Indigenous languages and cultures; spiritually-oriented; a communal activity, involving family, community, and Elders; and an integration of Indigenous and Western knowledge (CCL 2007, 2009; Weiss, Hamann & Marsh, 2013).

In terms of outcomes, Indigenous learning is recognized as building relationships among individuals and communities (Spak 2005; Cull et al., 2018). According to the CCL (2009), “the value of individual learning cannot be separated from its contribution to the collective well-being” (p.10). Thus, the individual who learns shares, deliberates, and discusses the knowledge with others to create a mental model of the phenomenon they observed and experienced (Berkes & Berkes, 2009b). As a result, Indigenous learning “nurtures relationships within the family and throughout the community. These relationships serve to transmit social values and a sense of identity, and also help to ensure cultural continuity” (CCL, 2009, p.10).

Learning as it relates to Indigenous knowledge has been researched in NREM in areas such as natural resources conservation and management, co-management, fire management, among

others. Documentation of learning in this field has often come from the experiences of Elders, Knowledge Keepers, and community members as it pertains to them sharing their observations and experiences with, for instance, hunting, fishing, and plants (Davidson-Hunt & Berkes, 2003; Turner & Berkes., 2006; Berkes, 2012, 2017; Menzies, 2019). For example, utilizing transect walks and site visits, Davidson-Hunt and Berkes (2003) learned and documented the knowledge of Elders from Iskatewizaagegan No. 39 Independent First Nation on spatial characteristics of biogeophysical landscape, temporal dynamics of landscape, spatial characteristics, structures, processes, among others. Elders provided their knowledge and perceptions about the landscape based on their personal experiences with the land, as well as stories that had been passed down to them including their history to share this knowledge so others could learn from it. Houde (2007) analyzed the application of Indigenous ecological knowledge in a Canadian context and identified six faces of knowledge as it relates to decision-making in co-management arrangements. These six faces - factual observations; management systems; past and current land uses; ethics and values; culture and identity; and cosmology – provide a frame for analyzing and examining Indigenous knowledge and learning in NREM.

The CCL has also developed a *Holistic Lifelong Learning Measurement Framework* to assist in considering Indigenous learning. The Framework is evolving (owing to insufficient and unavailable data in some instances) and has been developed mainly for measuring Indigenous learning in classroom settings (CCL, 2009). However, the Framework provides a good basis for considering Indigenous learning that can be applied to my research on First Nations solid waste management.

The Framework is organized into three broad categories, namely *Sources and Domains of Knowledge, The Lifelong Journey, and Community Well-being. Sources and Domains of*

Knowledge refers to the sources through which individuals learn, for example, through people (e.g., family, Elders), traditions and ceremonies, spirituality, languages, and the natural world. *The Lifelong Journey* component involves learning opportunities, formal and informal, that exist, and four stages of life: Infants and Children (0–5); Youth (6–18); Young Adults (19–34); and Adults (35–64) and Elders (65+). *Community Well-being* involves conditions that impact the learning process, such as spiritual, physical, political, health, and economic conditions. These three over-arching categories are further divided into domains, indicators, and measures to determine learning success (CCL, 2009).

Given that my research is a qualitative study, I decided to describe the three over-arching components and examined their role in solid waste management in communities. Specifically, under *Sources and Domains of Knowledge*, the research examined who or what sources of knowledge participants learned or had learned about waste management (e.g., through the land, Elders, family) and how that knowledge was impacting their current waste practices and approaches. Young adults, adults, and Elders were the focus of this research as described under *The Lifelong Journey* category. *Community Well-being* was examined by looking at conditions in the community that participants felt impacted their learning and waste management approaches and behaviours/attitudes (as described in Chapters 5 and 6).

2.6 Contributions to Understanding Social Learning and Indigenous Learning

Muro and Jeffrey (2008) question what constitutes social learning given the many interpretations that have been associated with the term, and therefore ask for empirical evidence to support the existence of social learning in participatory approaches to NREM. Similarly, Reed et al. (2010) indicate that there is no clear conceptual clarity on what social learning means, preventing scholars and practitioners from making definite conclusions that learning has occurred.

To Reed and associates, there needs to be a consistent approach to conceptualizing social learning in order to help practitioners operationalize social learning in practice. According to Rodela et al., (2012b), various contributions in the literature agree that social learning is about change, however, how this is operationalized differs among researchers - a gap in social learning thinking. Likewise, Indigenous learning has been explained to involve a number of processes, but no clear definition exists. This could partly be explained by the various unique cultures that characterize Indigenous communities, or it might be that the research is still too new. Battiste (2002), for example, argues that inadequate data on Indigenous learning, as underscored by the CCL (2007, 2009), does not help in defining and conceptualizing the approach. I do not expect to fill these definitional gaps; however, I will be clear in my use of the terms and in this way hope to contribute to at least the conceptualizations I think have the most support.

I do plan to approach some of the other noted gaps in the social learning and Indigenous learning literatures. For example, social learning in NREM concerns itself with taking collective action that leads to change (e.g., Keen et al., 2005; Keen et al., 2012). According to Cundill et al. (2014), “social learning research is change-oriented and most often interested in how social learning unfolds or is mediated and how it can influence action and adaptation” (Cundill et al., 2014, p.45). My research will shed light on how this change process – which is an important component of social learning - emerges as well as the areas in which this change manifests itself. In addition, I plan to examine how collective action emerges and the kind of changes that result from such actions. In this way, my research will contribute to the currently weak conceptualizations of the social learning -action-change nexus.

Further, some authors have grouped the outcomes of social learning into individual and collective components (Assuah, 2015) or social-cognitive and social-relational components (Van

der Wal et al., 2014). However, this has not been given attention in the social learning literature. For instance, it is not known how these two outcomes interrelate, and how one set of outcomes impacts the other. For example, does understanding resource problems (individual outcome) lead to participants collectively undertaking initiatives (collective outcome) to improve resources, or this understanding is gained through undertaking collective action initiatives? Also, does trust building occur among collaborators after they have undertaken initiatives, or they undertake these initiatives because they trust each other, or both? This requires empirical examination, which my research on First Nations solid waste will seek to address.

There are a handful of peer-reviewed studies (e.g., Kamaruddin, Pawson, & Kingham, 2013) that have examined social learning in a solid waste management context. In their study, for instance, Kamaruddin et al (2005) examined Keen et al.'s (2005) five strands of social learning – reflection, systems orientation and thinking, integration, negotiations and participation – as they relate to the work of two NGOs in implementing sustainable waste management activities in Malaysian schools. However, this research will examine social learning in a way that actively involves all citizens involved in their communities' waste management programs and therefore contribute to the understanding and application of social learning from a broader group of participants. This will go to strengthen the context within which social learning can be utilized, as well as its applicability.

Participatory processes can facilitate social learning; however, some authors describe social learning as any participatory process, and this has confounded understanding of the theory (Muro & Jeffrey, 2008; Reed et al., 2010). By examining the extent to which First Nations communities share their understanding on, for instance, recycling practices with others (e.g., family, friends) in order to establish such learning in the broader community as defined by Reed

et al. (2010), my research will be helping to provide clarity on the process of social learning in a cross-cultural context. In fact, it is not well established how social learning plays out within cross-cultural contexts, given that the theory is directly influenced by Western notions of learning.

This last point underscores the reason I have brought Indigenous learning into my research. I wanted first and foremost to understand as best I could the adult learning approaches common in my focus communities. With this in hand, I hope to be able to better understand the relationships, if any, among Indigenous learning and social learning. I feel that this will help me to understand more clearly the cross-cultural applicability of social learning. Thus, the research will be contributing to understanding the relationship between Western and non-Western adult learning approaches within a NREM context.

It has also been noted that Indigenous learning has a strong impact on community well-being and relationships (CCL, 2009). However, a gap exists in terms of the sorts of outcomes, especially in a resource management context, that Indigenous learning process yields. I am interested in the focus on relationships because relationship building is also important to social learning – in fact, some suggest that social learning increases as relationships among participants are solidified. Given that Indigenous learning has not been applied in waste management research that I know of, this research can also start a conversation on applicability of this learning approach and how it can be incorporated in managing the environment and resources.

More so, a gap exists in terms of how factors – e.g., physical, spiritual, cultural, political, and health conditions - that have been identified as influencing Indigenous learning (CCL, 2009) actually impact learning. Even though there are similar characteristics regarding learning in Indigenous communities, how learning actually proceeds can be significantly different among communities. This research will examine factors that have the most influence in communities.

2.7 Social learning, Indigenous learning, and Community-based Solid Waste Management

As explained above, social learning has been applied and used in different fields including NREM. This is because of the failure of top-down, command and control methods used by resource managers and the complex nature of resources and uncertain outcomes that require learning to help improve decision making and the resources themselves (Keen et al., 2005; Keen & Mahanty, 2006; Cundill & Rodela, 2012a). As well, the success of many management approaches requires the direct involvement of a wide range of people, and this is certainly the case with waste management, which is being examined in this research.

In NREM, a central argument in social learning is that as people work together or collaborate on managing natural resources and the environment, opportunities exist for people to learn among themselves in the process as they contribute, deliberate, reflect, and consider diverse knowledge sources to improve on decisions that they take (Keen et al., 2005; Cundill, 2010). Cundill et al. (2014, p.45) also suggest that “social learning research is change-oriented and most often interested in how social learning unfolds or is mediated and how it can influence action and adaptation” (Cundil et al., 2014, p.45). This thinking on social learning is in line with the proposed research, since managing waste and the resources contained therein in First Nations requires that community members and the relevant authorities work together to improve the current MSW management situation in their communities.

As a consequence of social learning in NREM, researchers have found that encouraging social learning promotes improving participant knowledge about resources/environment, increasing their understanding of resources/environmental problems, acquiring new skills, and approaching sustainable solutions (Schusler et al., 2003; Rist et al., 2007; Fernandez-Gimenez et al., 2008) as highlighted above. As a collective, participants can build trust among themselves

while managing resources/environment, develop initiatives to improve resources/environment, change management practices, and implement lasting solutions (Mostert et al., 2007; Pahl-Wostl et al., 2007; Assuah, 2015). The above outcomes of social learning will be examined in this research to help contextualize findings in the theory.

Similar to social learning, Indigenous learning is established as a social process that builds relationships among individuals and communities (CCL, 2009). Thus, Indigenous learning ensures that “the value of individual learning cannot be separated from its contribution to the collective well-being” (CCL, 2009, p.10). This attribute of Indigenous learning appears to align with social learning, in that both approaches look at the individual and collective components of learning. As well, one could generally conclude that both social learning and Indigenous learning recognize that individuals are at the core of learning and become social to the extent that lessons learned are shared with others. In the context of social learning, sharing occurs among people in the collaborative process or social networks (e.g., Reed et al., 2010; Cundil & Rodela, 2012), while community is the focus of sharing in Indigenous learning (Battiste, 2002).

However, as extensively discussed above, the processes of learning between the two theories might differ. In the context of Indigenous learning, the literature indicates that experiencing, reflection, and meaning making first occurs within the individual before any of the outcomes of these are shared with community members through storytelling and traditional ceremonies (Augustine, 1997; CCL, 2009). Further, it can be argued that learning still occurs among the community (or collectives) that participate in storytelling and traditional ceremonies. With social learning, the learning occurs as individuals or collaborators share ideas and deliberate on issues being discussed, which supposes that face-to-face or personal contact between

collaborators could be considered ideal in the learning process. These hypothetical differences will be explored in this research.

Despite the difference described above, both learning approaches involve sharing experiences or ideas and reflection, which are important to learning, and are relevant to this study. Practically, MSW management and, in this context, community-based solid waste management, is complicated as it involves several actors (e.g., civil engineers, landfill operators, regulatory agencies, communities, etc.) in designing and executing appropriate programs and plans. The actors that participate in the process, among other things, are therefore expected to collaborate, deliberate, and reflect on appropriate strategies that best suit community needs (Colon & Fawcett, 2006).

An important component of community-based solid waste management is to change or improve community attitudes and behaviours about waste disposal (Sekito, Prayogoa, Dotea, Yoshitakea, & Bagus, 2013), and this requires continuous learning by communities to reach this end. For instance, a community-based solid waste management program that introduces recycling or waste reduction, would require community members to learn constantly about, for example, the various ways to reduce waste, the importance of recycling, the need to keep participating, among others. This is because it is through such learning that behavioural and attitudinal changes could come about (Romina, 2014). As a result, I will be selecting and examining communities in which community members interact among themselves regarding the MSW management programs being implemented. Thus, conceptualization of social learning in this research will be within the context of community members (i.e., individuals and groups) working together to improve MSW management.

CHAPTER THREE

RESEARCH APPROACH

3.1 Introduction

This chapter discusses the philosophical underpinnings and methods for conducting this research, as well as considerations made for conducting research with First Nations.

3.2 Conducting Ethical Research Involving First Nations

The literature on conducting research in Indigenous communities in Canada is replete with information on unethical research that has disrespected the cultures and knowledge systems of communities (e.g., Castellano, 2014; Assembly of First Nations, 2009). Rather than research benefitting participants and their communities, research processes and outcomes have instead been harmful in some instances (Castellano, 2014) and painted a gloomy outlook of community problems (Smith, 1999; Bharadwaj, 2014). This is because historically First Nations, for instance, have been treated as subjects of research, and hence “research has not been grounded in respectful relationships and has failed to incorporate culturally appropriate ethical standards” (AFN, 2009, p. 4). The Royal Commission on Aboriginal Peoples [RCAP], 1996, p. 498) observed that:

The gathering of information and its subsequent use are inherently political. In the past, Aboriginal [Indigenous] people have not been consulted about what information should be collected, who should gather that information, who should maintain it, and who should have access to it. The information gathered may or may not have been relevant to the questions, priorities and concerns of Aboriginal [Indigenous] peoples.

As a result, research outcomes and data have often misrepresented the knowledge and issues in communities (Castellano, 2014; Ball & Janyst, 2008), resulted in negligence and disrespect for First Nations peoples’ intellectual property rights (Svalastog & Eriksson, 2010), as well as misunderstanding of First Nations perspectives and worldviews (First Nations Information Governance Centre [FNIGC], 2014). Consequently, there is a level of mistrust and resistance on

the part of First Nations in relation to research and researchers, especially those who hold Western worldviews and paradigms (RCAP, 2006; AFN, 2009). It has been established that Western research paradigms and methods have disrespected local cultures, resulted in power imbalances between researchers and participants, and denied First Nations participants/communities any authority or control over the research process and their resulting data/information (Castleden, Morgan, & Neimanis, 2010; Bharadwaj, 2014).

The above-mentioned factors have resulted in calls for cultural and methodological considerations for conducting research in First Nations communities that are different from non-First Nations communities. Consequently, several publications have suggested guidelines for conducting research in First Nations communities as a response to the unethical approaches and methods that have been applied in the past (e.g., RCAP, 1993; Smith, 1999; Castellano, 2014). In 1998, Canada's three federal research agencies – the Social Sciences and Humanities Research Council of Canada (SSHRC), the Canadian Institutes of Health Research (CIHR), and the Natural Sciences and Engineering Research Council of Canada (NSERC) – collaboratively released a document, the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS), to guide the conduct of research in Canada (Bharadwaj, 2014; Castellano, 2014). Whilst Chapter 6 of TCPS was dedicated to conducting research among Indigenous Peoples, it was only a starting point to an extensive conversation on how research conducted in Indigenous communities should proceed. This conversation ensued because the three Agencies could not establish policies in this area based on limited discussions with Indigenous communities, research organizations, and researchers (NSERC & SSHRC, 1998). However, the policy prescribed *Good Practices* for conducting research involving Indigenous peoples.

In 2010, TCPS 2 was released by the Agencies and, this time, the policy provided an extensive framework for how to conduct ethical research with First Nations, Métis, and Inuit People of Canada. Fundamentally, this section of the policy requires respectful relationships between researchers and participants and encourages researchers and participants to engage and collaborate with each other (CIHR, NSERC, & SSHRC, 2014). Chapter 9 of the TCPS 2 provides guidelines for community engagement, research agreements and collaborations, dissemination of research results, intellectual property, among others, as components that researchers need to consider and address when conducting research in Indigenous communities.

TCPS 2 notes that the framework provided “is not intended to override or replace ethical guidance offered by Aboriginal [Indigenous] peoples themselves” (TCPS-2, 2014, p. 109). As a political response to the past ‘evils’ of research conducted in First Nations communities (Schnarch, 2004), the Steering Committee of the First Nations Regional Longitudinal Health Survey (RHS) in 1998 developed guidelines for the conduct of ethical research in a First Nations context, referred to as ownership, control, access, and possession (OCAP) principles (FNIGC, 2007; AFN, 2009; Campbell, 2014). The OCAP principles provide self-determination or autonomy to First Nations over research conducted in their communities (Schnarch, 2004) and allows communities “to make decisions regarding what research will be done, for what purpose information or data will be used, where the information will be physically stored and who will have access” (AFN, 2009, p.1).

Though primarily developed for research in First Nations, these principles now apply “to research, monitoring and surveillance, surveys, statistics, cultural knowledge and...is broadly concerned with all aspects of information, including its creation and management” (Schnarch, 2004, p. 80). OCAP principles apply prior, during, and after research has been conducted (FNIGC, 2007; AFN, 2009) and are independent of any ethics or protocols from public institutions such as

universities (Campbell, 2014). Thus, each First Nations community has the freedom to develop their own ethics protocols based on the OCAP principles to direct research within their own communities.

The coming to force of TCP2 and OCAP principles are viewed as ways to prevent the re-occurrence of unethical research practices in First Nations communities. They direct that research in First Nations communities requires decolonizing research approaches and methods that are participatory and respectful of First Nations perspectives, that build research capacity of communities, empower research participants, foster relationships between researchers and communities and provide a voice to communities (Castellano, 2014; Castleden, Garvin, & Huu-ay-aht First Nation, 2008; Castleden, Morgan, & Lamb, 2012; Christensen, 2012).

The foregoing discussions guided this research to ensure that its conduct was ethical and respectful of communities. To begin with, a research proposal was developed based on the review of the available literature on First Nations waste management. To be able to work with and gain the input of communities, a shorter version of the proposal that contained the proposed research problem, research methods, benefits, and risks, were sent to the two selected communities. In the case of Peguis First Nation, the proposal was sent directly to the Public Works Manager who oversees waste management in the community on February 5, 2018. The proposal was then forwarded to Chief and Council for their review and input. A confirmation e-mail approving the proposal and hence commencement of the research was received from Chief and Council, on March 8, 2018. The letter received from Chief and Council did not raise any concerns about the research nor were there any additional research questions proposed. The letter of approval to conduct the research is attached as Appendix I. While in the field gathering data, the Councillor

assigned to Public Works confirmed that my letter was received, reviewed and discussed prior to my coming into the community.

A similar approach was utilized for the Heiltsuk Nation. The short proposal was sent to the Heiltsuk Integrated Resource Management Department Research Advisory Committee on February 5, 2018. Upon receipt of the proposal and letter regarding conducting research in the community, the Research Liaison Coordinator for the Nation, who is also an hereditary Chief, contacted me and requested that I fill out and submit a research application form developed by the Nation. The application form had five components: Identification of Researcher; Description of Research Project; Records Requested (use additional sheets as required); Agreement on Terms and Conditions; and Approval of terms and conditions. Completing the application form also required that I submitted a reference letter from my supervisor.

Once the submission was done, I was told that the Advisory Committee would review the package and get back to me with their recommendations. On March 12, 2018, I received an approval letter from the Advisory Committee, which is also attached in Appendix I. Similar to Peguis First Nation, the Committee did not question any aspects of the proposed research, nor did they request that anything be added. In effect, the communities (represented by the appropriate authority in charge of research) and the researcher agreed on the research problem and the methods to conduct the research. It is important to emphasize that prior to submitting the proposal to both communities, I had had extensive telephone conversations and discussions numerous times with the community representatives I sent the research proposal to and therefore got direction regarding how to proceed with the research and the interests of the community.

In terms of distribution of data or results of the study, a written summary report and the entire thesis will be sent to both communities once the thesis is completed. Additionally, a poster

will be developed and sent to communities. It is hoped that the poster, which will capture key findings and photos, will be printed and displayed in the community for community members. Further, any journal publications that will result from the thesis will be sent to the communities for input before submitting the paper. In fact, one of the recommendations from the Heiltsuk Integrated Resource Management Department Research Advisory Committee stated that “HIRMD will like the opportunity to review any publications that will come from your research project.” Currently, I am working on journal publications, which will be sent to the communities once completed.

It is also important to note that I collaborated with the Green Action Centre in Winnipeg to conduct a waste habit survey in Peguis First Nation, as part of the research. The survey sought to obtain basic waste management information in the community. One hundred and one (101) surveys were administered from October 1, 2018 to October 21, 2018. The results of this study resulted in a report that was submitted to Peguis First Nation and the Green Actin Centre, and I reference some of the data in the report in my thesis.

3.3 Worldview

Worldviews or research paradigms have been espoused and explained by many authors (e.g., Lincoln, Lynham, & Guba, 2011; Creswell, 2014) as broad guiding principles and approaches that help direct the conduct of research. In the social sciences, there have been several typologies given to worldviews. Creswell (2014), for instance, groups worldviews into four: post-positivist, constructivist, transformative, and pragmatic worldviews. These worldviews are usually explained in relation to the ontology (what constitutes knowledge) and epistemology (how knowledge is acquired) that underpin each paradigm; hence, providing the researcher with information to frame the research inquiry to align with their worldviews, or those that best support

the research inquiry. Thus, each worldview or paradigm comes with tenets upon which the researcher makes decisions. Explicitly stating a worldview helps to guide a researcher shape the inquiry being pursued and reveals to readers' foundational information about the research itself (Creswell, 2014).

Over the years, my research work has been influenced by constructivism or social constructivism. My thinking in this regard is the result, in part, of working with community groups about community forest management that revealed they possessed diverse multiple realities on issues, which were shaped by their social interactions, culture, and connections with historical events (Creswell, 2009; Lincoln et al., 2011). As the literature suggests, I found the realities of these groups were constructed through their interactions and social relationships with people and events of the world, and hence these groups viewed their relative realities as facts and the truth (Denzin & Lincoln, 2005; Neuman, 2010). These characteristics resonate with me, and social constructivism influenced my Master's research, in which I sought to understand how communities were managing local forests sustainably. Social constructivism seeks to understand phenomenon through the lens of participants, who hold reality about their world and or the phenomenon being studied (Lincoln et al., 2011). As a result, in my Master's research, I sought to examine the experiences of community members regarding how they viewed and used their community's community forest, their involvement in its governance/management, and their unique learning experiences and how that was helping to manage the community forest sustainably. Social constructivism was used in this research to gain an understanding of the individual multiple realities and experiences of community members regarding the community forest. Utilizing this worldview resulted in conducting face-to-face semi-structured interviews; observing at first hand

community forest meetings, training, and seminars; completing three forest tours; and reviewing essential documents that detailed activities, actions, and plans on managing the community forest.

This current research further builds on my experience in using the lens of social constructivism. My decision to use this approach was informed by the nature of the proposed research, and my conviction that it was through a social constructivist approach that participants would explain and share their experiences with MSW management based on their interactions with community members, close relations, and those in charge of waste management in communities. As Detel (2015, p. 228) describes it, “The core idea of social constructivism... is that some things are produced (and in this way constructed) by social actions, i.e., by actions that we carry out by interacting with other people.” It is the outcome of this construction of knowledge, based on interactions among community members regarding MSW, that this research sought to understand and document. Thus, this research examined the lived experiences of people (in this case waste management) and did so through the understanding from those who lived the experience (i.e., constructed the lived experiences through interaction) (Walker, 2015).

Also, community members have different experiences with MSW management and programs that are being rolled out in communities and it is only through community-level interactions that people will make sense out of these programs and participate in them (Lincoln et al., 2011). For instance, it is only through interactions with others that proper or good recycling habits would be adopted or developed, particularly if recycling has not been an approach to MSW management that people are familiar with. This understanding makes social constructivism important to this research.

Furthermore, social constructivism is in line with the process of social learning theory, which is examined in this research. At the core of social learning in NREM is interaction between

individuals and or groups about an issue of interest or importance (Keen et al., 2005) such as solid waste. Through interactions, therefore, those involved in the social learning process can deliberate and share their knowledge of the issue of interest. This process is in line with social constructivism, which concerns itself with making meaning of the world (i.e., construction) through social processes and interactions between or among people, instead of the individual trying to understand the world through individual cognitive processes (Young & Collin, 2004).

3.4 Strategy of Inquiry: Qualitative Case Study

This research employed a qualitative research design for three main reasons. Foremost, the purpose of the research, research objectives, and research questions set, are best suited to qualitative inquiry. This is because the characteristics, processes, lived experiences, and meanings that participants ascribe to their waste management experiences cannot be quantified in terms of amounts or quantity but need to be examined and explained through detailed descriptions (Denzin & Lincoln, 2008). Furthermore, this research seeks a better understanding of First Nations waste issues, and what specific initiatives communities are taking to improve the situation (Berg, 2007), and these can best be achieved through a qualitative inquiry, since it would be hard to quantify these sorts of experiences and information. Secondly, given my previous research endeavours, I am comfortable with a qualitative approach. Lastly, since the research seeks to ‘build’ or contribute to existing theory/concepts, a qualitative research approach is preferred (Creswell, 2014). This research sought to generate data to make sense of Indigenous learning in NREM, as well as understand how Indigenous learning and social learning can work or exist together (Leeming, 2018). Thus, using inductive reasoning to explain and contribute to theoretical generalizations (Bendassolli, 2013).

The need for a greater understanding of First Nations waste issues also demands an in-depth examination of the various components and characteristics within communities, since these often dictate the action taken – as evidenced by the variety of waste management approaches across any country. Due to this, a case study strategy of inquiry was ideal for this research. This is because case studies can produce the sorts of “concrete, context-dependent knowledge” (Flyvbjerg, 2011, p.302) that are needed to answer the types of objectives I have set, such as examining collective action and community change as a result of MSW programs. Moreover, case studies “explore a real-life, contemporary bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information...” (Creswell, 2013, p. 97). Given that the subject matter under investigation, MSW management, is a major challenge in First Nations, a multiple case study approach was utilized to compare and contrast factors that impact management in the communities (Gustafsson, 2017). A multiple case studies was also chosen to gather data in two different contexts to help in theory building as described above, and to help contribute to understanding waste management in First Nations communities (Berg, 2007; Yin, 2014). As such, I relied on multiple case studies from communities that have started initiatives that aim to find alternative approaches to their current waste management issues. The criteria, which is explained below, was used in choosing the cases.

3.5 Data Collection

Data was collected using several techniques, including semi-structured interviews, participant observations, documents review, and a community workshop. The study population included First Nations Elders, community members, staff of community waste management departments, and employees of Indigenous Services Canada. Data collection was conducted in two phases as outlined below.

Phase I

Phase I of the data collection sought to provide me with a better sense of the landscape and current situation of and opportunities for First Nations waste management in Canada, and to help me identify the suitable communities for an in-depth examination. This phase of data collection largely answered objective 1.

Selecting a case to research is a very arduous and challenging task (Stake, 2005). As a result, I developed a set of criteria to guide me in the process. Additionally, developing criteria was necessary because there was no comprehensive data/information on First Nations waste that was accessible to assist in choosing cases that best fit this research. The criteria include:

1. First Nations communities that are currently addressing challenges of waste management by pursuing initiatives such as recycling or sorting, composting, and/or any other initiatives.
2. First Nations communities that have year-round road access, since this represents the largest number of First Nations communities in Canada.
3. Communities that are open to allow the research to proceed. To ensure continuity of the research, it is very important that Chief and Council and or community research boards in chosen communities approve of the research from the onset.

It is important to note that I had access to data from the ISC on communities to help choose my cases. However, the data were not conclusive and reflective of the current waste management systems in some communities I had phoned to inquire about their waste management systems. As a result, I could not rely on that data pool alone for my case selection. That notwithstanding, the data provided me with information on communities I needed to disregard and those to focus on getting more information about their systems. Given the lack of reliable and available data, I

focused my selection of cases on First Nations south of the 60th parallel, because this geographic region has the most First Nation communities in Canada. I then focused on the Provinces of western Canada, including Alberta, British Columbia, Manitoba, and Saskatchewan as these provinces together have a high First Nations population of 554,185 out of 977, 235 nationally (Statistics Canada, 2017a) and were more easily accessible.

To reduce the number of First Nations that could potentially qualify or be part of the research, I sought to get twelve communities (three communities each from the four provinces). In doing so, I interviewed ISC employees who work directly with First Nations on solid waste issues from the four provinces. In British Columbia, the ISC official directed me to an individual whom, according to the official, works closely with the province's ISC and had the greatest experience and knowledge working with First Nations on waste management. I interviewed this person as a result. During the interviews, I requested information on communities that have 'advanced' in their MSW management, meaning: (a) the existence of composting, recycling, and/or reuse system in place; (b) availability of a transfer station/eco depot and or dumpsite (referred to loosely as landfills); and (c) availability of waste sorting process. To be selected as a case, a First Nation needed to meet the first criterion (a) above and one or both of criterion (b) and (c).

Based on the ISC referrals, I interviewed those in charge of solid waste management in these communities to determine the best two communities as case studies. In all, six ISC employees (including the individual I was referred to in BC) were interviewed and twelve personnel in charge of MSW management in the three provinces were interviewed for the first phase. Two communities – Heiltsuk Nation, British Columbia and Peguis First Nation, Manitoba – were selected for detailed study as a result of this work. Heiltsuk Nation was chosen because it met the criteria above and the community was willing to allow me to conduct the research. Peguis First

Nation was chosen because it was the topmost community in Manitoba regarding action on MSW, met the criteria, and was willing to allow me to conduct the research in the community. There was preference for a case in Manitoba because it is home for me and, as a result, it was important to understand MSW management among First Nations in the province. In both communities, there were recycling programs and, as discussed in Chapter 4, Heiltsuk Nation had an established and running composting program and a (free) thrift store program. Further, Heiltsuk Nation had a waste transfer station while Peguis First Nation had a recycling depot. Both communities had a waste sorting system in place.

