Education, Partnerships and Governance in Creating Sustainable Communities: If Not Sackville, Where?

BY

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Abstract

This paper focuses on education, governance, and partnerships in creating sustainable development in Sackville, New Brunswick, home to Mount Allison, a publicly funded, primarily undergraduate university. Implementing a waste management pilot project exemplified the opportunities within Town and led to a series of recommendations for a sustainable future for the entire community. This waste management project incorporated three apartment buildings into the existing residential recycling, composting and waste management system, of which businesses and multi-unit apartment buildings are currently excluded. The hypotheses that apartment building tenants are capable of properly sorting waste and reducing garbage destined for the landfill was supported by the findings of this project. Furthermore, with proper coordination and execution of this process, the barriers to success can be overcome for this, as well as a range of future sustainable community initiatives. This action-based research also demonstrated the need for a full-time sustainability staff position, connecting the Town and university communities. As Sackville moves towards a sustainable future, the university and other community partners must be consulted and included to ensure long-term, comprehensive success.

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Introduction

Climate change, one of the most significant concerns of the 21st century, is on the minds of many governmental officials in Canada, especially at the municipal level. Increasingly, community-based, bottom-up initiatives are proving to be some of the most successful strategies for climate change adaptation and mitigation. Across the country and globally municipalities are implementing innovative projects, many are at the forefront of environmental research, pushing the boundaries. As citizens strike, sea levels rise, and the atmosphere becomes increasingly polluted, sustainable development is being recognized as a core requirement for the future well-being of the planet, *and* its communities. Municipal governments are progressively including more climate action within their policies and initiatives. These projects range anywhere from awareness campaigns to green building retrofits and, for the most part, require community involvement to be successful. However, without proper leadership and coordinated action, it is easy for a community to become stagnant and resistant to environmental change or progress. While this type of behaviour may not be visible outside the walls of governmental buildings or the offices of decision makers, it is evident in the programs existing within the community, or lack-there-of, and their quality. For example, while sorting waste has been a long-standing practice within Canadian communities, not every waste management system is held to the same standard; the majority of human generated waste is dumped into the ground or burned, releasing further pollutants into the environment. The latest Canadian figures indicate that just 27 percent of waste is successfully diverted from landfill sites (Government of Canada, 2018).

Waste management strategies have been developed across Canada and the Maritimes over the past thirty years. These programs have focused on The Three R's; reduce, reuse, and recycle and they have made an immediate environmental impact through diverting waste from landfills and conserving natural resources. At least, that is what we are led to believe. Although recycling is practiced in many communities around the world, especially in developed countries, little attention has been paid to the actual scale of implementation and the on-going

challenges associated with meaningful recycling and sustainable practices at the local level. Furthermore, research has predominantly focused on sustainability practices as laid out in theoretical frameworks by governments and private corporations, rather than by local non-profit community groups and citizens wishing to make a difference. This often results in a disconnect between theory and practice, meaning that research is not informing implementation. Additionally, education for sustainable behaviour and development, frequently associated with the formal education system, often suffers the same disconnect between theory and real changes in one's behaviour.

This thesis addresses this divide between theory and practice by developing a methodological framework for assessing community-based recycling and related sustainable behaviours, as part of the larger issue of environmental leadership and sustainable community behaviour. This is carried out in a rather unique and under-studied context: a small, rural town that is also home to an undergraduate university and a strong environmental ethos across the community. Sackville, New Brunswick is home to Mount Allison University, and the community of 5,500 citizens and 2,200 undergraduate students prides itself on being highly sensitive to environmental issues and its various plans to create a more sustainable community. The university offers a range of environmental studies and science programs, as well as a host of student, faculty, and environmental researchers and action groups. The town has a 10-year-old sustainability plan, a climate change advisory committee and the local schools have a range of environmental education programs. However, only a fraction of the community's waste is sorted; while the university manages its own waste, there is no waste legislation or coordinated collection for businesses within the community, including the estimated 700+ apartments in the town (Smith, 2017). The local government considers apartments to be "businesses", thus falling outside of the requirement for "residential" recycling and waste collection By-laws. All of this waste goes into the regional landfill while students, faculty and residents continue to educate themselves and plan for an imagined sustainable community and a match to their theoretical understanding of the environmental emergency they are studying.

Neither the university or the town have any form of environmental or waste management coordination or partnership, yet the notion of Sackville as a "sustainable community" persists. While there are many inspired and dedicated individuals, groups, and organizations working towards sustainable development and a sustainable community, there are few truly sustained practices and behaviours in moving the agenda forward. A lack of leadership and coordinated partnership between the university and the community impedes environmental progress for both.

This study asks: if recycling and effective programs for sustainable behaviour are not practiced here, then where else would education and application come together for real change? The Sackville and Mount Allison community should, in theory, be the ideal setting for highly coordinated, long-standing, community-based environmental initiatives, yet this is not the case. Theoretical pillars of social economy, community-building and environmental education are examined in this case study, including an environmental scan of various other communities that house a university. The research purports that recycling, waste management and overall sustainable behaviour requires effective partnerships to be successful, and in this case study, the Sackville-Mount Allison community appears to have all the necessary components of such a partnership. The expected result for this project is that, with proper management and coordination, the seemingly insurmountable barriers to initiatives such as community-wide recycling and waste management can be overcome, and Sackville can be a leader in long-term, rural community sustainability. This thesis contends that community-based activists and groups are central to building social capital and inculcating environmental awareness, as well as the formal municipal and educational institutions, in contributing to the wider social network of practicing sustainable behaviours. Co-managed partnerships between community groups, the university and the local government would allow for increased local engagement and participation in creating a sustainable community – from theory to practice.

Rather than furthering the disconnect between theory and practice, the town and the university, this honours thesis demonstrates that a more educational and

action-based approach can be effective in bridging the gap between theory and practice. In an education and knowledge rich community such as Sackville, there is a missed opportunity of research-informed policy. Students and faculty are often researching current and relevant issues, especially within an environmental scope that could be used in real-time governmental decision-making and community-based actions. However, this is rarely the case. An important goal for this honours project was to directly impact the community that informed the thesis. After four years of learning and participating in the community, having a positive impact felt necessary. Writing an honours thesis needed to have a greater purpose than a grad school requirement, especially in a program where place-based learning should be prominent. The divide between theory and practice is often exemplified in student projects - the student becomes an observer separate from the community, rather than an active member. By addressing an issue that directly impacts students - the lack of proper waste management in apartment buildings where these students and other citizens reside, this thesis and associated pilot project, attempt to take an operational approach where theory and practice simultaneously inform one another, research and implementation demonstrate the possibilities within the community, and tangible environmental progress ensues. The challenge will be turning practice *back* into theory, and subsequently, into policy.

Literature Review

Education; A Tool for the Future

There have been countless examples in the academic literature of environmental education proceeding advances in policy or environmental initiatives. There are clear links between this type of education and pro-environmental behaviours and the importance of this link is outlined in a 2019 paper published by Liobikienė & Poškus. Their 2013 survey of 1007 respondents in Lithuania demonstrated the importance of environmental education as it relates to knowledge, which is a crucial part of climate change adaptation. In this case, it represents the lasting impact of education. Results of the study concluded that

environmental education leads to environmental knowledge and an ecological worldview (Liobikienė & Poškus, 2019). This knowledge influences behaviours, specifically; “The more respondents know about the impact of their behavior on the environment, the more they are concerned about the environment and the more aware of the consequences of their behavior” (Liobikienė & Poškus, 2019). This is especially important for pro-environmental behaviours in the private sphere, such as recycling. When individuals are not being observed by other community members, the pressure to act sustainably is minimized. Therefore, environmental behaviour must be driven by personal responsibility. Education and knowledge, coupled with the influence of public pro-environmental behaviours within a community can shift the actions of an individual towards sustainability (Liobikienė & Poškus, 2019). Essentially, education directly affects behaviours, indicating its importance within the environmental movement. Individual and collective behaviours become powerful agents of change within the community.

While environmental education is an important tool, the question remains: how and when are people educated? Two studies were conducted between 2007 and 2012 in Israel to assess the impact of environmental schools in communities and how experiences affect the environmental attitudes and behaviours of adults in Israel (Eliam & Trop, 2012). Researchers aimed to determine whether environmental education followed the knowledge, then attitude, then behaviour model of education, from the 1980s (Eliam & Trop, 2012). By better understanding how education influences individuals, communities can ensure they are sharing knowledge in the most effective ways possible, well beyond the traditional North American belief that schools are responsible for a child’s education.

The earlier study aimed to influence parents’ behaviours through environmental schools. This was attempted two ways; either by including parents in school activities or by educating students, who would pass their newfound environmental knowledge on to their parents (Eliam & Trop, 2012). The later study used a questionnaire to determine the effect of important experiences on

environmental attitudes and behaviours in adults. Both studies were conducted in various cities and schools and only evaluated participants with school aged children (Eliam & Trop, 2012). Results of the study concluded that environmental education effects environmental attitudes and behaviours differently; one is not a more advanced stage of understanding than the other. Environmental *attitudes* were formed slowly by personal, informal, educational experiences. Conversely, *behaviours* shifted due to more formal experiences, through workplace and media (Eliam & Trop, 2012). When determining the type of environmental education best suited to a specific group, it is important to understand the different possible outcomes.

Children and parents were influenced differently, schools could change the behaviours of adults and children, but only the attitudes of children, not their parents (Eliam & Trop, 2012). This indicates that while behavioural changes were observed, parents' attitudes towards the environment remained unchanged throughout the study. As previously mentioned, adults often require their own experiences before changing their attitudes, indicating a more personalized educational approach may be necessary. These are just a few examples from this study outlining the complexities of environmental attitude and behaviour changes through education. It is important to note that, while education plays an important role in the environmental movement, it is essential that the method of delivery matches the intended audience and outcome. It is also evident that experiencing and practicing environmental behaviours is crucial, rather than passively or theoretically introducing the concepts in a school setting.

As environmental education takes on a broader scope, many institutions, particularly within higher education, have used the globally recognized United Nations Sustainable Development Goals, or SDGs, in their curriculums (Franco *et al.,* 2019). Specifically, what can transform these theoretical guidelines for sustainability into actions and how Higher Education for Sustainable Development, or HEfSD, can help to achieve this (Franco *et al.,* 2019). Researchers reviewed published post-secondary materials on sustainable development and heard from Regional Centres of Expertise on Education for

Sustainable Development, or RCE's, from all over the world. Focus groups, interviews and surveys were also used to gather qualitative data on education for sustainable development (Franco *et al.,* 2019). Although there were discrepancies concerning which SDGs were and were not taught across the globe, there were certain commonalities. For example, this study showed that in higher education in the Americas, Asia and the Pacific, Africa and Europe, the study areas, there is an emphasis on SDGs 4, 7, 11, 12 and 15 within higher education (Franco *et al.*, 2019). Those SDGs are quality education (4), affordable and clean energy (7), sustainable cities and communities (11), responsible consumption and production (12) and life on land (15). Notably, SDGs 1, 2, 3 and 10 were paid the least amount of attention, particularly goal 10. These goals are as follows, no poverty (1), zero hunger (2), good health and well-being (3) and reduced inequalities (10) (Franco *et al.,* 2019).

While these are just some of this study's findings, they suggest that if not properly monitored, education for sustainable development can become hyper-focused on only a few of the many important goals. Addressing sustainability requires a multifaceted, interdisciplinary approach. The SDGs are intended to promote global sustainability and therefore are *all* important within climate change adaptation. There are also many regional differences in the focuses and approaches to environmental education, indicating that global and local collaboration with relevant stakeholders is vital to the success of this type of education (Franco *et al.,* 2019). Increasing environmental education must be done thoughtfully, with purpose, and be connected to one's daily life and behaviours in order to have a significant impact.

Barriers to Policy

Environmental education, while important, is not the only avenue to achieve environmental change. Climate change is regarded as one of the most significant issues of the century, and worldwide policy changes are being implemented to address adaptation concerns. However, these changes are not met without resistance and many barriers inhibit environmental policy advances. A study in Massachusetts aimed to evaluate the current state of climate adaptation in

small coastal cities and towns (Hamin, Gurran & Emlinger, 2014). The researchers focused on two main questions "What types of municipal adaptation action are occurring in smaller coastal communities in a region with minimal state guidance on climate change?" and "What sorts of barriers are planners experiencing in addressing climate adaptation in these towns and cities?" (Hamin, Gurran & Emlinger, 2014). The study only evaluated communities with a planning staff and collected qualitative data via interviews. This led to the conclusion that the following are barriers to municipal climate adaptation: lack of local and state leadership, conflicting values and beliefs, lack of resources and lack of adequate information (Hamin, Gurran & Emlinger, 2014). Specifically, each planner that was interviewed mentioned a lack of political support as a barrier to climate adaptation to some degree. Many residents felt that the consequences of climate change are too distant to be of any real concern. This combined with a gap in public environmental knowledge and citizen concern for personal property creates another significant barrier, according to interviewees (Hamin, Gurran & Emlinger, 2014).

Without a properly educated and unified community, local officials are working against individuals with valuable knowledge rather than with them. Planners also reported lacking adequate understanding, staff, and funding to properly plan for climate change adaptation. It is vital to comprehend the barriers to climate-based planning and policy, so that the proper steps can be implemented to address these issues, many of which are connected. For example, several of the barriers concerning beliefs and values could be addressed via public education campaigns, however without the necessary funds and staff, this is unattainable (Hamin, Gurran & Emlinger, 2014). Climate change is a complicated issue that effects many aspects of day to day living. Although education is a great tool, a lack of government cooperation and funding can prove to be seemingly insurmountable barriers.

These obstacles are not limited to the United States as seen in a Canadian study that examines the impact of the three levels of governmental policy - municipal, provincial, and federal, on flood adaptation in British Colombia (B.C.)

(Oulahen *et al.,* 2018). Although the study is focused on the interconnections between levels of government in working towards the specific issue of flood mitigation strategies, this example illustrates recurring themes within environmental policy and governmental action, or lack thereof. Involving multiple levels of government will be essential to the implementation of successful adaptation strategies (Oulahen *et al.,* 2018). Much like the American study, researchers found that barriers fell into one of the five following categories: 1) inadequate collaboration, 2) absence of senior level political leadership, 3) lack of public awareness, 4) insufficient financial and staff capacity, and 5) misalignment of policies (Oulahen *et al.,* page 411, 2018). While these barriers are specific to the relationships between the three levels of government, as they relate to Vancouver and Surrey B.C.'s flood adaptation plans, they can be observed elsewhere. By analyzing policy and governmental documents and interviewing relevant parties, researchers found that barriers could be lessened or overcome with the cooperation of all three levels of government (Oulahen *et al.,* 2018). Without collaboration, adaptation strategy development may not consider the complex nature of climate related issues. This study showed that interdepartmental collaboration in local governments was necessary, as well as cooperation and planning with nearby municipalities (Oulahen *et al.*, 2018). These findings are critically important to highlight in connection to the current study in Sackville, New Brunswick.

