

Article

Public perceptions of legislative action on reducing plastic pollution: A case study of Atlantic Canada

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Abstract: Government-led legislation is a key strategy to reduce plastic pollution; however, societal perception can heavily influence government intervention for environmental issues. To understand the public acceptability of government action to reduce plastic pollution, we examine the perception of existing and upcoming legislative action on single-use plastics by means of a structured survey with additional semi-structured interviews. Our focus is on the four Atlantic provinces of Canada, which was the first region in Canada to implement provincial-wide legislation for plastic reduction at the consumer level in 2019. Results show strong public support (77 %, n = 838) for bans on single-use plastic bags at the consumer level, and for further plastic pollution reduction legislation. However, the level of support differed between regions and by demographics. Semi-structured interviews show that decision-makers should increase efforts in raising consumer awareness and standardizing regulations across jurisdictions for smoother transitions prior to legislative action.

Keywords: Single-use plastics (SUPs), plastic pollution management, policy, pollution, Atlantic Canada.

1. Introduction

Plastic pollution is gaining recognition among the public as a global contaminant that requires government intervention. Since mass production in the 1950s, plastic and plastic products have become heavily integrated into modern society [1,2]. Overproduction, societal consumption, and mismanagement of waste increases the likelihood of plastic escaping into the environment [3-5]. As plastic pollution is progressively becoming a mainstream concern for the public, a global movement has motivated government legislative intervention, through bans and other forms of regulation, to reduce plastic use and disposal [6-9]. Public support is a key component to ensuring the compliance and acceptance of legislation to control plastic pollution [10,11]. As such, understanding public perceptions is a critical component in directing future plastic reduction legislation, especially since plastic production has doubled every decade [4].

Canada has contributed approximately 4.6 million tons of plastic to the global total, while generating 2.8 million tons of plastic waste [12]. Plastics are now used in every sector of the Canadian economy [13-16], which produces more plastic waste per capita than anywhere else in the world; yet only 9 % of this plastic properly recycled [17-19]. The Government of Canada has increased efforts in achieving zero plastic waste by committing to legislatively ban check-out bags, straws, stir sticks, six-pack rings, plastic cutlery, and food containers made from hard to recycle plastics under Schedule 1 of the *Canadian Environmental Protection Act* (CEPA) 1999 by the end of 2021 [19-22].

Several jurisdictions across Canada have either implemented or are considering legislation with respect to the reduction of plastic wastes [14-16]. On a provincial level, each province of the Atlantic region is following their own regulatory regime for plastic

pollution legislation. Prince Edward Island (PE) was the first Canadian province to implement a province-wide plastic bag ban on July 1, 2019, closely followed by Newfoundland and Labrador (NL) on October 1, 2020, and Nova Scotia (NS) on October 30, 2020. New Brunswick (NB) has no current plans for province-wide legislation of plastic bags or other SUPs; however, there are ongoing efforts at the municipal level to reduce plastic bags [23].

The current difference in legislation between Atlantic provinces offers a unique opportunity to observe the public's perceptions of plastic pollution legislation before, during, and after legislation has been implemented. As such, we seek to understand whether location, demographics, and/or existing concern for the impacts of plastics on the environment influences public support for the upcoming and/or existing legislation on single use plastics in Atlantic Canada. It is anticipated that the public will comply with the proposed government legislation; however, a small degree of negative perceptions of government action are to be expected. This study further attempts to identify best practices for future SUP mitigation strategies in Atlantic Canada to progress SUP reduction efforts by 1) identifying strategies for improving public cooperation of SUP reduction initiatives; 2) providing future direction for SUP legislation; and 3) better influencing SUP education and communication materials to the public. These outcomes can inform future policy and legislation decisions, as they advance the knowledge gap that exists around public perceptions of plastic reduction legislation.

2. Materials and Methods

Adapting methodology from Varkey et al. (2021), surveys and subsequent semi-structured qualitative interviews were used to understand public perception of plastic reduction legislation in the Atlantic provinces of Canada. A survey was conducted through online distribution to reach residents of Atlantic Canada to gauge interest and concerns surrounding SUPs, and to determine perceptions of plastic bag bans. Since the survey was broadcast solely online, it was not possible to determine the number of people the survey reached. Semi-structured interviews were conducted to provide an in-depth comparison of SUP reduction between provinces from experts in the field. We note that our research was conducted prior to enactment of plastic bag bans in NL and NS during summer 2020. Data collection methods were completed in accordance with the Dalhousie University Research Ethics Board.