The questions used for ISC participants and those in charge of MSW management in the 12 communities are attached as Appendix II. For the former, questions generally covered solid waste management initiatives, plans, programs, facilitates, infrastructure, and funding provided to communities, while components of the community's programs, diversion, pick-up services, and how community members utilize facilities/infrastructure and participated in MSW programs were the general questions asked. Appendix III contains the recruitment e-mails for the above participants, while the consent form is attached as Appendix IV. Phase I started on June 13, 2017 and ended on March 6, 2018.

Phase II

Phase II sought a deeper understanding of waste management within the two selected case communities and to provide a response to the other objectives. Three data collection methods were used: semi-structured interviews, observation, and a community workshop.

A total of fifty-two semi-structured interviews were conducted during this phase of data collection and these included Hereditary Chiefs, Elders, community leaders/members that have been spearheading or spearheaded community solid waste management initiatives, community

members participating in these initiatives, and staff in charge of MSW management in communities. Community Elders were purposively selected and interviewed because they are an embodiment of knowledge in First Nations communities and play the critical role of passing down knowledge to generations after them. Community members who have been leading or led solid waste management initiatives were also purposively chosen because of their involvement and the role they have play in these community initiatives (Daniel, 2011). Additionally, they were able to provide context information regarding how programs in the communities started.

Further, community members participating in MSW management programs were selected using respondent-driven sampling, in which participants interviewed recruit members of the target population for the researcher (Daniel, 2011). Staff of the solid waste departments were purposively selected and interviewed because of the wealth of knowledge and experience in working with and dealing with community members on solid waste. Interviews were audiotaped with permission from participants; otherwise, hand-written notes were taken instead. Appendix V shows the interview schedule for community participants. The interview schedule contained twenty (20) questions and were developed based on the set objectives of the research and the literature on MSW management in First Nations, Indigenous learning, social learning, and solid waste management as a concept. Questions generally covered participants' participation in programs, how and what they have learned, actions they have taken based on learning, and how they have applied culture in MSW management. Recruitment e-mails for community participants is attached as Appendix VI.

Table 3.1: Research Participants

Characteristics of Participants	Heiltsuk Nation	Peguis First Nation	Male	Female
Hereditary Chiefs	2	-	1	1
Elders	4	6	2	8
Community leaders/members who spearheaded MSW management initiatives	3	1	1	3
Community members participating in these initiatives	14	17	20	11
Staff in charge of MSW management in communities	3	2	4	1
Total	26	26	28	24

The interviews were conducted with participants at places of their choosing and where they felt comfortable. These places included homes, community centers, and libraries. At the start of the interviews, I provided the consent form (Appendix VII) to participants to read and ask questions if they had any. If a participant asked questions, responses were provided, and clarity was provided on any issue participants were not sure about with regards to the interviews. Once participants were comfortable to participate in the research after reading the consent form and answering their questions, participants signed the consent form. All participants had to sign the

consent form prior to conducting interviews. For some participants, I emailed them the consent form to read before meeting them in person for the interviews, so they showed up at the interviews with already signed consent forms.

When interviews took place in community centers or coffee shops, I offered participants tea or coffee. I was also offered coffee and tea when interviews were conducted in the homes of participants. If participants chose to be audio-recorded, the recorder was used positioned such that participants did not chance on it at the first glance. Interviews averaged about 50 minutes, and the structure of the interviews allowed me to probe when necessary. Interviews were approached in a form of a conversation between participants and myself.

In addition to semi-structured interviews, I participated in and observed solid waste management related activities organized in the communities, such as a community clean-up in Peguis, as well as solid waste practices at events organized in the community such as Treaty Days and Oceans Day in Peguis First Nation and Heiltsuk Nation respectively (I lived in both communities, staying on Heiltsuk Nation for 35 days and Peguis for 31 days). I kept extensive notes of my observations, which I have used in subsequent chapters below. My observations included how MSW management had been planned as part of these activities; for instance, if recycling and composting bins had been provided. I also observed first-hand at these events, attitudes and behaviours of community members as they used the bins and other equipment. Furthermore, I had four trips (two each) with those that are tasked to collect garbage and recycling in both communities, and I helped with the collection of mixed garbage and recyclables. An important component of my observations was taking photos, which I have used widely in the thesis.

Furthermore, I organized one community workshop in Heiltsuk Nation, in which eight people (all participants) attended. The workshop provided information on the data that was collected and encouraged discussion among participants regarding community attitudes/behaviours and what was being learned as the community works on managing MSW. All participants that were interviewed were invited to the workshop. During interviews, I discussed with participants that a workshop will be organized at a later date and were invited to attend to share their opinions with others on the questions that had been asked. I confirmed with participants two days to the workshop to be sure that they will be present and to help me coordinate logistics. The workshop was held on June 14, 2018 at the Elders' Building, and it lasted for two hours.

At the workshop, I presented the data that had been gathered and asked participants for their opinions on what was presented. Handwritten notes were taken during discussions. I also provided sticky notes to the eight participants to write their thoughts on the issues that were being discussed such as community involvement in the program, how to get Elders and traditional leaders to participate and share knowledge in waste management, how to properly relay information to community members, how learning can be improved, etc.

The community workshop that was planned for Peguis did not materialize because most of the participants contacted could not confirm their participation except three people. This made it impossible to continue with the workshop. However, there was a community workshop with the community based on the survey that I had conducted with the Green Action Centre and the Peguis Landfill, which was funded by the Green Action Centre. Results of the survey, which also captured some of the questions I asked for this research, was presented to community members for their input.

Phase II started on April 2018 and ended in July 2018. Data was collected in Peguis First Nation between April 3, 2018 to May 6, 2018. There was a follow-up visit from July 17, 2018 to July 20, 2018 to observe a major event, Treaty Days, in the community. From May 15, 2018 to June 18, 2018, data was collected from the Heiltsuk Nation. Ethics approval to conduct Phases I and II of the research are attached as Appendix VIII.

3.6 Data Accuracy and Analysis

The audio-taped interview recordings were transcribed manually and were member-checked by participants (Stake, 2005; Creswell, 2014). Thus, interview transcripts were emailed to participants to allow them to read through the scripts, correct any errors, and/or remove from the transcripts information they did not feel comfortable with. Participants were given two weeks within which to make corrections, take away uncomfortable information, and/or withdraw from the research. Even though a deadline was provided, participants who did not respond to the email were phoned and encouraged to look at the transcript and another two weeks given to those participants that had not responded. The opportunity was also given to participants to decide to withdraw from the research completely if they so wished.

Once the member checking was complete, the gathered data were coded with the aid of NVivo™ (QSR 2011) software. Data were entered into NVivo and managed initially through themes grounded in the data and the social learning, Indigenous learning, and solid waste management literature. It is important to mention that emergent themes grounded in the data itself were mostly used for the analysis. Extensive quotes from participants are used in the results below to highlight the most common themes unless otherwise stated. To indicate the number of people who expressed similar ideas on an issue, a code using the following wording was developed: “very few” was used when 6 to 10 participants had similar views; “few” for 11 to 20 participants; “some”

represented 21-30; “many” represented 31 to 44; and “most” for 45 to 52. For any data presented from less than 5 participants, the exact number of participants is mentioned. Data is organized in line with the objectives in the Chapters that follow.

3.7 Study Area

Peguis First Nation is located about 190 km north of Winnipeg, the capital of the Province of Manitoba (Peguis First Nation, 2020) (See Figure 3.1). The Nation is a signatory to Treaty Number 1, which was entered into with the Government of Canada in 1871 (ISC, 2017). However, the Nation is categorized as being within Treaty Number 2 territory. The population of Peguis First Nation is estimated to be around 8,410, with 2,785 people living on-reserve and 5,625 people living off-reserve (Statistics Canada, 2017b). However, available information on the Nation’s website estimates the population to be around 10,000 people of Ojibway and Cree ancestry (Peguis First Nation, 2020). According to statistics Canada, there are approximately 948 dwellings on Peguis First Nation, which has a land area of about 310.81 sq. km (Statistics Canada, 2017b).

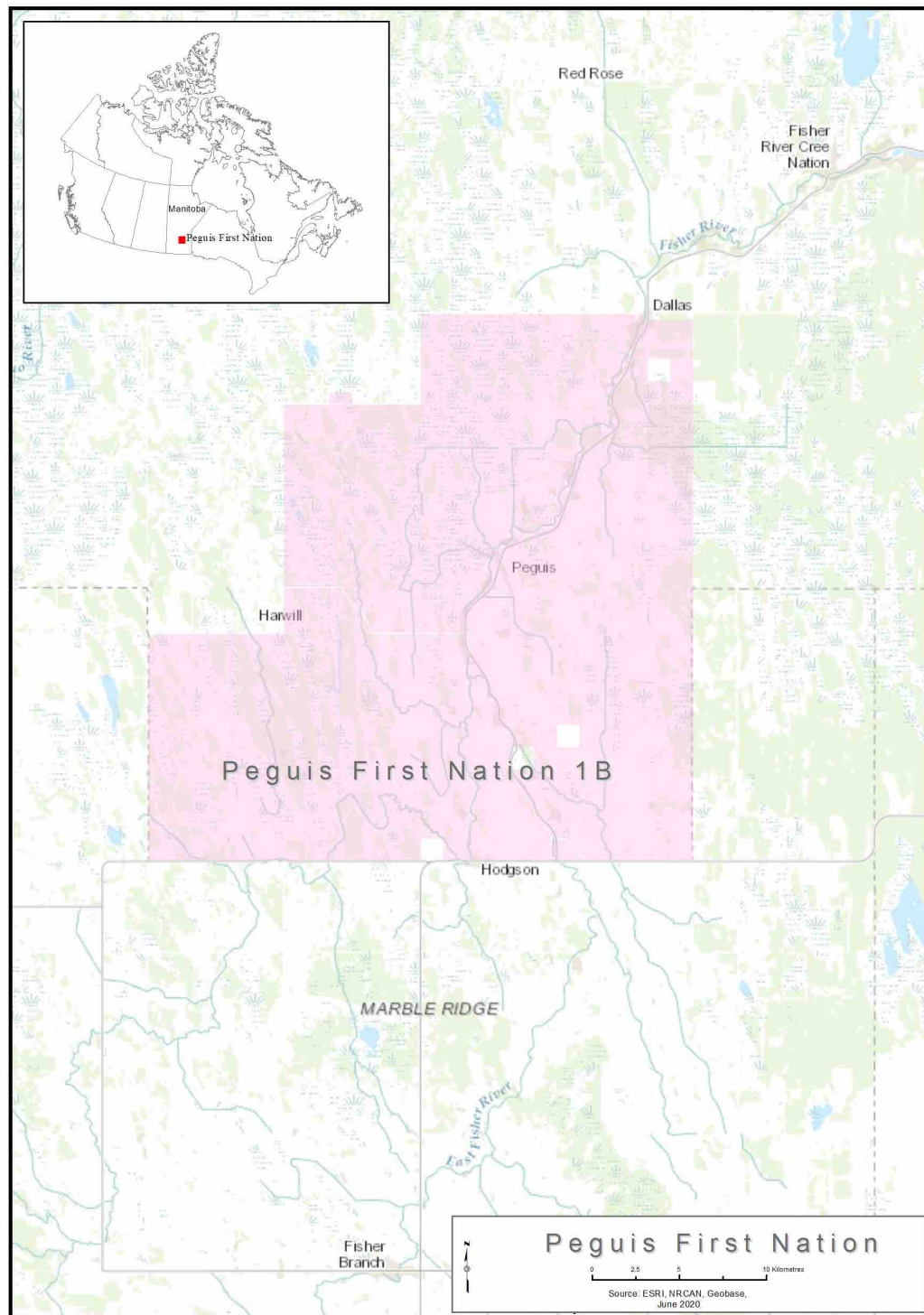


Figure 3.1. A Map showing Peguis First Nation.

Heiltsuk Nation has a population of about 1,935 people: 1,015 live on reserve, while 920 live off reserve according to Statistics Canada (Statistics Canada, 2017b). In its 2018 Tribal Council Report, however, it is estimated that the total population of the Heiltsuk Nation is 2,455 people, out of which 1,230 live on reserve and 1,233 live off reserve (Heiltsuk Tribal Council, 2018). The Heiltsuk occupy approximately 6000 square miles of land in central coastal British Columbia (Heiltsuk Nation, 2015) (Fig. 3.2). The Heiltsuk Nation is an island community, with 409 dwellings and an area of 5.85 sq. km (Statistics Canada, 2017b).

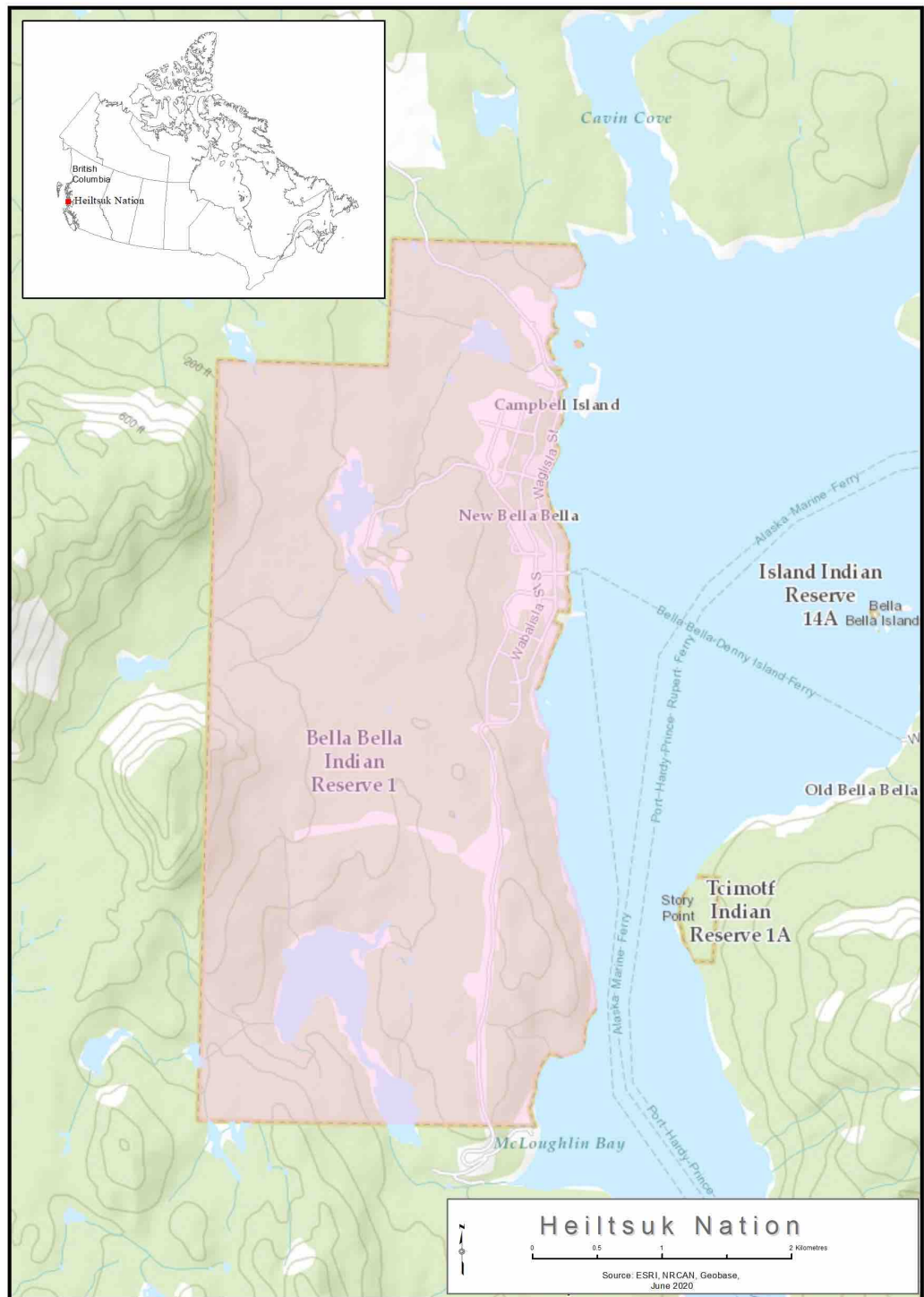


Figure 3.2. – A Map showing Heiltsuk Nation (Heiltsuk Nation)

CHAPTER FOUR

Municipal Solid Waste in Heiltsuk Nation and Peguis First Nation: Management Systems and the Role of Culture

4.1 Introduction

This chapter establishes the MSW management activities ongoing in my two case study communities and relates these to the cultural elements/factors (beliefs, values, teachings, etc.) that participants indicated impact MSW management in their communities. Culture plays important roles in MSW management, particularly because interactions within a culture can impact people's understanding of MSW, the value of waste, and how it is or can be managed. Five key cultural factors were mentioned by participants as impacting MSW management and I have organized the presentation of the results that follows around these factors: avoiding waste or taking only what one needs, taking care of each other, protecting the land, respect for the land, and connection to the land. Additionally, this chapter presents data on colonization and how that has impacted MSW management in the two Nations. I begin the chapter with a description of the waste management facilities and programs in the two Nations that local people had access to in order to provide context for the ensuing data.

4.2 Waste Management Facilities and Programs

4.2.1 Landfill in Peguis First Nation

Peguis First Nation has a 'new' waste landfill (Photo 4.1), which was built around 2008 following a request by Chief and Council to ISC. Prior to the construction of this current landfill, there was an old one that participants described as an eyesore and environmentally risky, because residents and non-residents dumped every type of waste at it and the site was uncontrolled. The current landfill started operation around 2010, after the old landfill was decommissioned. Unlike

the old unmanaged landfill, the current landfill is managed daily and is open from Sunday through Friday from 9:00 am to 5:00 pm. The landfill is closed on Saturdays and holidays. During data collection, I observed that there were two permanent staff/attendees employed at the landfill and casual staff were brought in to work when needed.



Figure 4.1. Peguis landfill site in Peguis First Nation. April 7, 2018

One landfill attendant stood at the main entrance of the facility to direct people and vehicles that came through the facility to dispose of waste. As I observed, most people who visited the landfill stopped at the entrance to talk to the attendant, often asking questions about what they can dispose of at the landfill or in designated spots for recycling. Depending on the materials

(recyclables or mixed garbage) that were brought to the facility, an attendant appropriately directed those that visited the landfill.

Furthermore, there is a free (paid by Council) pick-up of waste from the homes of Elders and people with disabilities once every two weeks, as well as the Band apartments. P50 added that, “It is about 200 homes [that waste is picked up from]. At the Band-owned apartments, pick-up is three times a week; once a week at the old town site (10 houses); and once a week at the school as well.” The pick-ups were on Mondays, Wednesdays, and Fridays. It is worthy of note that the large geographic size of the community and the location of the landfill means that some community members would have to drive for several kilometres to drop off their waste at the facility. Disposing of waste at the landfill, as a result, was a challenge for community members who lived far away from the facility and did not own vehicles. As a result, there is a fee per pick-up service for such individuals and households.

All over the Nation, there were wooden bins that individuals and households used as receptacles for their mixed garbage and recyclables. Typically, large-sized black plastic bags are used to hold mixed garbage before they were placed in these wooden bins for pick-up (Fig. 4.2). Some individuals and households also use grocery bags, which were smaller, to hold their waste. Most of the wooden bins were provided by the Band to the community, but some households provided their own bins. However, purchasing plastic bags is the responsibility of individuals and/or households. With the exception of the community’s central area (mall, offices/departments) and a handful of places that displayed or had recycling bins, most community members used the wooden bins as their receptacles.



Figure 4.2. Waste (mixed garbage and recyclables) picked up from wooden bins from households in Peguis First Nation. April 7, 2018.

I participated in picking up garbage and recycling from households, apartments, and entities in the community. Two garbage trucks – one collecting recycling/cardboards and the other household or mixed garbage – do the pick-ups in the community. The recycling truck usually takes the lead and is followed by the mixed garbage truck, which uses the same route as the former. Most community members disposed of their garbage and recycling in black bags as indicated above. As a result of this practice, it was difficult to sometimes distinguish whether the black bags were filled with recyclables or mixed garbage.

4.2.1 Recycling in Peguis First Nation

Inside the landfill at Peguis, there is a recycling depot/facility (Fig. 4.3). There are two big sheds at the facility – one for sorting recyclables and another for storing recycled and baled

materials. Additionally, there are designated areas for plastics, bottles, glass, used oil, etc., as shown in Fig. 4.4. The recycling facility/depot also has a baler (Fig. 4.5), which is used for baling plastics, metals, and cardboards. Cardboard is a major material recycled in the community.



Figure 4.3. Peguis Recycling Facility/Depot in Peguis First Nation. April 18, 2018.

The recycling program in the community started in 2011. Community members who use the facility can either drop off their recycling with the landfill attendants mentioned above or proceed to dispose of their recyclables in the various designated areas/spaces.



Figure 4.4. Designated Areas for Recycling in Peguis First Nation. April 18, 2018.



Figure 4.5. Baler used to package recyclables in Peguis First Nation. April 30, 2018.

Once a recycling bag is dropped off, an attendant at the facility empties the bag into a large bowl (Photo 4.6), in which recyclables are hand-sorted into bins using recycling symbols on the various materials (thus, from recyclable material #1 to #7). There are bins to store sorted cans and bottles and, as already indicated above, there are spaces for used oil, heavy metals, electronics, etc. The sorted materials, including cardboards are then baled depending on the quantity available or amount collected. These baled materials are then safely stored in a shed (Fig. 4.7) to protect them from being destroyed by weather or animals like bears, which sometimes make their way onto the facility.



Figure 4.6. A sorting bowl for recyclables in Peguis First Nation. April 26, 2018.

Similar to mixed garbage, recyclables are temporary stored in wooden boxes by individuals and households prior to them being disposed of at the recycling depot/facility or picked up by the company that provides the pick-up service. Recyclables are typically held in plastic bags before being stored in wooden bins. However, most of the bags containing recyclables are not clear bags to allow those that pick up the recycling to see their content. As a result, it was difficult for recyclables in dark, opaque bags to be properly recycled. P50 noted that, “Some people do not recycle well and have contamination, so we put them in the garbage. And, some do not have clear bags for us to see what is in there and I will not risk opening that bag because I do not know what I can find. Sometimes, when you pick it up, you see it is light, so you know it is recycling.”



Figure 4.7. A recycling storage shed in Peguis First Nation. April 28, 2020.

During my participation in picking up recyclables from the community, I observed that few places/households actually had blue bins and or used clear bags to dispose of their recycling. Although clear bags were used, I observed that recycling was not properly done in many cases, while few places had it done right as shown in Fig. 4.8. Regarding the former, some of the clear bags had Styrofoam, soiled paper towels, cans, bottles, and food waste in them (Fig 4.9).

Similar to mixed garbage, recyclables are picked up on Mondays, Wednesdays, and Fridays for those areas that the Band pays the company to pick up. As well, individuals and households that want their recyclables picked up pay for the service.



Figure 4.8. Proper recycling in Peguis First Nation. April 19, 2018.



Figure 4.9. Contaminated recycling in Peguis First Nation. April 19, 2018.

To get baled recycling out of the community, the community finds stewardship groups or companies to pick-up the recyclables. Based on the tonnes of materials that is taken out of the community, the community receives money back from stewardship groups or the companies that purchase them. Recycling is not enforced in the community, so individuals can choose to participate in the program or not. As a result, open dumping of waste is a major challenge in Peguis First Nation and quite common, since many people do not recycle owing to factors such as lack of enforcement, lack of funding for pick-ups, no recycling bags, etc. According to P50:

From my pick-ups, I will say 15% recycle, but I know some send their recycling to the landfill. The businesses and the offices are good at recycling, but I will say 15% for the homes. A lot of people cannot afford blue bags for recycling. The Band provided garbage bags for recycling to people, but people abused the system, and some used them for garbage

instead of the recycling. I have heard people say they do not get anything [deposit return] out of recycling, so they will not waste their time to do it. People also were swearing at the first guy who worked there [at the landfill], saying they will not recycle, etc. Some people swear at me and say, 'I am on welfare and you have to pick my garbage.' I had to call RCMP a few times because I was threatened by some people a couple of times since I did not pick up their garbage. But I am not supposed to pick up their garbage. Some people dig holes and put in their garbage and bury them.

Photo 4.10 shows some areas in the community, where waste was openly dumped. Furthermore, some community members burn their waste, as shown in Fig. 4.11.



Figure 4.10. Openly Dumped Waste in Parts of Peguis First Nation. April 19, 2018.



Figure 4.11. Open burning of waste in parts of Peguis First Nation. April 22, 2018.

4.2.3 Landfill in Heiltsuk Nation

Heiltsuk Nation does not have a landfill in the community. However, a company has been contracted to pick-up the mixed garbage in the community. To do this, a garbage truck is barged into the community every week to pick up garbage from the curb. As a result, community members are required to display their bins at the curb every Thursday for pick-up. Once the garbage truck

was full, it was barged out of the community to be disposed of at a facility in Port Hardy, British Columbia. According to P24, “Household garbage goes to Port Hardy, and it costs us about \$6,000 per month to take two of Fox Disposal’s metallic bins out of the community.”

Prior to having this current system in place, all types of waste including recyclables were stored in a huge trailer and was transported to Washington, D.C. to be disposed of. As a participant recounted, “Garbage was loaded into a Royal Blanco trailer and sent to a landfill in Washington. Garbage was kept in what is affectionately called a *bird cage* currently at the transfer station. They used to throw everything into it, and it was causing problems with the shipping, so it had to stop. Now, Fox Disposal comes in once a week and does door to door collection of MSW” (P24).

4.2.4 Recycling in Heiltsuk Nation

There is a depot/facility for recycling in Heiltsuk Nation, which has designated areas with bins for disposing of recyclables such as plastics, cans, batteries, etc. (Fig. 4.12). In addition to these designated areas, there is a big metal bin that is used to collect metals and all sorts of household



Figure 4.12. Designated recycling areas in Heiltsuk Nation. May 17, 2018.

items that do not have specific bins labelled for them (Fig 4.13). The facility has a baler (Fig. 4.14) that is used for baling cardboards, which is the major component of recyclables in the community. Cardboard materials are the major source of recyclables in the community. The recycling facility opens from 1pm to 5pm on weekdays and closes over the weekend, and at the time of data collection, there were four staff/attendants employed at the facility.



Figure 4.13. Metal bin for collecting assorted household waste in Heiltsuk Nation. May 19, 2018.

The distant location of the facility from the built-up area of the community meant that most people who came to the facility to dispose of their waste did so with their own vehicles. I observed that community members that visited the facility and were not familiar with how to properly sort their waste were assisted and directed by attendants. Once an attendant exchanged pleasantries with the user/visitor, the attendant asked about the components of recyclables that have been brought

to the facility. After this information was shared, the attendant guided the user to dispose of the recyclables in the appropriate designated areas. I also observed that staff made sure recycling was done properly by the user – a way of educating the user to properly recycle. There were not many users or community members that visited the facility, because there is a free pick-up service.



Figure 4.14. Carboard baler in Heiltsuk Nation. May 19, 2018.

The Solid Waste Department provides free blue and red bins to households for recycling (Photo 4.15). These bins are picked up every Tuesday at the curb. As I observed as a member of the crew that picked up recycling, most households properly recycled their waste while few had mixed waste or contamination in their recycling bins (Fig. 4.16). The contract for picking up waste such as metals, white goods, among others, has been awarded to a company outside the community, which comes in to pick up the waste at least once each month. During data collection, two trucks picked up this waste from the community.



Figure 4.15. Bins for households for recycling in Heiltsuk Nation. May 19, 2018.

After years of preparation, Heiltsuk Nation has signed on to the provincial recycling program and is a member of Multi-Materials British Columbia (MMBC). According to P24:

MMBC funds us now to do the blue box collection. Last year, we got the depot into a good enough shape, so we got to be part of that [MMBC] program. Originally, they were giving us funds for collection, but not paying for shipping out of the community. We had to ship out to the 7 Mile Depot to process it, because our facility did not meet their [MMBC] standards. A lot of it had to do with historical waste and the state of our facility. MMBC require your facility to be empty the day you start the program. It is a possibility in Vancouver, but not on a small island like this. As you can see on this sheet [shows me a sheet], we got \$11 on over 2,000kg of recyclables. But, for us, this is awesome because it represents massive savings. This is because it would cost us between \$7,000 and \$10,000 to ship the goods out of the community. So, these guys are paying to ship out of the

community and giving us some amount back, even though it is not big money. We ship this out every other week or once every three weeks, so it is massive savings for us. The amount of cardboard we generate here is massive because everything that comes in is boxed. One great thing here is that they deliver groceries in cardboard at people's homes for free if they wanted that. These cardboards then become household waste instead of commercial waste.

Baled recycling is shipped out of the community through a local company:

...Waglis Freight Company. [Name withheld], who operates it has been very helpful because the recyclables used to pile up a lot. Initially, we used to haul it out with a cube van as far as Port Hardy. [Name withheld] ships everything out in one 50-foot trailer. At one point, we shipped out 32 bales of cardboards, 30 bales of recyclables, 8-12 bales of Styrofoam, and some electronics. That was quite a load! (P24)

The Solid Waste Department provides bins for households to hold the garbage before they are picked up. Although burning of waste has been banned in the Nation, there is, however, prescribed burning of wood disposed of at the recycling depot.



Figure 4.16. Proper recycling (left) and improper recycling (right) practices in Heiltsuk Nation. May 19, 2018.

Furthermore, the community has signed on to oil and tire stewardships. P24 explained that:

We are also part of British Columbia Used Oil Waste Management Association, and we shipped out oil in December [2017] as well. We are allowed to transport anti-freeze, oil, and freon, and we are also in the tire stewardship program. The good thing about these stewardships is that they pay for the shipping from the community. Our job now is to collect them. The waste oil gives us so much per litre but also because of our remoteness, they give us \$2000 twice a year for shipping materials out. They subsidize how much we pay to ship things out. The last time, it cost us \$2000 to ship out and it was great because that was how much we were going to get. They also gave us credit for the oil, which was about 6 cubes for 6000 litres plus a bunch of drums... For tires, they do not give us anything back,

but they pay for shipping. If we have any recyclables in our garbage, the tipping fee is doubled straightaway, so it is important that we do it right.