Informing the public on the dangers of flooding in the area has also proven to be an issue for government officials and policymakers. One participant mentions that public concern can act as a catalyst to encourage political intervention (Oulahen *et al.,* 2018). If community members are unaware of the imposing environmental threats, they are unable to encourage proper governmental involvement. Furthermore, action, encouragement, and policy from higher levels of government are vital to ensuring that adaption strategies are uniform across the region and that the entire area is protected. This also eliminates the risk of adaptation plans negatively impacting one another in nearby

municipalities (Oulahen *et al.*, 2018). If communities all act independently, they may lessen the efficacy of their flood alleviation strategies.

Funding for these flood mitigation plans is also a significant barrier. In Canada, local governments are responsible for an increasing number of issues, without receiving the necessary additional funding. The provincial and federal governments must specifically allocate money for these added responsibilities to allow for successful implementation of climate change adaptation initiatives (Oulahen *et al.*, 2018). Comprehensive policy and adequate funding would give municipalities an added push towards making adaption plans if they have not yet done so. These are only some of the barriers that arise when local governments attempt to address climate-based issues, and do not illustrate the complexity of the issues. However, the study also demonstrates how intergovernmental cooperation can serve to eliminate problems (Oulahen *et al.*, 2018). There are thousands of municipalities across Canada, and without clear federal and provincial guidelines, local governments are forced to work blindly on issues like flood adaptation. Local policymakers may have the best insights and tools for what works for their communities, but without addressing key barriers and collective and coordinated responses, their efforts may be fruitless.

The Importance of Place

To address many of the policy barriers inhibiting the progress of sustainable action, citizens must advocate for change. Once environmental education has become an integral part of individuals' everyday lives, how does this translate into a call to action for change? The answer is simple: people must feel a connection to their local environment which will initiate community concern for well-being and personal and collective involvement in mobilizing for change. These connections are achieved through experiences with others and with the very place where citizens live and work. As people associate touch, taste, smell, hearing and seeing to a geographical location, that place becomes important (Tuan, 1975). These associations attach meaning to a place, making it special to the person who experienced these sensations there. This place-making is something that is often unconscious but could be part of the solution to many

environmental issues. Environmental degradation is exacerbated by a disconnect between humans and nature; it is much easier to engage in non sustainable behaviours when the consequences are seemingly unnoticeable in *your* community.

Research has demonstrated when individuals are able to interact with a landscape or place and witness the negative environmental changes, they are more concerned about the future of the area (Groulx, 2017). However, it is important to recognize a sense of place is not something that can be forced upon citizens, as many communities have their own environmental connections that would be negatively impacted by outsider's concept of place. Places, like their citizens, are unique and require specialized climate change adaptation plans and other related policies (Groulx, 2017). But taking larger concepts, like climate change, and creating place-specific initiatives and awareness campaigns can encourage environmental appreciation (Groulx, 2017). This notion is important under the larger concept of environmental education. When individuals, especially students, learn about the environment they also gain an appreciation for place. This place-making skill will continue to serve as a useful tool for the rest of their lives. Essentially, encouraging individuals to create meaning in places will in turn promote widespread environmental action. As these individuals enter the workforce and assume roles within their society, this type of environmental responsibility could become the norm, linking environmental education and positive environmental changes. Environmentally literate individuals cannot make these changes alone, but as communities begin to shift their environmental attitudes, connections and partnerships can be forged, creating tangible progress. Thus, place-based education is directly linked to community policy and planning, as well as active behavioural environmental responsibility.

Collaboration and the Interdisciplinary Approach

As mentioned in the previous sections, it is vital that proper education be implemented, and barriers be removed, to ensure the success of any environmental projects, programs, or initiatives. Without addressing these priorities, long-term change is unlikely to be sustainable. Furthermore, many

environmental problems fall under a wide range of subjects, departments, and jurisdictions at various scales. Therefore, it is necessary that partnerships be created and nurtured to allow for an all-encompassing interdisciplinary approach.

While focusing on the importance of collaboration within the environmental movement, it is imperative to consider the disconnect between the scientific findings and corresponding policy, or lack thereof. One study analyzes a marine research project, the Baltic Eye Project based out of Stockholm University, and interviews staff to identify the barriers to science informed policy and practice (Cvitanovic, Norström & Reed, 2018). This study uses a qualitative approach to determine what inhibits and what informs the progress of the Baltic Eye Project. The interviewees report progress was most effective when an interdisciplinary approach was adopted. Specifically, research was most efficient when conducted in teams comprising of "scientists, policy-analysts, science-communicators and journalists" (Cvitanovic, Norström & Reed, 2018). This highlights the importance of ensuring key players are involved in the process of researching or making decisions on a multi-disciplinary issue, as is the case with most environmental topics.

This study also mentions the importance of ongoing and "real-time" information and knowledge exchanges (Cvitanovic, Norström & Reed, 2018). Many environmental issues are subject to frequent research updates and science often corrects and contradicts itself as new, peer-reviewed research findings are published. As most policy makers are not up to date on the latest scientific articles and studies, it is vital that experts communicate with one another. Findings also demonstrate the limitations of traditional academic knowledge sharing and its effect on real-world policy (Cvitanovic, Norström & Reed, 2018). Important research and information are often enclosed within an academic bubble, never to be seen, read, or understood by those most directly impacted or in need of the information. Essentially, separated from the 'real-world'. This type of disparity is especially avoidable when academia and governmental structures reside within one community, as is the case in this study.

Successful collaboration is not limited to scientific study. Communities have vast networks of like-minded individuals and organizations working towards common goals, particularly sustainable growth and enhanced quality of life. However, when they are not working together, these goals become harder to achieve. Researchers have analyzed the importance of partnerships and collaborative networks within the environmental sector. Specifically, findings have shown that without communication amongst relevant actors, barriers become harder to overcome (Hawkins *et al.*, 2018). These working relationships were examined under the Institutional Collective Action (ICA) framework. The study considered community involvement, governmental bodies, and environmental organizations (Hawkins *et al.,* 2018) and its findings supported the theory that communities benefit from this type of network. Municipalities can benefit from one another and different actors can share resources. Collaborative environments encourage knowledge-sharing and growth while making goals more achievable (Hawkins *et al.,* 2018). Similarly, there are important environmental changes that will go unnoticed by officials and scientific researchers. Specifically, researchers often study an area for a period then move on; they are not familiar with certain long-term changes that would normally be found by longitudinal studies of the place. Therefore, it is vital that various knowledge holders be included in these partnerships (Groulx, 2017). Without partnerships and communicative approaches, environmental concerns are only addressed from one angle. Issues that span over a multitude of subject areas tend to lack the benefits of an interdisciplinary approach. This only inhibits progress (Hawkins *et al.,* 2018). Later sections will outline the issues that arise when these key bodies are not working together.

The importance of partnerships and community engagement was further outlined in the research process to inform the Sackville, New Brunswick case study. While Sackville, like a variety of other ‘university towns’, has an institute of vast resources and knowledge at its disposal, proper partnerships have yet to be forged. This gap between the so-called ‘town and gown’ has exemplified an inability to take advantage of valuable resources. There is rarely an oil reserve

undrilled in this country, yet knowledge, perhaps the most undervalued resource, often remains untapped. This next section will outline cases where universities and local governments were able to avail themselves of shared goals and use their collective resources to address local and global concerns.

Background Information

Becoming a Sustainable Community

This thesis examines the current state of environmental initiatives and climate change mitigation strategies as they relate to education, partnerships and governance in Sackville, New Brunswick. To properly evaluate the significance of barriers to tangible environmental policy progress, a recycling and composting pilot project was created and monitored at the Coops apartment buildings – 3 medium-sized apartment buildings located on Main Street, Sackville, NB., just steps away from Mount Allison University and dominated by student residents. The associated barriers, actors, management groups and individuals were documented or interviewed to highlight the lack of action within the community, despite successes recorded by similar communities. The focus of the thesis asked the central question: Why can't Sackville, a university town and hub of knowledge, ideas, and activism, generate lasting environmental initiatives and advancements? This thesis highlights areas within the Sackville case study where there have been failed opportunities in properly addressing important environmental concerns; from overarching climate change and sustainability strategies to a range of local environmental issues such as recycling programs and bike paths. To properly explain why these failings occurred and appear to be Sackville specific, comparable communities and projects were analyzed. While many communities could have illustrated the university-town dynamic, those highlighted exemplified the possible successes that could be realistically achieved in Sackville. Furthermore, only universities residing within Atlantic Canada were considered to ensure progress was achieved by means possible in the case of Sackville and Mount Allison. For example, universities from larger provinces or the United States were omitted as they lacked the features making them relevant

blueprints or comparisons for Sackville, with respect to the scale of the community, its location, and the size of the university, in terms of annual budgets, and student population size. The following section addresses the circumstances under which this project was created and how it was influenced by other universities and towns.

Choosing an Environmental Studies Honours Thesis Topic

Each fall semester, third-year students seek an honours supervisor; a professor who will oversee their research and thesis writing if they are accepted to pursue an honours degree. Once they have been approved, many students, especially those intending to research throughout the summer, apply for funding. Those who have a supervisor and funding typically spend their summer in Sackville, working in on-campus labs and developing research for their honours projects in close conjunction with their supervisor's research program. At Mount Allison University, like many other post secondary institutions, honours students usually continue their professor's research, often picking up wherever the last honours student left off. While this has proven to be successful and is a widely accepted norm for the honours 'formula', it limits students' ability to navigate their academic careers or to work in the very community where they have chosen to study. Researching and writing a thesis takes months of hard work, and it is even more difficult when the subject matter is remote or of little interest to the student. Furthermore, it is often the case that thesis research has no impact on the place where the student lives and studies thereby having little application in the community. The lab could be anywhere, and the student is further isolated from the surrounding community in their 'academic bubble'. However, this is not always the case and is a simplified version of the honours process illustrating a point; universities are hubs of information, constantly pushing the boundaries on a variety of topics. Yet, these papers will largely go unused in the public sphere. They will sit on shelves in university libraries for decades when they could be informing decision-makers on related subjects. Some students *are* given more freedom over their thesis topic, especially in the non-science programs. This project is the result of one of those more flexible thesis projects, where the

student, the supervisor and the topic of an environmental studies thesis have been driven by a real-time analysis of the community.

What is a real-time, place-based thesis? When this honours project was in its infancy, a variety of potential subjects and titles were considered. However, instead of choosing a topic and spending months on research to inform and test a hypothesis, a different approach was executed. Rather than approaching the research with a predetermined topic in mind, the local information gaps within environmental policy would inform the research. In this way, the thesis will have a dual purpose: to serve as an academic document for course credits and evaluation, as well as provide a tool to better serve the community, if relevant parties so choose. To properly consider potential thesis topics and determine how to best serve the environmental interests of the Sackville community, other cities and towns were researched, specifically, those that were home to at least one post-secondary institution in Atlantic Canada. This process led to the use of a real-time case study in the process of creating a sustainable community, and the general conclusion that Sackville, New Brunswick and Mount Allison University would both benefit from a shared sustainability coordinator in achieving such a goal. This recommendation was met with resistance, which became a central focus of the research.

The Acadia and Wolfville Community: A Success Story

Acadia university, located in Wolfville, Nova Scotia is home to approximately 3,574 undergraduate, 191 graduate students and has a 14 to 1 student to faculty ratio (Acadia University Website). This is not unlike Mount Allison, with its 2,100 students and 16 to 1 student to faculty ration (Mount Allison University Website). Acadia also resides in a small community with a population of just over 4,000 (Town of Wolfville website). This creates an atmosphere unique to small university towns; the student population is almost equal to that of the town. These small communities are ideal for university and town partnerships, an opportunity that Acadia and Wolfville have seized on a wide range of successful projects centred on sustainable community development.

The success Acadia and Wolfville have experienced in the creation of a sustainable community has been aided by the creation a Town and Gown committee (2018), where both town and university, so-called 'gown', can "collaborate on areas of priority and mutual interest" (Wolfville/Acadia Town and Gown Committee, page 2, 2019). This committee has a variety of shared goals in the following categories: communications, economic development, facilities/infrastructure, academic opportunities, strategic planning, and community harmony. Some specific examples of these goals include but are not limited to; the mayor and university president attending Student Council and Town Council meetings respectively, supporting one another in various areas such as using research opportunities to support community initiatives, and work on providing housing policies for student living on and off campus. Additionally, this agreement will be revaluated every four years to guarantee its efficacy and significance (Wolfville/Acadia Town and Gown Committee, 2019). This document is important as it sets a tone for the working town and gown relationship in this community. There is so often a disconnect between the two, creating separate communities within a town. This leads to an inefficient use of resources and a lack of cohesive goals and pooled resources, essentially a missed opportunity to act as one integrated community with economic and educational levels well above the provincial average.

After forging this relationship, the partnership between Acadia and Wolfville continued to flourish. The nature of their relationship as it relates to sustainability policy, goals and initiatives will be the primary focus in this section. In response to declaring a state of climate emergency, the Wolfville town council hired at Climate Change Mitigation Coordinator (CCMC) to oversee their larger Climate Action project (Environmental Sustainability Committee, 2020). This project aims to reduce the town's green-house gas (GHG) emissions within current practices and to identify additional areas where emissions can be decreased. The tangible goals, or "deliverables" for this project are "1) An Electric bike share pilot program, 2) A Property Assessed Clean Energy (PACE) financing program, and 3) A community-wide behaviour change campaign called

Inspire Wolfville" (Environmental Sustainability Committee, project charter, pg. 4, 2020). Theses goals have their own detailed timelines, objectives, and budgets. The CCMC was hired for a two-year contract with a yearly salary of $58,000 and their responsibilities include achieving the climate related goals set by the town (Environmental Sustainability Committee, 2020). Essentially, the town of Wolfville set sustainability goals, created a detailed and comprehensive document to outline the specific objectives and steps to achieve these goals and then hired someone to champion the cause. To better understand the inner workings of this position and how this could relate to Sackville, the CCMC was contacted for further insight.

