Executive Summary

Introduction:

The annual amount of textile waste per Nova Scotian is approximately 37 kg, of which 95% is generally recyclable. This growing amount of waste is leading to many negative environmental, ecosystemic, and economic repercussions brought on by the decomposing process of textiles, specifically through methane gas release and toxic chemical seepage into soil. There are however many methods that both individual citizens and the provincial government can carry out to reduce this vast amount of pointless waste.

Damaging Effects of Textile Waste:

The majority of textile waste ends up in landfills, where the decomposition process involves the release of methane gasses into the atmosphere, contributing to global warming. Furthermore, dyes and toxic chemicals leak into the groundwater and soil causing damage to the environment, ecosystems, and harming living organisms. These damaging effects also negatively impact the economy, due to forced migration and degradation of natural capital.

Improvements for the Future:

Many improvements can be made by the province of Nova Scotia including further promoting donation programs for textiles and clothing, as well as implementing new renewal technologies for textiles. Improvements can also be made by each citizen including:

- Participate in clothing donations
- Steer away from using fast fashion
- Participate in clothing swaps
- Rent single use textiles or clothing

Textiles and Clothing Waste:
Environmental Harm and Future Methods of Reduction

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Each and every year the number of textile waste continues to rise, which can and already has led to numerous harmful environmental side effects. Though many do not realize, the average citizen throws away over 37 kilograms of textile waste annually, of which 95% are generally recyclable (CBRM, n.d.). Out of the entirety of landfills riddled with garbage, over 10% of the entire waste comes from textiles (CBRM, n.d.). We have maintained efforts to limit this waste by recycling, which has led to 7000 tons of clothing and textiles being recycled annually (CBRM, n.d.). However, despite these efforts there still remains nearly 30,000 tons across Nova Scotia alone, not even to mention across the entire planet (CBRM, n.d.). The end of life textiles being left within these landfills can decompose naturally however it requires over 200 years, and the process also leads to the production of greenhouse gas emissions as well as leaked dye and toxic chemicals into the groundwater and soil. These side effects lead to massive environmental and ecosystem harm, and even impacts our economy, though it may not readily seem. As a province and community efforts are put in place to reduce this excessive number of waste, specifically through clothing and textile donation programs (CBRM, n.d.). Many other areas have also implemented new technologies which effectively break down textiles into molecular form to be reused in the process of making textiles (CEFIC, n.d.). Creating a perpetuating cycle and limiting the number of textile waste. Lastly, there are many ways in which both our province of Nova Scotia as well as individual citizens can help to reduce this vast amount of waste. We only have one planet, and if we wish to have a safe and clean home for our future generations, we must act now. Individual efforts may seem small and hopeless, but they build up over time and they do truly make a difference for our environment.

Generally, when textile waste is disposed of in landfills, the items remain sitting there very slowly and gradually decomposing over the course of 200 years (Brown, 2021). Throughout

this process greenhouse gas emissions, specifically methane gas, are being released into our atmosphere. While dyes and toxic chemicals are being absorbed into the groundwater and soil. Both of these issues have detrimental effects on our environment, our ecosystems, and even our economy. To begin, when excess greenhouse gasses are released into our atmosphere they start to have an effect on global warming. These gasses, methane for example, work to absorb energy from the sun, and raise the temperature on our planet. Without it the energy that reaches earth from the sun will be reflected back out into space through infrared radiation (United States Environmental Protection Agency, 2021). The problem is that when excessive gasses build up in the atmosphere too much energy is absorbed and it raises our global temperature. Not to mention methane gas usually exists in the atmosphere for up to 12 years (IEA, 2022). This rise in temperature leads to many worrying side effects such as extreme seasonal changes, melting of polar ice caps which in turn lead to rising sea levels, and even changes the livable conditions for habitats among plants and animals (Lindsey & Dahlman, 2024). Moreover, the dye and toxic chemical leakage often tends to seep into the ground, once again causing many issues. When the groundwater becomes contaminated by extremely small toxic chemicals, a process known as bioaccumulation occurs in which small organisms ingest these chemicals due to the high presence in water (Chojnacka & Mikulewicz, 2014). As we continue to move up the food chain we see a rising increase in the amount present within larger organisms, called biomagnification, which can cause damage to their metabolic functions and their subsequent health (CIMI, 2021). Furthermore, when these chemicals seep into the soil they can cause changes to pH which affects the ability of organisms to maintain homeostasis and once again have proper metabolic functions (Agriculture Victoria, 2021). The effects are endless and generally have a domino effect where one aspect is negatively impacted leading to many others to become damaged as well. Lastly,