With regards to how the recycling program has evolved, P25 explained that:

When the recycling program first started, it was purely on a volunteer basis - about 20 to 30 homes, and the former manager ordered the red and blue bins. There was no system when it started, it was just giving out the bins... It was quite a challenge when I first started because we found a lot in the bins that are not supposed to be there. So, we went door to door and gave people tips regarding how to do things right, cleaned some of the waste we picked up, and provided opportunities for community members to ask questions. There are some people who learn from their mistakes and do the right things going forward. Others are rebels who do not listen and decide to do whatever they want. From 2011 to date, I think things have really improved and working well.

4.2.5 Composting in Heiltsuk Nation

As part of dealing with waste in the community, a community-wide composting program was officially rolled out December 2017. Prior to introducing the program, there was a community compost survey conducted in 2010, which revealed strong interest in composting in the community according to P23. Following up on this interest, a proposal on composting was submitted to the Heiltsuk Tribal Council, lids for compost bins were purchased, and construction of the 'Batch composting' facility (Fig. 4.17) began. A six-month community compost pilot project was carried out to test capacity and the composting process.



Figure 4.17. Composting facility in Heiltsuk Nation. May 17, 2018.

To get community buy-in to compost, P22 explained that there was community-wide education. According to P22:

Yes [we educated the community] at events on Earth Day. We had a table, talked to people, and showed them how it is done. It did not take a lot of education. Anything organic went into the bucket, once something had life, it could get in there. We wanted people to unwrap stuff, so that plastics do not come in with their compost. There were not a lot of people putting non-organic materials into the compost, it was a few people... We did the education for about two years. There were not a lot of these events, but we made use of the ones we did. We distributed pamphlets to people, we used word of mouth a lot, and people called

me, so I can add them to the list [of those composting]. Word of mouth was the biggest thing in a small community, because families talk among themselves.

Similar to recycling, there is curbside pick-up of compost from households every Monday by the Solid Waste Management Department. Compost buckets (Fig. 4.18) are provided to community members as part of the composting program. Once a filled-up compost bucket(s) is picked up, it is replaced with an empty bucket for the household. The compost program had been temporarily halted during data collection, because of a broken-down equipment.



Figure 4.18. Compost buckets in Heiltsuk Nation are picked up from households and placed in a waste management truck. May 17, 2018.

4.2.6 Free store

In addition to the recycling and composting, there is a volunteer-managed free store, where community members can send items that they no longer have use for. These items are then picked up by community members, who might need/want them or can find use for. The items brought in are expected to be functioning and in good condition. Thus, torn or tattered clothing, broken appliances, among others are not accepted at the facility. This is to prevent community members from using the facility as a dumping ground. Fig. 4.19 shows some items displayed at the free store.



Figure 4.19. Items displayed at the Heiltsuk Nation Free store for community members. May 22, 2018.

A careful examination of the waste facilities and programs in Peguis First Nation suggests that the community falls within the second component or set of desirable methods to managing waste (i.e., recycling and residual management) on the Zero Waste Hierarchy. Given that some community members still burn their waste, the unacceptable or least desirable method (i.e., incineration) on the Zero Waste Hierarchy adds to the community's waste management methods. Thus, the programs/facilities in Peguis First Nation fall within the latter two components or methods to waste management as outlined on the Zero Waste Hierarchy (Figure 2.1). On the other hand, Heiltsuk Nation has a program for reuse, which is one of the most desirable methods; and recycling and composting which are on the second set of components on the Zero Waste Hierarchy. Similar to Peguis First Nation, Heiltsuk Nation has the unacceptable or less desirable method on the hierarchy because of the community's incineration of wood. Heiltsuk Nation therefore has one program/facilities that falls into each of the three components on the Zero Waste Hierarchy (Figure 2.1).

4.3 Cultural Factors that Impacted Waste Management

4.3.1 Avoiding Waste (Taking Only What One Needs)

Participants in both communities indicated they grew up believing that First Nations are expected not to waste anything, particularly food. As P38 noted, "One of the traditional beliefs is that if you do not need it, do not take it. And, if you take too much, no one will want the little bit you have and that becomes waste. That is traditional in all our [First Nations] cultures." Another participant mentioned that:

As a Heiltsuk, we have been taught to take just what we need and not to waste anything.

And, when we take, say cedar, we have to put the back of it into the bush. The fish bones

also go back into the ocean. Our grandfathers taught us to take what we need to protect the environment because it is ours. (P4).

Explaining how they have learned not to waste anything, which other participants also confirmed, P8 explained that:

What I learned from my family was that they did not just take the meat from the deer. They used the hooves of deer for ceremonial regalia, the hides for drums for singing, and the fat and bones of the animal were used as well. In the end, majority of the animal is being used and that was intentional to dispose just a little bit of the animal.

For their part, participants who hunt or fish, explained that they have learned to feed parts of hunted animals to other animals or use fish as bait to lure other fish in order not to waste the fish or animal.

P29, for instance, explained:

When I take an animal from the bush, I do not leave my waste behind but put it back in the bush for other animals to feed on them. That is recycling as well... As a traditional person, that is what I do with animal waste: I take them back for other animals to feed on them. It is a natural law for everyone.”

P8 also revealed that:

...I also think about how we use our waste as baits for other creatures. For instance, people will feed their fish guts to crabs and in turn harvest these crabs later on. I had some salmon in the freezer that was freezer burn, so I recycled that and used it as a bait to get a halibut.

So, reusing the resource to get other resources rather than just disposing or wasting them.

Two participants explained the underlying cultural teaching for avoiding waste as First Nations.

According to P11:

Our ancestral stories have embedded within them teachings of being clean, not being lazy, and taking care of our house. Our house was not just the physical structure but our territory. So, trying to keep our surroundings clean was held in high regard by our people. That was part of solid waste management... It was a teaching which is a preventative measure of not creating waste and asking how to clean it, but to prevent waste in the first place. When the waste was more of biodegradable items, it was more about the ways of doing things to maintain the sacred if you want to put it that way.

An hereditary Chief explained that:

It is our normal everyday living where you do not throw or dispose garbage around or litter. It is just one of those things that we grew up with. I cannot say there are waste management processes that we were taught, it was just understood that you do not waste anything. For example, carcasses of salmon were disposed of in areas that eagles, ravens and other birds will feed on them. That is a way of waste management. As we grew, we learned about the environment more and more.

P32 claimed that First Nations are environmentalists because they are required not to waste anything or life, explaining that:

All of our traditional teachings relate to the environment. We are environmentalists, so when we go out to hunt, we only take so much. Our grandparents only took what they needed when they hunt and that is what we teach today. We do not go out and kill a lot of animals and sell them to the market. We save the hides because we do hide tanning workshops, but when we trap and hunt, we only take so much.

In spite of the belief that First Nations are expected to take only what they need to avoid waste, many participants mentioned that the concept of waste management is not taught by Traditional Elders in, for instance, ceremonies except that people are told to clean after themselves. As a result,

participants such as P30 questioned why the concept of waste management and the importance of avoiding waste and cleaning after themselves as First Nations are not explained by Traditional Elders. He stated that:

I never heard my Elders talk about waste management when I was growing up. They taught us to pick up after ourselves, but we were not told the benefits or harm that waste causes. They never taught us how to recycle, but they said we should keep our spaces clean. They did not tell us why we should do it. They say clean it up and they did not know much about the environment. It is only recently that we have had recycling coming up and it will take a long time to take root in a big community like Peguis.

4.3.2 Taking Care of Ourselves

Participants indicated that throughout generations, they have learned about the belief that as First Nations, they need to take care of each other. This belief manifests in the form of sharing items such as food with Elders, the less privileged in the community and among others. As P19 explained, “We go out to fish for say halibut and we often go out to give it first to the Elders, single moms, people who need it and keep some for ourselves. That is taking care of ourselves... There is also a principle of ‘you never ask for help unless you need it, but when you are asked for help, you give it’ because the person needs it.” An Elder, recounting their experiences as a child, explained the importance of taking care of each other, illustrating with an example when they had meat in abundance at home:

We did not have anywhere to store this meat initially, but there was a grandmother who did not have anyone to take care of her, so that choice meat goes to her. We have an Elder who cannot hunt, so part of the meat goes to that person. There probably is a family over

there that needs meat, so part goes to them. As children, we were the ones running around with all this meat. We tell them our father shot a deer and wants to share it with them. That is how it was, everybody took care of each other. We took care of the Elders, the old ones. If we find out that the Elders cannot take care of themselves, we did the cooking at home and sent it to them. And, we knew this, because we went to their homes.

Participants underscored the importance of this belief in relation to solid waste management by indicating that by sharing food or one's bounty with others, waste is avoided. For instance, an Elder noted that there are "No teachings or stories on waste management, but we have been taught that when we go hunting or fishing, we provide for others who do not have when we have a lot. This prevents waste in the system." P10 also noted that "The Heiltsuk teaching that can be applied to solid waste is sharing and taking care of one another – sharing what you have with people. We are taught not to be wasteful and that is close to waste management." P11 drew attention to how it is important to care for each other, particularly regarding solid waste by explaining that:

How we manage our waste is important because it goes back to our teaching of keeping our house clean. It is not me personally, but we have that interconnection culturally and socially, so what I do and what you do has an impact on people. So, we have to be careful with what we do. Although it is individual actions, there is that community connection there that needs to be taken into consideration.

During the celebration of Oceans Day in Heiltsuk Nation, I observed that the Heiltsuk Tribal Council provided fish to Elders in the community. When I inquired about the reasoning behind this, I was informed that Elders are first provided with fish at such events or occasions before any other person received same, because culturally, the community needs to take care of its Elders.

4.3.3 Protecting/Taking Care of the Land

Participants mentioned that First Nations have a duty to protect the land with which they have a connection. "... All our teachings point to protecting mother earth, the water, sky, sun, etc.," said P36. This belief, according to some participants, has influenced and continue to impact their solid waste management practices. For instance, P16 indicated that "I recycle because I was taught to protect the land, and we have to take care of our land otherwise our children do not have a chance to have a cleaner environment." P29, who leads traditional ceremonies and hunts, also explained that:

I recycle to preserve the land. Waste is damaging to the land. Waste is affecting the environment in a big way, particularly climate change. I can see that in the animals, the medicines, the land, and how much it has changed from when I was a young person hunting and gathering food on the land... Once we live off the land, we need to take care of it and keep it clean. The healthy animals have moved back into the bush because there is no pollution there. Once they see that there is contamination and pollution, they move away where there are no such things.

Other participants, however, were of the view that the extent of pollution in communities is contrary to the belief of protecting the environment and therefore there needs to be action taken to protect the earth. "... I think of mother earth and I think through things like garbage dumps and it hurts and makes me feel that we should do something to protect it because the garbage dumps are too huge," said P3. Another participant suggested that, "We have to protect mother earth. And, how are we going to do that? By not contaminating it. From mother earth, we gather all our medicines, so we need places that have no contamination for picking and storing medicine" (P35).

To some participants, protecting mother earth was instilled in them when growing up and they expressed frustration with current attitudes that do not align with these teachings. According to P39, “We are not supposed to be throwing things out as Indigenous people, but I see people who throw their containers out and it irks me. We have to protect mother earth and throwing things out is not right. I am not sure how the traditional people here think about protecting the environment.”

P5 also recounted that:

I was brought up by my grandparents, who taught me how to protect the land and keep our surroundings clean because you do not want wild animals coming around. Even when we only had one street in the community, the board walk, nobody left garbage around their portion. Everybody cleaned their property well, so the community was clean. Now, people go to the grocery store, purchase an item, open it and drop the packaging on the floor. The only time people like to clean up is when someone special is coming into the community!

P8 narrated a story of being lectured by their grandfather to protect and take care of the land when they littered:

...One time I had a candy wrapper and I threw that on the floor, and I remember having a lecture from my grandfather who said this is your land and you need to take care of it, so it takes care of you as well. The word Heiltsuk, when you translate it, means speak and act correctly. So, if you are not acting correctly by taking care of your space and with your waste management, then you are not living according to the name of our people. If you are taking care of your waste and reducing your footprint, then you are contributing to the bigger picture and the land will take care of you. That is something I have kept in my mind and made sure our garbage is taken care of properly.

Some participants, however, raised concerns that protecting the land has not been applied to solid waste management in their communities. For instance, according to P4, “We all have been taught that it is important to take care of our land and resources. However, that has not been brought to solid waste because this [solid waste management] is fairly new.” P47 shared this opinion and went on to explain that:

I have not really learned something in particular in our teachings about waste, but rather do things differently not to create waste. Traditionally, I have to cater for mother earth because she provides for us and we have to respect it the way it does respect us. Traditionally, she is sick right now because of all the pollution and abuse that she suffers. We need to change our attitudes, because all that we do are hurting her...

4.3.4 Respect for the Land and Environment

Respect for the land, environment, self, and others were values participants revealed they have learned and been taught, which also guide them in managing solid waste. Explaining the value of respect in their culture, P29 explained that “A lot of the teachings come with respecting the land like respecting your mother. We have to look after the earth like our mother because it looks and takes care of us. As a result, we have to respect it. Just look at your mother and see how she taught you and respect her.” P11 also explained that, “One of our teachings is respect... what I am saying is that the waste is the residue of society and our relationship to place. As we move forward, this teaching must continue to inform us regarding how we need to live...” As well, P8 explained that:

Our Elders were not just throwing their bones and fish guts anywhere, but they put them back in the water as a sign of respect for the water, so that the salmon will come back.

Some people also throw the guts out to the birds and there is a respect element to it. That is a big thing. I think about that and when I do my fishing, I take my fish guts and bones back to the ocean to say thank you, because that resource, fish, is sustaining me. These kinds of teachings and having respect for the land shows that we are not better than any other species.

P42 connected respect to waste management in the following words:

...For respect, it starts with self. We all want to dress and appear neat. Imagine walking around with a piece of garbage attached to you. That is how it is when you throw a piece of garbage on the earth. You are carrying the garbage with you everywhere you go and that does not look good on you. You will not look good if you have garbage attached to you for say 5 years.

P47, like many other participants, indicated that “My love for mother earth and my respect for her motivates me to recycle. Everything we have, she provides for us - from food to everything else - but she does not get the respect she deserves.”

Most participants raised concerns that although they have learned to respect the land from past generations, this was not the case currently in their community and others. They claim that people have lost respect for the land and environment, which is evidenced by the amount of garbage disposed of in the environment. As P48 noted:

We were clean, we loved mother earth and the animals, but that love is gone, I think. Are you going to throw all that garbage out there? No, and that is what was taught by our ancestors. You must treat mother earth with respect that she deserves like your mother that you love and respect. But, most of the traditional people have forgotten that.

Consequently, participants suggested that as a cultural value, respect needs to be emphasized in waste management education, because “part of our cultural teaching is respecting the land and environment, and I think that can be part of the education and teaching offered in the community” (P40).

4.3.5 Connection to the Land

A value that participants referenced as impacting solid waste management was their connection to the land. This cultural value was prevalent among most participants, who believe that as First Nations they have a natural connection to the land, which should lead people not to pollute the land or environment with waste. As P27 explained, “...Our people [forebears] did not pollute anything and left things in the forest intact. All that our people did were for the reasons that they are connected to the land.”

Some participants described their connection to the land and how that actually affects their solid waste management practices. P46, for instance, explained that:

My connection to the land is always at the back of my mind in whatever I am doing. It is always there regarding how I am going to manage my waste at home or at work. If I spill oil at work, there is a place we send the contaminated soils, used oils, etc. That is because I am connected to the land and do not want to contaminate the earth.

P32 also reflected that “I am motivated to recycle because I am a hunter and trapper, and I am connected to the land. And, that is what I teach. It is not a motivation; it is a way of life for me.” Further, P33 mentioned that “I recycle to save our environment, because I have connection to the land as an Indigenous woman” (P33).

However, one participant noted that many people have lost their connection to the land, because “... that connection must come from within a person with knowledge. People do not reflect on that and this is why we have lots of challenges today” (P42). Admitting that they contribute to waste on earth and therefore they need to act because of their connection to the land, P36 revealed that:

My connection to the land affects me, knowing that I contribute to waste on mother earth.

But I think about how to leave less footprint and I do not see any plausible way not to do that. I feel I have that connection, and I am contributing to footprint on earth, but I am trying to have a lesser footprint for me and my family.

To reconnect people to the land and environment, P31 and others advocate that “People must be taught and be aware of the teachings. People are caught up in their busy lives, so people do not want to sit to listen to these teachings. The teaching has to be the connection to the land and that will make them think differently about things like waste management...”

It is important to emphasize that the beliefs and values described above have become established through traditional teachings over several thousand generations. In both communities, participants mentioned the seven teachings – respect, love, honesty, truth, bravery, humility, and wisdom - as being passed down from their ancestors to the current generation. Some participants mentioned that all the teachings relate to waste management, while others identified specific teachings such as respect and love that they think applies in a waste management context. For instance, P47 noted that, “I will say all the teachings apply to dealing with waste: loving mother earth, respecting mother earth, being truthful to yourself and her ... For me, everything I do is tied in together. If you have respect, you will respect mother earth because you respect yourself, etc.” Another participant indicated that,

“...With the teachings that I have learned growing up, I think it is respect, being truthful, honest [that applies to waste management]. When dealing with waste management, be honest about it. Respect the land and the environment, the bylaws, and recycle; do what you are being told to do. Lots of people do not recycle, because they do not follow the traditional teachings.” (P32)

P39 also mentioned that, “We can talk about respect and honesty and this affects everything...”

While the data above shows that cultural elements are impacting solid waste management efforts in the two communities, some participants do not agree with this assertion because they see a lot of waste in their communities. Other participants also mentioned that they are just doing their part to protect the land and that their actions and efforts are not influenced by culture. According to P13:

I do not bring any Heiltsuk values in here [waste management], except that I am contributing to a broader scheme of protecting the environment and my family...I do not bring anything like Gvilas into waste management. I do not partake in the dancing. Potlaches and all the First Nations culture does not impact me.

P16 also retorted that:

I think a lot of people ignore our culture when it comes to waste management, because people do not recycle...The older people do not want to recycle because they are stuck in their old ways. However, if you are taught to protect the land, then you need to care more about recycling... The culture here has died comparing to when I was a child, because everybody cleaned the environment and you attended ceremonies to learn how things are done.

Further, P42 explained that:

I am not familiar with the Gvilas and fundamental truths to that extent, but it is built into our ways of living to protect the environment like many Indigenous communities. So, when I see litter around in the street and water ways, I see a disconnect from our culture. This is because our culture is to look after the land and respect it and leave it as you met it. I think if we apply our Gvilas to waste, we will feel prouder of ourselves. My brutal assessment is that, how can we worry about what the federal government is doing up there, if we cannot take care of our land? People will not agree with me though.

Another participant expressed their concern in the following words:

Not any that I can think of [regarding teachings]. When it comes to waste, people do not think about the ancestral and traditional sides. But people must connect to that because our people were caregivers, they cared for the land, they tried to keep the land the way they found it. Now, we do not see deer around anymore, but we used to have bears and deer all around. It was such a peaceful place, but now it feels that we are alone. (P45)

Other participants were not sure how their culture or cultural elements fit within a waste management context. P40 explained that:

I know that our traditional culture and ceremonies have a lot to do with the environment and appreciation of mother earth and the environment (the medicines, animals, nature in general), but as far as waste is concerned, I am not sure what to say on that. In our ceremonies and culture, we are reminded of taking care of the environment and respecting it, but nothing specific on waste management.

However, participants suggested several means by which community members can reconnect to the culture. According to P41:

...We can start from asking ourselves which teachings will help us heal and then move on to respecting the land, then move to managing the land – waste management. Once people get healthy, then they can have hope. I look at it from three edges: healing leads to healthy people and healthy environment, which ultimately leads to hope for the people.

P11 also explained that:

I think there are people who subscribe to the ancestral systems of waste management and stewardship. However, there are people who do not subscribe to this system because of the impact of colonization. They do not subscribe to these values mainstream and it is just about money. That value [money] trumps everything. That is a part of our decolonization process and to get back to those values and ethics that must stay with us. This type of decolonization work has to be done through intergenerational knowledge transfers. Elders, knowledge keepers, community champions, etc. transferring knowledge to the youth. A good example of how that can happen is through community schools and through the family. That is where it starts. [For instance] programs in the school that brings students to the land, programs that bring students to the Koeys, etc. This is because if our young people are disconnected from place - our land - they will not subscribe to the traditional values and ethics of our ancestors and the community. It also goes down to an individual value, because if what they care about is money, they cannot subscribe to our ancestral values of the Gvilas.

For their part, P49 said that:

I think it starts with reconnecting with our roots. Some are not connected to the teachings we have like others. The teachings need to be promoted. Personally, I would like to have signs along the highways. It is so nice for people to clean the highways during the Spring

cleanup, so why cannot we maintain that? There should be consequences for people who litter the community. I have thought about this before, but I have not taken action on it...

According to P18, "I think it could start with the Hemas - the cultural leaders. But, some of them are the worst offenders. It needs to be highlighted how important culture and environment work together." Some participants opine that working with children at a younger age will be ideal to start making connections to the culture. One of such participants was P28, who noted that:

I walked with my grandparents and they walked with me. They taught me how to do things and I did them. If I make a mistake, that is not the end of the world, because there will always be a second time. We have to do things with the children because once they start doing things, they will keep doing and grow with it. You start the teaching; you show them how to do them."

4.4 Colonization, Culture, and Solid Waste Management

Most participants mentioned that historical occurrences such as colonization, the 60s Scoop, and banning of cultural celebrations and ceremonies account in some ways for the challenges of solid waste management in communities. Participants explained that these occurrences disrupted and prevented the transition of cultural ways of managing waste to generations after them. In discussing these occurrences, an hereditary Chief explained that:

...Our potlatches were banned for a long time and there was residential school and 60s Scoop and all that played a role in the way we were brought up. For instance, banning a potlach means people were banned from gathering together to celebrate. The residential schools banned people from speaking or teaching their language. They also separated our families. For example, you are not allowed to see your sibling with whom you attended residential school with, they do not allow you to mix or mingle like normal communities

do, and they keep your sibling away from you. I know families who never got together even though they were all in the same residential schools.

P5 explained how knowledge about culture and cultural teachings have been lost through residential schools:

People have lost the Gvilas and our culture because of residential schools. This is because when their children were taken away from them, the parents did not have anyone to take care of and to pass on that knowledge to. When the children came back from residential schools, they only knew what they had been taught in those schools. That was the way of losing the culture and not passing on things to the children... I went to a day school without knowing where we were going until we got to the airport. They call you and when you get up, you are told this is your boarding mum and dad and you live with them for 10 months before coming back. I had no idea where my elder brother went, but he went to a residential school. So, it is a lost generation of how to teach and mentor your children that contributed to the loss in passing down cultural teachings. When you think of it, it is still happening today...

Participants also made connections between losing their culture and properly managing solid waste. According to P30:

Before I could have the chance to learn all that about properly managing my waste, I was sent to residential school for 5 years, and I did not come back until I was about 35 years. And, I left again after two years. I was never old enough to learn about recycling when I was in Peguis. It was just the slop piles and the person designated to take it out.

P31 also explained that:

the reason why people do not recycle is because of colonization, which took us away from that connection to the land. That is the reason many of our people will not recycle. Colonization took away the connection to the land and that is why our own people do not understand the connection to the land. We lost the teachings that connect us to the land.

P7 observed that:

I think there is generational challenges with people understanding how this [waste management] works and I guess this same generation is carrying the burden of residential schools, and that is a really double sword challenge there. A lot of people who have challenges understanding our solid waste system have historically been alienated from our culture through residential schools, etc. So, there is a lot social healing that needs to happen to support environmental practices. There is a lot more work that needs to be done in the community to reconnect people to the fundamental truth to support individual healing and a community waste management program. We have done a good job connecting the generation after me with our community values through the Koeye camp, youth centre, etc. But I think this was more difficult in my parents' generation.

P4 also mentioned that:

A lot of our traditional norms was lost to colonization. A lot of our young people are now starting to learn our language, cultural heritage, and values. It will take time for some to connect these things and apply them to waste management. There is a 58-year old who is now starting to learn about herself. A lot of these learning are happening concurrently.

4.5 Discussion

The lack of infrastructure and facilities for MSW management to deal with increasing waste generation results in poor solid waste management systems in municipalities (Malakahmad,

Nasir, Za'im Zaki, Kutty, & Isa, 2010; Yoreh & Horne, 2014; Kumar et al., 2017). This makes providing facilities and infrastructure such as landfills, bins, bags, recycling depots, and transportation imperative when dealing with MSW (Tadesse, Ruijs, & Hagos, 2008; Abdel-Shafy & Mansour, 2018). As the data show, there are differences in the available infrastructure and facilities in Peguis First Nation and Heiltsuk Nation. The former has an un-engineered landfill and a recycling depot/facility, while the latter has a recycling depot, a compost facility, and a facility for used materials. These different facilities/infrastructures also determined the MSW management programs that both embarked on. For instance, in Peguis First Nation, the existence of a landfill meant that the community collected and managed its mixed garbage, while Heiltsuk Nation collected and shipped its mixed garbage out of the community to a facility with a landfill. Similarly, Heiltsuk Nation has an established composting program because of the compost infrastructure and facility that exists in the community; however, Peguis First Nation, which does not have such infrastructure, has no composting program.

There are similarities, however, in MSW programs in both communities. Bins, for instance, are provided to community members to hold mixed garbage as part of the disposal programs. As well, in Heiltsuk Nation, recycling bins are provided to households that participate in the community's recycling program although wooden bins – which hold mixed garbage – are still used to hold recyclables in Peguis First Nation. Providing such bins is a way of encouraging and motivating community members to participate in proper MSW management disposal practices, particularly recycling (Williams & Taylor, 2004; Lyas, Shaw, & van Vugt, 2005; Chong, Karlan, Shapiro, & Zinman, 2015). As Tadesse et al. (2008) found in Ethiopia, the availability of waste facilities has an impact on the choice people make in disposing of their waste. They found that an inadequate supply of waste management facilities and the longer distances people

have to travel to get to these facilities increased the likelihood of open dumping along roadside and open areas.

In addition to providing bins to encourage community members participate in programs, both communities do not charge tipping fees to community members for disposing of mixed garbage, even in Heiltsuk Nation where garbage is shipped out of the community to be disposed of at a different location. Nor, do community members pay waste management fees. This system is different from many jurisdictions in Canada, where households pay tipping fees for disposing MSW or it is part of their municipal tax system (Giroux, 2014). On the other hand, charging tipping fees can discourage community members from participating in MSW management programs, since the fees could increase household budgets or expenditures. This is even more important given that about “81 per cent of reserves had median incomes below the low-income measure, which Statistics Canada considers to be \$22,133 for one person” (Press, 2017). Charging tipping fees would put further strain on incomes and likely result in indiscriminate dumping by community members because they cannot afford the fees, which has been seen in other jurisdictions (Tadesse et al., 2008; Seng, Fujiwara, & Spoann, 2018).

Curbside pick-up of MSW has been found to be an effective component of MSW management, particularly curbside collection of recycling (Kumar et al., 2009). In addition to no tipping fees and free pick-up service for recycling and mixed garbage, compost pick-up is also free in Heiltsuk Nation. However, there is a pay per pick-up service for recycling and mixed garbage in Peguis First Nation, except for community members with disabilities and Elders. For community members who do not fall into these categories and do not have cars or vehicles to transport and dispose of their waste, the long travel distances to the landfill discourages its use and lead to indiscriminate dumping (Tadesse et al. 2008; Adediran & Abdulkarim, 2012). This could account

for the increased number of illegal dumping or open dumping and burning in Peguis First Nation. Seng et al. (2018) found that one cause of illegal dumping of waste is the non-existence of waste collection systems. In a study of waste habits in Peguis First Nation, a key recommendation provided by community members was to pick-up wastes from households (Peguis First Nation, Green Action Centre, and Assuah, 2019).

It is important to emphasize that by embarking on MSW management (including recycling) in both communities, Heiltsuk Nation and Peguis First Nation are part of a growing number of First Nations in Canada that have such programs in place. This is because as some participants revealed, Heiltsuk Nation used to ship out all of its waste as far as Washington for disposal without any recycling, and Peguis First Nations barely managed MSW because all kinds of waste (mixed garbage) was previously disposed of in the old landfill in the community or burned. These previous approaches to MSW management are in line with authors (e.g., Zagozewski et al., 2011; Oyegunle, 2016) who found open burning and dumping common in First Nations. In a study by Oyegunle and Thompson (2018), the authors found that in both Garden Hill and Wasagamack First Nations in Manitoba, there were no recycling or waste collection programs in place and all community participants in the study revealed they openly burned and buried waste of all kinds, including medical and electronic wastes.

While embarking on these programs is impressive for Heiltsuk Nation and Peguis First Nation, it is noteworthy that the programs in both communities are not at the same level, with Heiltsuk Nation having a comparatively improved or ‘advanced’ recycling system compared to Peguis First Nation. Getting communities to have very similar systems will require increased funding and investment in facilities/infrastructure including bins and clear bags, transportation, and MSW management programs, which communities cannot provide by themselves due to

insufficient funding from the federal government. In order to address this problem, funding for solid waste management for First Nations provided by the 2016 federal budget (ISC, 2016), should be administered to improve already existing systems such as those in Heiltsuk Nation and Peguis First Nation. Further to the above, both communities need to find ways to build their capacity to embark on programs aimed at achieving the more desirable approaches to waste management described in the Zero Waste Management Hierarchy, including *rethinking* (products that are purchased), *reducing* the amount of waste created (by, for instance, minimizing discards due to spoilage and non-consumption of food), and *reusing* available materials (to their maximum capacities until there is no more use for them) (Zero Waste Canada, 2019).

In addition to the actual MSW management infrastructure available and, even in the context of what is available, culture and worldviews influence what individuals do or not do (Gill, 2013). In both communities, members were used to disposing all streams of waste together – a culture of MSW management – until sorting, recycling, and composting were recently introduced. The change from the ‘old’ ways of managing waste to the existence of the current programs is evidence that culture and habits of a group of people can be altered or changed when new information becomes available and is considered capable of improving on what already exists (Tangwanichagapong, Nitivattananon, Mohant, & Visvanathan, 2017). In fact, MSW management, among other things, thrives on good information provided through education and outreach programs (Ferronato & Torretta, 2019) to help change attitudes and behaviours about how waste should be managed.