The person chosen to occupy this town staff position was already a resident of Wolfville; they had lived there for three years and therefore was already familiar with the community and had existing community relationships (CCMC Meeting Notes, 2020). While the CCMC holds a formal position within the town of Wolfville, their work also involves collaborating with the university, specifically the Acadia Sustainability Coordinator. The CCMC spent four months working with the university, further strengthening the town and gown relationship (CCMC Meeting Notes, 2020). This staff person also served as a point of contact and a resource for members of the community. By answering questions, facilitating a climate discussion circle, and working with students, the CCMC has surpassed the requirements of the position that were outlined in the previously mentioned town document (CCMC Meeting Notes, 2020). This meeting also clarified the incumbent is occupying the CCMC position for two years, as that is the duration of the funding financing this post. This grant comes from the Federation of Canadian Municipalities (FCM) and covers most of the salary for this position (CCMC Meeting Notes, 2020). This grant specifically targeted funding climate change-based staff positions in small to medium sized municipalities throughout Canada. There was an opportunity for up to 80% of the salary to be covered (up to $125,000), and this initiative sought to improve climate change adaption and mitigation while simultaneously removing the cost barrier in smaller communities (FCM website, 2019). This funding, combined

with the partnership between Wolfville and Acadia, created the opportunity for widespread, community-based climate action. Although eligible for the same award through the FCM, Sackville has never moved forward on this program. This illustrates one of the many examples where the Sackville municipal officials failed to take advantage of potential resources in investing in climate action, even though there were several advisory groups, university-based experts, and a significant level of environmental awareness in the community.

While the town of Wolfville also has an Environmental Sustainability Committee, they only have the capacity to advise and make recommendations to council, and have no budget (Sustainability Coordinator Meeting Notes, 2020). This committee guides and oversees the CCMC and is comprised of five community members and one Councillor, including one staff person from the Acadia Sustainability Office (Wolfville Environmental Sustainability Committee, 2016). As the biggest consumer of energy and the largest employer in the community, it is vital that Acadia be part of the climate change mitigation strategy for the Town of Wolfville. By meeting with the sustainability coordinator at Acadia, more of the town and gown relationship as it relates to sustainability came to light.

Overall, the coordinator's role is to improve sustainability on the Acadia campus through a variety of initiatives (Acadia University Website). Specifically, projects are determined based on outside funding and short and long-term paybacks associated with the initiative (Sustainability Coordinator Meeting Notes, 2020). The coordinator also works with the Town; as a significant partner and stakeholder, it is vital this role supports larger sustainability goals for the Wolfville community, including Acadia. Furthermore, the sustainability coordinator is involved in the academic and educational mission of the university. This can mean including students in initiatives, co-supervising student projects with faculty and working with the relevant student interns (Sustainability Coordinator Meeting Notes, 2020). This role further demonstrates the steps the combined Wolfville/Acadia community is taking to address climate issues and forge a strong relationship that includes educational goals within their mission

and progress. One adjustment that could be made is to improve the level of cooperation between town and gown; the university and town could share one or more staff persons, specifically the sustainability coordinator or CCMC. By working under both large stakeholders, this person (or people) would act as a sustainability consultant and would be freed of the 'red tape' associated with working for either a university or municipality. Learning from Wolfville and Acadia, when hiring a sustainability staff-person was first brought to the town of Sackville, it was suggested that *both* the university and town fund the salary for the position and oversee the day-to-day operations of the coordinator.

The Dalhousie and Halifax Case Study: Another Type of Partnership

While the previous example demonstrates the possibilities when town and gown collaborate, it is important to further investigate these types of relationships in other locations and at different scales. Not all university and municipality partnerships work in the same way as Wolfville and Acadia have done. Halifax was also examined in terms of its staff positions, initiatives, and university relationships. Although Halifax is home to a variety of post-secondary institutions, for the sake of this study, it was deemed pertinent to research the largest; therefore, the collaborations between Halifax and Dalhousie University were analyzed.

Unsurprisingly, Dalhousie has also hired staff to address university sustainability, as a major part of the overall educational mission of the university, as well as its role as a large, public institution in the heart of the city. As a place with thousands of students and employees and a significant environmental footprint, Dalhousie has an Office of Sustainability with multiple employees, including an executive director (Dalhousie University Website). This person was interviewed to provide insights concerning how the office started, their relationship with the surrounding community and their day-to-day operations. The executive director shared that, while Dalhousie has a College of Sustainability and an Office of Sustainability, they have different roles within the university (Executive Director Meeting Notes, 2020). While the College teaches about sustainability and oversees the educational side of the discipline, the Office runs

the daily operations. Because the office is a separate entity and not a part of facilities management, they are less restricted and do not get sidelined to prioritize other non-environmental projects (Executive Director Meeting Notes, 2020). This autonomy leaves room for innovation and a separate budget, with a significant role for education and student engagement. Like the Wolfville climate change mitigation coordinator position, the post of executive director originally had an end date. The job was advertised as a six-month term position with an operating budget of only $10,000, and a handful of staff and students to collaborate with. Because of its success, the position became permanent (Executive Director Meeting Notes, 2020). Another interesting aspect of this position is that students, faculty, and facilities management lobbied the university for its creation, which led to the term job and the formation of the President's Advisory Council on Sustainability Terms of Reference (PACS) (Executive Director Meeting Notes, 2020).

This Advisory Council creates the opportunity for involvement from students, staff, faculty, and members of the community to share their opinions and suggestions on matters related to campus sustainability (President's Advisory Council on Sustainability Terms of Reference, 2016). This Council also ensures consistency within the university's Office of Sustainability, College of Sustainability and Student Sustainability Office, as all three must report to the PACS. The council consist of 18-24 members from the university and community. There are specific requirements for representatives as well, as outlined in section 4.2. of the terms of reference document (President's Advisory Council on Sustainability Terms of Reference, 2016). The Council ensures that the relevant parties are involved in important sustainability conversations and that an assorted group of interests are represented. Ideally, more community members and diverse groups would be represented on this council, for example a traditional holder of Indigenous knowledge. Nevertheless, this document outlines that in 2016, *fives years ago*, Dalhousie was strides ahead of Mount Allison in their sustainability commitments and measurable outcomes. The PACS's role also includes advising, where relevant, and supporting the operational and academic

bodies at the university as they attempt to reach sustainability goals and updating the President once per term (President's Advisory Council on Sustainability Terms of Reference, 2016). While this is an important body in achieving on-campus objectives and creating initiatives, how does Dalhousie's sustainability plan interact with the surrounding community?

While meeting with the executive director of the Office of Sustainability, it was imperative to the Sackville case that the town and gown relationship be discussed. Dalhousie largely operates independently from the City of Halifax and the larger Halifax Regional Municipality (HRM). While they do not rely on the municipality for funding, they do provide support and are partners on a wide range of initiatives (Executive Director Meeting Notes, 2020). This largely consists of acting as a sustainability role model, not only in Halifax, but also in Truro, Nova Scotia, where the university's agricultural campus is located. In Halifax, this local environmental leadership entails sitting on a climate action committee, discussing projects together and working on local initiatives (Executive Director Meeting Notes, 2020). One particularly successful example of this collaboration is the sustainable transportation initiative, SmartTrip. SmartTrip is a program developed by Halifax to encourage more environmentally responsible transportation options and increase the overall mobility of the local workforce. As a significant employer with a large off-campus student housing market, Dalhousie adopted this program to address achieving their goal of reducing the university's overall greenhouse gas (GHG) emissions. This program also includes educational tools and a variety of transportation-based initiatives aimed at reducing local traffic and pollution (Dalhousie Website SmartTrip). SmartTrip is just one of the initiatives that have been implemented through university-community cooperation on sustainability issues. When considering university and municipal partnerships, it is important to recognize there are many models that demonstrate effective collaborations. Whether the relationship is participatory, or a more independent consultation-based approach, by working together universities can integrate themselves into the larger community and increase the success of sustainability initiatives. An analysis of other university-

community relationships and efforts allows for a deeper understanding of the disconnect between Sackville and Mount Allison and where there may be some specific changes that can be implemented in moving towards an integrated approach to sustainable community development.

Experiential Learning: An Untapped Resource in Bridging the University-Community Divide

The research for this paper was completed during a summer internship with the Regional Centre for Expertise on Education for Sustainable Development (RCE) Tantramar. This not-for-profit organization aims to incorporate education for sustainable development within the greater Tantramar area (including Sackville) through community engagement and the integration of knowledge and initiatives for a more sustainable future (RCE Tantramar website). While there are more than 100 RCEs globally, RCE Tantramar is one of only six in Canada and the only RCE in the Atlantic provinces. The United Nations University Institute of Advanced Studies recognize RCE organizations. The Tantramar division was created after the document Tantramar 2040 was published, one of many community sustainability plans in the area (RCE Tantramar website). Working under this organization was possible thanks to the ECHO Foundation internship awarded through the Mount Allison Experiential Learning Office. This internship provided the freedom necessary to investigate the status of climate-based action in Sackville and nearby communities, which eventually led to the creation of this honours project.

Working with a non-governmental organization provided insight that many Mount Allison students are not privy too. Because of the disconnect between town and gown, many students are unaware of the inner workings of Sackville, especially while they live on campus. However, many students are very concerned with the state of Sackville's sustainability, especially surrounding waste management. One of the biggest issues students observe daily is the inability of both Sackville and Mount Allison to have comprehensive and cohesive waste management, especially in university buildings, local businesses, and apartment housing. This concern was one of the research goals for the RCE

internship: determine a potential long-term solution for this and other environmental concerns within the town and university, allowing for transition to a more sustainable community. As outlined throughout this paper, the overall suggestion of a shared sustainability coordinator appears to be just out of reach for Sackville. For most operational and local cultural aspects of this community, the university and the Town often seem to be two solitudes. An important consideration is whether this seemingly unattainable goal is blocked by tangible, temporary barriers, or if a lack of cooperation and close-minded attitudes are inhibiting any substantial progress towards integrated operations and cooperative approaches. While researching the relevant case studies, barriers like those that have restrained Sackville were easily overcome, indicating that perhaps there are other factors impeding advancements.

The summer internship involved a comprehensive environmental scan that investigated the status of sustainability initiatives over the past decade, climate change action plans and town and gown partnerships in other communities. As a result of this research across the Atlantic region, it was clear that Sackville, New Brunswick is severely lacking in responding to the many best practices that have been established in other places. While other communities are implementing community transportation programs, hiring climate change staff, signing Memorandums of Understanding on integrated policies, plans and actions, reducing energy consumption and emissions outputs, Sackville is struggling with the basics. For example, waste management, recycling, and composting, one of the first steps communities take to increase their environmental responsibility has not been implemented. Over the past decade, many elementary schools across Canada have students involved in their own waste sorting programs, as students can easily grasp the concept at a young age. While there has been one local initiative at the middle school, now suspended, the Town of Sackville has not implemented an exhaustive waste management program. In fact, local schools and the entirety of Mount Allison operate separate and independent waste management systems, with no connection to the Town.

While single household residences are included in a three-stream pickup system, garbage (clear), recycling (blue) and compost (green), a large portion of the community is not incorporated, including apartment buildings with five or more units which are considered businesses. According to by-law 252, ""residential dwelling" means all single family houses, duplexes, mobile homes, multiple family dwellings and apartment buildings 4 units or less in Town but does not include schools, businesses, hotels, motels, Mount Allison University, other institutions, restaurants, stores, shops or hospitals;" (By-Law NO. 252, page 1, 2016). Businesses are responsible for their own waste collection; they are therefore not included in the municipalities hauling contract and are not subject to the by-law. Many students choose to live in apartment buildings, and in Sackville these buildings are mostly businesses according to the Sackville by-laws, as they have more than five units. This represents more than 700 apartment units in the community, with all their waste going directly into the landfill site near Moncton. (Smith, 2017). This issue has been raised by students for years and is a concern for other community members as well, including local environmental organizations and the residents of seniors complexes (Sustainable Sackville, 2010). The demand and willingness to participate exists, but the proper resources do not. Residents have no direct point of contact at the Town to approach with this and other sustainability concerns.

While recycling and composting, or waste management, is just one of the possible sustainability initiatives that could be implemented in Sackville, it represents an example of a much larger issue. Since the adoption of the New Brunswick Beverage Containers Act in 1992, more than 5,000 types of containers are recyclable, along with countless other types of materials (Government of New Brunswick website). While waste management has made significant strides over the last few decades, it is a basic environmental issue and only one aspect of creating more sustainable communities. This concept is introduced to children in elementary schools, who are then able to share this information with their families and, ideally, change societal behaviours. This is the key concept of education for sustainable development (ESD) and the global effort towards the critical issues of

the world, as seen in the United Nations Sustainability Goals (United Nations Education 2030, 2017)

The ease with which these students can grasp the concept of waste management was illustrated during a presentation on the subject to a class at Port Elgin Regional Elementary School, as part of this research project. If children can understand the importance of proper waste management, why does it escape decision-makers at the local level in Sackville? To properly understand and address the key question of this thesis and to identify the barriers to sorting waste in apartment buildings and businesses, it was necessary to go into the 'belly of the beast' – Sackville Town Hall.

Waste Management in University Towns

Picture this: you are an honours student in Environmental Studies at Mount Allison, a top-rated undergraduate university, ranked #1 by Maclean's magazine 21 times in the last 29 years (Mount Allison University Website). You live in a town that recently spent $25,000 on a sculpture designed to "show which way the winds are blowing on climate change" (Wark, 2020) and you attend a university "committed to environmental sustainability" yet you live in a six-unit apartment building that does not sort household waste (Mount Allison website). The disconnect between theory and practice is striking; both Sackville and Mount Allison have taken a passive, performative approach to their environmental progress. Environmental sustainability is observed in theory, but not in practice in the very community where thousands of students are studying environmental issues and the global climate crisis. A community where education, research and sustainability practices are taught has failed to lead businesses, like Mount Allison, in the right direction and, conversely, Mount Allison, a top university in Canada, has failed to demonstrate the value of research and education and integrating knowledge into the community. Proper waste management is a rudimentary service that should be offered everywhere in Canada, especially in the community home to an establishment like Mount Allison. Thankfully, other universities have exemplified proper waste management and the successful nature of university led initiatives and it is hoped that the university-community

relationship in Sackville can benefit from those experiences through this current action-based project.

Why focus so heavily on universities when this project is mainly highlighting problems within the town? In reality, they are one and the same. Small university towns have a unique environment where a significant portion of the citizens are temporary residents, known as students. Because of the nature of these communities, mutualistic relationships exist between town and gown; what is good for the university is good for the town and vice versa. Therefore, a comprehensive and shared waste system initiated by the university could be the necessary catalyst for the town to follow suit. Therefore, in communities like Sackville, the town and university must create a symbiotic relationship where they build on initiatives to work towards a more sustainable future. They share the community ecosystem.