2.1 Survey

A survey was tailored to each Atlantic province (see supplemental information). Each survey began with a brief section on respondent demographics, followed by 10–12 multiple choice questions (depending on province) related to their use of plastic bags and perceptions of plastic pollution legislation in their respective province. The survey was anonymous, and respondents had the freedom to leave the survey at any time. Only completed surveys were considered for analysis. Survey respondents also had the option to add additional comments at the end of the survey. There was no incentive or compensation provided for completing the survey. The survey was first distributed online in June 2020 via social media (e.g., Facebook, Instagram, Twitter), and remained open until the end of August 2020. The survey was also promoted on local news outlets through radio interviews and web articles in NB, NS and PE, increasing exposure to thousands of potential participants across a range of populations.

Results of the survey were compiled and responses for location, demographics, existing concern for plastic, and whether the participant supported, opposed, or was neutral about legislative action on single use plastics were extracted. Responses from the three factors were then individually compared against the corresponding responses for the

participants' perceptions of a plastic bag ban. For each factor, the number of responses for each level of support option were counted and standardized for comparison. The original count was converted into percentage of each response to highlight trends within the data. A one-way ANOVA was used to compare responses within each of the three factors against the participants' viewpoint on a bag ban. Factors were analyzed individually to identify practical trends for future SUP reduction efforts. Following this, a Tukey Kramer Ad Hoc test was conducted to identify groups that were different; $p < 0.05$ was considered statistically significant.

2.2 Semi-structured interviews

Semi-structured interviews were conducted concurrently with the distribution of surveys between June 2020 and August 2020. The interviews provided an in-depth comparison of the provinces' concerns and opinions from experts in the field. Interview participants included those who work in waste management, the environmental non-governmental organization (ENGO) sector, local or provincial government, and academic researchers in the four Atlantic provinces. As with the survey itself, interview questions were tailored to each province (see supplemental information). Interviews were semi-structured in nature and designed to gather a better understanding of the interviewee's ideas and concerns surrounding plastic legislation and best practices towards a zero-plastic waste future for Atlantic Canada. Interviews were conducted using either video conference or phone call, which were recorded and transcribed. Participants' identities were kept anonymous using an alphanumeric code. Responses that addressed the three research questions were extracted and coded through a process of theoretical thematic analysis as outlined by Maguire and Delahunt (2017) [24]. Themes were then compared with the results from the survey to develop recommendations for future SUP reduction strategies.

3. Results

3.1. Survey

A total of 1,092 community members participated in the survey (712 from NS, 231 from NB, 88 from PEI, and 61 from NL). Overall, there was a high level of support (77 %, $n = 838$) for plastic bag bans across Atlantic Canada. However, this differed between provinces. NB and PE were the most supportive provinces of the ban, both with 92 % of participants in support of a ban. NL also displayed strong support, with 90 % approval for a plastic bag ban. There was more opposition in NS, with only 67 % of participants supporting a plastic bag ban (Figure 1).

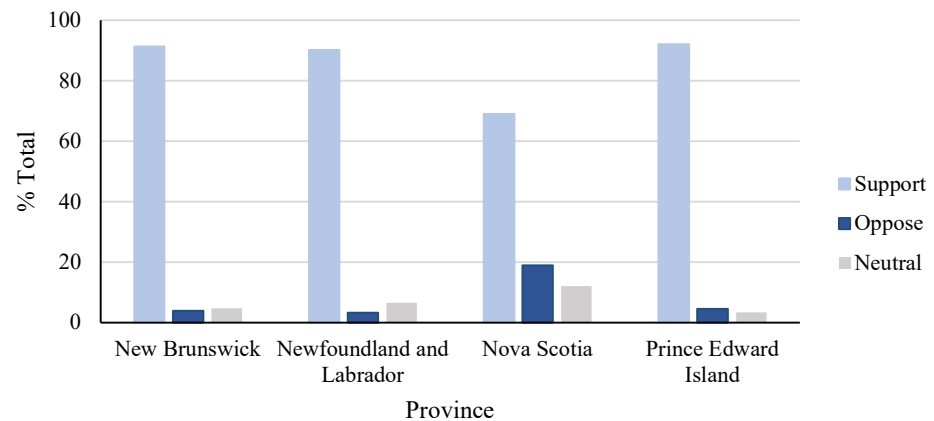


Figure 1. Survey responses of participants' perspectives on plastic bag bans in Atlantic Canadian provinces.