As the data show, participants in both communities revealed cultural factors that impacted their MSW management efforts and practices. These factors include avoiding wasteful items, taking care of each other, protecting the land, respecting the land/environment, and connecting to

the land. Avoiding waste and taking care of each other, for instance, are two cultural elements/factors that complement each other and are intended to focus on how much of a resource or item community members need rather than how much they can store or save. This helps to prevent excessive consumerism or waste, which has often been described as the cause of the increasing generation of waste and the current throwaway culture in society (Vafa, 2009; Van Kerckhove, 2012). Rather, these moves toward avoiding waste encourage the act of giving and sharing one's resources in order to reduce waste generation per capita, which is important in a First Nations context owing to the many challenges communities face in managing waste. Avoiding waste is also in line with the most desirable or preferred option in the solid waste management hierarchy – Prevention (Hansen, Christopher, & Verbuecheln, 2002; Zero Waste Canada, 2019). Prevention was evident in the descriptions and explanations by some participants that they use all parts of animals or fish harvested in order not to create waste. As a result, when meat or fish cannot be used for personal purposes such as food, making hooves or ceremonial regalia, they are used to feed other creatures in an effort to prevent waste from being produced. This latter practice also confirms that in First Nations culture, human actions need to respect, protect, and take care of all the other components of the environment (Assembly of First Nations, 2005). These acts also follow trends in terms of how waste was traditionally managed by Indigenous people.

When considered together, the data related to the cultural elements show that they are interconnected and confer a sense of individual responsibility, as well as set a challenge for community members to do more for the environment and the land in their everyday activities and decision-making, bearing in mind that individual actions impact the collective. Thus, when a community member comes to the realization that they are connected to the land through traditional teachings, then they have a responsibility to respect and protect the environment by avoiding waste

and not accumulating too much for oneself. Some participants indicated that applying and reflecting on these cultural elements or factors together on a daily basis can result in a positive impact on the environment as a whole and solid waste management specifically.

Practically, however, this is not the case in either community as revealed by participants. Rather, there is a discrepancy between the amount of waste generated and managed in both communities and adherence to cultural traditions. That is to say that there is too much waste disposed of in both communities. Some participants also suggested that the cultural practices identified have been influenced by the influx of packaged consumer goods that are part of the settler economic system that First Nation communities have become a part of – by choice or not. Not surprisingly, many of the stories I heard about not wasting related to biodegradable waste such as fish, fruits, and meat as opposed to non-biodegradable waste such as plastics and glass. This makes sense because historically First Nations have “lived off the land” and participated in cultural activities such as hunting, trapping, and/or fishing (Oster, Grier, Lightning, Mayan & Toth, 2014) and, as a result, are accustomed to managing biodegradable waste. Things taken from the land can be given back to the land. This means there is the need to learn, for example, about how traditional teachings and cultural practices could be applied in the context of the increasing MSW made of components that are not easily disposed of on the land.

Although participants mentioned that these cultural factors impact their MSW management practices, they also suggested that this has happened as a result of their own understanding of the factors in relation to waste and not because of any new teachings. Owing to this, participants expressed the need for their communities to consciously teach and apply these cultural factors, which are important to them and their existence, to help in positively changing attitudes and behaviours in relation to MSW. Participants already have traits related to not wasting. However,

some of the factors such as avoiding waste and taking care of each other (or sharing with others) can and have been applied to non-biodegradable waste without this being taught to community members. This is because these factors involve making decisions and a choice to purchase or not to purchase items and/or keep or share what one has with others.

The Seven Sacred (or Grandfather) Teachings - love, courage, wisdom, truth, respect, humility, and honesty - are said to be built into the ways of life of First Nations (Ontario Native Literacy Coalition, 2010; Kading, Gonzalez, Herman, Gonzalez & Walls, 2019). However, it was not clear to participants how all these teachings have been taught and applied in the context of waste management, even though they are “instructions about the foundational values that make up our relationships with each other and the natural world” (Verbos & Humphries, 2014). For instance, how humility, wisdom, and bravery have and/or can be applied to waste management was not explained by participants. In fact, no participant explained all these factors and how they have guided or could guide community members to properly manage MSW. However, love (for the land), honesty (with self and the state of waste generation), respect (for the land and self), and truth (about challenges with waste) and their impact on solid waste management were the most common and well-explained of the Seven Sacred Teachings. Explaining these traditional teachings and how they impact MSW management requires a deeper understanding of the teachings themselves and sharing of that knowledge.

It is important to emphasize that most participants were of the opinion that culture does not in fact play a role in MSW management in their communities. They mentioned this situation needed to be changed through reconnecting to cultural teachings and cultural ways of life in the community. Achieving this, according to participants in both communities, will have positive impacts on MSW management. Generally, participants think that their culture has not been as

vibrant as it should be compared to earlier generations, because of the historical factors of colonization and events such as the 60's Scoop, which limited opportunities for teaching and passing down knowledge and lessons about solid waste management to current generations. This created a gap between the generation that was taken to residential schools and their community (including families), which hindered the latter from learning about the land and the environment from the former. Consequently, the former has not been able to pass down traditional knowledge and teachings to generations after them because they lack the requisite knowledge about the environment. This is particularly important because First Nations life is centered around their culture (Oster et al., 2014).

CHAPTER FIVE

Social Learning and Indigenous Learning in, and through, Solid Waste Management

5.1 Introduction

This chapter describes the various ways in which Indigenous learning and social learning evolved among participants in the context of MSW management in their communities. The literature on Indigenous learning mentions that participating in ceremonies, listening to stories, interaction with the land, family, and knowledge passed down by Elders are some of the means by which people learn and discuss issues in communities (Davidson-Hunt & Berkes, 2003; Houde, 2007; CCL, 2009; Cull et al., 2019), and that these are mostly informal in approach and nature. In a natural resources and environmental management context, on the other hand, deliberations and discussions among interested parties on an issue are key characteristics of the social learning process (Keen et al., 2005; Keen et al., 2012). This chapter presents data on the processes of Indigenous learning and social learning such as ceremonies, discussion with family members, interactions with waste management attendees, band meetings.

5.2 Indigenous Learning

5.2.1 Ceremonies (e.g., sweat lodges, pipe ceremonies)

Ceremonies are rooted in values of Indigenous Peoples and, as Cajete (2000) describes it, ceremony “is both a context for transferring knowledge and a way to remember the responsibility we have to our relationships with life” (p.70). As such ceremonies – e.g., pipe ceremonies, potlatches, and sweat lodges – provide avenues for participants to learn and to pass down information and knowledge. Two participants mentioned that they have learned and talked about solid waste management at ceremonies they have attended. According to P36, “At ceremonies, I

have heard them talk about properly disposing of our garbage and not throwing it on mother earth. I have heard that, and I have vocalized that, too.” P46 also explained that:

I share about recycling at sweat lodges and other ceremonies. We talk about these things and how to do things better and preserve life...Being responsible and disciplined go hand in hand with waste management. If you are walking that path where you are involved in ceremonies or carrying a pipe, then you cannot be a polluter because it conflicts with each other.”

An Elder described the effort their community is making in dealing with solid waste at ceremonies by explaining that “In our ceremonies, we try to do away with Styrofoam, and people need to bring their own plates. Why is not there enough pressure to get plastics out of the system?” they queried.

However, most participants indicated that they had not directly learned about or discussed waste management issues at ceremonies and that there had not been a conscious effort to talk about waste management issues at ceremonies. “They [Elders] never really talked about garbage or solid waste in ceremonies. They will just tell you to put the remaining of your food on the side and all other garbage on another side,” according P37. P4 also revealed that “We all have been taught that it is important to take care of our land and resources. That has not been brought to solid waste because this is fairly new.” P40 further explained that:

I know that our traditional culture and ceremonies have a lot to do with the environment and appreciation of mother earth and the environment (the medicines, animals, and nature in general), but as far as waste is concerned, I am not sure what to say on that piece. In our ceremonies and culture, we are reminded of taking care of the environment and respecting it, but nothing specific on waste management.

Also, some participants mentioned that they are not traditional or not involved in the traditional ways of life and therefore they do not attend ceremonies. According to P52, “I have not been involved with the traditional ways and attending ceremonies because I was brought up as a Christian.” Other participants also mentioned that “I am not involved in traditional ceremonies here” (P39), and “I was not brought up with any spiritual angle – not traditional or Christianity” (P41).

5.2.2 Learning from Elders

Regarding learning from Elders or the exchange of knowledge between Elders and the next generation on MSW management, only one participant mentioned that they have directly learned from an Elder regarding MSW management. “...The only Elder who has talked about waste is [name withheld], who talked about how they used to recycle in those days. She said they never left anything behind when they were children,” (P52)

All other participants indicated that they have not directly learned from Elders or did not learn from Elders on how to manage MSW when growing up “...because there was not much of waste in the community” (P13). Another participant explained that “I have not learned about waste culturally, because our people did not have a lot in abundance, so they found use for everything they had. I talked to an Elder who was raised in a big house and she told me that there was the house, clothes, food, and human waste” (P16). According to P34, “I have not sat with Elders in a long while. I have not learned how to manage waste from any traditional sources.” On their part, P30 explained that:

I never heard my Elders talk about waste management when I was growing up. They taught us to pick up after ourselves but were not told the benefits or harm that waste causes. They

never taught us how to recycle, but they said we should keep our spaces clean. They did not tell us why we should do it. They said, ‘clean it up’ and they did not know much about the environment. It is only recently that we have had recycling coming up, and it will take a long time to take root in a big community like Peguis.

Explaining what might have accounted for the lack of education or passing down knowledge on waste management from Elders, P13 noted that “We were not managing them [waste]. There was no sense of maintaining a proper dump, people just threw garbage away. It was not looked at as recyclables or reusable. That was not in the back of our minds, ever.”

5.2.3 Stories/Storytelling

Most participants confirmed that knowledge is passed down through stories and teachings in their culture. “Our culture has a lot of verbal means of passing things down through teachings and stories” (P1). However, none of the participants mentioned stories and/or teachings as a direct source from which they have learned about waste management. An hereditary Chief explained that, “There have been no teachings or stories on waste management, but we have been taught that when we go hunting or fishing, we provide for others who do not have when we have a lot. This prevents waste in the system.” Similarly, P47 explained that “I have not really learned something in particular in our teachings about waste, but rather do things differently not to create waste. Traditionally, I have to care for mother earth because she provides for us and we have to respect it the way it does respect us.”

5.2.4 Discussions Among Close Family Relations

There was a lot of information sharing and learning among close family relations, including children/grandchildren, parents, and grandparents.

5.2.4.1 Children/Grandchildren

Some participants explained that they learned about how to recycle from their children. This was most common with participants from Heiltsuk Nation, where a recycling program was established in the community's school with the hope that children would learn about recycling and pass on their knowledge to the rest of their family members. As a result of this, P13 explained that:

I started recycling since the children started the program in the school. [Names withheld] were smart about starting the program in the school, because they utilized the children and showed the community that we impact the environment with the waste that we generate. It helped us to start sorting and separating our waste like plastics, cans, cardboards, etc. The depot would not take the waste if you do not separate it and we have had to go on with the sorting and recycling... My daughter encouraged us to participate in the recycling program, because she was on board. She asked what will happen to my grandchildren if we do not recycle and continue to negatively impact the environment with our waste. After that, we started getting on board.

Another participant from Heiltsuk Nation explained that:

They taught the children in school and it was them that came home to teach me. They came home and said 'grandma, you have to recycle, compost, and do all of that.' They fell off along the way, but I teach them to do it. And, they know grandma does not like her house to be messy, so we have to recycle. (P5).

P4 also explained that “My grand-daughter, who was four years old at the time, caused this change [recycling and composting] in me, because she will say you do not put the bottles in the garbage but into the recycling. You put food waste in the compost bucket. And, she was only four!” (P4).

In Heiltsuk Nation, a teacher in the Community Elementary School started a recycling program with her class, which grew big within the school and the community. The students involved made educational videos about recycling, which were distributed in the community. As evidenced above, the children taught members of their household, as well as other community members about what they learned in school. However, the teacher who started the program left the community and since then the program has been non-existent. The teacher who initiated the program narrated as follows:

I started the program with my first kindergarten class in September 2006. We started out within my class by students bringing beverage containers. A colleague of mine was teaching grades three and four at the time and he joined me, and our classes started having competitions that grew within our elementary school. I had another colleague join and help out with whatever was needed. First, I showed her a video that I watched while working in the Cultural Centre about a lady who lived in a small community, I believe it was Gibsons BC, who started recycling in her community all on her own. I thought if she could not do it, I can do it as well...We continued throughout the school and it got bigger and bigger. (P20)

An Elder from Peguis, on her part, explained how she learned about recycling and waste management from her niece in the following words:

One of my nieces in Grade 2 (about 7 years) called me and said she wanted to visit us for a couple of hours. I told her to come and when she came, she told me she wanted to tell me

about the 3Rs. It was her school project. She told me she wanted to teach me what I could do with my waste. We used to burn garbage sometime, not every day though. So, yes, she dumped our garbage on a newspaper she spread on the floor. She started sorting them gradually and told us we are not to have so much garbage. And, she was right because some of them could be re-used. It was just a few that was to be in the garbage bag. She told us we needed three bins at home. I can foods, so I used bottles and jars for that purpose. We realized that a couple of people were doing this in our community as well. So, we were doing things but learned from my niece as well. At the old landfill grounds, the hospital brought stuff there and they burned them, and the ashes scattered around.

Some participants also mentioned that they have passed on and taught their children and grandchildren how to recycle. According to P8,

Definitely with my children. We have conversations with other family members, but we talk to our children to be mindful of what they are disposing of and how they are disposing it. For instance, if it is salmon, you put the unused parts back into the ocean and be conscious of it rather than throwing things away.

Furthermore, P5 mentioned that:

I share my knowledge with my grandchildren because I want them to know how to respect the land and take care of the environment. All my grandchildren know how to preserve our food now...I taught them when they were very little, and they now do these on their own. You teach them in ways that does not seem like work, so they can enjoy it and also enjoy the food after.

An Elder from Heiltsuk Nation also explained how their community passed on knowledge about waste to children in their community.

Everything we do, we are guided by the Gvilas. We pass on to our children our ways of living. As they are growing up, we are there to guide them as to what they need to do and do things the proper way. We made sure that everything goes into the garbage. When we did our seasonal foods like salmons and preserving them in jars, we show our children how to cut and can them for winter use. All the garbage and fish bones (because we use everything), were thrown down the beach. With the compost now, that can go in there.

5.2.4.2 Grandparents

Two participants mentioned that they have learned from their grandparents about how to manage their MSW. One of them, P3, explained that:

Growing up, my grandmother taught us not to waste anything. For example, when we ate halibut, the only thing that went back to the beach was the guts. They will smoke the bones and cook the head of the fish. We used everything; they will never waste anything. That is one example of how we never really wasted anything...It was my grandparents talking to us [about how to manage waste] and also us observing. Back in the day, our grandparents made sure we were with them because we did not have much to do.

On their part, P20 also added that:

I have learned from my grandparents that there was not too much waste in their time compared to our current situation. We went to a memorial, where we took a sea bus full of people and they did not want to leave any waste nor any wrappers behind. The elderly people cleaned everything and brought it back home.

While they have learned from their grandparents, P20 mentioned it is hard to explain recycling to their grandparents:

Yes, it is clear to me why the community has to sort the waste, but it is hard to explain that to my grandparents. They understand that our fruits and vegetables should go into the compost, as well as paper towels and coffee grinds but not the recycling. A little pamphlet will help in this direction.

5.2.4.3 Parents

Two participants mentioned that they have learned a lot from their parents regarding how to manage MSW. According to P2:

I lived in my mum's house until my baby was 8 years old. My mum was strict about everything regarding keeping things clean and taking care of our garbage. Our garbage went to one place all the time, nothing else...It was just one garbage that everything went inside, we did not have recycling or composting. We used to do a lot of burning those days - we burn clothes, papers, etc. with wood stoves. Old clothes went into the fire. We only put clam shells at the beach. Cockle shells, butter clams, etc. went back into the water, they did not go into the garbage. Cans and plastics all went into the garbage, we did not separate anything.

P23 also explained that:

I used to go fishing on a commercial boat with my parents. We did not throw our garbage around, but we bagged them. For example, if we cook rice, we feed the crew and leave what was salvageable for the sea into the water and bagged and brought back the cans and bottles we had to whatever community we were in and threw it into their garbage bin. I know this because onetime, I left the bin outside and everything was scattered, and I had to pick everything up the next morning.

For many participants, information sharing and learning only happens among their immediate family relations. According to P4, “It is just my family that I share my knowledge on solid waste with. Outside them, you just cannot tell people to go get a bucket and recycle. We can only tell them what we are doing. I know that for some people, they do not have the time for it.” P37 also mentioned that “When my children and grandchildren visit, I tell them about what I do with the waste. When I visit them, I ask them where they put their plastics, cans bottles, etc. I have not gone beyond my immediate family to educate anyone.”

Participants provided a general view/knowledge on how traditionally and culturally they have learned about MSWM. For instance, P11 explained that:

I do not think there was even a term called waste management... It is an intellectual construct...When I was a child, I was told what to do by family and Elders. I was told to pack things for Elders, so I can be around them and be taught. That is how the knowledge transfer occurred.

5.2.5 Conversations Among Community Members

According to participants, some community members (e.g., friends, neighbours, etc.) discuss MSW management issues and they have had the opportunity to join such conversations and have learned from them. Other participants mentioned that through conversations, they have educated and passed on knowledge and information to community members. Regarding the former, P8 explained that:

Lots of the people I talk to are aware of the solid waste programs in the community and we talk about things that are shown on social media and discuss them...I get to speak to people

and tell them they need to recycle, and they say I am making them shy, but that is a way of making them get onboard.

Another participant revealed that “Every time we meet our neighbours, conversation [about waste management] comes up and we ask ourselves: are you still recycling?” (P34). P7 also explained that:

We have one neighbour that has the tendency to litter, so we have had discussions and conversation around that and offered to help them out if they needed it. They were surprised but they were positive. Things have gradually started to change with them...When we have had community cleanups, this is something that I share with people. I do same with my leadership capacity on Council and even chatting with people or seeing people throw away, for instance, a can on the streets. It is hard not to tell people in a way that sounds preachy and turn people off, but you have to do it.

On providing education and/or information on solid waste management to community members, P30 for instance, explained that “Whenever people come to visit me, I make sure they are recycling and not throwing everything in the garbage. That is my way of educating people.” According to P37, they had to learn how to recycle and have been discussing their experiences with community members:

Quite a few years back, they would not let you in the landfill with all your garbage at the back of your truck because you have to sort it out. So, I started sorting my garbage – plastics, metals, bottles, and cans. I have been doing this for a while and when people come visiting us, I watch them and make sure they know exactly where to put their garbage – be they recyclable or just garbage.”

5.3 Social Learning

5.3.1 Band Meetings/Information Sessions

Four participants mentioned that they learned about waste management by attending band meetings and public information sessions. Regarding learning from band meetings, P27 explained that “When we have band meetings, things like that [waste management] come up, so I learn...I do not think the whole community was approached regarding how best they should recycle and how to do it.” P47 also added that, “I got information about recycling from a community band meeting, where the Band Council said we have a landfill, and this is how we going to run it, etc. There was information on the bulletin board at the mall on how to separate waste and all that.”

Furthermore, P25 indicated that:

The Solid Waste Department have had a meeting regarding why we are having these waste management programs in the community. The Tribal Council also has an AGM once a year and have three days for entities to talk about what they do. The solid waste guys also participate, and we learn from them.

P7 corroborated this by explaining that, “I remember at one-point, the Solid Waste Department had a feast in which they shared information [on the solid waste management programs in the community].” I did not witness any Band meetings or information sessions in both communities while in the field; however, participants mentioned that they had opportunities to ask questions on issues they were not clear about at these events.

5.3.2 Waste Facilities (Landfill and Depot)

Five participants mentioned that they received information and learned about recycling and MSW management through their interaction with Peguis landfill attendees. According to P36,

“...When you get to the landfill site, they tell you to recycle and where to put the various waste streams...It was helpful the first time they told me how to recycle. Since then, I have not been told anything about how to recycle differently or what not to recycle.” Another participant explained that “I learn when I go to the dumpsite...” (P38). As already mentioned in Chapter 4, I observed that when community members drive in to dispose of their waste, attendees at the Heiltsuk Nation Waste Facility and Peguis Landfill interacted, directed, and explained where waste should be disposed of at the facilities.

5.3.3 Information Materials Provided by Solid Waste Management Departments

Many participants mentioned that they have learned about MSW management through information or materials provided by those in charge of MSWM solid in their communities. This was mostly common among participants from Heiltsuk Nation, where information is provided for both the recycling and composting programs. According to P16, “they [Solid Waste workers] gave us the information that contained how to recycle and what goes into the compost. I think they provide that information once a year because things do change.” P15 also mentioned that “Yes [they provided us with information], and I found it helpful. I am not sure if there is one with pictures, but the one I have seen only has words. I think people can laminate and put them in their homes.” Another participant indicated that “It was good information that they gave out, but it needs to be redone. Initially it was great, and people forget again, we really need to update it” (P18). P7 also revealed that:

Yes, the information provided stated what can go into the compost, as well as what to recycle, etc. When I signed up for the compost pilot program, I got a little flyer with photo-

intensive guides on what can or cannot go into the compost. I will say that about every year, I get information on what can and cannot go into the recycling, etc.

A participant from the Solid Waste Department in Heiltsuk Nation confirmed that they gave and continually give out pamphlets that contain information on the programs in the community, highlighting that:

When we first started, we gave people a list of what to put in the recycling. That was the challenging part because we had to talk and explain to people physically what to put in the bins. When the pamphlets started going out, it was helpful for people to have a visual idea of what needs to be recycled and composted. (P25).

Figure 5.1 shows the different kinds of flyers that have been distributed to community members in Heiltsuk Nation. Information provided have been updated a couple of times to reflect changes that have occurred in the community, particularly items that are recyclable. I did not find flyers or other materials containing information on the community's recycling program in Peguis First Nation; however, I was informed that there were flyers provided to community members at some point when the recycling program started. According to P46:

Information was provided just when recycling started, and everything just went downhill regarding providing information. I think those at the landfill assumed people will retain that information. There could be people who never understood what was on that information sheet...the information they provided was helpful, but I do not think it was to the degree where it should have been, and they did not keep up with it as well.



Figure 5.1: MSW management flyer distributed to community members in Heiltsuk Nation.

5.3.4 Community Newsletters

A few participants from both communities mentioned that they learn about waste management from information they receive from community newsletters. P12, for instance, revealed that “I received updates that they are now accepting styrofoam through the quarterly community newsletters.” P35 also explained that they receive information about solid waste management “through community newsletters. The school sends home a weekly newsletter called the Weekender, so we were able to provide information on recycling in there... it could be that people receive information that way.” P51 mentioned that “People probably see information from the Weekender from time to time because they have grandchildren [in the school] who bring this home.”

According to P37, “sometimes they [school] put up information at the mall about what is happening at the landfill and the reserve... They sometimes put information on recycling there, but that is not often. Whenever I have time to go there, I read information on the bulletin board.” I could not get samples of the community newsletters to confirm their distribution or the number of times per month or week information on solid waste management is provided in the newsletters.

Most participants in Peguis First Nation mentioned that they do not receive information on solid waste management or through newsletters. For instance, P34 revealed that “I do not receive any information,” when asked if they receive information on waste management from the community. Another said that, “I am sure they have given information out, but I have not received any personally” (P47). According to P52, “No, they do not have that. In the beginning, they tried to have some committee on waste management, but there was no interest. There needs to be more interest in recycling on reserves. P32 also noted that:

No, there is not a lot going on here in terms of communication and information on waste management. This is because we lack the capacity and resources. How do you get funding to create the capacity to deal with waste management? There is only very little funding available for Peguis First Nation.

5.3.5 Internet/Social Media/Television/Radio

The internet, television, social media, and radio were other means through which some participants mentioned that they learn about waste management. For instance, P36 revealed that, “I will go on the internet to find out what I cannot recycle or can recycle.” According to said P38, “I read a lot on google and I look at a lot of programs.” P8 also explained that “I get much of my information from the Facebook group, where you can post concerns and ask questions when you have one.” One person mentioned they obtain information “Through television, but I want to excel more. There should be a system, where everything could be picked up because not many people have vehicles to haul their waste” (P34).

In Heiltsuk Nation, there is a Facebook page called 'Ha'aikila Qnts 'Waxv:wiusax-Taking Care of Our Land/Heiltsuk Nation Eco-Depot, where information on the community's programs is circulated. Some of the information provided include: Updates on recycling and compost pickups, closure of the Recycling Depot, Emergencies on Waste Management, among others. Figure 6.2 provides information on some of the updates provided on this Facebook page. On the Facebook page, community members interact among themselves and staff of the Solid Waste Department and are free to ask questions on, for instance, why their recycling were not picked up, when compost will be picked up, their need for more compost and recycling bins, among others. There were over 500 members on this Facebook page during data collection.

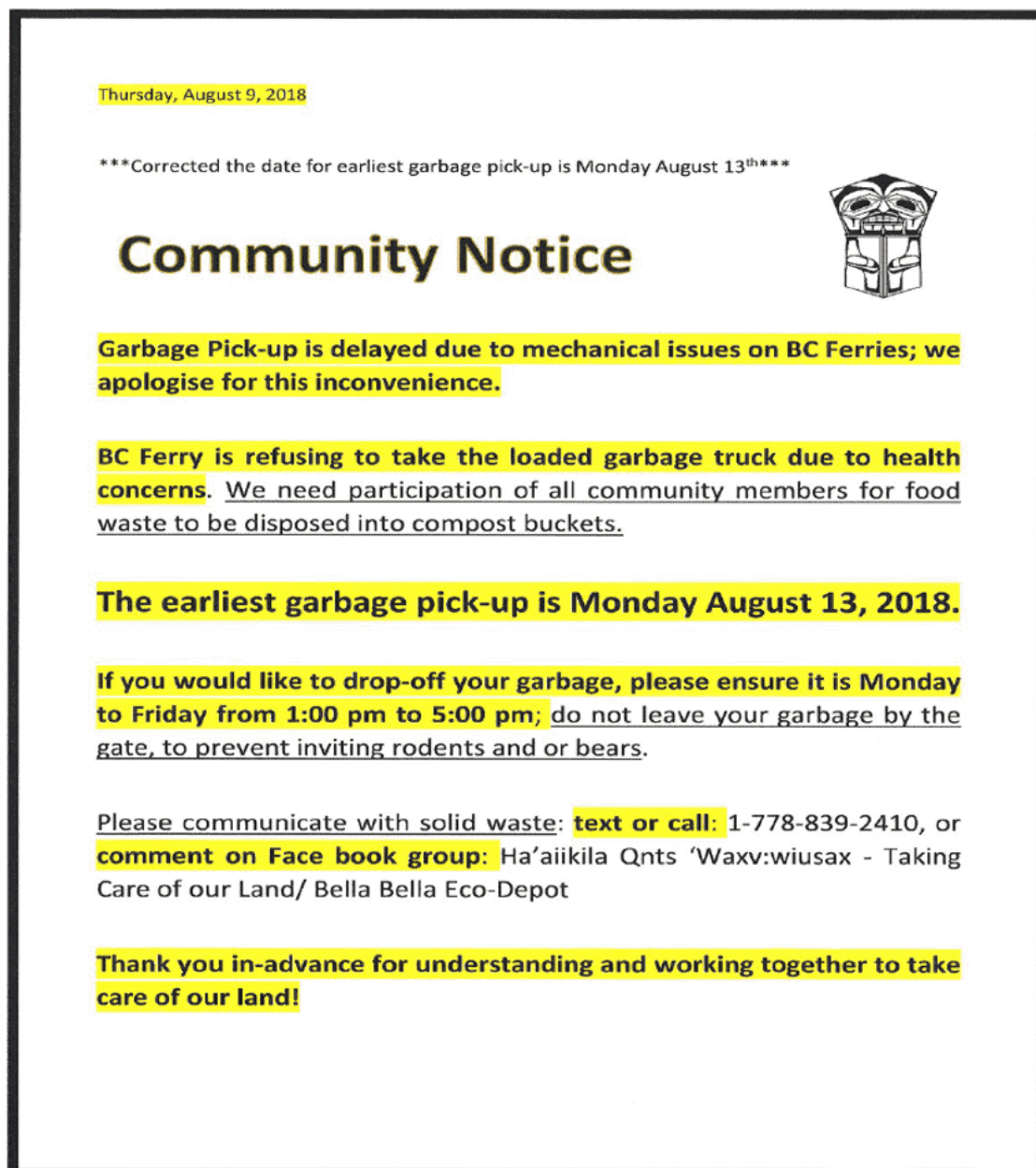


Figure 5.2. Sample update on curbside pick-up posted on Heiltsuk Nation's Facebook page.

5.4 Discussion

The above data show that social learning and Indigenous learning occurred in both communities through avenues such as discussions with close family relations, discussions with

friends, band meetings or information sessions, newsletters, and discussions with Elders. Specifically, Indigenous learning occurred mostly through discussions among close family relations including grandparents and children, confirming the CCL's Holistic Lifelong Learning Measurement Framework, which mentions family as a major source of learning in an Indigenous context (CCL 2007, 2009). More specifically, the Report of the Royal Commission on Aboriginal Peoples states, among others, that "...Through apprenticeship and teaching by parents, grandparents, aunts and uncles, skills and knowledge [are] shaped and honed..." (Royal Commission on Aboriginal Peoples, 2000, p.443). In this study, some participants mentioned that learning from family members such as parents and grandparents have resulted in, for instance, taking what they need from the environment to prevent waste, using parts of animals for different purposes instead of throwing them away, and reusing materials, as extensively discussed in Chapter 6.