This is not to say that nothing has been done around mutual cooperation and specific projects and agreements in this community. Both Sackville and Mount Allison have committed to environmental progress through a variety of initiatives, including waste management. These commitments are outlined in a variety of places, including documents like Sustainable Sackville (2010), University Waste Audits (2014) and on their respective websites. A common theme for a variety of these action-based sustainability goals is a lack of tangible progress. Goals can be outlined in as much detail and as many documents as needed, but without proper leadership and measures, years will pass, and goals will remain unachieved. Based on research, other similar communities and the Sackville case study, the missing link is a sustainability coordinator and an overall long-term commitment by concerned parties. This type of position can be titled anything from Climate Change Coordinator to Sustainability Officer, but one thing is evident, this person is vital to the implementation and success of environmental projects and climate change mitigation. While there are a wide number of exciting projects and initiatives that have been attempted over the years, with much attention on websites and in the media, they are, ironically, not sustainable.

By briefly touching on waste management initiatives and goals outlined in a variety of university communities, a picture starts to form. This picture shows the necessary circumstances for successful initiatives, like the Sackville Waste Management Pilot Project developed as part of this action-based research study. Acadia is one of the universities that has exemplified proper waste management, where 70-80% of campus waste is diverted from landfills (Acadia University Sustainability Website). Acadia was also the recipient of various awards for waste management. Specifically, in 2004, they received the Institute of the Year Award from the Resource Recovery Fund Board or RRFB Nova Scotia (Acadia University Sustainability Website). The university has also implemented waste reduction initiatives and sort waste into four streams, paper, organics, recyclables/refundable and garbage.

Furthermore, the Acadia University Sustainability website offers a detailed guide to sorting waste on campus, complete with a variety of resources and an explanation on how to properly dispose of specialty waste specific to the university, like electronics and ink cartridges. Not only does Acadia have an entire website dedicated to sustainability within the community, but most of their waste related programs are overseen by their Sustainability Office, including the Sustainability Coordinator. This ensures proper education and project management, which likely accounts for their overall success (Acadia University Sustainability Website). If necessary, Wolfville can rely on the expertise of this institution for their own waste management. The Town of Wolfville Website hosts a comprehensive four stream sorting guide for residents living outside the university buildings (Town of Wolfville Website). This program also includes multi-unit dwellings, or apartment buildings, within their community collection and sorting program (Solid Waste-Resource Management Bylaw, Chapter 106, 2021). This community is a great example of the long-term waste management potential for Sackville but is not the only one.

In 2011, ST. Francis Xavier university implemented a recycling and composting pilot project on campus to test a potential campus-wide waste management model to increase sustainability within the university (STFX

university website, 2011). This pilot project was well received by faculty and staff. When waste was not properly sorted, bags were not collected and received a rejected sticker to indicate the lack of proper sorting. Educational posters and a standardized order for bins were credited as being vital for the overall success of the project (STFX university website, 2011). Furthermore, barriers to the project were outlined as students entering the province from areas with different waste management protocols and an overall misunderstanding of waste sorting on campus, as many students believed that sorted waste did not stay sorted after being collected from the university. This project also determined that education was the key to success, and a variety of posters and pamphlets were used to teach students and staff about proper waste management. As is the case with many public university buildings, including Mount Allison, if one of the waste streams becomes contaminated, the entire bag goes into the landfill site (STFX university website, 2011). More recently, in 2020 two ST. Francis Xavier graduates were the recipients of a $25,000 grant from Spark Nova Scotia (STFX university website, 2020). These students' goal is to recycle plastic right on campus, diverting waste from landfills and bodies of water. They hope to work with students, staff, and faculty to collect, clean and recycle plastic from the university (STFX university website, 2020). This is an especially exciting initiative as it would allow ST. Francis Xavier to act as a closed loop for plastic waste, something that has yet to be implemented in Canada (STFX university website, 2020). This is another example of a university town at the forefront of sustainability initiatives in Atlantic Canada.

Dalhousie University recently published a document detailing sustainability initiatives on campus within the last ten years (Sustainability Progress Report for Campus Operations, 2010-2020). One of the many goals outlined in this report was to divert 70% of waste generate on campus from the landfill by 2020. Between the Halifax and Truro campus, the diversion rate from 2019-2020 was 64%, just shy of their goal. However, if wood ash, produced at the Agricultural Campus, is included in these numbers, their diversion rate jumps to 71%. Therefore, the report quantifies this goal as partially achieved and achieved

(Sustainability Progress Report for Campus Operations, 2010-2020). While this is not the exact intended result, Dalhousie has shown their dedication to achieving sustainability goals. It provides a measurable result of their shared initiatives and goals and a key factor in changing behaviours in creating a more sustainable place. Furthermore, the table below details the progress in waste diversion from 2013 to 2020, where each year diversion rates improved.

"Halifax |AC

2013-2014 (baseline)*	2017-2018	2018-2019	2019-2020	2017-2018	2018-2019	2019-2020
60%	62%	62%	64%	55%	63%	65%
50%						

**60% uses bill and audit data as the University hadn't purchased a weigh scale at that time. 50% is based on bill date only. Percentages does not include wood ash."* (Sustainability Progress Report for Campus Operations, pg. 8, 2010-2020)

Additionally, Dalhousie created a detailed document outlining the standard for waste bins on campus. This document sought to aid in achieving the goals of 70% waste diversion, essentially it is a tangible aspect of the steps required to reduce landfill waste at the university. The document details general guidelines for signage, colour coding, waste bin openings and the order they will appear in on campus (Indoor/Outdoor Waste Bin Standards for Dalhousie University, 2017). Where bins will be located on campus, including classrooms, dining areas, residences, offices, outdoor spaces, and more are also outlined in this document, including examples of bins and signage (Indoor/Outdoor Waste Bin Standards for Dalhousie University, 2017). This is important as it demonstrates some of the groundwork required on campus to come close to achieving this goal and to understand the importance of shared knowledge in addressing human behaviours associated with recycling and waste and energy reduction.

Furthermore, Halifax also has a successful waste management program. This four-stream program separates waste into recycling, paper and cardboard, organics and garbage and includes apartments; every building must be equipped with the proper receptacles and residents must sort their waste (Halifax website). Also, Halifax Solid Waste will offer free educational services to the community, including schools, universities, and businesses to ensure proper sorting. This outreach program aims to educate Halifax residents on how to reduce waste, compost at home, the importance of individual actions, how to educate others and more (Halifax website). This comprehensive program and educational outreach led to successful waste management in the Halifax and Dalhousie community.

Sackville has a long history of committing to sustainability, including waste management, yet the results are limited. Some of this is detailed in the important document, Sustainable Sackville, launched after an extensive community-university integrated sustainability planning process in 2009-2010. Two of the goals that are especially relevant to this paper are as follows; "Hire a Sustainability Coordinator: 1) Reporting to the CAO, this individual would work with each municipal department to build a corporate culture around sustainability principles. 2) Create a committee of Council who oversees implementation of sustainability principles in all decisions of Council" (Sustainable Sackville, page 26, 2010) and "Wet/Dry Program Participation: 1) Integrate multi-unit apartments into wet/dry program; 2) Include commercial and institutional properties in the wet/dry program as much as possible; 3) Establish an incentive system for residents to sort their waste properly; 4) Research and develop efficiencies in cross-jurisdiction garbage hauling; and 5) Increase illegal dumping penalties and have them strictly enforced" (Sustainable Sackville, page 50, 2010). Hiring a Sustainability Coordinator and including multi-unit apartments were flagged as goals to achieve within two years, yet 11 years later, the community is still waiting (Sustainable Sackville, 2010). The time frame is also obvious from the language, Sackville transitioned from the wet/dry system to a three-stream system five years ago (Council Meeting of Tuesday October 11th, 2016). Sustainable Sackville has since been updated from time to time over the past decade, but how

can residents be expected to believe those goals will be met when they have yet to be achieved? Does the Town plan on implementing these sustainability changes or are these documents simply fulfilling criteria for funding and to ease residents climate change concerns? Without proof of progress, it appears these documents are more aspirational or theoretical, not true environmental plans.

Mount Allison University is also behind in terms of waste management. According to the most recent campus waste audit, a lack of education is inhibiting proper waste management on campus (Environmental Audit, 2014). The latest audit on the university website is from 2018, so this is concerning as sustainability on campus a severely lacking and several student-led climate strikes have occurred within the community in the last few years (Mount Allison Website). The University has an established Environmental Issues Committee, research on this group's work reveals little to no action in recent years. Although environmental audits are completed every two or three years since the first one in 1998, the last audit that included waste management was from 2014 (Mount Allison Website). The 2014 audit also explains that proper sorting is an issue on campus and the system at the time was challenging for students and staff to navigate. Furthermore, it explains that when waste is not properly sorted and bags are contaminated with materials from other streams, the entire bag becomes garbage (Environmental Audit, 2014). As a student at Mount Allison and RCE Tantramar intern, I can fill in the gaps since that audit. While the university has switched to the more straightforward three-stream sorting system, waste is rarely properly sorted. In the last four years I have seen first-hand, improper signage, mismatched bags and bins, insufficient receptacles, and a lack of consistency across campus. While improvements have been made in the last year, it is impossible to know how they affected waste as an audit has yet to be published from the three-stream system; measurable progress is not possible with such inconsistencies and ineffective committee oversight, despite past calls to address these issues (Report of the Chair, Environmental Issues Committee, 2013). Furthermore, most of the bins that have the correct signage and bag colours are in units of four, which confuses students, staff, and faculty as the university only

uses three streams. Both the university and town are struggling to implement and maintain initiatives like the waste management pilot project. Based on the research and results of this project, one specific conclusion is that the missing link is hiring a dedicated and properly supported staff person to oversee sustainability within the entire community, including both town and gown.

Why Waste Management and Who Manages It?

After researching other universities and towns and concluding that the Mount Allison and Sackville would both benefit greatly from a shared sustainability coordinator, a core recommendation of this study is that it is time to create such a position and get to work on the wide range of sustainability projects that have been neglected in the past. The plan was to present this idea to town staff and then address any concerns. Once an agreement had been made, the university would be incorporated in discussions. This would involve meeting with both parties separately to ensure everyone is satisfied with the recommendation before bringing them together. While this is a large undertaking for one summer internship and honours project, it seemed possible. The blueprint for a combined town and university sustainability coordinator positions already exists, as the case studies demonstrate. A key issue that must be stated here, and an issue that persists in all communities, is the funding for such a position and how it would be shared by the university and town. Clearly, working together and sharing costs reduces the financial burden for both partners. The other key element of university communities, including Sackville, is the willingness for non-governmental environmental groups (ENGOs) to invest in the creation of a sustainability office and coordinator, including financial support and human resource and volunteer potential. For example, RCE Tantramar has consistently agreed to contribute significant partnership funding and leadership to such a position. After several months of the environmental internship, what was previously seen as an outrageous recommendation for such a position became reasonable through research, planning, and cooperation. That is, until meeting with the town staff.

Through two meetings with varying town staff (July 10th and 28th, 2020), such as the mayor, chief administration office, director of parks and recreation, town climate change intern, who also hoped to see this position come to fruition, and the town engineer/director of public works, countless hours of research quickly became irrelevant. After the first meeting, it was clear that facts and figures could not make up for a lack of precedent. Pioneering a new type of staff position was out of the question. How could it be guaranteed this would be a success if it had not been done before *exactly* this way? Without proof that this type of shared position had successfully been implemented elsewhere, the second meeting was focused on other types of initiatives that could be implemented in the town. It seemed critical to develop a "pilot program" in Sackville that would demonstrate that a planned, implemented and measured environmental program would work. This is where having a mixed methodology and an action research agenda became a critical point in the overall research project. It was determined that implementing a recycling pilot project would be an appropriate project to be undertaken. This type of pilot project has been unsuccessfully attempted in the past, but the hope was that this time would be different. After the project, if numbers demonstrated that sorting waste in apartment buildings was just as possible and cost the same as the residential program that exists for houses, perhaps it would be considered long term, as policy. Clearly put, it appears that the challenge of human behaviour in the face of change is not restricted to recycling and waste management. A long history of municipal and university behaviours, the classic town and gown relationship, had to be addressed as a key factor in creating a sustainable community.

The research and action processes related to this project became increasingly frustrating, with the literature on resistance to change being evident at every step. Suggestions were met by those in decision-making roles providing a long list of problems and reasons why things could not be done, rather than potential solutions and responses for collective planning and action. For example, the issue of getting landlords to participate in a widespread recycling and compositing program was held up as a major obstacle. How can the town possibly

encourage landlords to pay for extra bins for sorted waste? This type of question seemed odd at the time, considering the two recommendations for Sackville were hiring a sustainability staff person *and* creating a waste management policy. Towns do not only encourage citizens' behaviours; they create laws and policies to enforce it, through incentives or deterrents. Later sections will highlight the barriers to any significant progress that were previously mentioned and their relevance in the case of the Sackville Waste Management Pilot Project. Additionally, the lack of cohesion that illustrates the need for a shared coordinator will also be outlined. The purpose of this background information section was to demonstrate that proper governmental and institutional leadership facilitates comprehensive changes within sustainability and climate change mitigation. Without proper government and political leadership, outside parties will be met with frustration and more steps backwards than forwards, something that is illustrated in the example of implementing a waste management pilot project in three apartment buildings in Sackville, New Brunswick. It should be noted that these criticisms of policy and practices are in no way directed at individuals associated with these issues; rather, it is an action-based approach at identifying and addressing the traditional models and relationships that have existed in the community over time. These comments can also be applied to those within the university administration, their policies, and decision-making processes. Rather than finger-pointing or blaming others, the intention of this project and the researcher is to stimulate discussion, provide a research-based plan for change and to create a new set of recommendations and ways of working cooperatively towards a long-term, sustainable community.

Methods

This project was designed in the summer of 2020 and implemented three local apartment buildings in Sackville, New Brunswick in the Fall of 2020 and Winter of 2021. These buildings, commonly referred to as "The Coops", were chosen for a variety of reasons. Specifically, the garbage hauler these buildings contracted-out to, the reputation of these buildings as primarily "student housing" and the landlord's willingness to participate. This project was the result of

research and meetings with various actors in Sackville and Atlantic Canada (see background information section). This applied project case study worked well as part of an honours thesis course, in the connection between the theoretical aspects of environmental policy and behavioural change and the ability for a community to respond to the introduction of such a project. Without proper research and preparation over the summer period, as well as the willingness of the community partners to engage in a real-time pilot study, this project may not have been implemented so quickly and efficiently.