When examining gender, 776 of participants identified as female, whereas 293 identified as male. The survey shows 82 % (n = 639) of females supported a plastic bag ban compared to only 62 % (n = 185) total support from males (Figure 2a). Those who identify as non-binary were included in our survey; however, there was insufficient responses to determine a trend. When examining the age category of respondents, 195 participants identified as 18 – 24, 208 participants identified as 25 – 34, the 35-44 and 45-54 age groups both had 140 participants, 172 participants identified as 55 – 66, and 238 participants identified as 65+. Most age groups responded that they supported a plastic bag ban.; however, the level of support varied across age categories. The 18 – 24 age category was strongly supportive with 92 % (n = 180) of respondents, whereas only 63 % (n = 152) aged 65+ responded that they supported a ban. Support for a ban decreased with increasing age (Figure 2b).

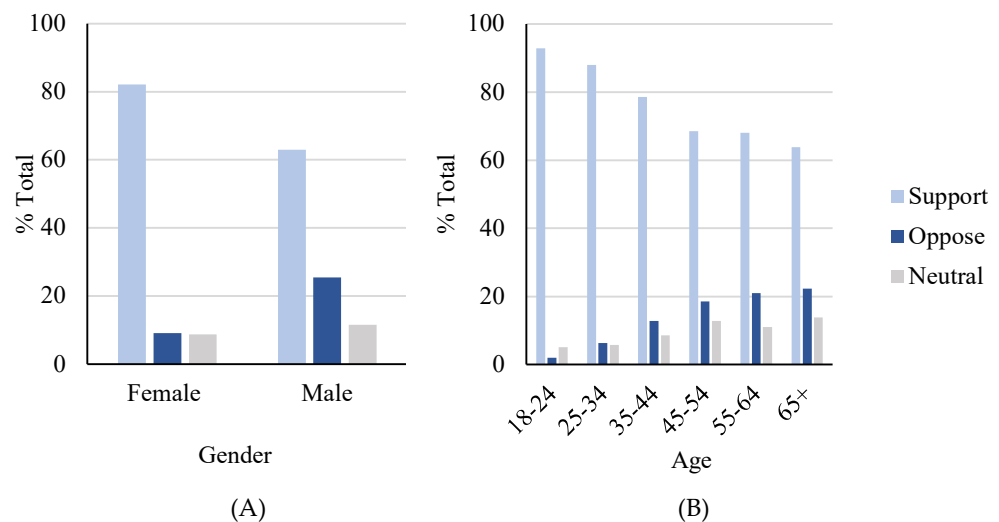


Figure 2. Survey responses of participants' perspectives on plastic bag ban across Atlantic Canada, a) relative to gender, and b) relative to age.

The survey suggests that having some form of advanced education results in a higher likelihood of a participant supporting a plastic bag ban. Those who identified as holding

a bachelor's, master's, professional, or doctorate degree were the most supportive of a bag ban with 82 % (n = 326), 89 % (n = 145), 85 % (n = 46), and 81 % (n = 40) in support, respectively. Following in succession, 76 % (n = 130) of participants with a college diploma, 65 % (n = 106) of participants with a high school diploma, 62 % (n = 10) of participants with an associate's degree, and 51 % (n = 29) of participants in the trades identified as supportive of a bag ban (Figure 3a). In terms of employment status, the survey showed that students were the most supportive, with 92 % (n = 108) of participants. This was followed by part-time workers with 87 % in support (n = 71), unemployed participants with 83 % (n = 52) in support, full-time workers with 78 % (n = 388) in support, retired participants with 66 % (n = 185) in support, and self-employed participants with 60 % (n = 34) in support of a plastic bag ban (Figure 3b).