Although the assumption is usually that children learn from their parents and family members, some participants mentioned that they learned about proper waste management practices such as recycling and composting from their children and or grandchildren. This was common among participants from Heiltsuk Nation, where children were taught recycling and were expected to transmit the knowledge in their homes and the broader community. This is consistent with the findings of Maddox, Doran, Williams, and Kus (2011) who concluded in their study that school-based waste education "...can play a key role in developing children's knowledge about sustainable waste management but, more importantly, in ensuring that the message initially delivered in school is taken home, with the result that waste management in children's homes becomes more sustainable" (p. 2597). Specifically to First Nations, McGregor (2010) reported that the Earth Keepers program, which aimed at building capacities of First Nations to develop waste

management plans included children who were expected to learn about waste management with the responsibility of passing their knowledge on to other community members, including members of their own households. Although children have played this role in the community, education about waste management in Heiltsuk Nation stopped once the teacher who initiated the program left the community.

Parents learning from children and vice-versa also highlights reciprocity in learning in general and specifically in a First Nations context. In the context of pursuing higher education, for instance, Kirkness and Barnhardt (2001) claim that “...What First Nations people are seeking is...an education...that is relevant to their view of the world, that offers reciprocity in their relationships with others, and that helps them exercise responsibility over their own lives” (p.18). Learning and exercising responsibility over their own lives is also important in a waste management context and explains why many First Nations, including Heiltsuk Nation and Peguis First Nation, are embarking on programs to reduce waste generation and the negative impacts of improper management on their lives. Reciprocity or shared learning between the young and elderly can help communities keep up with changes and trends in MSW management in this regard.

Furthermore, the community is a source of learning in an Indigenous context because the community in which a person grows up or develops has an impact on both themselves and their interactions (Mitchell, Vizina, Augustus, & Sawyer, 2008). The data confirms that participants learned about MSW management through discussions and conversations with other community members talking about and sharing their own experiences, as well as discussing information learned from others. The communal nature of living in Indigenous communities could account for the opportunity and avenue to discuss issues among community members, particularly issues that affect the community as a whole. Indigenous Peoples have a vested interest in their lands and its

protection and are therefore interested in sharing their knowledge for such purposes (Whyte, 2017; Boiral, Heras-Saizarbitoria, & Brotherton, 2020). This is a key to successful MSW management, which requires consistent information sharing to help sway attitudes and behaviors towards good practices.

There has been emphasis on learning from ceremonies, Elders, and stories/storytelling in Indigenous learning (e.g., Augustine, 1997; Battiste, 2005). While it is established that learning does occur through such avenues, there was not much learning about MSW management through these sources among participants. For instance, most participants explained that MSW management is not a topic that is mentioned at ceremonies in order to engender conversations. This is because there are no specific ceremonies on MSW management or environmental management in general that are organized in both communities. Also, ceremonies are formal celebrations that are prescribed by tradition or custom (Wilson & Henderson, 2014) and if there are no such ceremonies for MSW management, there is no likelihood of discussions arising on the subject matter. However, the participants that indicated they had learned from ceremonies explained that they were told to separate biodegradable waste from other types of garbage without the word waste being used. This is an indication that waste management could be used indirectly at ceremonies without using the term waste or waste management, which one participant mentioned is an intellectual construct. This action is directly related to the cultural value of taking care of the environment and the focus of culture on biodegradable waste described in Chapter 4. In fact, some participants admitted that the term ‘waste management’ is a relatively new concept in their communities, which community members are learning to embrace. This insinuates that practices could reflect waste management but are not directly referred to as such in communities, since there is no word or traditional term to describe waste. Since ceremonies are avenues or ways

in which First Nations learn and MSW management has become an increasingly important issue in communities, there needs to be efforts towards incorporating elements of MSW management or environmental management into some ceremonies. Or, at least, values about protecting and appreciating mother earth through waste management can be incorporated in ceremonies.

That some participants do not identify themselves as traditional and therefore do not attend ceremonies also impacted the responses provided on ceremonies and MSW management. This is because these participants do not have insight and experience regarding what happens during ceremonies and could therefore not tell if waste management issues are discussed. Using statistics from the 2001 Canadian Census, Hay (2017) claimed that “The large majority of Indigenous people in Canada call themselves Christian... But it looks as if roughly two-thirds of First Nations, Inuit, and Métis people in Canada claim Christianity as their religion.” While being Christian or non-religious might not mean Indigenous people are not involved with their culture and tradition, the data above indicates that participants who identified as Christians or non-religious did not participate in traditional practices, including ceremonies, potlatches, or pow wows.

It was surprising that only one participant mentioned they had directly learned about waste management from Elders in their community, because learning from Elders, or Elders passing down knowledge to the younger generation, is understood to be an integral part of sharing knowledge within First Nations culture (Knudtson & Suzuki, 2006; Dockstator, 2005; McGregor, 2010). In fact, Elders are seen as the embodiment of a community’s knowledge and act as transmitters of intergenerational knowledge and a people’s culture to the younger generation (Cull et al., 2018). It is noteworthy that the Elder this participant learned from did not touch on how waste was managed and how that knowledge could be adapted or conceptualized to meet current waste management challenges, or at least the participant did not report it when asked. As a result,

it was difficult to connect the ‘how’ in past MSW management practices to current or present situations. However, Elders are also learning about MSW management since current management practices are new to them. It will therefore take time to understand the issues before sharing their new knowledge. It is also important to note that many participants mentioned they learned about waste management from their parents and grandparents, who could be Elders in the community.

Most participants mentioned that there were not a lot of materials or resources to use and that their grandparents and fathers did not waste anything. As a result, there was not much waste available to manage. This was confirmed by the Elder from whom the participant mentioned as directly speaking about waste management, explaining that nothing [waste] was left behind when they (Elder) used materials – an out-of-sight approach to management. Out-of-sight management in this case means burying and/or burning waste, which has been found to be a characteristic of MSW management in First Nations (Zagozewski et al., 2011; Oyegunle & Thompson, 2018). Open waste burning, for instance, has dire environmental consequences because it releases greenhouse gases and toxins that pollute air, water, and soil (Triassi et al., 2015; Cogut, 2016). Similarly, burying organics qualifies for anaerobic composting which releases methane gas into the atmosphere (Mohsen, Abbassi, & Animesh Dutta, 2017), even though the resulting compost fertilizes the soil.

Given that new MSW management programs are being pursued in the two communities and other First Nations, there is opportunity to learn about proper ways of managing waste. As a result, the generation after this current one could benefit from this knowledge being currently gained by Elders and community members. As participants revealed, waste was not managed in their communities until a few years ago; instead, waste was disposed of without thinking about its environmental or human implications.

Although storytelling sessions are talked about as ways of sharing information and knowledge in First Nations culture (Kovach, 2010; Iseke, 2013; Datta, 2018), none of my participants directly mentioned it as a way they learned or shared about MSW management. Since storytelling is an interactive activity between two or more people (Datta, 2018), its application in MSW management could help in sustaining knowledge, validating experiences, and sharing of knowledge among those involved (Iseke, 2013). Such an approach could be helpful in the waste management context to create the needed discourse around how to properly manage waste in both communities. It is important to note that in Chapter 4, while explaining factors that impact MSW management practices, participants indicated that they have learned from Elders and stories in their communities that require them to avoid waste through practices such as keeping their homes clean, sharing to avoid waste, and not polluting the land. These have indirect or latent impacts on waste management even though the word ‘waste’ was not utilized and what they learned was not focused specifically on waste management.

From a social learning perspective, there were no specific sources or avenues identified by participants; however, given that social learning involves individuals interacting among themselves and sharing that knowledge with others to make it situated within the wider community (Muro and Jeffrey, 2008; Blackmore, 2010; Reed et al., 2010), attending band meetings/information sessions, interactions between community members and solid waste management workers, and discussions on the Heiltsuk Nation’s Facebook page were identified as major social learning processes. Regarding the former, four participants mentioned that they had learned about MSW management at band meetings. However, these participants did not elaborate on the extent of deliberations to provide context and to determine the sort of factors that influenced their learning, except that decisions were made at the meetings and there were opportunities to ask

questions. Although no band meetings or information sessions were witnessed to assess deliberations and discussions during data collection, participants indicated that there were opportunities at these meetings to ask questions, suggesting the opportunity for interaction and deliberation among social learning actors. This is an important process component of the theory (Schusler et al., 2003; Keen et al., 2005). (See also Chapter 2).

The data also show that interactions occurred between community members who utilized the solid waste facilities and facility attendants, which resulted in the former learning how to properly use the facility and be involved in programs such as recycling and composting. These interactions contributed to deepening the knowledge of community members about recycling, expanding understanding of composting, and developing the appropriate skills needed to undertake both activities. These outcomes are expectations of social learning (Fernandez-Gimenez et al., 2008; Eguny, Reed, & Sinclair, 2016), and are discussed in detail in Chapter 6. Furthermore, the Heiltsuk Nation's Facebook page provides community members who are involved with the community's waste programs a platform to interact and discuss issues among themselves and with staff from the Solid Waste Department, in order to learn about the programs and also suggest ways programs can be improved to meet their waste management needs.

For ease of presentation of the data, I have attempted to distinguish between social learning and Indigenous learning in this chapter. As a result, established and documented ways of learning in First Nations such as Elders, ceremonies, and family members (Battiste, 2002; Cull et al., 2018) were categorized as Indigenous learning, while other identified ways of learning were classified as social learning once they fit the definition of the theory. However, the data presented above reveal that the two learning approaches have similarities. For instance, discussions among close family relations have been categorized as Indigenous learning and these discussions and

interactions about MSW management also typify the central component of social learning, as explained in Chapter 2.

Likewise, discussions among community members, which are categorized as Indigenous learning, fit within the purview of social learning, because of interactions and consequent outcomes such as encouraging family members and other community members to participate in MSW management programs. These discussions take place because community and family members are interested in improving MSW management in their communities, as well as developing a common understanding of a problem (Biedenweg & Monroe, 2013). Given the diverse opinions, knowledge, and perspectives that each has, such discussions could help broaden the knowledge base and deepen understanding of programs being implemented in their communities (Rist et al., 2007; Fernandez-Gimenez et al., 2008; Brummel, Nelson, Souter, Jakes, & Williams, 2010). For instance, as already noted, some participants were not very knowledgeable about what they need to recycle and new materials that belonged in composting bins but have been able to compost and recycle by learning these things through discussions with others.

Notwithstanding the similarities above, there are of course differences seen in the data. For example, family is a major source of knowledge sharing and transfer in an Indigenous context and it highlights the Indigenous learning process of individuals observing, experiencing first-hand, reflecting, making meaning, sharing/teaching, and acting (Augustine, 1997; Kaminsky, 2012). Thus, family provides the individual an avenue to experience and learn first-hand without intrusion (Battiste, 2002). This is contrary to social learning in NREM, in which learning typically occurs through discussions and deliberations among interested parties usually in a formal setting, who may have diverse experiences and knowledge that they bring to the table. That is to say that the very nature of Indigenous learning happens in an informal setting, as opposed to social learning in

which learning could be formal or informal with discussions occurring among those interested in NREM issues in a group setting. The relationship between Indigenous learning and social learning is more fully discussed in Chapter 6.

CHAPTER SIX

Exploring the Relationships Among Social Learning and Indigenous Learning

6.1 Introduction

Chapter Five focused on how participants learned or the avenues by which participants indicated they learned about MSW management. The purpose of this chapter, therefore, is to present data related to the sorts of learning that occurred in both communities and the resultant outcomes of that learning on behaviours, attitudes, and collective action efforts. Among other outcomes, community-based MSW management approaches aim to improve attitudes and behaviours about waste management (Sekito et al., 2013), which can be achieved through learning to develop new understandings while improving on existing knowledge and understanding of programs (e.g., Schusler et al., 2003; Newig, Günther, & Pahl-Wostl, 2010 – see also Chapter 2). Similarly, learning to improve decision making in the context of MSW management can and result in collective outcomes (Cundill & Rodela, 2012a). It was found that learning indeed occurred within both communities and also impacted attitudes and behaviours and collective action, which are presented below. The first section of the chapter describes learning outcomes or what was learned, and the second part explains the impact of learning on attitudes, behavior, and collective action. This chapter is based on objectives 3 and 5.

6.2 Learning Outcomes (What Was Learned)

This section provides data and information on what participants learned as a result of participating in MSW management programs in their communities. Five key themes, which are grounded in the social learning literature and the data, are used to present the data, including: community practices related to MSW management; MSW management skills; knowledge about

community programs; new perspectives on MSW management; and, deeper/improved understanding of MSW management.

6.2.1 Community Practices Related to Solid Waste

Participants indicated that they have learned about community practices regarding solid waste management through observations and interactions with other community members. The results of these observations and interactions are however mixed because participants mentioned that some community members are doing well by recycling their waste and that generally attitudes and behaviours had improved. However, some participants mentioned that community members were not pulling their weight or were stuck in their old habits of managing waste. Four participants who observed changes in community behaviour and attitudes explained that:

I have learned that there is more care in the community because people are sending their electronics and all that into the transfer station which they would have otherwise left in their yards. I am also surprised by the number of people who use the compost buckets, which is positive. There is also a lot of cardboards from the various entities. (P4).

Another participant mentioned that, “People are learning [to recycle and compost] because things are changing, and they realize it is not the 80s or 90s anymore, where we had a big open pit and set things on fire” (P25). According to P35:

I have seen a lot of improvements about how people dispose of their materials, except those who cannot haul them to the dumpsite. There are no huge piles of garbage in people’s homes, so I think one thing I have learned is people have the knowledge to properly dispose of items in their homes and also knowledge with dealing with household hazardous waste.

P6 also explained that:

I think overtime, our community has become more aware of the importance of maintaining a clean and healthy environment. By this, I mean becoming more aware and educated about recycling, composting, and separating our waste with recycling. We did not know more about that until we started getting those flyers to provide information.

However, some participants indicated that community members do not understand the issues surrounding recycling and have not improved their MSW management habits. For instance, P45 mentioned that, “Some do not like the idea of the recycling, and they get frustrated when you talk to them about it and they get in your face...” P5 also observed that:

People go to the grocery store, purchase an item, open it and drop the packaging on the floor. The only time people like to clean up is when someone special is coming into the community. Everyone was cleaning up when Prince William was coming here, but I say everyday should be a special day.

According to P52, “Many people do not recycle. Years ago, there was a waste audit in the community and only 5% of waste were recycled.” Based on my conversation with the employees who pick up the waste and my personal observations on the field, about 70% - 80% of community members now recycle.

6.2.2 Waste Management Skills

Many participants mentioned that they have learned skills needed to manage solid waste such as recycling, sorting out waste, and composting. According to P45, “Sorting/separating waste, where it [waste] needs to go in the bin, etc. are some of the skills I have learned.” P36 echoed similar views, indicating that “The skills I have developed is sorting out my garbage well and being a good guardian of mother earth.” P4 recounted that, “Knowing how to separate the paper, bottles,

and plastics and composting are things I did not know before but now I do. They have a way of doing it that I never knew – different buckets for paper, bottles, and plastics.” P37 also explained that, “I taught myself how to do things well and to place the waste in the appropriate bins. Sometimes they mix things up when I am not home, and my grandchildren come to visit, so I have to do it right.” Keeping recyclables clean is an important part of the recycling process, which two participants mentioned they have learned to do. According to P5, “I wash and clean all my recyclables and put them in blue bags.” P2 also shared their learning experience by indicating that “I rinse and wash recyclables before I put them into the bins.”

6.2.3 Knowledge About Waste Management and Community Programs

Some participants indicated they have learned a lot about and from the programs in their communities, which has contributed to their knowledge of waste management. P8, for instance, mentioned that,

The biggest thing I have learned is to see the program grow. It started so small and I learned that if we all do our little piece, it turns into one big piece together. We went from having nothing and the majority of the community is now involved with it... I have learned that we should be part of the system and contribute to the greater good of the community.

P19 shared similar thoughts by explaining that:

What I have learned is that I am proud of our composting and recycling programs. It is something that started small and spread to the whole community. It is like a natural flow of self-regulation of people recycling and composting. That is the cool culture that I really like. The coolest thing is caring about things!”

Emphasizing the progress made from burning garbage to the current programs, P9 explained that, “It is interesting to learn about how fast things can catch on: moving from burning everything to these recycling and composting programs over a short period of time. Batteries were thrown in the ocean, but we recycle them now.”

Other participants mentioned that they have learned more about waste materials that need to be recycled, composted, or disposed of as regular garbage. According to P7,

I have learned a few things. There are things that I do not put in the compost bucket, but I keep and use them in my own gardens. Examples are eggshells that I keep dry and crush, coffee grinds, leftovers of traditional resources like fish guts, herring eggs, and seaweed that has gone bad. It is interesting to learn what can and cannot go into the compost.

P12 also mentioned that, “I have learned that coffee and leftover vegetables can go into the compost and therefore less waste in the regular garbage. However, they do not provide a lot of information on what they do with the by-products. It will be nice to get information on what they use those for.” According to P51, “I have learned about the kinds of contamination that results from poor waste management...”

One participant, however, mentioned that they have not learned anything about the programs in their community “...because I have not been fully involved with it. My daughter lived in the apartment and she did everything and it never got picked up and it gets stinky. This prevented them from going forward with it” (P17).

6.2.4 New Perspectives on MSW Management

A few participants also indicated that they have developed new perspectives about MSW management since they have been involved with the programs, as well as observing other

community members participate. P20, for example, mentioned that, “I have developed new perspectives on things not necessarily new ideas. For instance, not everybody can afford expensive things that I might buy, so I understand why people will use the free store.” Similarly, P23 explained that:

I have learned that there needs to be a system in place for the free store. I am an advocate for thrift stores, so I think we should implement those models in the community. I have learned that not everything that comes to the free store is reusable or recyclable, so we need to have the right program. I have learned that it takes a lot of manpower and resources to get things done.

On their part, P7 explained that:

Understanding what makes a good compost, the process to turn it into good soil additives in the context of gardening, and how to mix it to make a good soil is something I have learned. It has been interesting to combine knowledge from my grandparents’ generation regarding how people fertilize the soil. It is interesting to get knowledge on traditional methods of burying fish guts and seaweed, as part of fertilizing the soil and combining that with the compost...

Touching on the technical aspects of MSW management, P48 explained that

I have learned that there is a lot more to do in the community. We need to get into the technical parts, too. They are supposed to be testing the landfill each year, but since it began, they have not tested it even once. That was something I was pushing and that is why I was finding people to understand the things we could do to keep the landfill running well.

For their part, P18 explained that:

I have also learned that recycling has to be accessible to people. We need to have bins outside in the community, so that children can use those bins. One of the things that has helped with the education is making that cultural connection and starting at a young age. Your ancestors were strong here and protected the environment and that needs to continue.

6.2.5 Deep Understanding of MSW Management

Many participants mentioned that they have deepened their understanding of waste management issues as a result of participating in the programs in their community. For instance, P21 explained that:

As already mentioned, our ancestors looked after our land for the benefit of our own health and the health of all living things. So, over the years, especially after opening the free store, I have learned that it is better to thrift shop than buy new clothes all the time. I have learned about the impact of landfills and how they leach into the ocean. More recently, I have learned about how the garbage affects the sea creatures when they eat the garbage. When we catch these sea creatures for food, they end up back on our plate with the garbage in them. Overall, I have just learned about all the negative impacts that garbage has on the environment from batteries to plastic bags, even with boat and car motor oil and gasoline. And I have learned that we can use more environmentally friendly cleaning supplies that will not affect the environment as much as some harsh chemicals like laundry soap, dish soap, mouthwash, shampoo etc.

P9 also shared their deep understanding of MSW management issues as follows:

I have learned that part of the issue is that things change over time and communication is important. For example, glass used to be accepted for recycling but currently it is not. The importance of having trained workers makes a big difference. For instance, seeing [name

withheld] doing the composting and how it has struggled since he left, says a lot about having training for workers and valuing these roles. The solid waste job should be treated as very important, getting training for the workers, and investing in it. The free store was running well because workers and volunteers invested in it, but over time, we had issues with it becoming a dumping ground, rats coming in, etc. The people that work in waste management should be treated and valued like medical doctors, etc. because it is so very important.

Two other participants explained their deepened understanding of MSW management as follows:

I have gained a lot more knowledge about how to recycle and how to go about it. For instance, making sure that all the plastic cans and bottles are separated and not throwing all of them in the garbage. I never used to separate Styrofoam plates and cups, but now I do. I have been showing my children and they tell their friends, who also tell each other. The gases that come from the plastics and go into the atmosphere impact the ozone layer. I see big cities destroying the ozone and we need to do something about that. (P34).

I have learned that a lot of our people need to be educated on recycling. Also, some people do not do it and it is a need. I have also learned that people can use recyclables for art. I reused margarine container, but I now recycle them because they recycle them out there. I have learned that the stores have too much packaging, one packaging after one packaging for one little thing. (P33).

6.3 Effects of Learning on Attitudes and Behaviours

Participants mentioned that their attitudes and behaviours have been impacted as a result of participating and learning from their community's programs. Some participants indicated that

they did not realize the essence of recycling when the programs started; however, they began to see the importance of recycling after the program started. Attitudinal and behavioural changes occurred at the individual and family/communal levels.

6.3.1 Individual Attitude and Behaviour Changes

Participants described how, individually, their attitudes and behaviors have been impacted by what they have learned through participating in the MSW programs in their communities. These impacts or changes occurred as a result of having the opportunity to participate and learn from doing composting and recycling, understanding the impact waste has on the environment, among other reasons. For instance, P13 revealed that:

My attitude has changed to be positive, because I saw recycling as a waste of time, but now thinking through it, I see it was important to recycle looking at the environmental impacts of waste. About 2 and half years ago, I began to see that the things that I do have impact on the environment, and it was up to me to get involved and reduce my environmental footprints or not. I used to throw my fishing lines and other things overboard in the water and that destroys the water system if you think about it. However, I now take a garbage bag, which I put them [garbage] in and bring them back home instead of throwing them overboard. I realized that the ocean provides sustenance to me and my family and if I am throwing things like pop can and bags of chips overboard into the water, fish and some aquatic life will be impacted. I talked to family and friends over it and they questioned why I do that [throw waste overboard], and I replied saying, ‘what am I supposed to do?’ They told me to get a garbage bag and put them in like I recycle on land.

P8 shared similar experiences, explaining that:

My attitude and behaviour have changed from what I used to do four years ago for sure. The change is as a result of having the opportunity to compost and recycle, and it was hard at the initial stages because we used to throw everything in the trash. Our attitudes have now changed, and we wash our cans and bottles first even before we toss them into the bin. We are definitely paying more attention to it than we used to.

Other participants discussed their attitudinal change in the following words:

My attitude towards waste has changed big time. I now think about what I put in my garbage as opposed to just throwing it in there. I came to this point by the fact that I am more aware of the impact of waste generally [through participation in the program and interactions with community members] and getting those flyers that provide information on what to do. And, it is not happening just here but everywhere. There are adverts on Facebook about waste management strategies, so I guess people are getting educated. It is disgusting to see people leaving plastics in the ocean and, even though I am one person, I care about what I am doing here in my community. (P6).

When I go to restaurants, I tell them not to put things in plastic. I request for glass. I have a cup marked for members of my family and each person uses theirs. We have things for people who visit, but they take care of it. I told one guy to have that and not be buying plastics because it is cheap and easy to get. We have had parties for about 50 people, but we do not buy plastics and Styrofoams. We have reusable plates. I look at it as a not going back thing. We can learn going into the future to educate people. You have to tell people about it. (P38).

When I take an animal from the bush, I do not leave my waste behind but put it back in the bush for the other animals to feed on them. That is recycling as well. I do not leave them

lying around, I take them back into the bush. As a traditional person, that is what I do with animal waste, I take them back for other animals to feed on them. It is a natural law for everyone. (P29).

6.3.2 Family or Community Attitude and Behaviour Changes

In addition to changes in individual behaviours and attitudes, participants also mentioned there have been these changes at family and community levels. According to P29, “Our community feasts are all natural, we bring wooden forks. Since we started putting the bins out, people’s attitudes have started changing gradually.” An Elder mentioned how their family changed their attitude towards using plastic materials and replaced them with more sustainable substitutes:

There are a lot of pop cans and bottles at potlatches and I am not sure how we manage that. However, my mother had a feast and instead of bringing bottled water to share, we brought water jugs and cups. We did not use styrofoam plates nor plastics, but reusable plates. I remember that when I was a child and went to a feast, you will see a group of women, who were designated cooks, and they had a table that they brought cups, plates, and everything needed for the tables. Each woman manned a table of 8 or 10 people and, after the feast was done, they took all these homes and washed them. There were no plastic cups, Styrofoam plates, etc. We have talked about this in the community and people say we need to go back in our old ways, but it is harder to go back. This is because people feel it is too much work.

P10 also revealed that:

When we did the tombstone feast for my dad, we did the research and bought biodegradable items like cutlery and we restarted that trend in the community. In the olden days, people were told to bring their own plates and cutlery and we wanted to reinvent that. In Klemtu,

every woman is responsible for hosting a table during potlatches and they had totes in which they keep these reusable items. Another thing we did for people for witnessing my dad's feast was giving out things that was not plastics from say the Dollar Store. It became waste and useless over time. We gave wooden paddles to the kids that danced, so they have something to keep. We gave fresh fruits as well to people to help people who struggle to eat healthy and also because everyone can do with food. In our culture, the richest chief is supposed to be the poorest chief because they are measured based on how much they give at potlatches.

P15 and P38 shared their family experiences respectively as follows:

We are sorting things every day and we get them ready for pick up. Pot, pans, bottles, etc. are part of the things that we sort. Besides the recycling program, there is someone in the community that comes around to pick our waste. We collapse all the boxes and put them in the red bins, and the plastics, cans, etc. go into the blue bins. I did ask about aluminum cans because my mum does not get any place to recycle them, and we do not put food waste in the garbage.

We have plastics, aluminum, and tin food cans. We try not to create too much waste than we have to because we leave further away from the landfill and it takes a lot of travel (30 minutes) and fuel to drive all the way to the landfill. My truck is old and there will be lots of pollution in the air while driving there.

To help clean their community, P37 explained that:

I got involved with recycling for a cleaner reserve and a cleaner earth. When I walk along hiking trails or along the road and see plastics and cans, I pick them up and put them in my backpack. I try and bring them back home, so that they are properly disposed of. I do these

because I know it will take years for mother nature to disintegrate them. I want it to be clean, so that when my grandchildren and great grandchildren go out to play, it its clean.

A few participants also mentioned that they did not feel that they have changed their attitudes very much. According to P36:

Other than more anger that we are creating so much waste, my attitude has not changed much. Human beings are creating boxes and little boxes and plastics that they do not need, and we should learn to know that we are doing all these things to destroy our earth and we do not know how long it is going to live for our future generation.

P40 mentioned that, “We have not recycled on a full scale probably because of laziness – not taking the time to do it and ensure that is done in the family. I know it is important for the environment, but we are not really practicing it.”

In addition to what participants explained about community attitudes, I had the opportunity to observe these in both communities regarding MSW management practices and the use of facilities/infrastructure. In Heiltsuk Nation, there was a ceremony for blessing a new housing subdivision on May 31, 2018. This ceremony was very colourful and was open to everyone in the community. While traditional and political leaders participated in the ceremony, the youth and children were at the heart of the ceremony, singing and performing traditional dances. Food and water were distributed to attendees at the event. Food - sandwiches and fruits - was packaged in brown paper bags, and bottled water was available. However, I did not see any compost buckets, garbage bins/bags or recycling bins put out at the event. Consequently, and as shown in Fig. 6.1, I observed few bottled water disposed of on the premises where the event occurred.



Figure 6.1. Discarded plastic bottles during the blessing of a new subdivision in Heiltsuk Nation. May 31, 2018.

On June 15, 2018, Oceans Day was observed in Heiltsuk Nation, where education and awareness programs about the ocean and environment in general were provided to students (children and youth) in the community. Community members also participated and had opportunities to ask questions and interact among themselves and with those in charge of providing the information. Education and awareness were provided on aquatic life and species diversity in the ocean, as well as plastic pollution in oceans and how that is endangering the lives of living organisms in the ocean. As one educator mentioned, the goal of creating awareness on plastic pollution in the ocean is to dissuade children and youth from using plastics and other materials like Styrofoam and to encourage them to use alternatives that have less environmental impacts. As depicted in Fig 6.2, food was served at this event on disposable plates and cutlery.

Compost buckets, blue and red recycling bins were displayed for attendees to dispose of their waste. Regarding composting, I observed that attendees placed their plates, leftover food,



Figure 6.2. Traditional BBQ salmon and roasted potatoes provided during Oceans Day.
June 15, 2018.

and fruit peels into the compost buckets (Figure 6.3). Some attendees asked others whether they should dispose of their plates in compost buckets, recycling bins or garbage bins, and they were directed to use the compost buckets, because the plates were compostable.



Figure 6.3. Compost buckets provided during Oceans Day is filled with compostable materials.
June 15, 2018.

With recycling, I found quite a mix of waste items in the bins provided as shown in Fig 6.4. The red bin, which is used as a receptacle for cardboard in the community, was being used by people to recycle bottles, plates, foil, etc. even though blue bins were available. As I observed, when an individual disposed of items that they thought was recyclable into the red bin, others usually followed in that regard, particularly those who were not sure where to dispose of their recyclables.



Photo 6.4. Improper recycling observed during Oceans Day. Red bins are used for cardboards. June 15, 2018

In Peguis First Nation, attitudes and behaviours were observed for three continuous days during the community's annual Treaty Days Celebration from July 17, 2018 to July 19, 2018. On the Treaty grounds were white and blue barrels that had been set up for collecting household garbage and recycling respectively (Fig. 6.5). There were very few recycling-labelled (with 'Recycling' inscription) bins available on the grounds. Basically, there were three parts of the grounds: The Pow Wow area, amusement park area, and area for tents for businesses to sell their products and food. Interestingly, I observed that in the amusement park area, mixed garbage and recycling bins were positioned side-by-side. When I inquired about this observation, I was told by a representative of Wonder Shows, which manages the amusement park area, that both kinds of bins are carried by the crew anywhere they have a show and that the crew is urged to pick up

garbage when they see any on the floor. The garbage is stored in one of the many trucks until the show is finished, after which they are disposed of.