Once it was decided that a waste, composting, and recycling pilot project would be part of this honours thesis, the next step was organizing key community actors. To ensure the project ran smoothly, a series of meetings were required. First, relevant players were contacted to gauge their level of interest in the project and determine the associated cost of their services. This included Eco360 (the Regional Service Commission sorting company), Miller Waste (the hauling company), Town of Sackville staff, including the Town engineer who became the Town's contact for the project, as well as the participating landlord. While these are only a few players, coordination was not as straightforward as expected, especially during a global pandemic, with the various stages of public health regulations that had to be negotiated during this entire period. Although several different private waste haulers operate within the Sackville region, the project needed to take place at an apartment building that contracted Miller Waste, as the Town contracts Miller Waste for residential waste three-stream collection and using a different hauler would complicate the process and likely be more expensive. Thankfully, the Coops apartment buildings, located at 172b, 174 and 178 Main Street in Sackville also contract the services of Miller Waste. These three buildings, with 18 units each, can house 48, 54 and 54 tenants respectively and are primarily three-bedroom units, other than six apartments in 172B.

Before progressing any further, it must be noted that apartment buildings in Sackville with greater than five units are not required to engage in the three-stream recycling program. For this project to occur, the landlord needed to be on board and open to the three-stream process for his tenants, not only with

introducing composting and recycling to the buildings, but also with the uncertainty and associated steps of the project as a pilot study. Specifically, the project included placing new and additional waste bins at each building, auditing the content of those bins three times, and allowing access to the buildings for the duration of the project. Thankfully, this particular landlord was extremely willing to participate and did not require an abundance of details or updates. Another important actor for this project is Eco360. Throughout the pilot project a variety of staff members provided support, expertise, and educational materials to ensure its success. Additionally, it must be considered that there has been a long history of attempts to address the issue of apartment waste and recycling, given that there are currently hundreds of apartments where all the waste goes into the landfill at Eco360, with no recycling or composting taking place. The key methodological aspect of this research project was the ability of the researcher to design and effectively communicate with the various actors in an efficient and non-threatening manner. The educational value of participating in the pilot project was key to the project.

As part of the research methodology, Eco360 staff agreed to provide three waste audits of the project, as well as supplying educational materials, all free of charge. These audits measured the rate at which apartment building residents were able to properly sort their waste, known as the "compliancy rate". They were completed on October 20th, 2020, December 12th, 2020 and April 13th, 2020. Miller Waste also agreed to partner on this project; they provided free waste bins and collection and were always willing to cooperate with the researcher to adjust the pilot study when necessary. The only associated costs of this project were the costs to transport the waste to Eco360 for the three audits and the tipping fee associated with disposing of the waste. The landlord was already paying a tipping fee at the landfill to dispose of the waste from these buildings. Sorting this waste lowered the cost; the tipping fee for recyclables and compost at Eco360 is lower than that of garbage and by sorting waste, the garbage would weigh less and therefore cost less. Also, the Town of Sackville, Miller Waste and Eco360 graciously offered to cover the costs of the audits, ensuring that the project did not

fall to the landlord, residents of the apartment buildings, or RCE Tantramar and the researcher. As part of the willingness to support this research, as well as reducing the barriers to participating in the program, we were able to secure free green, blue and clear waste and recycling bags from AL-Pack distributors, a manufacturing company located in Moncton, NB. Appropriate three-stream bags were provided to all residents of the Coops through-out the pilot program.

Once all the participants were contacted and organized, the educational aspects of the project commenced. Based on the research outlined in the previous sections, education was deemed to be vital to the success of the pilot project. For this project, each unit of the three buildings received an educational packet, including a sorting guide, reusable bags, and the waste collection schedule. Furthermore, an explanation of the project, complete with contact information, and additional sorting guides were posted at the front and back entrance of each building. Any residents that were home for the packet drop-offs were also given an in-person overview of the project, and others not at home were directed via post-it note attached to the apartment door that provided the relevant information. This was to ensure that a lack of proper sorting was not a barrier to the project's success. Under the direction and advice of the landlord, each laundry room facility in the three buildings were equipped with extra supplies of all three types of bags.

After the organization and education phases were completed, a date was chosen for the project to begin and the dates of the three audits were approximated. The initial start had to be pushed back a week, which will be further explained. Once the project began, on October 1st, 2020, the general management of the project was much simpler. This involved checking on the bag supply with a master key provided by the landlord and adding additional educational posters into the laundry room after the first audit. Overseeing this project also included organizing the next two audits and getting permission from both the Town and landlord to access the audit results from these buildings, compared to residential household results. It was important to obtain the numbers from previous audits to determine if the compliancy rates differ between sorted

waste in households versus apartment buildings. Also, the weights or fullness of the other receptacles at the Coops were recorded by Miller Waste and provided to the researcher. Because of the space behind the buildings and the landlord's preference, the waste and recycling and compost had different types of bins. The garbage, or clear bags, went into a top-loading bin and the weights were electronically recorded each time they were emptied. The recycling and compost, or blue and green bags, were in smaller bins typically used for single household waste. Extra bins were added to account for the small-sized bins for these two streams. These smaller bins were recorded as either 1/4 full, 1/2 full, 3/4 full, or full each time they were emptied.

Once the results from all three audits and the weights and fullness of the bins had been recorded, these numbers were analyzed. The results were also compared with the numbers from the last waste audit of the Town's residential waste program. The goal was to determine whether the ability and willingness to sort waste of the residents in the Coops apartment buildings were significant barriers to the overall effectiveness of the program. This will inform the decision on implementing recycling and composting for all multi-unit apartments in Sackville, as a matter of public policy. Any associated fees were considered to determine the long-term costs of implementing such a program. While the methods are seemingly straightforward, it is important to consider the self-imposed barriers the Town of Sackville used to try and deter the future success of recycling and composting in the community. The results will demonstrate the reality of this type of initiative, rather than the fabricated blockades that have been impeding environmental progress in this community in previous attempts at addressing the issue.

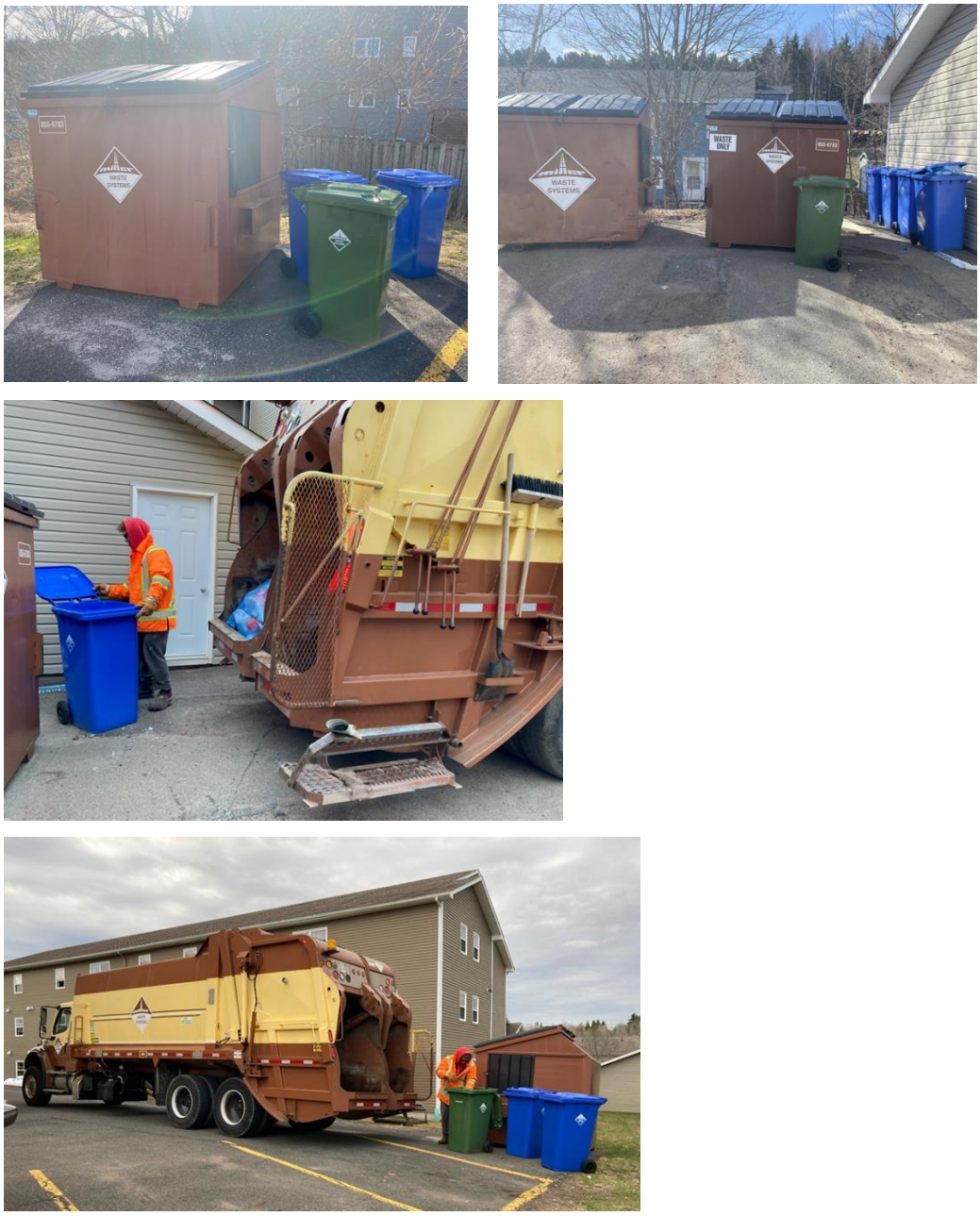

Figure 1: “The Coops” apartment buildings recycling, composting, and garbage bins and pickup as modified for the waste management pilot project.

Barriers to Success: Why *Not* Sackville?

While analyzing the necessary conditions for implementing and sustaining successful environmental initiatives and progress, barriers to this success within the Sackville context came to light. Specifically, a lack of coordination, cooperation, and communication have proven to impede projects such as this waste management pilot program. Therefore, specific examples will be used to illustrate the types of problems that arise regularly within the community. This section is not meant to blame individual actors or organizations, but rather to exemplify a bigger issue within the community as a whole when it comes to sustainable development and the university-community relationship. Furthermore, there is an important distinction between perceived and substantial barriers; certain obstacles were experienced throughout the duration of the pilot project and others were theoretical reasons, or perhaps excuses, why the community was unable to implement initiatives that other case study communities achieved. Both will be covered in this section. A more in-depth explanation of the possible solutions to these barriers will be outlined in a subsequent section.

Organization and Implementation

This pilot project, in itself, was the response to addressing a barrier. The original request was for the Town of Sackville to hire a climate change staff-person act as a shared resource between the town and university. Ideally, the first goal would be having this resource person implement a widespread recycling and composting program for apartments and businesses in Sackville. The lack of funds and precedent were considered insurmountable barriers and the suggestion to hire this staff person was therefore rejected. Working together to realize widespread waste management policies and processes was also denied, as enforcing this new regulation was seen as too onerous for the municipality to take on. While a successful working relationship between the town staff and landlords is imperative, it is ultimately the Town's responsibility to advance environmental practices within the community, via policy and by-laws. This lack of initiative was also a significant barrier; many town decision makers were hesitant to implement any type of project, especially amidst the COVID-19 pandemic. For

nearly two decades, the official position of the Town of Sackville has been that apartment buildings with greater than four units are officially considered to be private businesses, and thus, are not the responsibility of the Town for waste management.

As previously explained, before starting this project, consultation with Town staff was required. Initially, this meant presenting research and reasoning for why Sackville should consider the appointment of a shared sustainability coordinator. As with any new project that would require human and financial resources and administration, this recommendation was met with questions and concerns, which were to be addressed in subsequent meetings. While many of these questions were answered, a key barrier was the lack of precedence – that unless there was case study evidence that proved that this model would be successful, Town officials were hesitant. This mindset has proven to be a long-term barrier to success in Sackville, even though the Mayor and others stated that there was a need to push the boundaries and accepting some risk in pioneering new projects and programs whilst creating a sustainable development. This is especially relevant for unique communities like Sackville and was part of the reason why the waste management project was implemented as an active research component of this thesis. Beyond the key barrier of lack of precedent, another usual barrier to adding supplementary staff resources for a long-term recycling program for apartments in Sackville is the additional costs and the overall budget issues every community faces.

Not only do the additional bins required to sort waste into three streams add costs, but so do the supplemental pickups of waste by contracted waste hauling companies. Currently, apartments (and businesses), only pay for one pickup and *all* the waste goes into the landfill site located at Eco360 just west of Moncton in Barry's Mills, New Brunswick. Bringing sorted compost and recycling to Eco360 would require at least one additional pickup. The main barrier associated with these additional fees focuses on who pays for it. The Town currently pays for residential waste pickup from households only and was not prepared to absorb the added cost of apartment building collection. As noted

earlier, because multi-unit apartment buildings (upwards of five units) are classified as businesses, the cost of waste pickup is considered to be their responsibility, even though these units pay municipal taxes to the Town. Over the years, without proper policy, by-laws, or regulations, it has become unclear whether the Town or landlords should be held accountable for this service, in terms of a political decision and definition of what is "residential" and what is a "business". Money is often a deterrent when it comes to implementing sustainability within the infrastructure of a municipality or organization, especially when funds are needed elsewhere. The COVID-19 pandemic proved to impede progress even further, as it became the priority for communities worldwide.

Although dealing with the impacts of COVID-19 and limiting spread has been vital for the well-being of community members, it is often used as an excuse for a lack of environmental progress. The advancement of this project was deterred with what has been described as 'the COVID excuse'. The pandemic did completely disrupt ways of life and redefined the norm, including the shut-down of the recycling facility for months, but over a year after lockdowns first started, many communities have learned how to operate in this new world. Specifically, rather than using COVID-19 as a reason to stop or delay environmental progress within a community, it can certainly rationalize implementing more sustainable development models. Residents are constantly adapting to changing regulations and restrictions, yet an inability to acclimate to a new waste model and proper waste sorting was raised as another factor inhibiting the success of the pilot project over the long-term.

Before the project's implementation, there were already doubts concerning tenants' ability to adapt. Although inefficient sorting can cause issues for the recycling and composting facility, it was definitely a case of creating barriers where they did not exist. Moreover, it raises the question as to why occupants of single-unit households are required to properly recycle, while those living in apartments are somehow not obligated to behave in the same way? While a high rate of resident turnover is especially common in student apartments, there are

also many houses that are also traditionally occupied by students. The ability of students to properly sort waste was not the only behavioural concern associated with this project. Town staff were also concerned about accountability; what incentive do tenants have to properly sort waste? This was another example of a barrier that was mentioned before the project had even been organized. Although the success of the pilot project does rely on willingness to participate, the lack of waste management in apartment buildings was brought to the town as a student issue. If students did not plan on sorting their waste, why would they care if the infrastructure is non-existent? Additionally, the reason town staff suggested initially implementing three stream waste management as a pilot project was to determine what barriers existed. This was a common theme when meeting with Town staff-asking questions that the pilot project was meant to address and prematurely deciding what the response would be.