though it may not seem, the effects of climate change caused by the decomposition of textile waste can even influence our economy, mostly through this previously mentioned domino effect. It will result in damage of homes, infrastructure, and cause increased worry regarding extreme weather conditions leading many families and individuals to flee the area. These displaced populations may cause strain on host nations due to a lack of resources and infrastructure, leading to economic pressures (Huang, 2023). The severe negative consequences brought onto the ecosystems, and the degradation of natural capital can impact sectors which are dependent on ecosystems such as agriculture and fisheries, leading to a loss of productivity, output of services, and subsequently negatively impact our economy.

To help mitigate these impacts and environmental damage, many nations, states, and provinces have been implementing systems and services to reduce the large amount of textile waste. Specifically, Nova Scotia has been conducting a used clothing and textile donation program. Within they accept virtually every type of item regardless of condition, to then make the decision as to whether or not it can be recycled (Huang, 2023). This program is likely the reason why we only have 30000 tons of textile waste rather than 37000 tons. Furthermore, there are also many other locations in which further services are provided to accelerate the decomposition of textile waste. For instance, a company known as Renewcell has manufactured technology to break down textile waste into a biodegradable pulp which can be used to create textiles and clothing rather than wood (CEFIC, n.d.). Creating a perpetuating circular cycle for buying, reusing, and producing textiles and clothing (CEFIC, n.d.). This technology effectively combats the growing trend for fast fashion, one of the leading causes in not only our province but the world as a whole in producing textile waste.

Looking towards the future, in an effort to reduce the annual amount of textile waste to prevent many of the negative side effects brought on by the decomposition process, both individual citizens and the province of Nova Scotia have numerous methods of improving the reduction in textile waste. Firstly, individual citizens have many options to prevent the excess waste of textiles and clothing. These include: participating in donation programs or clothing swaps for unused textiles that would be previously thrown away, veering from their reliance on fast fashion, and even looking into the potential for renting clothing that may only be used on a few occasions (Brown, 2021). These are some of many different ways in which each citizen can work towards reducing their textile and clothing waste, considering over 95% of the waste can be recycled. Moving onto the province of Nova Scotia, they have an equally important responsibility, if not more, to prevent the excess annual waste of textiles and clothing. To achieve this, they need to maintain their donation programs and make it widely available to each and every citizen. Individuals will not donate if the program is not readily accessible, nor will they if they are unaware of the program, leading into the next point. More marketing and advertising needs to be conducted to spread the information regarding these clothing and textile donation programs. Individuals cannot do their part of this fight if they are unaware, as are most citizens, of the programs available. Lastly, Nova Scotia would likely benefit from implementing similar technology to Renewcell's. As expensive as the technology may be to implement, the negative environmental and economic repercussions far outweigh the costs, and would even likely reduce the amount of future spending on reversing the side effects brought on by the decomposition of textile waste.

To conclude, though many of us do not realize, on average we throw away over 37 kilograms of textile waste annually. The massive amount of waste builds up immensely when

considering the total population of Nova Scotia, and has detrimental side effects to our environment, ecosystems, and our economy. As a province, measures are in place to help reduce this amount, through clothing and textile donation programs to allow for recycling of still useful items. There are also new technologies being created which help to accelerate the decomposition of textile waste and actually transform it into a substance which can be used to further create new textiles. Creating a perpetuating cycle and combating the growing problems related to fast fashion. As citizens of Nova Scotia there are many ways in which we can help reduce our annual textile waste. Specifically through clothing donation programs, clothing swaps, less reliance on fast fashion, and even looking towards renting single or few use textiles. Furthermore, the province of Nova Scotia needs to further promote their donation programs as it remains extremely unknown to many individuals, preventing them from effectively having accessible opportunities to reduce their own individual textile waste.

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