Figure 6.5. Examples of recycling bin (left) and mixed garbage bin (right) provided during Treaty Days Celebration. July 17, 2018.

I observed on the morning of the first day that some youth were picking garbage that had been littered on the grounds. I later learned that the youth had been hired to pick-up garbage, as part of Peguis Development Corporation's Student Employment Program, which enrolls students from age 15 to the Secondary School level to do a variety of work such as Treaty Day cleanups, cleaning Elders' homes, maintenance of facilities, among others. The contract to transport garbage bins to the landfill was, however, awarded to a local waste management business, Spence Disposal.

One thing I saw a lot of over the three days was littering, which was quite common on the grounds. As shown in Fig. 6.6, some participants at the event littered the grounds with cans,

plastics, Styrofoam, among other waste materials. I observed an instance, where a child, in the company of their parents, dropped an empty pop can on the floor in close proximity to a bin. Other participants left their leftover food on benches.

As I observed, the crew that was employed to clean-up the grounds arrived around 4:00 pm to pick up garbage that were littered, as I was told they would the previous day. The crew also cleaned up parts of the grounds in the evenings and other parts in the morning before the next day's activities started. Fig 6.6 shows sections of the grounds that were littered on July 18, 2018, but were cleaned the morning of July 19, 2018.



Figure 6.6. Littered spaces on Treaty Days grounds. July 18, 2018.



Figure 6.7. Section of the Treaty Grounds cleaned up by the Treaty Day Clean-up Crew. July 19, 2019.

On the other hand, some participants properly disposed of their recycling and garbage properly as they should. Also, there were bins that contained mixed waste of household garbage and recycling, as well as overflowing bins. As well, some participants disposed of their recycling in the wrong bins (Fig. 6.8).



Figure 6.8. Mixed recycling and household garbage during Treaty Days. July 19, 2018.

6.4 Areas of Attitudinal and Behaviourial Changes

In addition to the above, the data showed attitudinal and behavioural changes manifesting in four areas: avoiding complex packaging, feeding leftovers to animals, reducing waste generation, and reusing materials.

6.4.1 Avoiding Complex Packaging

A few participants specifically mentioned that they have made efforts to cut down on their purchases and use of packaged items. As P10 reflected:

I never thought as a child that I will think about packaging. However, when I am out of the island and buying items, I think about the fact that I am coming to an island where we need to ship out waste. When one item is reusable than the other, I rather go for the reusable ones. And, also because we eat a lot from the ocean, I am mindful of the amount of waste

we create that might end up in the ocean. As a result, I struggle to sometimes choose an item even though I might really need it. I sometimes try to justify [purchasing] it, but my conscience makes me think it is too much plastic to add to what we already have in the community.

Similarly, P18 mentioned that “I compost and recycle, and I try not to buy too much packaged items...The whole packaging thing has helped me think and I am selective of the things I buy now.” To reduce the amount of packaging that ends up at the landfill, P38 indicated that, “What I try to do is not bring lots of plastics home and it helps our landfill. When we go Christmas shopping, I carry my pocket knife with me, which I use to cut off the plastic packaging on, for instance, toys and leave them at the checkout. I do not bring them home.” Additionally, P33 indicated that “We used Styrofoams to serve food, but I told my daughter we should use reusable plates instead because we can do our dishes. I know a couple of people who still use styrofoams.”

6.4.2 Feeding Creatures with Leftover Food

Few participants in Peguis indicated that rather than dispose of their food waste in bins and ultimately the landfill, they feed other creatures like birds with the leftover food. “I have no idea what to compost. Most times, I put food outside for the animals - birds, rabbits, squirrel – to come eat. I put a bowl of food outside for about 3 days and I go pick it up later. I look at them through the window while they feast” (P37). P47 also revealed that “If ever I have leftovers, we make offering to the land and feed some to the birds. We try not to waste food.” Elaborating on how they treat leftover food, P38 explained that:

If I am going through the garbage, all the food waste goes out into the bush around us here.

We use all that for ceremonial purposes. If we are having dinner, we take one part of each

food item and place it in the bush, and we say a few words and ask for thanks and forgiveness and ask for blessings. For the greens – lettuce, radish, etc. – we gather them in the bush. When we used to have chickens, we used to feed it to them. We offer to mother earth and the good Lord – it is the same way of giving thanks. We just leave the food on the ground. If we have leftovers, we also take them to the bush.

In Heiltsuk Nation, many participants mentioned that they dispose of their leftover food, particularly fish (bones, head, and guts), at the ocean at low tide to allow creatures such as eagles to feed on them (Fig. 6.9).



Figure 6.9. Birds feeding on fish that have been left behind on the beach for them. May 28, 2018.

6.4.3 Reducing Waste Generation

Most participants mentioned that they have significantly reduced their household garbage since participating in the programs in their communities. “I have gone from 4 or 5 bags to 2 bags

for a busy week. I get a lot of people in my house for dinner every day. I can have about 5 children here over the weekend and they know the routine regarding how things work here with recycling and composting” (P10). P6 also confirmed reduction in their garbage, stating that “The garbage generated at home has only gone down because we separate and compost and recycle. We are 5 people currently in my home and if we were not currently recycling, we would have about three garbage bags, but we have one bag weekly.” Another participant indicated a huge decrease in household garbage production in the following words:

My actual garbage has decreased because of recycling and composting. I am down 3 garbage bags a week and, before, I could have about 8 bags. For my husband and I, it is just one bag per week. I felt good that the programs came in because all this waste will be used again, and it will decrease the waste going into my landfill. (P3).

For his part, P44 explained that they have significantly cut down on their use of plastic bottles, revealing that, “...you can buy one plastic container with a filter in it rather than buying a case of bottled water. We have good water here, but I still run that through a filter instead of buying a case of 25 bottles of water...”

However, P17 indicated that:

My waste generation has increased, because there are more mouths to feed. When it was my husband and I, we did not even fill one black bag, but now we can fill twelve bags. This is because those that live in my house do not rip off the cardboards, they just throw them in the garbage bins. We do not have the red and blue bins, even though I saw a notice that said they will drop them off at any home prior to starting the program.

P36 also mentioned that “I do not think the waste we generate has increased or decreased; it has stayed the same. Our eating habits have not changed.”

6.4.4 Reusing Materials

Some participants mentioned that they reuse a lot of items such as plastics, jars, containers, among others. P10 for instance explained that, “I reuse a lot of jars for my children’s school projects or things for Christmas. We reuse different types of containers to store, for instance, seaweed...I see people throw jars away instead of reusing them to jar fish each year...” Similarly, P5 mentioned that they store a lot of materials for their grandchildren to repurpose them:

I reuse a lot of items because the children like to make stuff out of it. I have a 9-year old grandchild who wants to recycle every day. She is amazing and makes all sorts of stuff. She used Styrofoam and plastics to make a boat and filled it with water to takeoff. She also made an electric version of a boat. She is always creating stuff and I do not know where she gets her ideas.

P8 also explained that they reuse

Jars for preserving salmon year after year. We use ice cream containers and also reuse bags. We try to reduce the amount of plastics that we purchase, and my wife has purchased some cloth bags for our use instead. However, we reuse the plastics that we have at home.

In addition to the above, some participants mentioned that they use the free store in Heiltsuk Nation to gain access to items they need other than purchasing brand new ones. Expressing their delight for the existence of the free store, P7 explained that, “I absolutely love the fact that I have a place to send things that I do not need but still has life in them, and I can get things that are in great condition... Overall, I think the free store is a great idea and well received by the community.” P8 added to this by revealing that, “We take and give items back. Sometimes we decide to get rid of items and find out that someone might need them. We sometimes have abundant items and we give some out, and we also take things that we will need.” Similarly, P20 mentioned that, “We

drop things off and pick items as well. All the things at the Free Store are not in bad condition, there is nothing wrong with them. The people we pick the items for are grateful for that.”

6.5 Learning and Collective Action

In addition to the individual actions explained above, participants mentioned that they have taken collective action or been part of collective action initiatives in their communities. Collective action involved actions that participants mentioned did not just involve them, but also others in their communities (Meinzen-Dick et al. 2004, Assuah & Sinclair, 2019). These actions, as explained by participants, fell into three grounded sub-themes, including community clean-ups, self-initiated actions/encouraging community members to clean up, and encouraging friends to clean up.

6.5.1 Community Clean-ups

In both communities, community-wide cleanups are organized every year in Spring, particularly on Earth Day. Some participants indicated that they participate in such community-wide cleanups every year. The purpose of the clean-ups is to get community members out of their homes to help cleanup waste that has accumulated in the community, particularly over the winter months and to beautify the environment. According to P3, “I participate in cleaning up the community, which is organized sometimes on Earth Day. We clean up twice in a year...I work in the school and we have to be role models to the children.” P9 also mentioned that “I have been involved in the community cleanups.” Furthermore, P45 mentioned that, “I have been involved with ditch clean-ups and beautification process to plant trees in the community.”

In Heiltsuk Nation, community clean-ups are organized by the Social Development department and is open to all community members to participate. Three participants mentioned

that they were challenged by a fellow community member to cleanup, which they accepted. P23 recounted that:

I was part of the community cleanups. One of our Councillors challenged us to clean up and I took four big bags of garbage from the community. I have identified that little area and I will do it again...It was walking the talk and I think that is leadership to show the people.

The community member who challenged the others explained that:

A conversation started on Earth Day, where I challenged Councillors to go out and pick up about two bags of litter. People actually did that, and this was after we had a big storm.

Those who participated got up to about 40 or 50 bags taken out from the community. (P7).

In a related development regarding cleaning up the community, P8, described action taken by community members in Heiltsuk Nation to prevent wildlife from coming into the community to feed on garbage:

We realised that the bears and other wild animals were coming very close to the homes and it was because many people had wooden boxes that they used for their garbage. Once we saw that, the community started moving towards the bear-safe cans and we saw drastic decrease in bears coming around and also having to shoot them. So, having to clean up our little spaces did not only help us, but the bears as well because there were not habituating anymore, and they were not getting shot anymore. This is a result of us keeping our homes and little places clean. Everybody has the responsibility to be accountable for their personal space.

It is important to note that while data was gathered during Spring, there was no community cleanups organized in Heiltsuk Nation. No reasons were provided for the delays in going ahead

with the community cleanups; however, it was mentioned that the cleanups will happen. However, the cleanup had not been organized as of June 18, 2018.

In Peguis First Nation, however, a community cleanup was organized from April 25 to May 4, 2018 (Fig. 6.10). The community cleanup was organized by the Peguis Training and Employment Department and was advertised for participation by community members under the name *Green Team Project*, as shown in Fig. 6.11.



Figure 6.10. Community cleanup in Peguis First Nation. May 27, 2018.

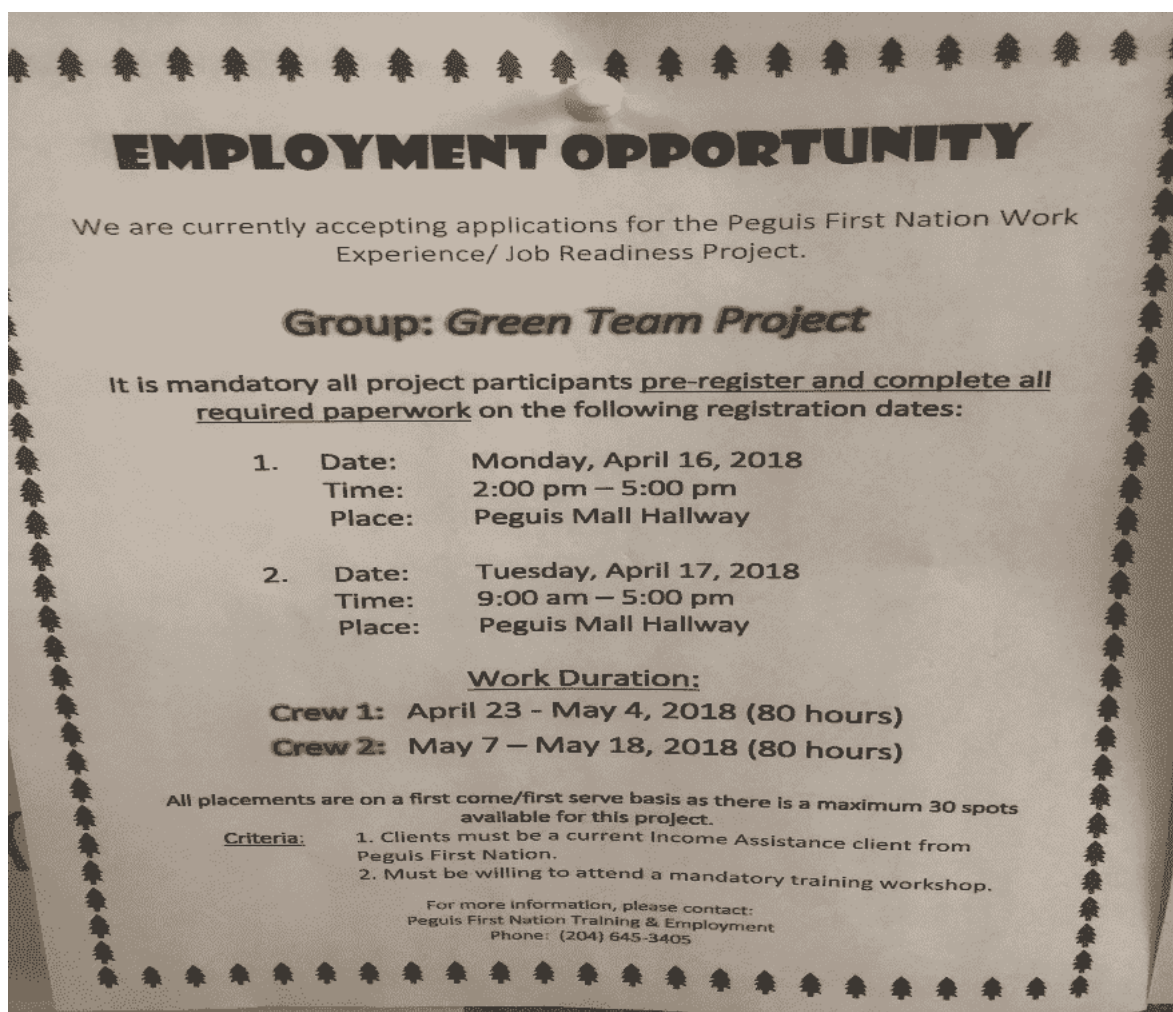


Figure 6.11. Advertisement for participants for community cleanup in Peguis First Nation.

The cleanup was not voluntary in nature. Community members who participated, working from 9am to 5pm during the timeframe of the project, were to be paid for their services. Equipment such as gloves, rakes, garbage bags, etc. were provided to successful applicants to the cleanup project, and supervisors regularly checked to ensure that participants were working. Participants signed in and out when they started and ended the day's work. The supervisor was responsible for picking up garbage and recyclables bags that had been collected. I participated in the cleanup and took photos of what participants were doing.

6.5.2 Self-initiated Actions and Initiatives/ Encouraging Community Members to Cleanup

Very few participants mentioned that they have, on a personal level, initiated actions in their communities as part of keeping their communities clean. P20 for instance mentioned that “Together with a colleague at work, we initiated a pickup around our building at work and we got some of the children to do that cleanup. We got the girls to also go pick up garbage at the school park.” Further, P32 indicated that “Sometimes on my way to the camp, I pick up garbage along the way to make it look clean. Visitors come in there and we try to keep it clean. I take up some of the children to do that, so I can show them.”

Additionally, a few participants indicated they took action involving children. For instance, P32 mentioned that “When we are working with the children and we set up camps, we make sure they put their garbage in one bin and recyclables in another. That is also a teaching we give them out there – keeping things clean, keeping the forest clean, and the environment clean.” P4 also revealed that:

When I teach the children, I tell them to recycle their paper, which we do. I enforce these things and I tell them to take care of their juice boxes, so we do not have to use all the chemicals to clean them up on the floor. We use water to wash the floor and you want to limit the amount of water we use.”

Another participant revealed that:

I share with students how much recycling we do at home, how much we take out of our garbage, and telling them about the proper way to recycle...What prompted my action was seeing the community dirty, people throwing waste out of car windows and the landfill area as well - very dirty area and animals go there too. (P51)

Some participants mentioned that they took action by encouraging and/or talking to others in the community to participate in, for instance, recycling and composting programs and be involved in community cleanups. According to P16, “We got my parents to recycle, because their garbage is heavy, and I do not want to carry all of that. I told them to compost and recycle and they finally decided to do it.” P10 also mentioned that: “I tell people about what is reusable and what they should use them for. I buy crates of jars and give them to others, so they can use them.” As well, P13 indicated that:

On a small scale, I let people know that you cannot just throw away your garbage without recycling. For boat owners who come to our dock and have garbage, my first question to them is if their garbage is separated. I tell them there is a recycling system in Bela Bella that needs to be adhered to and make sure they do that before they add their garbage to my bin. That is an impact there. I have seen about 100 boats come through, so I have to stay on top of issues and make that impact there. You have to be able to pass these on. At work, I also tell people to recycle instead of throwing things in one bin.

According to P47:

I have had to stop people from throwing things out of their car windows. People like to toss garbage out of their car windows, and I tell them not to do that. I have had to literally stop my car and go pick-up garbage that somebody threw out of the window. From that day, they have never littered from my vehicle. I also understand that they do not do that anymore.

An Elder from explained that:

You can have a feast bag and put a bowl, cup, and a spoon when going out into the community. With that, you can eat a meal and drink water from your cup. At traditional

ceremonies, those can be used as well. I teach that to people. We are in a world, where everything is fast-paced, so we like to dispose of things quickly. I tell people let us use what we have, wash it, and reuse them constantly and get away from Styrofoams. These reusable plates will last longer than the Styrofoams or disposable items we have. There is a push to get all the shopping bags away and for people to have reusable bags into shops. There needs to be ways to repurpose these things like Styrofoams instead of letting all of them just go down into the earth.

6.5.3 Encouraging Friends/Family to Clean Up

Some participants also mentioned that they took action by encouraging and/or talking to others about participating in the recycling program and to cleanup. According to P36:

I have had the opportunity to make my closest relations pick up garbage they threw out from my car while traveling. I told them to put them in my car and they say they throw the garbage out so that people could have jobs picking them up: “We are creating jobs for them”. And, I tell them I do not agree with that because it is our job to dispose of our waste properly. I told my cousin not to throw garbage out of my vehicle or their vehicle either... My children do recycle and now tell their friends to recycle, too. They tell their friends to put their waste in the right bins when they come to my place...I know I have made impact with my children with their knowledge and learning about recycling and protecting mother earth.

P8 also explained that:

I always encourage people to be part of the recycling program. For instance, when I go to my brother’s place, I ask him if he recycles, etc. At the end of the day, it makes you feel

good and proud that you are contributing to something good in the community. What prompted me to do that is realizing the change in our own household and the positive change in participating in the programs.

P38 also revealed that:

Yes, I have taken action. All the guys at work used to dump everything in one bin and I told them ‘I am the safety officer in the yard, and we are all going to recycle. It appears you guys are creating nauseous gas in the recycling bin and we have to fix that by recycling’ ...I also posted a notice or a rant in the mall. It was a plea to make people stop dumping their waste along the road. We work for [name withheld] department and we pick 14 bags of garbage every two weeks along the road from Fisher Branch to Fisher Bay. 14 Bags is too much! And, out of the 14, 13 are recyclables. I stapled it above the bulletin board in the Mall.

According to P37, they learned to recycle when they were turned away from the landfill for not sorting out their waste. Once they learned how to properly recycle, they decided to teach others:

Quite a few years back, they would not let you in the landfill with all your garbage at the back of your truck because you have to sort it out. So, I started sorting my garbage – plastics, metals, bottles, and cans. I have been doing this for a while and when people come visiting us, I watch them and make sure they know exactly where to put their garbage – be they recyclable or just garbage.

6.6 Discussion

It is evident from the data that there has been learning and consequent outcomes since the introduction of MSW management programs in both communities. The learning outcomes include developing skills in managing waste, gaining knowledge about programs, developing new

perspectives, gaining deeper understanding of MSW management in communities (Schusler et al., 2003; Brummel et al., 2010; Fernandez-Gimenez et al., 2008), and learning about community practices related to MSW management. These learning outcomes have resulted in changes in individual and community-level attitudes and behaviours (or actions) about MSW management such as avoiding complex packaging, reducing amount of waste generated per week, reusing and repurposing waste materials, and feeding animals with leftover foods. As well, very few participants mentioned that their attitudes and behaviours have not been impacted as a result of the programs. Further, the data shows that introducing MSW management programs has resulted in collective action efforts, including participating in community cleanups, encouraging community members to cleanup, and involving community members in self-directed initiatives.

An important learning outcome for participants was knowledge or new knowledge (Schusler et al., 2003; Brummel et al., 2010) gained or acquired about MSW management, particularly because there were no established programs for waste management; rather, burning and burying of waste were commonplace in both communities. However, both communities now have the opportunity to recycle and, in Heiltsuk Nation, there is access to a composting facility and a thrift store, where items can be donated and picked up for free. The availability of these MSW management options have made it possible for community members to gain knowledge such as what needs to be recycled, what contaminates recycling, what can go into a compost bucket, what is disposed of in bins, and the types of waste that are accepted in recycling bins. Learning about programs or gaining knowledge about natural resources and environmental management issues and problems such as waste management is a common outcome in the social learning literature (e.g., Fernandez-Gimenez et al., 2008; Assuah & Sinclair, 2019), which the above data/results confirms. As Romina (2014) argues, an individual "...who is being exposed to new

information can get [their] own assumptions challenged...” which could lead them to increase their levels of knowledge (Garmendia & Stagl, 2010). Given that changes regularly occur within MSW management such as determining the kind of materials that can be recycled as well as how packaging should be managed, there is increasing opportunities in both communities to learn more about waste materials and how to manage them.

Moreover, few participants mentioned that they have gained new perspectives owing to their participation in the programs. These perspectives include why some community members use the thrift store rather than purchase new items in order to reduce waste, regularly testing the landfill to keep it running effectively, and using both traditional and current approaches for composting.

In addition to the above, some participants have developed skills such as rinsing/cleaning their waste materials before recycling them and sorting out/separating materials for recycling, which they did not have previously. Household separation or segregation of waste, for instance, is a very important process in managing waste, particularly to recycling (United Nations Development Program, 2010; Ghani, Rusli, Biak, & Idris, 2013). As Miezah, Obiri-Danso, Kádár, Fei-Baffoe and Mensah (2015, p.16) describe it, “Source sorting and separation of waste is one of the traditional fractionation methods and fundamental steps in an integrated waste management system with the potential to provide data on waste generation and the quality of the fractions.” The high levels of contamination in plastic recycles, which partly resulted in China banning the import of plastic waste (Brooks, Wang, and Jambeck, 2018; National Waste and Recycling Association, 2019), for instance, makes this learning outcome even more important. This is because cleaning and properly sorting out recyclables will prevent the diversion to landfills of waste materials that are required to be recycled.

More so, many participants have developed deeper understanding of MSW management issues such as the connection between improper management and its negative effects on the environment, waterbodies, fish, and wild animals. This understanding has resulted in some participants committing to continue to recycle and keep protecting the environment. This is consistent with the findings of Schusler et al. (2003), who found that their participants identified a “common purpose to guide management efforts...” (p. 324). In Heiltsuk Nation, protecting animals resulted in the community moving from using wooden bins and totes, which attracted bears and other animals to using bear-safe bins to collect household garbage. This action by the community results from a deep understanding of how waste produced could result in shooting and even killing animals that are culturally symbolic.

Further to the learning outcomes above, the data also reveal that introducing MSW management programs has resulted in behavioural and attitudinal changes among community members. For instance, very few community members have chosen to sacrifice purchasing items with complex packaging to reduce the amount of waste, particularly plastics in their environment and communities. This change has trickled down to some families, who recycle together and have learned to use less environmentally impacting items including biodegradable cutlery and plates for their events. The use of these options was evident in Heiltsuk Nation, where recyclable plates were used during Oceans Day celebrations. As well, some families have developed a taste for reusable items such as plates and cups instead of buying cheaper but environmentally harmful plastic choices. Traditionally, participants that hunt have also done their part to prevent waste by feeding parts of hunted animals to other animals and using the rest for other purposes, such as hides, to prevent waste. These changes in behaviour and mindset are in line with pro-environmental behavior, which focuses on reducing or minimizing negative impacts on the environment through

behavioural changes (Kollmuss & Agyeman, 2002; Turaga, Howarth, & Borsuk, 2010; Park & Ha, 2012).

Also, many participants have found uses for waste items, including reusing margarine containers to store food, jars to preserve salmon, and bottles for making crafts. This finding epitomizes the circular economy concept, which encourages a rethink of the traditional linear approach of extract-produce-use-discard and urges reuse of materials in the economy after they no longer serve their original purposes (Kopnina, 2018). By reusing materials, community members, albeit small in number, are contributing to preventing the extraction of virgin or new materials for production, and the associated environmental impacts.

The most common impact of the programs introduced in both communities is the reduction in the number of garbage bags of waste produced by individuals and households. Adding recyclables to garbage meant that more garbage bags were needed to hold waste before they are disposed of; however, with the availability of recycling, it is only garbage that is disposed of at the landfill, not recyclables. In Heiltsuk Nation, where food waste ends up in compost bins, little or no food wastes are disposed of and the resulting composts from the composting program are used in planting gardens in the community.

Generally, the appropriate use of MSW facilities and infrastructure varied in both communities. In Peguis First Nation, for instance, many community members or attendees at the community's Treaty Days celebration did not utilize the bins provided, evidenced by littering that occurred during the event. This could be explained by the fact that many community members are still not recycling in the community owing to the lack of education and awareness created about the programs, as well as the proper ways to recycle (Peguis Landfill, Green Action Centre, & Assuah, 2019). That most bins contained both recyclables and garbage during the Treaty Days

Celebration indicate that users found it challenging to distinguish between recycling and garbage bins or simply were not interested in sorting their waste. The above is symptomatic of littering and open dumping, which were found to be common in the community, as the data shows. Factors that explain littering in the community include inadequate infrastructure such as bins and bags, lack of curbside pickups, inadequate education and awareness, and the long distance to the landfill from many households, which are in line with the findings of other authors (e.g., Zagozewski et al., 2011; Oyegunle & Thompson, 2018).

It is noteworthy that the practice of using black bags to dispose of waste in Peguis First Nation poses potential health risks to the waste management crew, because opening up these black bags to verify whether its recycling or garbage could result in exposure to toxic and hazardous waste, as well as physical injuries from broken household items. Several authors (e.g., Poulsen et al., 1995; Kuijer, Sluiter, & Frings-Dresen, 2010; Akormedi, Asampong, & Fobil, 2013; Gutberlet et al., 2013) have documented health-related risks and injuries among waste collectors, including headaches, pulmonary problems, infectious diseases, respiratory problems, chronic bronchitis, among others. It is obvious that the lack of different bins for recycling and mixed garbage, as well as unavailability of clear bags for recycling, are major reasons for this current practice.

In Heiltsuk Nation, there was no littering at the community's Oceans Day celebration, which was held along the ocean. Education and awareness of MSW management played a role in this, which is evidenced by attendees at the event inquiring from others where to dispose of their bins. As some authors (e.g., Hasan, 2004; Han et al., 2018) emphasize, public awareness and education on the consequences of improper waste management and its impact on wellbeing are important. The reason there was no littering at this event could be that the ocean is a source of livelihood for a lot of people in the community, which places some form of responsibility on them

to protect the resource, especially on a day that is set aside to celebrate the resource. This finding also relates to the value of protecting the environment described in Chapter 4. Similar to Peguis First Nation, there were bins at this event that contained recyclables and garbage as indicated in the data.

In spite of the positive impacts that has resulted from the introduction of MSW management programs in both communities, most participants indicated that a lot of community members are still not properly managing their waste because these community members do not understand the importance of waste management. This observation and assertion are explained by the littering and open dumping of waste in both communities as mentioned in the data above. It is also possible that participants feel that some community members are not participating in the programs as others are, and are responsible for littering and open dumping in the community. It is therefore important that both communities examine a range of variables including socioeconomic factors, attitudes, behaviours, and knowledge, that can improve participation in the MSW programs as examined by authors such as Babaei et al. (2015) and Mamady (2016).

Unlike Heiltsuk Nation, Peguis First Nation organized a community cleanup. However, the cleanup was not voluntary but a paid community service, which cannot be considered collective action. For an action to be considered collective action, the common actions undertaken must be voluntary or an obligation in nature and not paid for (Meinzen-Dick et al., 2004; Ostrom, 2004). Even though payment could be an incentive for those on social assistance to participate in cleaning up the community, as occurred in Peguis First Nation, the action does not amount to collective action, at least theoretically.

As discussed in Chapter 5, there are similarities in the two approaches to learning. However, as most participants reported, their learning was through interaction with others such as

family members, community members, and Elders, who shared their knowledge of how waste has been or is being managed. This knowledge has been carried over and continues to impact participants' current MSW management efforts. Participants did not learn how to manage MSW by 'getting their hands dirty' (first-hand experiences), which is a component of the Indigenous learning process (Battiste, 2002; Berkes, 2012; Menzies, 2019). That is to say, the experience by participants with MSW is unlike hunting and fishing, where community members journey on the land and water with their teachers to learn about weather patterns, the art of hunting and fishing, and the intricacies of seasonal changes (Peloquin & Berkes, 2010; Menzies, 2019). A few participants, however, reported that they learned by observing and doing things such as separating food remains from other types of waste, using all parts of animals to prevent waste, and keeping their spaces clean. Observing, acting, and making meaning out of what one experiences or is taught are also important to Indigenous ways of learning or knowing (Battiste, 2002; Kaminsky, 2012).

Further to the above and the discussion in Chapter 4, there are similarities in the Indigenous and social learning outcomes revealed in the data. This is because participants did not apply each of these lenses when talking about the outcomes of their learning, but were clear about how the learning occurred. Thus, whether through learning from their own experiences with MSW management practices, from others they came into contact with, or through learning from Elders, family relations, band meetings, ceremonies, etc., what participants reported as their learning outcomes related to waste management did not differ, there were not learning outcomes unique to either social or Indigenous learning.