Once the nature of the recycling project was agreed upon, there were many concerns regarding the details that needed to put the project into motion. Some of the more pressing issues were how to weigh/measure the waste, which hauler to use, how to find a landlord willing to participate, and how to pay for the project. Although arranging the specifics was an important step, those details were presented as significant problems before the relevant parties were consulted. For example, a significant portion of the second meeting with town staff was dedicated to determining how to weigh the waste from the apartment buildings so the results could be quantified. This ‘problem’ was easily solved by the project’s main contact at Miller Waste hauling company after a quick phone call explained that larger bins are already equipped with scales. This continued for most of the other issues as well. Finding a landlord willing to participate who used a hauling company interested in the project was almost too easy; the first person that was contacted was eager to join and ensure the projects success. Furthermore, each stakeholder involved donated time, resources, or materials, eliminating any cost-related barriers. Details of the project that were presented as vital during these two meetings with town staff were easily arranged, or non-issues, such as who to contact first. Overall, the perceived potential restrictions were more serious than

the actual barriers to starting this project. By relying on the support of local actors and trusting the relevant professionals' opinions and advice, the project was ready to begin after only a few weeks. It is also recognized that having a full-time summer intern who was not part of the town staff or budget was an important element in the overall research, planning and execution of the project. Ironically, this position closely resembled the very proposal for a sustainability coordinator that was actually under study.

Managing the Pilot Project: Turning Mountains Back into Molehills

Throughout the duration of the project, there were many small problems that required immediate attention on the part of the researcher. These issues were not barriers to success on their own, but without a central point of contact to manage the project and mediate these problems, it may not have surpassed the organizational stage, as was the case in previous attempts over the past many years. This highlighted a singular underlying barrier- the lack of coordination and communication between various like-minded organizations with common goals. This may seem like an easy task, but a significant portion of the summer internship was dedicated to contacting and meeting with other organizations in Sackville and nearby communities. The complexity of this network of potential partnerships is illustrated in the figure below, where a climate change staff person, titled as "sustainability coordinator", is the key component.

These smaller problems that arose during the project were often last minute and needed to be a priority. For example, the apartment buildings were originally going to have two large bins each - one for garbage and one split for recycling and compost. However, once they were on site, the landlord realized they were not the bins previously envisioned. This resulted in a series of phone calls, both to and from Miller Waste and the landlord. While the solution was simply to push the start date by a week and replace the split bins with smaller waste totes, it almost ended the project. Miller Waste was concerned about upsetting the landlord and losing business, while the landlord worried about overflow and tenant well-being and demanded all bins be removed and replaced with the former one-stream system. Without someone to diffuse the situation and ensure both parties felt

understood and appreciated, this could have derailed the progress thus far. Once again, an action-research methodology was key to allowing the project to carry on through effective planning, communication and immediate attention to the behaviours in response to the problem at hand.

A similar miscommunication issue surfaced once the donated blue, green, and clear waste bags arrived. The landlord had agreed to store them for the duration of the project, but the shipment was much larger than expected. This involved loading and reloading boxes of garbage bags for transportation while a place for storage was established. This was another simple fix but required someone's time and energy. Organizing the three waste audits followed a similar structure; there was a small issue, it was brought to the attention of the intern/action researcher and effectively resolved before it became a significant problem. This position was essential to the project success and required very little experience in actual waste or project management. A project like this was unprecedented in Sackville and there are details concerning the dismantling of this initiative that have yet to be determined. However, although it was at times chaotic, the project was quite successful, even though it was a case of 'building a plane while flying'.

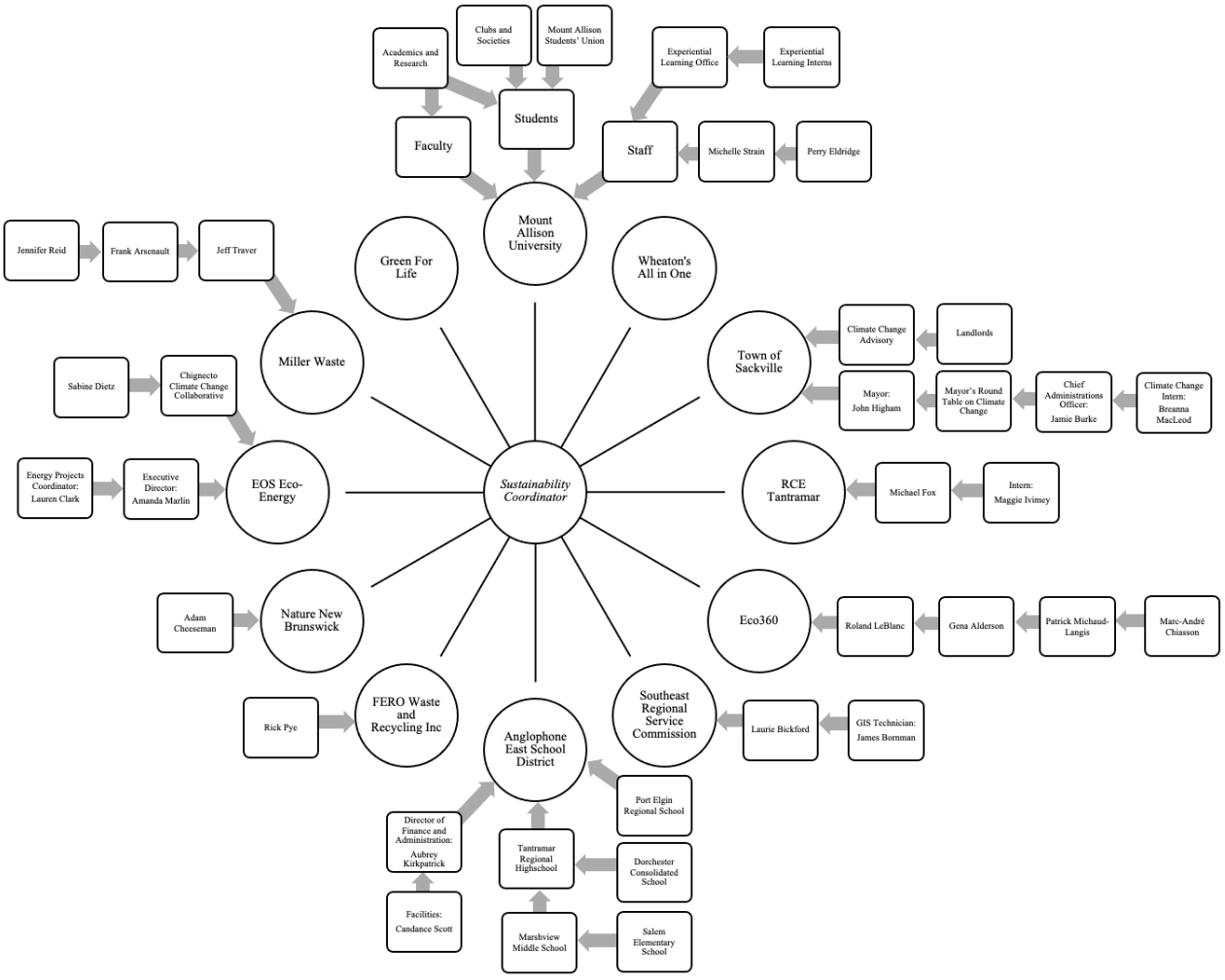

Figure 2: Relationships between key environmental players in the Sackville, New Brunswick community.

Results and Analysis

Once the three waste audits were completed, and the project concluded, the final data was collected and analyzed to determine the recommendations for the Sackville community and how the previously mentioned barriers will affect these propositions. A comparison of waste weights and composition between audits and years was used to evaluate the success of the project. The hypothesis was that these numbers would be lower overall, indicating that apartment residents are capable of properly sorting waste when the proper education and infrastructure exists. Similarly, throughout the duration of the project, "The Coops" waste would be less contaminated and eventually sorted at the same level

as residential waste in Sackville. The figures below illustrate the findings, which support the hypotheses for this project.

As illustrated in Figures 3, 4, and 5, the overall trend indicates lower weights of garbage in the later pickups in 2020/2021. These graphs do not have specific dates attached to them, as they were not picked up on the same days between years; however, they were from similar time periods with one extra pickup recorded for the pilot project year. While it is important to consider this when analysing the data, it is unlikely that the discrepancy had a significant impact on the results. Furthermore, Miller Waste recorded the blue and green bins to have been ¾ full, full, or overflowing upon collection each week indicating that residents were benefiting from the additional streams. Due to the increase in recyclables, additional blue totes were added partway through the project as well.

In building 172B, Figure 3, the 2020/2021 garbage weights are lower than the 2019/2020 weights in the earlier months of the school year and are higher in the later months. This result suggests that these changes are related to the educational aspect of this pilot project that occurred in the fall of 2020. Also, the project was designed around the duration of the academic school year at Mount Allison University, and it is possible that students returning in the second semester were unfamiliar with the waste management system for the area. Furthermore, because of the COVID-19 pandemic, it is also likely that some of the tenants returned to Sackville for the second semester in January, which could affect these numbers. Factors such as occupancy rates, tenant demographics and lifestyle can also impact the amount of garbage produced. For example, during the pandemic, many students are buying more online products or moving in with their significant others, both of which would generate more waste. However, the landlord of these buildings reported that the occupancy rates for 2019/2020 and 2020/2021 were almost identical for all three buildings. There is also the risk of town residents using the bins who do not live in “The Coops”. The 172B building’s dumpsters are located behind businesses and housing on King Street, including a restaurant and a student housing complex. It is possible that these renters occasionally use “The Coops” bins, which could have skewed the results.

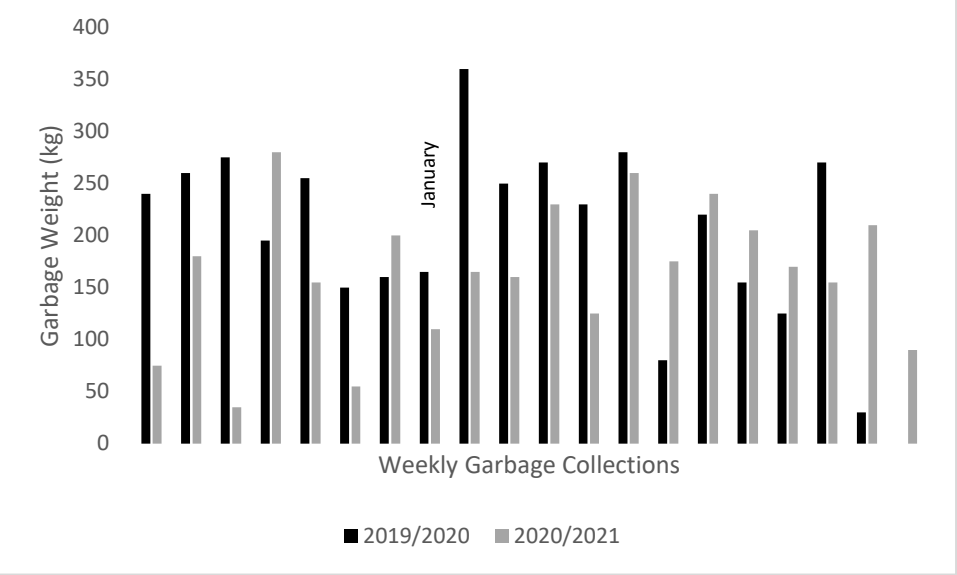

Figure 3: Comparing the 2019/2020 to the 2020/2021 garbage weights at 172B Main Street in Sackville, New Brunswick.

The data trend from 174 Main Street is almost the complete opposite to the previous building. In this case, the weights from 2019/2020 are lower than those from 2020/2021 in the first half of the graph. In later pickups, 2020/2021 has lower recorded weights, for the most part. While there are some weights from 2020/2021 that are higher in the later part of the graph, the high spikes from 2019/2020 indicate an overall trend of less garbage in 2020/2021, especially in the second semester. Another factor that could be impacting the data from 2019/2020 is the university's closure in March due to the COVID-19 outbreak. Once the university moved online, many students left their apartments, choosing to complete their semester from their hometowns. When these students left, they may have generated more waste, especially if they completely moved out. Conversely, if a high number of students left "The Coops", the amount of weight generated would be lower towards the end of the graph for 2019/2020, as this last pickup recorded in the graph for that year is from March 25th, after many students had already left the province. Figures 3, 4, and 5 all have significantly lower weights (well under 100kg) for the final pickup on the graph, and without the pandemic's influence, it is likely that these numbers would be much higher. It is

important to take these factors into consideration as it impacts the interpretation of the data.

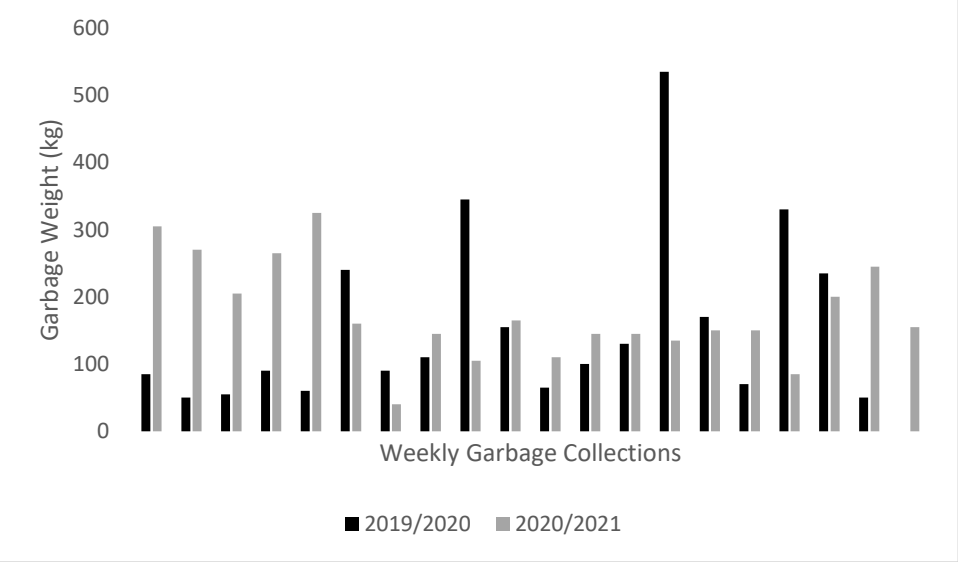

Figure 4: Comparing the 2019/2020 to the 2020/2021 garbage weights at 174 Main Street in Sackville, New Brunswick.