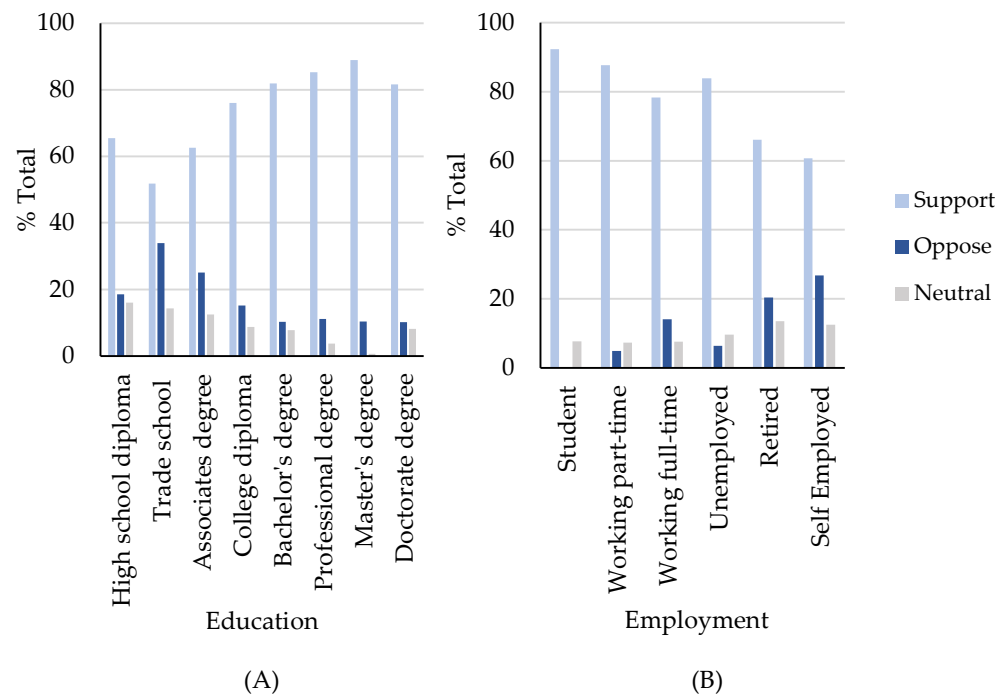


Figure 3. Survey responses of participants' perspectives on a plastic bag ban across Atlantic Canada, a) relative to level of education, and b) relative to employment status.

Across Atlantic Canada, 1,020 participants stated they were concerned about the impacts of plastics on the environment, whereas the remaining 70 participants were not. These responses were then compared with the participants' perception of a bag ban to determine if existing concern for the impacts of plastic bags had an influence on supportiveness of a bag ban. The survey shows 82 % (n = 837) of participants who are concerned about environmental impacts were supportive of a bag ban. Conversely, participants who identified that they were not concerned about environmental impacts of plastic pollution were largely unsupportive of a ban, with 88 % (n = 62) stating that they oppose a ban (Figure 4a). When asked about future legislation, 75 % of respondents stated they would like to see more legislation reduce SUPs. NB was the province the highest support of respondents, with 92 % (n = 215) of participants expressing they would like to see further legislation for reducing single-use plastics. Respondents from NL, NS, and PEI all had similar opinions about implementing further legislation to reduce SUPs in their province with 72 % (n = 43), 71 % (n = 516), and 71 % (n = 63) in support respectively (Figure 4b). When provided with the opportunity to nominate other SUPs to be included in a bag ban under future legislation, common answers included straws, plastic bags, and plastic bottles.