What participants learned – community practices, community programs, new perspectives on MSW management, skills, deeper/improved understanding of MSW management – can be categorized as the social cognitive or socio-cognitive components of social learning (Van der Wal

et al., 2014), as opposed to the socio-relational or social-relational components such as developing trust and improving working relationships and communication. This is consistent with Indigenous learning, which involves the individual reflecting and making meaning of situations they encounter (a cognitive process) (Battiste, 2002; Kaminisky, 2012). In this case, the situation encountered is MSW management.

Furthermore, by sharing and discussing their knowledge with others, some participants initiated and or were involved in collective action efforts in their communities. This speaks to the sharing component of Indigenous ways of knowing or Indigenous learning (Houde, 2007) and its expected impact on the collective (CCL, 2009). Similarly, there is empirical evidence of social learning resulting in collective action outcomes in natural resources management (Biedenweg & Monroe, 2013; Egungyu, Reed, & Sinclair, 2016). For example, Assuah and Sinclair (2019) found that the board of the Wet'zinkw'a Community Forest Cooperation engaged in collective action such as adding value to logs, protecting First Nations cultural values, and hiring locally for forest jobs. It is noteworthy that the individual is central to learning in both approaches and what the individual learns has an impact on the collective, from sharing knowledge and perspectives on issues to participating in collective action programs.

Participants did not directly mention building new relationships with community members they shared their knowledge with and/or participated in collective action with; however, such relationships were necessary in completing collective tasks, particularly self-initiated actions. These relationships are assumed to have been established between and among community members through other means. Relationships or building relationships are emphasized in both learning approaches (Battiste, 2002, Cundill & Rodela, 2012a; Weiss et al., 2013; Assuah & Sinclair, 2019). However, relationships with other humans is as important as relationships with the

natural world, land, and spirits in Indigenous learning (Spak, 2005; Weiss et al., 2013). This contrasts with social learning that looks at relationship between individuals and/or collaborators working together.

CHATER SEVEN

Conclusions and Recommendations

7.1 Introduction

The purpose of this research was to investigate the role of and potential for social learning and Indigenous learning in managing MSW in First Nations communities in Canada, and how they can encourage best management practices. MSW management is a challenge in many, if not most, First Nations across Canada, and to help understand these challenges and how they might be overcome, this research examined whether communities are learning among themselves and from programs that have been established to deal with the waste they generate, as well as whether what has been learned is impacting management practices. The research examined this through the lens of social learning theory and Indigenous learning. Social learning provides opportunities for individuals involved in dealing with complex environmental issues such as waste management to share ideas and interact among themselves (Schusler et al., 2003; Muro & Jeffrey, 2008; Rodela, 2011; Cundill & Rodela, 2012a). Given that social learning is influenced by Western and Eurocentric approaches to learning and that the research was being conducted with First Nations, I incorporated the lens of Indigenous ways of learning or Indigenous learning. Indigenous learning has been described as, among other things, involving individuals experiencing a phenomenon (e.g., land), making meaning of the phenomenon, and sharing the knowledge gained with others (Batistte, 2002, 2005; CCL, 2009; Kaminsky, 2012). The two learning approaches, therefore provided the context and framework to examine MSW management in the case study communities.

The research had five objectives that form the frame for my conclusions in section 7.2. It was qualitative in approach and followed a social constructivist worldview, which involves participants sharing their lived experiences and realities that are influenced by their interactions

with others, and cultural and historical experiences (Creswell, 2009; Lincoln et al., 2011). As outlined in Chapter 3, this worldview was chosen because participants were engaged in the work to share their experiences with MSW management programs in their communities. Further, social constructivism aligns with the theory of social learning and Indigenous learning (used in this research) that involves interactions between and among people and groups. A case study approach was used to gather in-depth data regarding the experiences of participants (Creswell, 2013), and a multiple case study approach – with two cases – was used to provide more data for understanding the phenomenon being studied than would be provided by a single case (Berg, 2007; Yin, 2014; Gustafsson, 2017). Through a systematic search using case study selection criteria, Peguis First Nation and Heiltsuk Nation (Bella Bella) were selected and examined out of 12 First Nations (three each in the four Western Provinces of Canada) that were identified as having more advanced waste management systems in place when compared with other First Nations. The two communities were also willing to allow the research to be conducted in their territories. Semi-structured interviews, participant observations, and a community workshop were the three methods utilized to gather data. Analysis of data involved developing themes grounded in the data that were then organized using Nvivo software. Some of the themes included avoiding waste, taking care of each other, and protecting/taking care of the land. Similarly, themes or constructs from the literature – e.g., skills, discussions with Elders, and ceremonies – were analyzed in line with the objectives of the research.

Given that the research involved First Nations, the OCAP principles as well as the Tri-Council policy on conducting research with Indigenous Populations were followed. Following these processes required that the research's objectives, methods, benefits and risks associated with the research were discussed with both communities (Chapter 3). Following approval of the research, approval letters from both communities were provided for the research to commence.

7.2 Research Contributions and Conclusions

Conclusions are drawn in relation to each of the objectives set at the outset of this research in each of the sections below. The theoretical and empirical contributions of the research are also highlighted and discussed in these sections.

7.2.1 *MSW Infrastructure/Facilities and Cultural Factors that Impact Waste Management*

The first objective of this research was to *examine MSW management practices among First Nations in Canada to identify leading practices*. The findings and data related to this objective (Chapter 4) contributes to the scant body of literature on First Nations (or Indigenous) waste management issues in Canada, providing information on the components of waste management, programs and practices, characteristics, and approaches. While the challenges of waste management in First Nations across the country have been acknowledged and highlighted (Bharadwaj et al., 2006; Doyle, 2016), few peer-reviewed papers (e.g., Bharadwaj et al., 2008; Zagozewski et al., 2011; Keske, Mills, Godfrey, Tanguay & Dicker, 2018; Oyegunle & Thompson, 2018) have focused on empirical analysis of the issues to managing MSW in First Nations. Twelve communities were examined in terms of their MSW management practices, two of which were the subject of detailed analysis in this research.

In the two case study communities, the data revealed that the infrastructure and facilities in both communities are different and are managed differently. While Peguis First Nation has a landfill and a recycling depot, Heiltsuk Nation boasts of a composting facility, a transfer station, and a free store. Furthermore, community members are provided with recycling bins and compost buckets in Heiltsuk Nation. On Peguis First Nation, some households are provided with wooden bins as receptacles for recyclables and mixed garbage while others provide for themselves.

Additionally, community members in Peguis First Nation have to provide their own plastic bags to hold recyclables before placing them in wooden bins (Chapter 4).

The existing infrastructure and facilities determined the MSW management programs that each community embarked on. With a landfill, Peguis manages its mixed garbage in the community, while Heiltsuk Nation has to send its mixed garbage to the nearest landfill by barge because there is no landfill in the community. Composting and a free store, where community members can donate and pick up used items, were two established programs in Heiltsuk Nation and not in Peguis First Nation, because the infrastructure and facilities exist in the former. There are four MSW management programs undertaken by Heiltsuk Nation compared to two programs in Peguis First Nation. With the exception of the free store program in Heiltsuk Nation, there is free pick-up in the other three programs, while pick-up in Peguis First Nation is available to a section of the community. Those who do not enjoy these free services must pay for pick-up or find ways to dispose of their waste. In addition to free pick-up, provision of bins has enabled community members in Heiltsuk Nation to participate in their programs. Heiltsuk Nation and Peguis First Nation, particularly the former is among the minority of First Nation communities in Canada that have high functioning waste management systems, programs, and infrastructure/facilities to manage waste. With the exception of the noted differences above, generally, the infrastructure and programs in both communities are in line with the five main components of MSW management – generation, storage, collection, transportation, and disposal (Abdel-Shafy & Mansour, 2018). However, there are less than 50% of community members involved in the recycling program in Peguis First Nation while about 80% community members in Heiltsuk Nation participate in all of the community's programs except for mixed garbage collection in which all community members participate. Part of this difference can be attributed to

the educational work done on Heiltsuk Nation with households that sign on to programs, as well as the ongoing interaction with community members through Facebook. That the community has to ship all their waste off the island likely has an impact on waste diversion efforts. Peguis First Nation, on the other hand, does not provide direct or an ongoing educational program in the community, which is important to effective MSW management (Hasan, 2004; Han et al., 2018).

Heiltsuk Nation is part of British Columbia's recycling program administered by Recycle BC and has signed with other extended producer responsibility organizations who deal with various waste streams such as used oil and paint. As an island community, however, the community faces increased cost to transport recyclables and mixed garbage out of the community, as well as flying in personnel out of the community to collect mixed garbage. Peguis First Nation, on the other hand, have challenges getting recyclables out of the community; however, before data collection ended, the community was working with producer responsibility organizations in Manitoba to get recyclables out of the community. In spite of the efforts the two communities are making towards managing waste, they need to find the capacity to develop programs that help them move up the waste management hierarchy; that is, rethinking products before purchasing, reducing waste, and reusing materials (Zero Waste Canada, 2019). This is very important, particularly because food and other products that end up in First Nations often arrive in single use packages.

The data also confirm the challenges faced by First Nation communities in their pursuit of improving MSW management, including lack of facilities and infrastructure, lack of effective educational program on MSW waste management, lack of bins, curbside pick-ups, and lack of participation in programs, as also captured in the literature (Oyegunle & Thompson, 2018; Peguis First Nation, Green Action Centre, & Assuah, 2019). On the other hand, factors that contribute to

effective MSW management in First Nations, such as providing bins to households, offering curbside pickups, providing educational materials and updating them, embarking on multiple waste management programs, participating in extended producer responsibility programs, and using social media to address concerns of residents have been revealed through this research. These are also well documented in the literature (Tadesse et al., 2008; Kumar et al., 2009; Lyas et al., 2005; Chong et al., 2015).

This research also reveals the need for more research to be conducted on First Nations solid waste management to provide the sort of information that have influenced municipal, provincial, and federal waste management policies and programs in Canada. This is particularly important because First Nations face enormous challenges in managing their waste and programs need to be developed to help communities build capacity and to help them tap into all the extended producer responsibility programs available.

7.2.2 *Impact of Cultural Factors on Waste Management*

The second objective of the research was to *examine cultural elements/factors that impact MSW management practices*. This objective provided the opportunity to determine and highlight the importance of cultural factors, such as avoiding waste, taking care of each other, protecting the land, respect for the land/environment, and connection to the land. These were found to impact community members' involvement in managing their waste and provide researchers and practitioners with characteristics that need to be considered when planning environmental protection and management programs (Chapter 4). First Nations have lived with and been influenced by their culture for generations, and it is important that approaches and attempts to

(re)connect them to protecting the land through managing waste, examine key factors that could make such approaches successful.

Participants noted that the cultural factors provide the foundation for their responsibility to be mindful of their waste management practices, attitudes, and behaviour in order to protect the land – a characteristic that defines Indigenous relationship with the land (Richardson, 2008; Weiss et al., 2013). Of important note is that the Seven Grandfather Teachings have not been directly applied to waste management; however, some participants did explain how some of the teachings apply in a MSW management context. Consequently, research examining how the Seven Grandfather Teachings can influence people's attitudes and behaviours towards waste management is needed. This is because the teachings constitute a value system that place responsibility on First Nations in all facets of life, including human-environment connections/relationships (Verbos & Humphries, 2014; Kading et al., 2019).

7.2.3 *Learning, Attitudinal and Behavioural Changes*

The third objective was meant to *investigate whether learning has led to behavioral and attitudinal changes about how solid waste should be managed*. The data collected related to this objective has helped to highlight attitudinal and behavioural changes that result from learning, because it is not automatic that (social) learning will result in change in behaviours and/or attitudes (Reed et al., 2010). Avoiding complex packaging, reducing amount of waste generated per week, reusing and repurposing waste materials, and feeding animals leftover foods were the attitudinal and behavioural changes that resulted from learning about MSW management that participants noted, as well as learning from community programs (Chapter 5). Learning from recycling programs in both communities, and from the composting program in Heiltsuk Nation, directly

impacted the above attitudinal and behavioural changes, particularly reducing the amount of waste generated and sent to the landfill.

Furthermore, the above behavioural changes divert waste from the landfill, which is more desirable on the zero waste hierarchy (Zero Waste Canada, 2019). Reducing the amount of garbage sent to the landfill as a result of recycling was the most mentioned behavioural change, while only a few participants noted or talked about avoiding complex packaging and reusing/repurposing waste materials. One reason for this is because programs for waste reduction and diversion are relatively new in both communities, which used to dispose all types of waste in the landfill, burn, or bury them. As a result, the most direct impact of these programs was reducing the amount of waste sent to the landfill, as well as dealing with burying and burning. As community programs grow and participation in them increase, communities could embark on community-wide campaigns on, for example, waste prevention and reuse/repurpose. This is most likely in Heiltsuk Nation, which already has a program on reuse with its *free store* (Chapter 4). Another reason for the little mention of avoiding complex packaging as a behavioural change is as a result of the remoteness of both communities, which makes it difficult for communities to do away with packaged food and other packaged items, since that is how they most often arrive in the communities.

Indigenous learning occurred through interactions with Elders, family members and friends, ceremonies, and Elders, while the two main social learning avenues were Band meetings/information sessions and discussions with staff at the waste facilities. However, other avenues of learning that are categorized as individual learning components of social learning (Assuah, 2015) were information or pamphlets provided by solid waste management departments, community newsletters, and learning via the internet, social media (Facebook), and television.

Although there were no opportunities to observe deliberations and discussions about MSW first-hand, the above findings show that most of the learning involved interactions and discussions between and/or among a group of people (Chapter 5). This is in line with Reed et al.'s (2010) conceptualization that social learning occurs through “social interactions and processes between actors within a social network, either through direct interaction, e.g., conversation, or through other media, e.g., mass media, telephone, or Web 2.0 applications.”

7.2.4 Relationships Between Social Learning and Indigenous Learning

The fourth objective was to *explore the relationship between social learning and Indigenous learning in relation to learning processes and outcomes*, which has not been explored in the literature. In terms of the process of learning, the data revealed that there are similarities between the two learning approaches, as they involved interactions, discussions, and sharing of information and knowledge among those involved – these are characteristics of both learning approaches (Chapter 6). However, first-hand learning experiences gained by being on the land and participating in activities, such as hunting and fishing, which are important in Indigenous learning, were not reported by most participants. This notwithstanding, a few participants reported that they were involved in learning by doing, which is also part of the Indigenous learning process.

Findings on the outcome of the learning processes further highlight the similarity in both learning approaches. Some of the outcomes included gaining (new) knowledge, obtaining skills to properly manage waste, deeper understanding, and developing new perspectives about how waste should be managed. The findings further strengthen the outcomes of social learning theory, which are evolving in the literature. While these outcomes are largely socio-cognitive outcomes of social learning (van der Wal et al., 2014; Assuah, 2015), they are also embedded in Indigenous learning

because they require individuals to, among others, think/reflect and make meaning of their experiences to create knowledge, which is a cognitive process (Battiste, 2002) (Chapter 6).

Further to the above, the findings have provided a new dimension for examining and considering social learning in participatory processes, in that it has shown that social learning outcomes can occur and be documented in a broader community setting or context, in addition to being documented among smaller groups (Schusler et al., 2003; Pahl-Wostl, Mostert, & Tàbara, 2008; Egunyū et al., 2016). For instance, Egunyū et al. (2016) investigated social learning among the board of a community forest. In this current research, however, social learning was examined without a pre-organized participatory process or an established system that brings stakeholders or participants to work together. Rather, social learning was examined in a broader or wider community – communities that are working to deal with a common problem of MSW as evidenced by the programs introduced. Thus, social learning was examined as it evolved among community members.

It is worth noting that most of the learning happened among close family relations such as parents, children, and grandparents. Learning from Elders is highlighted as one of the main means or avenues that First Nations learn (Battiste, 2005; McGregor, 2010); however, most participants did not mention it as how they learn about MSW management. Moreover, storytelling, which is also mentioned as a means of learning was not mentioned by any participants as a source of learning. As many participants mentioned, MSW management is a relatively new phenomenon in their communities and they (including Elders) are learning about it, which could account for the reason Elders and storytelling were not mentioned as primary means of learning. Moreover, some participants emphasized that colonization and events such as the 60's Scoop brought with them a

gap in the transfer of cultural knowledge and know-how to younger generations, which accounts for the little to no knowledge about solid waste being passed down to younger generations.

Based on the above, future research should examine the role of Elders in learning and passing down knowledge about solid waste management. This will help fill the empirical gap that has been found in this research regarding Elders and solid waste management, as well as provide insight into how knowledge transfer by Elders could positively impact ongoing solid waste management efforts by communities. Moreover, there is the need for future research to replicate the methodology utilized in this research to further examine the relationship between social learning and Indigenous learning, to solidify research outcomes.

On the other hand, rather than examine self-reported social learning and Indigenous learning, which was the approach utilized in this research, future research should establish or build social learning and Indigenous learning into waste management approaches, to examine their outcomes and processes. With such an approach, first-hand learning experiences which characterizes Indigenous learning, as well as sharing and discussions/deliberations associated with social learning can be closely monitored and examined. Results of such research would help compare and contrast the approach utilized in this research to strengthen the theoretical basis of utilizing both learning approaches. As well, this approach would help shed light on the amount of time required for learning to actually happen after participants have been exposed to ideas, knowledge, and perspectives of others.

7.2.5 Learning and Collective Action

The fifth objective sought to *examine collective action and community change that emerged from learning about solid waste management*, which was meant to respond to the implicit

social learning-collective action conceptualization in the social learning literature (Ducrot, 2009; Bidenweg & Monroe, 2013) and that of Indigenous learning which is expected to benefit the community (Battiste, 2005; CCL, 2009). Collective action outcomes such as cleaning up the community and encouraging others to cleanup or recycle were found in both communities. This further gives credence to the claim that social learning results in collective action, although there were not many collective action initiatives (Chapter 6). However, in Peguis First Nation, a scheduled community clean up ended in community members being paid for their services and therefore does not fit the conceptualization of collective action in the literature (Meinzen-Dick et al., 2004). Heiltsuk Nation did not organize its community clean-up as planned; however, the community took action by changing their bins to bear-safe bins once they learned that wildlife like bears were scavenging garbage in homes and roaming about in the community for food.

It was a surprising outcome that community cleanups did not occur in Heiltsuk Nation and that participants were paid in Peguis First Nation to be involved in cleaning up the community, since community clean-ups are common and also used as a learning tool to help people understand the need for collective action on MSW (Joseph, 2006; Henry, Yongsheng, & Jun, 2006; Sinthumule & Mkumbuzi, 2019). Generally, there were not strong outcomes of collective action.

7.3 Future Considerations

The considerations provided below are based on the study's findings and data, and suggestions made by participants. They are grouped under two themes: MSW management systems and learning and culture.

7.3.1 MSW Management System

Peguis First Nation

There is great need for Peguis First Nation to explore ways or develop a model for picking up and transporting waste from households to the landfill and recycling depot because the community is large and wide, and has residents living all over the area. As revealed by participants, transporting waste to the landfill is a challenge because of the long distances they have to drive to dispose of their waste and the fact that not everyone has a car to do so or has the money to hire the services of others to dispose of their waste. I would suggest a model that involves dividing the community up into four blocks – North, South, East, and West – and building one temporary transfer station in each block. Residents could then bring their waste and recycling to these stations. Recycling from the four spots could then be picked up once per week or month and disposed of at the main recycling depot. This approach will also help bring more community members into the community's recycling program because they can 'easily' access the facility. More so, employment will be provided for a few more community residents. To realise this plan, the community needs to invest in equipment such as forklifts, balers, storage sheds, and a truck to move waste and recycling material to the recycling depot. Also, the community needs to invest in constructing the temporary transfer stations.

Additionally, this model should include providing recycling bins and clear bags to community members to participate in the recycling program, because providing such resources have been reported by authors to motivate people to participate in recycling programs (e.g., Lyas, Shaw, & van Vugt, 2005; Chong et al., 2015) as is the case in Heiltsuk Nation. As a result, the community needs to work with producer responsibility organizations, such as the Canadian

Beverage Container Recycling Association to provide bins to households. As well, the community, through the Public Works department, can invest in purchasing recycling bins for the community.

Providing free curbside pick-up in the community will significantly improve the littering and open dumping situation in the community, as participants suggested. This will involve the community purchasing roll-off trucks or paying the services of a local business to collect waste from every household. Alternatively, Peguis First Nation could subsidize the price of pick-ups for residents, particularly those with low income and who do not have vehicles to transport their waste to the landfill, as it does for Elders and those with disabilities.

Further, an extensive educational campaign targeted at changing community attitudes is required in Peguis First Nation to encourage and involve more people in the community's recycling program because, as participants revealed, very few people participate in the program. Newsletters, radio announcements, and flyers that contain information on how recycling should be done must be provided to community members. This was another suggestion provided by participants.

In addition, the community needs to expand its participation in the province's extended producer responsibility programs by signing on with producer responsibility organizations that they have not yet signed with, particularly white goods and bulky materials. By participating in the programs of these organizations, the community can divert more waste from the landfill, participate in recycling, and receive support to help achieve their goals.

The above suggestions are meant to further involve community residents in MSW management and to take more responsibility for their waste, as indicated by participants. There will need to be significant monetary investments to provide the available infrastructure and facilities necessary to succeed. However, this is needed because MSW management is a challenge

in the community, which requires conscious efforts, plans, and programs, and the necessary investment to deal with the situation.

To make these considerations actionable, the community should start with providing recycling bins and clear bags to community members in the short term and accompany that with an ‘aggressive’ waste management educational campaign to encourage participation in the program. Providing the bins, at the minimum, will send a signal to the community that immediate change is needed in community behaviour about recycling. Also, in the short term, the Public Works department should reach out to stewardship programs they are yet to work with to find out more about those programs, program requirements, infrastructure needed, rebates, transportation, among other requirements. This will help the community prepare and get ready to participate in these stewardship programs.

In the medium term, the community should look into providing free curbside pickup, since it is a major factor hindering participation in the programs. The financial model required to realise this needs to be assessed in the context of funding received for solid waste management in the community. Furthermore, in the medium term, Peguis First Nation should assess the feasibility and cost involved in establishing the four temporal transfer stations in the community, as well as the equipment that will be needed to make operations successful. It is important that any feasibility studies examine the potential number of people that will be served by each of the transfer stations, salaries for staff, and the number of staff that will be needed at each facility. When found to be feasible, construction and operation of the temporal transfer stations should be considered in the long term.

Heiltsuk Nation

Participants suggested that Heiltsuk Nation needs to revive the school education program on solid waste management, because there is evidence from the data that children have been able to transmit information and knowledge they learned in school about waste management to their parents and other community members. If the program is well developed, it could be one of the main means to educate residents about the community's solid waste programs and MSW management in general. This is because there will always be interactions between children and their immediate families, as well as other residents given the small size of the community. Therefore, knowledge and information about waste management can be passed on with relative ease.

According to participants, to help sustain the program, the community needs to get more than one person or teacher to spearhead the effort to prevent the program from collapsing once one person is unavailable or leaves the community. Also, a solid waste management club consisting of students and teachers can be formed in the school and specifically tasked with the responsibility of promoting waste management in the school and the community. Although it will be difficult to pick up from where the program stopped, some level of foundation has been laid. Since community members still remember learning from children, their knowledge of how the program was run could be the starting point. Thus, in the short term, school teachers and community members that were positively impacted by the programs can be consulted to share their experiences to give a structure to reviving the program. In the short to medium term, children who participated in the program when it initially started can be motivated and tasked to educate current students about the program and how beneficial it was and will be to the community. This approach could raise current students' interest in the program and prepare them to participate.

In the medium to long term, the community should develop incentives for students to participate in the programs, as well as establish the infrastructure needed for the program to succeed. Moreover, there needs to be a long-term plan for those who will be in charge of managing the program. Rather than depend on an individual or a teacher to run the program as has been done in the past, a committee, consisting of teachers and community members, should be formed and responsibility given to them to manage the program. Utilizing this approach will ensure that when teachers leave the community, there will be community members to lead the program to prevent it from collapsing as it happened previously.

7.3.2 Learning and Culture

In both communities, participants indicated the need to integrate their culture into MSW management because current discourse and discussions do not capture how culture plays a role. Elders, Knowledge Keepers, schools, and other stakeholders responsible for teaching and passing down traditional knowledge will need to incorporate MSW management into their teachings, particularly the cultural factors identified in this research and the Seven Sacred Teachings or Grandfather Teachings that are fundamental to First Nations culture. This should be approached foremost by giving MSW management attention at ceremonies, sweat lodges, storytelling moments, and other traditional means where learning occurs. Starting such discussions will begin to raise awareness about waste management.

Furthermore, solid waste management terms and methods should be translated into various languages to help residents understand MSW management issues and concepts. This is even more important at a time when language and cultural revitalization have begun in Peguis First Nation and Heiltsuk Nation, as well as other First Nations. Incorporating MSW management in the culture

and language revitalization process could therefore be helpful in educating current and future generations to think about waste management differently as it applies to First Nations culture and their responsibility to protect the land.

7.4. Conceptual Model for MSW on First Nations

Having conducted this research, the need for an overall framework to guide the development of a learning-oriented MSW management system in First Nations communities that respects culture and tradition is imperative. Based on my findings and what I have learned from the literature regarding First Nations MSW management, I developed the conceptual model shown in Fig 7.1. There are seven main components of the framework: infrastructure/facilities, cultural factors, traditional sources of learning, education and information, extended producer responsibility programs, curbside pick-up, and community programs. The relationships among these components are explained below.

As an example, a community could start by considering the MSW management system they already have in place and look to modify that to implement the robust system suggested by the framework. Existing infrastructure/facilities (Fig 7.1) will determine in the first instance the waste management and diversion programs that a community can most easily undertake or is already undertaking. For instance, with a recycling depot and bins, a community can roll out a recycling program. Conversely, the programs desired by the community can determine the kind of infrastructure that will be built. Some of this may be easier to achieve than others. For example, a first place to consider would be the extended producer responsibility programs operating in each region and how these can be accessed at little or no cost. For more ambitious changes such as implementing a composting program, the appropriate compost infrastructure and facilities must be

built to enable the program to be a reality. This is the relationship between infrastructure/facilities and MSW management and programs.

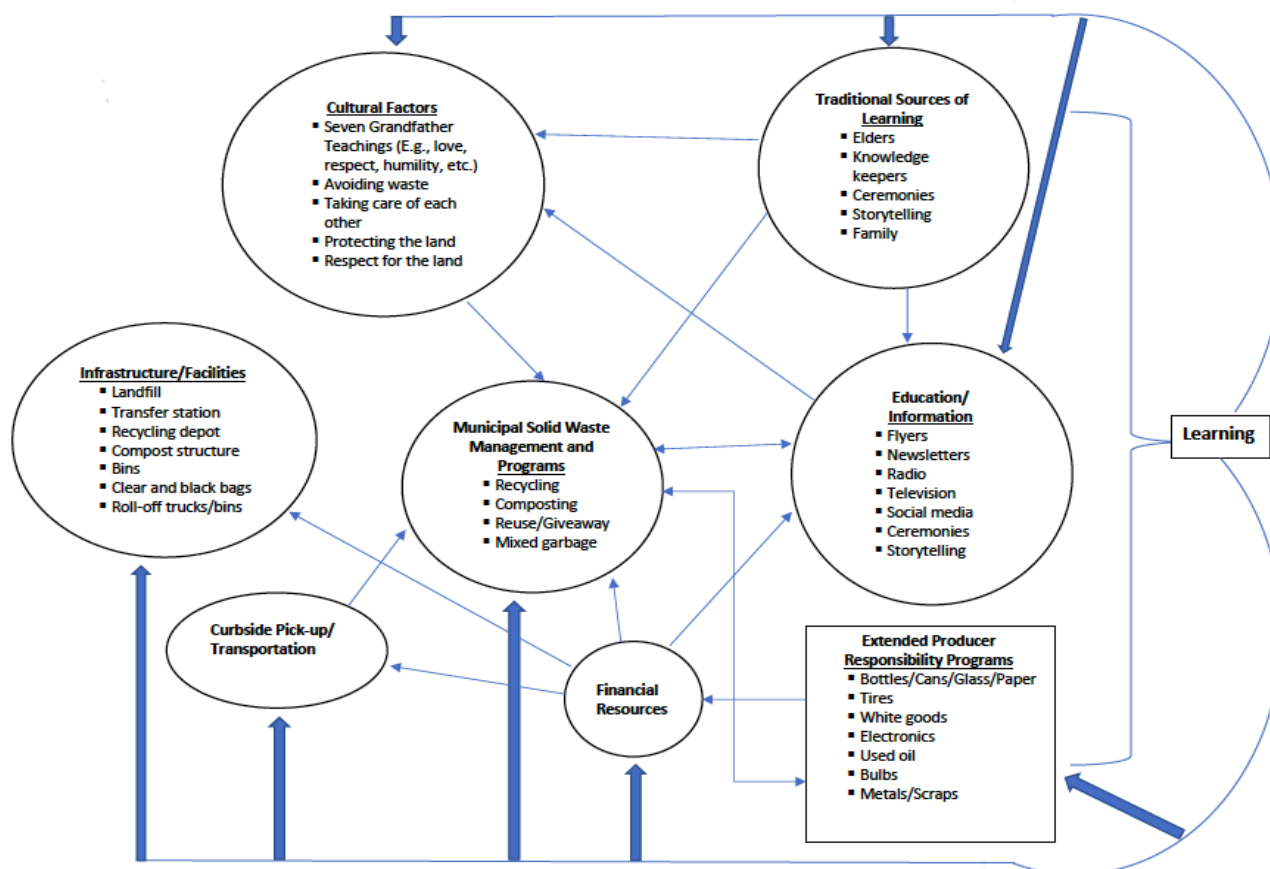


Figure 7.1. A Learning-Oriented Conceptual Model for Municipal Solid Waste Management Applicable in First Nations

As noted in Fig 7.1, curbside pick-up stands as an independent component to facilities/infrastructure, because free curbside pick-up results in high participation in programs. Particularly in First Nation communities where MSW infrastructure/facilities are often further away from built-up areas of the community, free curbside pick-up prevents community members who do not have the means to dispose of their recycling and waste, or are unable to dispose of

them, from resorting to improper solid waste practices such as open dumping and open burning of waste. As a result, programs embarked on in communities should factor in curbside pick-up as an essential component.