Figure 5 illustrates a similar trend, where weights are higher in the first few pickups for 2020/2021 and then are equal to or lower than those of 2019/2020 in the later pickups. There are also spikes in waste in the second half of the 2019/2020 data. While there are several cases in Figure 5 and the previous graphs of the pilot project year, generating more waste for the clear stream, it is important to further consider how COVID-19 impacted these increases. The pandemic has extended time spent at home; thus, tenants were discarding more waste in the bins behind these buildings. Trips to restaurants, cafés, bars, and university facilities are lessened amidst the pandemic which also adds to the amount of waste generated by households. As bubbles are expanded and reduced according to the province's public health guidelines, these numbers are also impacted. With more freedoms comes more guests, but also less time spent at home, which could account for the inconsistencies in waste generation from pickup to pickup. To properly analyze the actual reduction in waste destined for the landfill during this pilot project, the combined weights of all three buildings are compared from 2019/2020 to 2020/2021, as well as their averages.

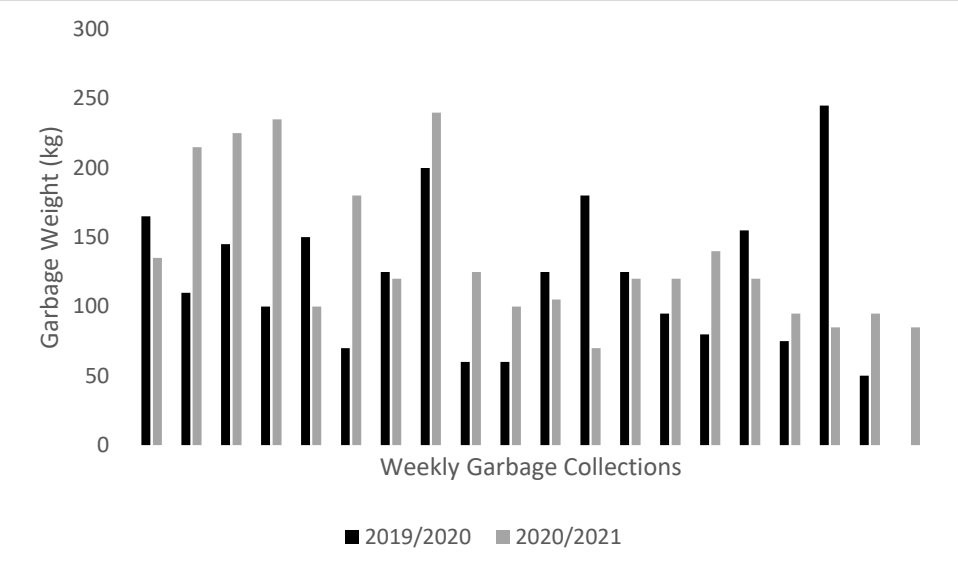

Figure 5: Comparing the 2019/2020 to the 2020/2021 garbage weights at 178 Main Street in Sackville, New Brunswick.

By combining the weights of all three buildings in both years, the actual reduction of waste resulting from the pilot project is apparent. Furthermore, this reduces the significance of discrepancies related to the garbage bins location, outside use, and building size. Some bins may be used by tenants from more than one building from "The Coops" which would impact waste from week to week, month to month, and year to year. Also, building 172B is the only building with any two-bedroom units. These six apartments may also impact waste weights, especially amongst buildings. Figure 6 demonstrates the total reduction in waste from 2019/2020 to 2020/2021. This figure illustrates a similar trend to Figures 4 and 5; where the waste weights from the pilot project are lower in the later part of the graph. However, the last two pickups for 2020/2021 are much higher than 2019/2020, as students had moved out due to COVID-19, as previously mentioned. Although there are some instances where the 2020/2021 numbers are higher than 2019/2020 in the later pickups (after tenants were accustom to this new type of sorting), the overall trend indicated a reduction in waste headed to the landfill as a result of the waste management pilot project. This is further illustrated in the graphs where the weights from all three buildings are averaged.

Averaging the weights allows the waste reduction to be quantified on a more realistic scale, where the numbers reflect a tangible reduction.

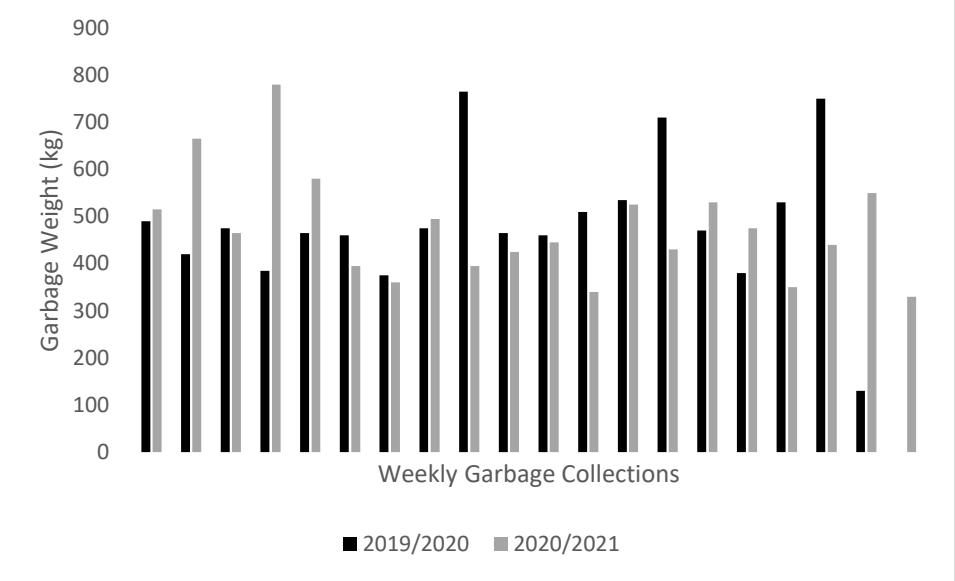

Figure 6: Comparing the 2019/2020 to the 2020/2021 combined garbage weights at 172B, 174, and 178 Main Street in Sackville, New Brunswick.

The line graph used for Figure 7 illustrates the reduction between the two, year averages more comprehensively. Just over two months after the pilot project was implemented, tenants landfill waste was on average, lower than the previous year. As highlighted by the red circle in Figure 8, by mid December the 2020/2021 weights were almost always lower than 2019/2020, excluding the final drop in waste in 2019/2020 due to the early building vacation. It is also worth noting that students paying rent may not have occupied their apartments until 2021, as many chose to return to Sackville for the winter semester only. While the quantitative data for this phenomenon does not exist for these buildings or Sackville as a whole, it is important to recognize that there may have been more tenants in the later months of the pilot project year, yet waste was still lower than the earlier months of 2020/2021. To further understand the impact of this project, the recycling stream was analyzed in depth via three waste audits throughout the project.

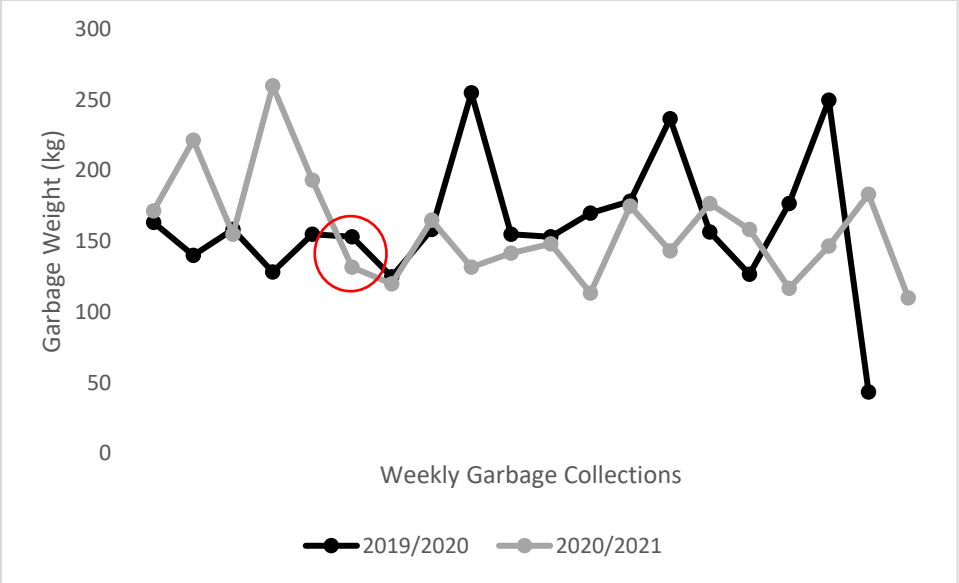

Figure 7: Comparing the 2019/2020 to the 2020/2021 average garbage weights at 172B, 174, and 178 Main Street in Sackville, New Brunswick.

Each waste audit examined the contents of bags from all three streams: garbage (clear), recycling (blue), and organics (green). By analysing the waste, the sorting ability of residents in "The Coops" was determined. The audits occurred three times during the project; the first just a few weeks after the initial start date of the project, another two months into the project, and finally, approximately a final one just a month before the project data collection ended. The goal of these audits was to determine the ability of tenants to sort waste, but also the to evaluate the impact of education and practice on the compliancy rates of tenants in each unit. The blue bags from all three audits were compared by analysing the weights of various types of materials, the percentage they reported, and the resulting contamination rates. According to a professional at Eco360 sorting company, a contamination rate of approximately 15% (or 10-20%) is generally allowed in household waste. It is important to note that there was a lack of consistency between the three audits, due largely to miscommunication and a lack of resources and coordination (the issues highlighted in the barriers section). Therefore, audit one only reflects a sample of the waste from "The Coops" pickup, audit two only analysed the recycling and organics streams, and only audit three was completed to the original specifications. Thus, the graph

illustrating the contents of the blue bags by percentage is more accurate than that which compares by weight. Figure 8 demonstrates the discrepancies in sorting from audit to audit and highlights the improvements as the project progressed, however for the sake of accuracy, Figure 9 will be the focus of the results for this stream.

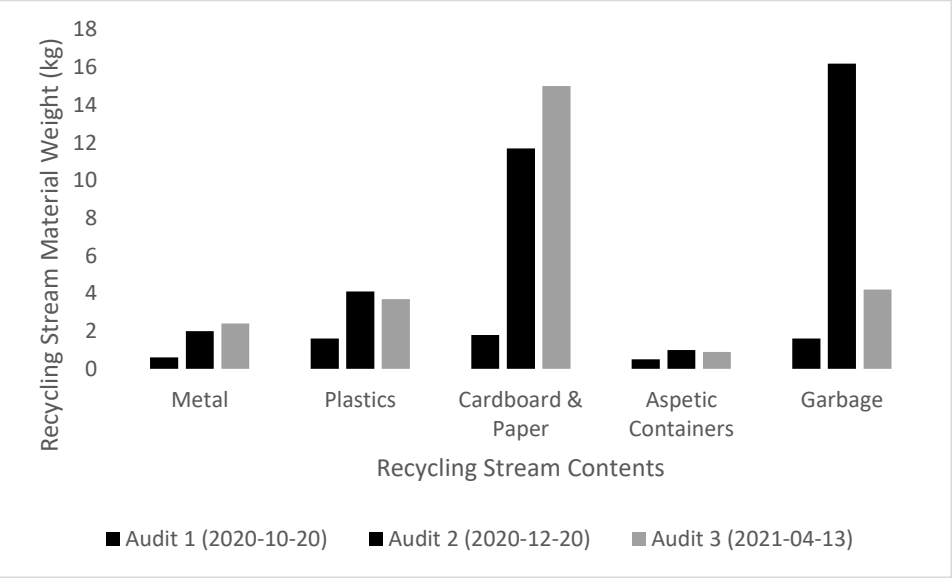

Figure 8: Comparison of the contents of the recycling stream by weight from three waste audits of "The Coops" apartment buildings in Sackville, New Brunswick.

By comparing the contents of the blue bin by percentage, some of the error associated with a lack of consistency was mitigated. Recycling was organized into five categories by Eco360 for these audits: metal, plastic, cardboard and paper, aseptic containers (for example milk cartons), and garbage. The garbage section is made up of any waste that was rejected by the recycling facility or was glass, as Eco360 does not recycle glass at their facility. To determine the success of the project, ideally, the number of recyclable materials in the blue stream would increase while the amount of garbage or "rejects" would decrease as the project progressed. This would address some of the concerns from meetings with Town Staff. Furthermore, these graphs can be used to determine the contamination rate, whether it is comparable to that of the existing residential recycling program in Sackville, and if it lies within Eco360's excepted parameters.

As illustrated in Figure 9, the garbage contamination was the lowest for audit three and highest for audit two. It is possible that the spike in contamination in audit two is the result of the small sample used for audit one skewing the data. Audit one could have had more contamination if more waste were analysed, or tenants may have had more trouble sorting for audit two. The percentage of various types of recyclables is higher in the third audit than in the second for each material. This further indicates a sorting improvement from audit two to audit three. Audit one has similar numbers to audit three for the most part, although there was a higher percentage of plastics, aseptic containers, and garbage in audit one and slightly more metal.

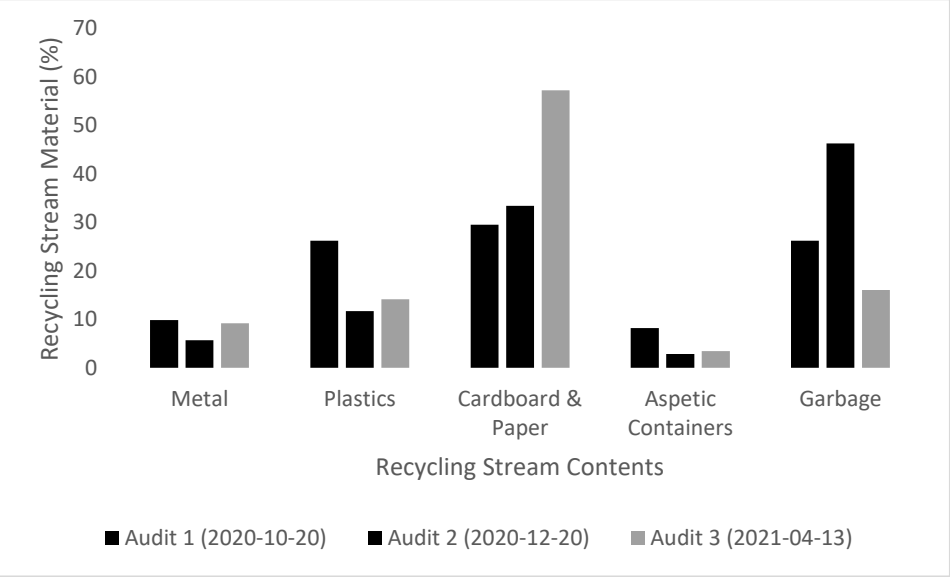

Figure 9: Comparison of the contents of the recycling stream by percentage from three waste audits of "The Coops" apartment buildings in Sackville, New Brunswick.

By dividing the amount of garbage present in the blue bags by the total weight, a recycling contamination rate was determined for each audit and a portion of the existing residential pickup for Sackville, which was also audited in April 2021. These rates are as follows; audit one: 26%, audit two: 46%, audit three 16% and residential: 20%. Of the four percentages, only audit three and the residential waste audit are within the excepted Eco360 parameters, however the third audit is lower. Although the quantitative contamination rates only exist for

the recycling stream, the photos below in figures 10, 11, and 12 exemplify the content and contamination of all three streams based on a visual evaluation.

Due to the lack of precedent, there were many aspects of this project that were improved upon throughout the pilot project. This led to a lack of consistency in certain areas. For example, the audits all contain slightly different data, and the third audit only contained raw data. This is largely due to the nature of the project. As an honours thesis, the pilot project was subject to university deadlines and, although the third audit was completed, the report was not as detailed as the earlier two. Therefore, the contamination rates for organics and garbage will only be qualitatively compared to that of the residential program as reported by an expert at Eco360. Furthermore, organics are significantly heavier than recycling and waste so evaluating the contents by weight would not accurately portray the data.

According to Eco360, by the end of the pilot project and the final audit, the apartment buildings' residents were equally capable of sorting their garbage as the residential residents. They were better at properly sorting organics, and were equal in sorting recyclables, although containers were much cleaner in "The Coops" than in the residential system. Overall, the apartment building tenants were able to achieve the same or better levels of compliancy within approximately six months. This is further exemplified by the contents of the clear bags from the final apartment audit and residential audit from April 2021. The garbage from "The Coops" final audit had 38.1 kg of rejected materials and 12.9 kg of recyclables while the residential garbage had 40.8 kg of rejected materials and 28.6 kg of recyclables. These numbers indicate the visual evaluation from Eco360 to be accurate.

These results indicate that with education and practice, any residential housing can properly sort waste, even those with higher numbers of tenants. Furthermore, there is no need to enforce proper sorting or for residents to be 'held accountable' contrary to Town Staff suspicions. After only six months, "The Coops" residents were able to achieve a compliancy rate comparable to that of the residential collection, who have had years to perfect their sorting. This indicates

that effective recycling education is an important factor contributing to the success of this pilot project, and likely future sustainability initiatives in Sackville. When the proper infrastructure exists, citizens will do their part. Despite the changing COVID-19 restrictions and barriers that may have negatively impacted this project, as the numbers indicate, it was a success, and the hypotheses are supported. When considering the recommendations for the Sackville and Mount Allison community as outlined in the upcoming section, these numbers cannot be ignored. This community is capable of much more than what currently exists in terms of sustainability and climate change mitigation, including a full and frank re-consideration of all of the previously mentioned barriers that are often viewed as being insurmountable, including the actual costs associated with these efforts.

Figure 10: Selection of material contents found in audit one example photos, described as follows by Eco360: organics bags collected for October 15, 2020 audit, organics bags collected for October 15, 2020 audit, aseptic containers found in recyclables, plastics found in recyclables, garbage dumpster contents, and garbage bag contents.

Figure 11: Selection of material contents found in audit two example photos, described as follows by Eco360: organics bags collected for December 3, 2020 audit, organics bags collected for December 3, 2020 audit, metal found in recyclables, aseptic containers found in recyclables, contamination found in recyclables and recyclables collected for Decembers 2, 2020 audit.

Figure 12: Selection of material contents found in audit three example photos, described as follows by Eco360: green bags 1, green bags 2, blue and green bags at arrival 2, cardboard, clear material at arrival and reject 1.

Discussion

Recommendations for A 'Sustainable Sackville'

Sackville has the perfect conditions for implementing sustainable initiatives and climate change mitigation strategies, but lacks the institutional partnerships, direction, and commitment necessary to sustain these modifications. The purpose of this project was to create a blueprint for future programs while addressing any barriers or unknown variables to aid Town staff and encourage the continuation of environmentalism within the municipality, including the significant presence and potential partnership that Mount Allison represents as part of this community. After extensive research, project implementation, thesis writing and professional consultation, accurate and attainable recommendations for the Sackville and Mount Allison community became apparent. This honours thesis was designed to benefit Sackville's progression towards a sustainable future, not criticize the current state of the town or its personnel. Therefore, based on the previous sections of this thesis, the following propositions would best support the goals outlined in documents such as the Sustainable Sackville Plan of 2010, turning theory into practice.

The primary recommendation for Sackville remains the same as identified in the summer of 2020: for the town and university to hire and share a Sustainability Coordinator. This person would primarily work for the Town and report to Town staff, but the university would share the cost of this person's salary. Although the university would be considered a resource or local partner, not unlike Miller Waste and Eco360, their size and impact in the community is disproportionately larger. Therefore, as this staff person implemented programs and initiatives, Mount Allison would require more time and attention and would benefit substantially from this Town hire, thus would cover a small portion of the cost. In this way, there is no confusion surrounding this person's reporting responsibilities or employment status, but they would have a network of contacts within the university. This approach would also reduce the barrier associated with space, where would this person's office be, Town Hall or on campus? Evidently, as part of this recommendation, both the Town and University must, finally, set

out a clear Memorandum of Understanding on their partnership and mutually beneficial effort to act in unison, as part of a community that has sustainability and education at its core. This may be exorbitant yet is essential in addressing the issues that have frustrated so many projects and proposals over past years.

Due to the nature of this type of position, a permanent office space would likely be unnecessary, especially while developing initiatives akin to the waste management pilot project. Whether meetings are in person or via video chat, this person would be spending most of their time in the community. It is essential that the position be established within the community, not only with relevant organizations and businesses, but individual community members as well. They would act as a point of contact for citizens, would be the catalyst implementing tangible progress within the community, and would assist in the realization of goals outlined in sustainability documents. This is not unlike the Wolfville Climate Change Mitigation Coordinator, a position which has proven to be quite successful. By following the best practices of municipalities that have successfully implemented similar positions and relying on the course of action outlined in this pilot project case study, Sackville can effectively pioneer this new type of Town and Gown position, with limited risk of failure. In summary, the town should hire a full-time sustainability coordinator to implement environmental initiatives within the Sackville and Mount Allison community. This person would also be able to drive forward the implementation of widespread recycling and composting in apartment buildings in Sackville, so as to not lose momentum in the wake of this pilot project.

After consulting the professionals at Miller Waste, an immediate-action recommendation was suggested: petitioning the provincial government to ban certain materials at landfills across New Brunswick, effectively requiring waste sorting within the province. This would shift the responsibility and potential negative pushback onto the provincial government, preserving the relationship between the town, landlords and business owners. Furthermore, this strategy has proven to be successful, as it was previously implemented in Nova Scotia. However, this does not absolve Sackville of any liability. The municipal

government must lead this supplication, to hold the province accountable and ensure these recommendations make it past the unread pile on desks of policy makers. In order to be successful in this request, other municipalities must join forces with Sackville to present a united front. For example, including communities such as Moncton, Saint John, and Fredericton would re-enforce the concept that this is a province-wide concern, especially in towns home to a university or post secondary institution. Incorporating the entire province into one exhaustive collection system would increase efficiencies and cut costs. This also provides the opportunity for various waste hauling companies to share the labour, dividing pickups geographically, rather than by contract. These communities must steer other municipalities to a sustainable future, and a comprehensive wide-spread recycling and composting initiative would be the ideal start to improving environmental attitudes across New Brunswick and leading by example. Sackville, as an active member of the Union of the Municipalities of New Brunswick (UMNB), would be well placed to move such a motion within this organization, as they have done with a number of other key issues in environmental sustainability across the province.

A more municipally-based recommendation would be to implement one of the following policy options as an interim step, while petitioning the provincial government through UMNB. These options are as follows: incorporating apartments in the existing infrastructure or expanding waste management to incorporate *all* waste that is generated in Sackville, effectively reorganizing the current program. Both recommendations could be covered by a variety of payment distribution options or environmental grants. The first recommendation would likely be more costly on a per capita basis; by only incorporating apartments there is less opportunity to distribute the costs associated with additional pickups. The second option includes apartment buildings, businesses, houses, and Mount Allison in one waste system. Effectively dividing Sackville by geographic location would ensure that trucks are collecting waste more efficiently and would result in widespread cost distribution. Furthermore, the scale of the second option would allow the Town to contract more than one hauling company

as to preserve the existing relationships. In a meeting with Miller Waste in the summer of 2020, a senior staff person communicated a willingness to share a contract like this with Fero Waste and Recycling Inc. This would be an ideal solution for Sackville's waste management inconsistencies, however there are significant associated costs.

While fees are reduced when more waste generating bodies are involved in the collection system, there would still be a price increase. The Town could cover these costs, however based on previous meetings, it seems unlikely that there is room for this within the municipal budget without a grant, provincial funding or increasing property taxes. Grants and governmental funding are great options for one-time fees or temporary initiatives, but waste management requires a long-term monetary solution. Elevating property taxes would spread the financial burden more evenly within the community, as landlords can offset or download the fees to their tenants. However, it is this type of policy implementation plan that would likely receive significant backlash, from both landlords and tenants. This issue also exists with the alternate option: mandating landlords (and business owners) to implement the three-stream waste system via their own individual contracts.

This option would be even costlier as these contracts would lose the efficiencies from incorporating all waste management into one community system at a uniform scale and community-wide policy and practice. While this would give landlords more freedom over their contracts in terms of choosing a hauler, it would ultimately be more expensive. After considering all the potential policy options for a long-term, comprehensive implementation of three stream waste management at apartment buildings and businesses in Sackville, the best course of action is as follows: incorporating the entirety of the Sackville/Mount Allison community into one system. This framework would contract to two or more haulers due to its size, and the increase in costs would be shared by both the Town and business owners/landlords. The organization of this system would occur in tandem with the creation of a committee of town officials from municipalities across New Brunswick to persuade the provincial government to ban recyclable

materials and organics in landfills across the province. Furthermore, to sway the Sackville municipal government to implement such a program, a cost-benefit analysis would be performed to demonstrate the environmental advantage of properly sorting waste. While there are associated fees for this infrastructural change, this type of analysis would exemplify the need; sustainable development costs, but the price of not acting is far greater. Therefore, a cost-benefit analysis of implementing this inclusive waste management program is one of the recommendations requiring immediate action.

These recommendations will not only require monetary resources, but staff time as well. This further illustrates the need for an environmental staff-person within the community. This person needs to be familiar with the inner working relationships in Sackville and how to further connect to businesses and organizations. They must also incorporate environmental education within their goals, as previously illustrated it is the key to success, along with coordination and cooperation. This past week, there has been exciting news in Sackville: the town was the recipient of a provincial government Environmental Trust Fund grant to fund a part-time one-year environmental position within the community in 2021/2022. This is a great opportunity for Sackville, especially if these recommendations are considered, along with the possibilities for this position as previously outlined by the Halifax and Wolfville case studies. By implementing initiatives with short-term paybacks, and quick wins, while also working towards long-term goals, this person can theoretically find funds to renew their own position. Immediate and tangible changes within the community will demonstrate the importance of such a role, while also facilitating the implementation of sustainable infrastructure, which is prolonged and often unseen by community members. This person could be the catalyst the Sackville/Mount Allison community needs to work towards a sustainable future, especially by considering the relationships, case studies, barriers and recommendations as outlined in this thesis and pilot project.

Long-Term Goals for A Sustainable Community

The aforementioned recommendations are designed for short term environmental changes within the community. However, to truly reach its potential as a hub of sustainability, there are recommendations that could aid Sackville in the future. Specifically, the role of 'sustainability coordinator' is the beginning of building a larger office of sustainability in the Sackville/Mount Allison community. As this type of office grew, so would the necessary staff. The goal would be to create not only a money-generating resource for the sustainable development, but also a hub of community-based environmental education. This office could house student-led projects, not unlike this one, and hire student interns. This would likely resemble the Dalhousie Office of Sustainability, which generates income for the university. Furthermore, it would strengthen the Town and Gown relationship while creating an opportunity for more education for sustainable development. This pilot project supports the theory that through partnerships, education and governance, sustainable development is achievable and by creating an integrated sustainability office, Sackville can ensure its role as a leader in environmental, community-based action. All of these initiatives can be supported, sponsored or contributed to by the research, education, student internship and other resource possibilities that housing a public university brings to the community. Mount Allison is the largest employer in Sackville, as well as a massive consumer of energy and producer of waste. The economic, social and environmental impact of the university must be considered in the design and creation of a truly sustainable community. If not Sackville, where?

Conclusion: Sackville, The Future of sustainability

When considering the conditions necessary to foster environmental progress in communities worldwide, Sackville, New Brunswick exemplifies the possibilities when key players work in cooperation and coordination with one another. By testing this theory through an action-based waste management pilot project at "The Coops" apartment buildings, a blueprint for further action and initiatives was created. This research and action approach created a working document that will assist in creating accessibility to university research as it

attempts to narrow the divide between Town and Gown. By creating a project that involves both the town and university, Mount Allison's impact on the greater community became clearer; the two are intertwined. One cannot consider the sustainable future of the town without considering that of the university. As is the case in many other small university towns, they are intrinsically connected.

In order to create a truly sustainable community, Mount Allison University and the community of Sackville must strengthen their relationship and creating a shared sustainability coordinator position is the ideal starting point. In a community teeming with knowledge, the conditions are ideal for future initiatives, much more exhaustive than this pilot project. After considering the circumstances necessary for the type of environmental progress seen in communities such as Wolfville and Halifax, it is increasingly evident that once there is momentum propelling sustainable development, the possibilities are endless. The immediate future of sustainable development in Sackville is largely dependant on the months following the completion of the waste management pilot project. Not only has this project captured the interest of Town officials and council members, but the upcoming 2021 municipal election presents the opportunity to include these environmental values, within the Town's policy and programs. To answer the question asked in the title of this thesis, 'If not Sackville, where?' each aspect of this project must be considered, especially education, partnerships, and governance. The circumstances required for environmental progress exist, the partners are willing to cooperate, and residents are longing to see change, if not Sackville, nowhere.

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