Incorporating cultural factors as a component in MSW management helps to drive the system by linking key cultural traditions – such as care for mother earth – to using the MSW system available and to reducing waste in the first place. As well, modern MSW management practices such as recycling is relatively new in communities and there is a need to contextualize these in culture in order to reach desired ends. For instance, explaining how the Seven Grandfather Teachings such as love and respect relate to waste management and how to apply them daily can be a recipe for improving attitudes about MSW management.

Elders and Knowledge Keepers also need to learn and understand the various MSW management programs in their communities and waste management in general to effectively combine that knowledge with what they teach in the community. This is the relationship between traditional sources of knowledge and solid waste management captured in Figure 7.1. Communities need to build the capacity of Elders in terms of their understanding of the MSW management system in place and the desired results, so that they can translate and share that knowledge. This is even more important because in many communities, MSW management is new and evolving.

The literature, as described above, clearly established that education and information are the foundation of every successful solid waste management system, because of the need for community members to be educated in addition to updating themselves about programs on an ongoing basis. Knowledge sharing by Elders will be an important part of this in First Nation communities. It is essential therefore that communities build their capacity or are allowed to build

their capacity regarding how to utilize different types of education and information campaigns such as newsletters, flyers, and community radios to inform the public about MSW programs and what needs to be done to increase participation and help change community attitudes and behaviours. This explains the two-way relationship between education and information and solid waste management and programs in Fig. 7.1. Furthermore, education and information campaigns should be designed to connect cultural factors to waste management as has been explained above.

As noted above, First Nation communities need to take advantage of and participate in extended producer responsibility programs in their provinces and municipalities. These programs can help with the setting up of systems to collect recyclable material and ensure its proper storage, handling, and transportation on a regular basis. Through extended producer responsibility programs, solid waste managers will also be trained in how to handle waste streams (including hazardous and special waste) and in turn pass on that knowledge to the community to improve solid waste management. This explains the two-way relationship between extended producer responsibility programs and solid waste management and programs established in Fig. 7.1. Participating in these programs can also bring in revenues (in the form of rebates) to communities depending on the amount of waste diverted. This explains the relationship between financial resources and extended producer responsibility programs in Fig 7.1.

The literature establishes that the availability of financial resources is important in driving solid waste management. For instance, financial resources are required to build infrastructure, fund programs that communities embark on, and sustain pick-up programs to ensure that waste is always collected. Similarly, financial resources are required to design flyers and newsletters, and provide updates of programs on platforms such as radio, television, and social media. The above highlights

the relationships between financial resources and infrastructure, curbside pick-up, solid waste programs, and education/information depicted in Fig 7.1.

As can be observed on the far-right side of Fig 7.1, learning is cast as an overall mediating component of a successful MSW management system. Learning connects all aspects of solid waste management because all aspects of the process – from waste generation to disposal/treatment – require learning to understand and improve the system at every stage. In order for the system to grow and improve, learning is essential. As explained in the above paragraphs, learning underlies what the MSW management system looks like, and mediates the relationships between the various components, which creates feedback loops for dealing with challenges that may arise from management and the need for system improvement. MSW management systems need to be learning oriented not to only ensure innovation within the system, but also that participants understand and share in the system. This is why learning is separated from the other components and positioned solely to the right, and the feedback from learning cast to envelope the entire system in Fig 7.1.

It is important to note that the framework or model does not assume that all First Nations are at the same point in the development of their waste management systems or am I suggesting that it is applicable to all First Nations, as my early review of the literature revealed that few communities have higher functioning MSW management systems or have advanced in the facilities and programs offered in communities on which to build. That notwithstanding, communities with high functioning or advanced waste management systems can utilize the model to improve on their programs and help institute behavioural and attitudinal change in their communities, as well as pass along knowledge to the younger generations. On the other hand,

communities without the necessary infrastructure and programs can pursue other components of the model and/or use the model as a framework to plan for future waste management programs.

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APPENDICES

APPENDIX I

Letters of Approval from Peguis First Nation and Heiltsuk Nation



Peguis First Nation

P.O. Box 10
PEGUIS RESERVE, MANITOBA ROC 3JO
Telephone: (204) 645-2359 | Toll Free: 1-866-645-2359 | Fax: (204) 645-2360
Website www.peguisfirstnation.ca

February 21, 2018

To Whom It May Concern

RE: SUPPORT LETTER FOR ANDERSON ASSUAH REQUEST FOR HIS PHD RESEARCH, TITLE: "EXAMINING the ROLE of the POTENTIAL for ABORIGINAL and SOCIAL LEARNING THROUGH COMMUNITY-BASED SOLID WASTE MANGEMENT IN CANADIAN FIRST NATIONS COMMUNITIES" – ON-SITE TWO MONTH VISIT

This letter is in support of Anderson Assuah's request to do his above mentioned research in our community for duration of approximately two (2) months.

We, the Chief and Council, approve of Mr. Assuah's research request and welcome him into our community to complete his research of Peguis First Nation's "...unique traditions, ceremonies, and participating in activities related to solid waste management..." as stated in Mr. Assuah's letter request.

If you have any questions or concerns please contact the Peguis First Nation Band Office at 1-204-645-2359. Thank you.

Sincerely,

Chief Glenn Hudson

Councillor Mary Tyler Bear

Councillor Wade Sutherland

Councillor Annette Spence-Meeches

Councillor Glennis Sutherland

Cc: File Copy



**Heiltsuk Integrated
Resource Management
Department**

March 12, /18

Dear Anderson Assuah :

This is to inform you that The Heiltsuk Integrated Resource Management Department ~ Advisory Committee has reviewed your Research Application.

We have recommended approval of your project," **Examining the Role of and Potential of and Potential for Aboriginal and Social Learning through Community- Based Solid Waste Management in Canadian First Nations Communities.**"

The Research Advisory Committee has approved your Project with the following conditions

- Contact Heiltsuk Capital Works manager to ensure we have no overlapping issues with their project contact information 250 – 957 – 2381 Public Works waste manager Brian Fagan e mail brian.fagan@heiltsuk.ca Brian can connect you with the Waste Project manager.
- Report to the HIRMD office prior to starting your project and provide CV
- HIRMD would like to have the opportunity to review any publications that may come from your Research Project

On behalf of the Heiltsuk Nation we would like to thank you for your interest in doing some research in our Territory. If you have any questions or concerns please contact me at your convenience have a good day


Harvey L Humchitt

HIRMD Research Liaison Coordinator.

Work 250 957 2303 ext 226 mobile 250 957 7516

APPENDIX II

Draft Interview Schedule for Indigenous Services Canada Participants

General Questions

1. How long have you been involved with solid waste management issues in your community?
2. In your experience, what leading MSW waste practices have you seen unfolding in communities?
3. What contributed to these initiatives (Prompts: leadership, a program, money, desire, etc.)
4. How successful do you think the programs initiated have been?
5. Can you describe to me any existing federal or provincial policies or programs that support First Nations communities with their solid waste management? (Prompts: when the policy and or programs were established/ how long have the programs been running for? What are the goals of the policy and or programs? If no policies or programs, what are the reasons?)

Contextual

6. How many solid waste management programs have you initiated in First Nations communities in last five years?
7. Did you have any focus communities?
8. How were these initiatives funded, and how much has been spent?
9. How involved were First Nations communities in designing these programs?
10. What are some of the outcomes of these programs?
11. Which communities were the most successful?
12. What characteristics made these communities excel? (Prompts: leadership, a program, money, desire, etc.)
13. Which factors led the others fail?
14. How many stewardship groups operate within or are partnering with First Nations communities, and for what materials?
15. What have been the outcome of these partnerships?
16. Can you tell me whether there is information sharing between First Nations and stewardship groups?

17. If you do, how many workshops on solid waste management do you organize for communities in a year? Any information sharing with communities?
18. Do communities patronize these workshops?
19. How do you contact communities regarding these workshops? (Contact persons, Chief and Council?)
20. Do you send follow-ups to these workshops?

Technical

21. How many communities have sanitary landfills?
22. How many communities are operating segregated landfills?
23. How many communities have access to recycling facilities?
24. Can you tell me the number of communities that are making use of any or all the following waste management strategies: reduce, re-use, recycling, and recovery (4Rs)?
25. In your experience, what will you say is the dominant solid waste management practices of most communities?
26. In your estimation, which communities have advanced in terms of solid waste management?
27. Any other comments on MSW in First Nations or this interview?

APPENDIX III

Draft Interview questions for Persons in Charge of MSW Management in Communities

1. Can you tell me about the current solid waste management system in your community?
2. How different are these practices or system from five years ago?
3. What are the solid waste streams in your community?
4. Has any analysis been done of the contribution of each type (e.g., percentage of recyclables, re-usables)?
5. Can you describe to me the various ways you currently manage MSW in the community? Is there a “program” for managing MSW (open dumping and burning, sorting at landfill, recycling, composting, re-use)?
6. Can you describe each of the ways mentioned above and provide any written information on each of the programs?
7. How are the programs working? (How does the community dispose of the waste? (Paid employees to pick up, Disposal at landfill by each person)
8. Which of the programs are successful, and why?
9. How do you measure the success of the program? Do you have any results yet?
10. What is the current state of the programs or initiatives?
11. What are some of the challenges to these programs/initiatives?
12. Prior to introducing these programs or initiatives in the community, how was the community managing MSW? (Prompts: traditional management, sorting, recycling, open dumping, open burning, landfilling)
13. Why did the community decide to embark on these initiatives or make use of the programs you have mentioned?
14. Who in the community was involved at the outset of these programs? (Prompt: did the community, Chief/Council, or community member push for these programs?)
15. How did the community come to this decision? How were local people involved?
16. How did you build capacity among community members as you introduced these new programs? (Prompts: community workshops, information sessions, etc)
17. How did you go about this capacity building, and how long did it take?
18. What are some of the things you are learning from other communities regarding solid waste management?
19. What are some of the things you have been learning from the programs you have implemented? (Prompts: Challenges and positives)
20. Which are your sources of funding for the program(s)? (Prompts: Community, Chief and Council, ISC)
21. Did you train any community members as part of implementing these initiatives?
22. In which ways is ISC supporting you?
23. What other sources of funding are you exploring or have explored to fund these programs?
24. Which stewardship programs in the province are you making use of?
25. Do you have any specific future plans regarding how to manage your solid waste? If yes, how was this developed? Was the community involved?

APPENDIX IV

Draft Interview Schedule for Community Members

1. How do you manage the garbage created in your household (e.g., landfilling, segregation, composting, recycle, etc.)?
 2. Do you segregate your garbage at home and at the landfill? Is it clear to you why your community has a segregated landfill?
 3. Do you participate in your community's recycling program? How well do you feel it operates? What materials do you commonly recycle? (e.g., tire, car scraps, etc.)?
 4. Do you compost your waste? How has this been going and who has supported you with your composting efforts? Which materials in your household do you re-use?
 5. Do you think the amount of waste generated in your household has increased in the last 5 or so years? If so, what sorts of materials account for most of this increase?
 6. Do you receive information about the waste management programs (e.g., recycling, composting) running in the community? Have you found this information helpful? Do you know who to contact if you have questions?
 7. Prior to introducing the above programs in the community, how were you managing your MSW? (Prompts: traditional management, sorting, recycling, open dumping, open burning, landfilling).
 8. What motivated you to participate in the programs that are in place for MSW in your community?
 9. Have you developed any new ideas/understandings about MSW and/or your community since participating in these programs? (Prompts: understanding of waste management challenges, innovative management approaches, new skills, etc.).
 10. Do you feel that your attitude and or behaviour towards solid waste management has changed over time? If so, how so? What do you feel caused your change in thinking?
 11. What are some of the actions that you and other community members have undertaken or implemented as a result of participating in the above programs? What prompted these actions?
 12. What are some of the solid waste practices that you see changing (or has changed) in your community following the introduction of these programs?
 13. Have there been any community events you have participated in – or just discussions with your neighbours – about MSW in the community? What have you taken away from these discussions?
 14. Have you shared any of the things you do to manage your MSW with other community members (e.g., friends, family, etc.)?
 15. Are there traditional means or avenues through which you learned about managing your waste? (Prompts: ceremonies, stories, Elders, teachings, on the land etc.).
 16. How did you learn what you learned?
 17. In which ways do you share with other community members what you learn through these traditional means?
 18. How does your connection to the land help you think about managing the waste you create?
 19. Are there any traditional norms and or beliefs that guide or regulate solid waste management practices in your community?
- Do you have any other comments about the MSW system in your community or this interview?

APPENDIX V
Recruitment E-mail for ISC Employees

Good Morning [Inset Name]

I trust this e-mail finds you well. This is Anderson Assuah, the PhD student at the University of Manitoba researching solid waste management in First Nations communities. I am contacting you today regarding my research titled: **“Examining the Role of and Potential for Indigenous and Social Learning through Community-Based Solid Waste Management in Canadian First Nations Communities.”**

As someone who works directly with First Nations communities on solid waste management, I believe that you will be an invaluable resource for my research. If you decide to participate in my study, your participation will include a telephone interview with me at a time and date convenient to you. The interview will take a maximum time of one hour, and questions will pertain to solid waste management initiatives and programs in First Nations communities in your province.

You are under no obligation to take part in this research; however, your participation would be greatly appreciated. If you would like to set-up an interview, and/or have any questions regarding the research or what may be expected of you, please feel free to contact me by email or phone. If you decide to participate, I will send you a Consent Form that has been approved by the Joint Faculty Research Ethics Board of the University of Manitoba for your review. This Form explains your right as a participant of this research, as well as anonymity and confidentiality of the data you share during the interview.

Thank you in advance.

Anderson Assuah
Natural resources Institute, University of Manitoba,
303 Sinnot Bldg, 70 Dysart Road, Winnipeg. R3T 2N2
E-mail: assuaha@myumanitoba.ca

APPENDIX VI

Recruitment for Community Members in Charge of MSW Management

Good Morning [Inset Name]:

My name is Anderson Assuah, a graduate student at the University of Manitoba. I am contacting you today regarding my PhD research titled: **“Examining the Role of and Potential for Indigenous and Social Learning through Community-Based Solid Waste Management in Canadian First Nations Communities.”**

As someone who is in charge of your community’s solid waste management programs, I believe that you will be an invaluable resource for my research. If you decide to participate in my study, your participation will include a telephone interview with me at a time and date convenient to you. The interview will take a maximum time of one hour, and questions will pertain to solid waste management initiatives and programs in your community.

You are under no obligation to take part in this research; however, your participation would be greatly appreciated. If you would like to set up an interview, and/or have any questions regarding the research or what may be expected of you, please feel free to contact me by email or phone. If you decide to participate, I will send you a Consent Form that has been approved by the Joint Faculty Research Ethics Board of the University of Manitoba for your review. This Form explains your right as a participant of this research, as well as anonymity and confidentiality of the data you share during any interview.

Thank you in advance.

Anderson Assuah

Natural resources Institute, University of Manitoba,
303 Sinnot Bldg, 70 Dysart Road, Winnipeg. R3T 2N2

E-mail: assuaha@myumanitoba.ca

APPENDIX VII

Recruitment E-mail for Community Members

Good Morning [Inset Name]:

My name is Anderson Assuah, a graduate student at the University of Manitoba. I am contacting you today regarding my PhD research titled: **“Examining the Role of and Potential for Indigenous and Social Learning through Community-Based Solid Waste Management in Canadian First Nations Communities.”**

As someone who has been involved with your community’s solid waste management programs, I believe that you will be an invaluable resource for my research. If you decide to participate in my study, your participation will include a face-to-face interview with me at a time and date convenient to you and in a comfortable location of your choice. The interview will take a maximum time of one hour, and questions will pertain to solid waste management initiatives and programs in your community. Tea and or coffee will be provided during the interview.

I will also conduct a modified sharing circle as part of my data collection, and I will be grateful if you could participate. If you decide to participate, you will be in the circle with five other people to discuss topics related to solid waste in the community. Snacks and refreshments will be provided during the sharing circle.

You are under no obligation to take part in this research; however, your participation would be greatly appreciated. If you would like to set up an interview, and/or have any questions regarding the research or what may be expected of you, please feel free to contact me by email or phone. If you decide to participate, I will send you a Consent Form that has been approved by the Joint Faculty Research Ethics Board of the University of Manitoba for your review. This Form explains your right as a participant of this research, as well as anonymity and confidentiality of the data you share during any interview.

Thank you in advance.

Anderson Assuah

Natural resources Institute, University of Manitoba,
303 Sinnot Bldg, 70 Dysart Road, Winnipeg. R3T 2N2

E-mail: assuaha@myumanitoba.ca

APPENDIX VIII

INFORMED CONSENT FOR INTERVIEWS (ISC PARTICIPANTS)



70 Dysart Road, Winnipeg, Manitoba
Canada. R3T 2N2.

General Office (204) 474-7170

Fax: (204) 261-0038

http://www.umanitoba.ca/academic/institutes/natural_resources

Research Project Title: Examining the Role and Potential of Indigenous and Social Learning through Community-Based Solid Waste Management in Canadian First Nation Communities.

Principal Researcher: Anderson Assuah

Natural Resources Institute, University of Manitoba, 301 Sinnot Bldg., 70 Dysart Road, Winnipeg, R3T 2N2

E-mail: assuaha@myumanitoba.ca

Research Supervisor: Professor John A. Sinclair

Natural resources Institute, University of Manitoba, 306 Sinnot Bldg., 70 Dysart Road, Winnipeg, R3T 2M6.

Tel: (204) 4748374 Fax: (204) 2610038

Email: john.sinclair@ad.umanitoba.ca/john.sinclair@umanitoba.ca

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Project Summary: This study is part of requirements to complete a PhD degree in Natural Resources and Environmental Management, and it is titled, '*Examining the Role and Potential of Indigenous and Social Learning through Community-Based Solid Waste Management in Canadian First Nation Communities*'. The purpose of this research is to investigate the role and potential of learning in the management of municipal solid waste in First Nations communities in Canada and ways that such learning can encourage best management practices and illuminate the place of learning in creating lasting, sustainable solutions. The specific objectives of the research are: examine solid waste management practices among First Nations in Canada to identify leading practices; examine cultural elements (ideas, social norms, beliefs, values, traditions, etc.) that impact solid waste management practices and learning in these communities; investigate whether learning has led to behavioral and attitudinal changes about how solid waste should be managed;

explore the relationship between social learning (individual and collective components) and Indigenous learning in relation to the learning outcomes identified; and examine collective action and community change that emerged from introducing solid waste management strategies.

What you are consenting to: You have been asked to consent for your participation in an interview. You may withdraw your consent to participate in this interview by notifying the principal investigator at any time. The interview will be recorded with an audio recording device if you consent to the use of one. If you do not wish to have the interview recorded using an audio recording device, the interview will be recorded manually. The interview will take approximately one hour to complete. The information you provide during the interview will be transcribed and analyzed with other interview information in order to draw conclusions about the research topic.

Data Gathering and Storage: All recordings, notes and transcripts will be stored in password-protected computer files, and any hard copies will be stored in a locked cabinet. The information resulting from this interview will be kept confidential. If you wish to retain anonymity, an anonymous pseudonym, rather than your name, will be used to identify you on transcripts and any other reproductions of the information you provide. No one other person than myself and my supervisor will have access to the information you provide. Data will be destroyed within a period of 5 years after conducting the research to allow for dissemination, journal publications, and public presentations where necessary.

Risk and Benefits: No information will be used in a way that could put you at risk. You may also choose not to respond to questions, if you deem them inappropriate, or you can carefully word your sentences. You may benefit from participating in this research project through further exposure to the solid waste management practices in your community, and how learning is impacting people's attitudes and behaviours regarding how they manage solid waste, as well as possibly learning about what is really working in your community and some challenges that need to be addressed.

Expected Outcomes: A PhD thesis, academic publications and presentations would be the result of this study. Once you provide consent for your real name and direct quotations to be used in any publication, no further written consent will be required of you during such publications. If you are interested in receiving a copy of the findings of my research, I will make that available to you.

Feedback/Debriefing

Towards the end of this interview, you will be briefed on the information you provided, so you can verify and confirm them. In addition, you can confirm some of the information provided at a community workshop that will be organized at a later date. Further, all aggregated outputs will be shared with all participants, including you upon a second visit to your community by the researcher.

Research Timeline: Data collection (interviews, sharing circles, workshops, and participant observation) will be carried out starting July 2017. Over the next several months, I may contact you with follow-up questions, or to ask for clarification or confirmation of the information you have provided.

Questions: If you have any questions either now or in the future, please feel free to contact me or my advisor (contacts are provided on the next page).

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

This research has been approved by the [insert full name of appropriate REB]. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Coordinator at 204-474-7122. A copy of this consent form has been given to you to keep for your records and reference.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

This research has been approved by the Joint-Faculty Ethics Review Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Coordinator (HEC) at 474-7122. A copy of this consent form has been given to you to keep for your records and reference.

-
- ☐ Yes, I agree to have the interview recorded using an electronic audio recording device.
 - ☐ No, I do not agree to have the interview recorded using an electronic audio recording device.
 - ☐ Yes, I prefer to remain anonymous.
 - ☐ No, I do not prefer to remain anonymous.
 - ☐ Yes, I would prefer to receive a summary report of this research.
 - ☐ No, I would not prefer to receive a summary report of this research.

I, _____ agree to participate in the interview.

Research Participant's Signature _____ Date _____

Researcher's Signature _____ Date _____

Thank you for your time.

APPENDIX IX

INFORMED CONSENT FOR INTERVIEWS (Community Participants)



70 Dysart Road, Winnipeg, Manitoba
Canada. R3T 2N2.

General Office (204) 474-7170

Fax: (204) 261-0038

http://www.umanitoba.ca/academic/institutes/natural_resources

Research Project Title: Examining the Role and Potential of Indigenous and Social Learning through Community-Based Solid Waste Management in Canadian First Nation Communities.

Principal Researcher: Anderson Assuah

Natural Resources Institute, University of Manitoba, 301 Sinnot Bldg., 70 Dysart Road, Winnipeg, R3T 2N2

E-mail: assuaha@myumanitoba.ca

Research Supervisor: Professor John A. Sinclair

Natural resources Institute, University of Manitoba, 306 Sinnot Bldg., 70 Dysart Road, Winnipeg, R3T 2M6.

Tel: (204) 4748374 Fax: (204) 2610038

Email: john.sinclair@ad.umanitoba.ca/john.sinclair@umanitoba.ca

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Project Summary: This study is part of requirements to complete a PhD degree in Natural Resources and Environmental Management, and it is titled, '*Examining the Role and Potential of Indigenous and Social Learning through Community-Based Solid Waste Management in Canadian First Nation Communities*'. The purpose of this research is to investigate the role and potential of learning in the management of municipal solid waste in First Nations communities in Canada and ways that such learning can encourage best management practices and illuminate the place of learning in creating lasting, sustainable solutions. The specific objectives of the research are: examine solid waste management practices among First Nations in Canada to identify leading practices; examine cultural elements (ideas, social norms, beliefs, values, traditions, etc.) that impact solid waste management practices and learning in these communities; investigate whether

learning has led to behavioral and attitudinal changes about how solid waste should be managed; explore the relationship between social learning (individual and collective components) and Indigenous learning in relation to the learning outcomes identified; and examine collective action and community change that emerged from introducing solid waste management strategies.

What you are consenting to: You have been asked to consent to your participation in an interview. You may withdraw your consent to participate in this interview by notifying the principal investigator at any time through e-mail, telephone call, or verbally. If you decide to withdraw from the research, your interview transcripts, recordings, and/or handwritten notes will be destroyed immediately after receiving your notification. However, your right to withdraw from this research is no longer possible beyond March 2019, after which time a complete thesis will be submitted to the Faculty of Graduate Studies at the University of Manitoba.

The interview will be recorded with an audio recording device if you consent to the use of one. If you do not wish to have the interview recorded using an audio recording device, the interview will be recorded manually. The interview will take approximately one hour to complete. The information you provide during the interview will be transcribed and analyzed with other interview information in order to draw conclusions about the research topic.

Data Gathering and Storage:

You are not required to identify yourself by name or identifiable characteristics that connects you with information you provide unless you choose to be identified. If you choose the former option, a pseudonym will be used in place of your name on transcripts and any reproduction of the information you give. All recordings, notes and transcripts will be stored in password-protected computer files, and any hard copies will be stored in a locked cabinet. The information resulting from this interview will be kept confidential. No one other persons than myself, supervisor, and auditors for the University's ethics review board will have access to the information you provide. Data will be destroyed by March 2024 after conducting the research and allowing for dissemination, journal publications, and public presentations where necessary.

Risk and Benefits: No information will be used in a way that could put you at risk. You may also choose not to respond to questions, if you deem them inappropriate, or you can carefully word your sentences. You may benefit from participating in this research project through further exposure to the solid waste management practices in your community. There are no risks associated with participating in this research.

Expected Outcomes: A PhD thesis, academic publications and presentations would be the result of this study. If you are interested in receiving a copy of the findings of my research, I will make that available to you.

Feedback/Debriefing

Towards the end of each interview, I will request you to verify and confirm the information you have provided. I will also send you a copy of the interview transcripts for your review once I have transcribed the interview. In this case, you will have a month upon receipt of your transcript to alert me of any changes you want made. This change could be any inaccuracies you find upon your review, statements you would like to be anonymous, comments or statements that no longer reflect your thinking, among others. I will create an overview newsletter-type report of my work and send that to you, and you also have the opportunity to receive an electronic copy of my thesis if you are interested.

Research Timeline: Data collection (interviews, sharing circles, workshops, and participant observation) will be carried out in April 2018. Over the next several months, I may contact you with follow-up questions, or to ask for clarification or confirmation of the information you have

provided.

Questions: If you have any questions either now or in the future, please feel free to contact me or my advisor (contacts are provided on the next page).

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at your research records to see that the research is being done in a safe and proper way.

This research has been approved by the Joint-Faculty Ethics Review Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Coordinator (HEC) at (204) 474-7122 or humanethics@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

-
- ☐ Yes, I agree to have the interview recorded using an electronic audio recording device.
- ☐ No, I do not agree to have the interview recorded using an electronic audio recording device.
- ☐ I give you permission to associate my name with information I provide in this interview
- ☐ I do not permit you to associate my name with information I provide in this interview; instead, I want to remain anonymous.
- ☐ Yes, I would prefer to receive a transcript of this interview via email:
or mailing address: _____
- ☐ No, I do not prefer to receive a transcript of this interview.
- ☐ Yes, I would prefer to receive a summary report of this research via email:
or mailing address: _____
- ☐ No, I do not prefer to receive a summary report of this research.

I, _____ agree to participate in the interview.

Research Participant's Signature _____ Date _____

Researcher's Signature _____ Date _____

Thank you for your time

Appendix X

University of Manitoba Ethics Approval Letters



Research Ethics
and Compliance

Human Ethics
208-194 Dafoe Road
Winnipeg, MB
Canada R3T 2N2
Phone +204-474-7122
Email: humanethics@umanitoba.ca

PROTOCOL APPROVAL

TO: Anderson Assuah
Principal Investigator (Advisor: John Sinclair)

FROM: Kevin Russell, Chair
Joint-Faculty Research Ethics Board (JFREB)

Re: Protocol J2018:024 (HS21734)
Examining the Role of and Potential for Aboriginal and Social Learning
through Community-Based Solid Waste Management in Canadian First
Nations Communities (Phase II)

Effective: March 28, 2018

Expiry: March 28, 2019

Joint-Faculty Research Ethics Board (JFREB) has reviewed and approved the above research. JFREB is constituted and operates in accordance with the current *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*.

This approval is subject to the following conditions:

1. Approval is granted only for the research and purposes described in the application.
2. Any modification to the research must be submitted to JFREB for approval before implementation.
3. Any deviations to the research or adverse events must be submitted to JFREB as soon as possible.
4. This approval is valid for one year only and a Renewal Request must be submitted and approved by the above expiry date.
5. A Study Closure form must be submitted to JFREB when the research is complete or terminated.
6. The University of Manitoba may request to review research documentation from this project to demonstrate compliance with this approved protocol and the University of Manitoba *Ethics of Research Involving Humans*.

Funded Protocols:

- Please mail/e-mail a copy of this Approval, identifying the related UM Project Number, to the Research Grants Officer in ORS.

Research Ethics and Compliance is a part of the Office of the Vice-President (Research and International)
umanitoba.ca/research



Research Ethics
and Compliance

Human Ethics
208-194 Dafoe Road
Winnipeg, MB
Canada R3T 2N2
Phone +204-474-7122
Email: humanethics@umanitoba.ca

PROTOCOL APPROVAL

TO: Anderson Assuah
Principal Investigator (Advisor: John Sinclair)

FROM: Kevin Russell, Chair
Joint-Faculty Research Ethics Board (JFREB)

Re: Protocol J2017:083 (HS21042)
"Examining the Role of and Potential for Aboriginal and Social Learning
through Community-Based Solid Waste Management in Canadian First
Nations Communities"

Effective: September 21, 2017

Expiry: September 21, 2018

Joint-Faculty Research Ethics Board (JFREB) has reviewed and approved the above research. JFREB is constituted and operates in accordance with the current *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*.

This approval is subject to the following conditions:

1. Approval is granted only for the research and purposes described in the application.
2. Any modification to the research must be submitted to JFREB for approval before implementation.
3. Any deviations to the research or adverse events must be submitted to JFREB as soon as possible.
4. This approval is valid for one year only and a Renewal Request must be submitted and approved by the above expiry date.
5. A Study Closure form must be submitted to JFREB when the research is complete or terminated.
6. The University of Manitoba may request to review research documentation from this project to demonstrate compliance with this approved protocol and the University of Manitoba *Ethics of Research Involving Humans*.

Funded Protocols:

- Please mail/e-mail a copy of this Approval, identifying the related UM Project Number, to the Research Grants Officer in ORS.

Research Ethics and Compliance is a part of the Office of the Vice-President (Research and International)
umanitoba.ca/research