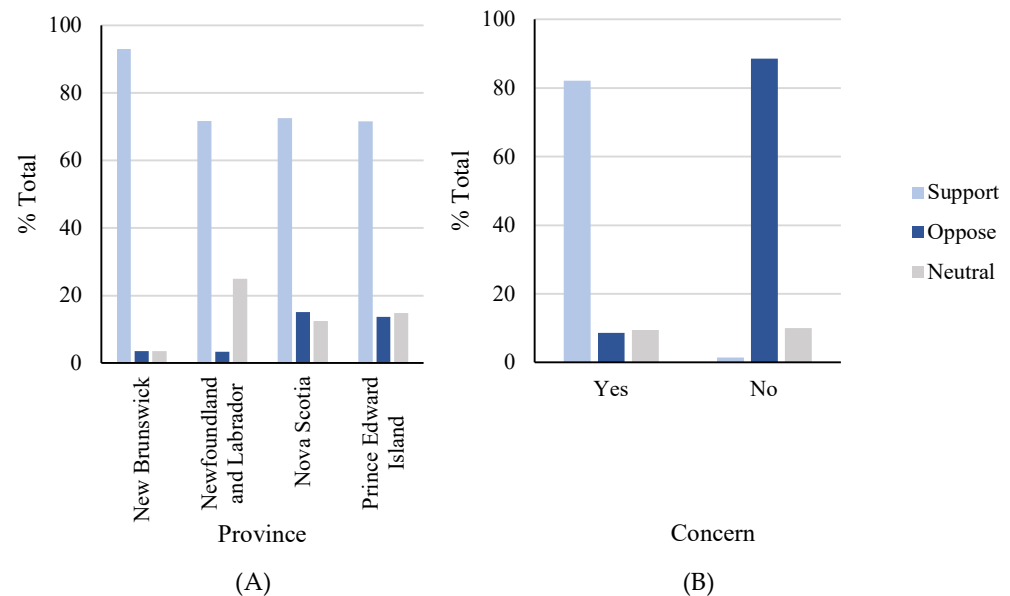


Figure 4. Survey responses of participants' perspectives on a plastic bag ban across Atlantic Canada, a) relative to concern for the impacts of plastic bags on the environment, and b) desire for future plastic pollution legislation.

The analysis shows most participants across Atlantic Canada have similar perceptions of a plastic bag ban; however, we found a significant difference between location ($p = 0.03$). There was also a significant difference found between demographic categories within individual provinces, with differences in the level of education in NL ($p < 0.01$), and age ($p < 0.01$) and employment status ($p < 0.01$) in PEI. Within these factors, NS was found to have statistically lower support for the ban than the other three Atlantic provinces. In NL, those with a trades background were found to have statistically lower support than other levels of education. In PEI, age groups with statistically lower support were 45 – 54, and 65+. Retired and self-employed participants also had statistically lower support than other employment categories.

3.2 Semi-structured interviews

Of the 36 interview requests sent to potential participants, 14 were available: six participants from NB, one participant from NL, four participants from NS, and three participants from PEI. The final sector tally included four government workers (municipal or provincial), three employees from the ENGO sector, four academic researchers, and three waste managers.

Reactions to a plastic bag ban were mixed; participants from NB expressed uncertainty, stating that there are many unknowns due to lack of communication with the federal government and conflicting public support. Participants from the other three Atlantic provinces discussed a more positive response, with the most enthusiasm from those in PEI. Across Atlantic Canada, government workers were apprehensive, although they understood the public desire for environmental action. ENGO workers were eager about a bag ban and optimistic about the potential for it to spark further eco-friendly behaviour. Academics were supportive, although some would like further education from the federal

government prior to implementation. Waste managers were positive about a plastic bag ban, stating that it's something that should be well received (Table 1).

Table 1. Predictions of the public's response to a plastic bag ban organized by province and sector with sample quotes from interview participants.

Question: How do you predict the general public will respond to a plastic bag ban?

New Brunswick	
Government	"It's a hard question right now with the unknowns of what's coming down from CCME [Canadian Council of Ministers of the Environment] and the federal government."
ENGO	"New Brunswick has the ability to make the shift. If the changes would be made, I hope that people would react positively to it"
Academic research	"Making the transition should not be too difficult...it might be a little tough to start out with but it's coming in in a very user-friendly way."
Waste management	"I believe that it is something that can be a positive piece of change."
Newfoundland and Labrador	
ENGO	"It seems to be accepted by a lot of people and expected almost, no one was shocked to see it come in."
Nova Scotia	
Government	"There was a lot of interest from the public to see plastic bags banned... but I'm not sure where Covid-19 will lead us."
ENGO	"I believe Nova Scotians are ready to take the next step. Seven years ago, <i>Superstore</i> tried to create [a fee] for plastic bags and Nova Scotians were angry. But <i>Walmart</i> had a similar program three years ago...and everyone was fine. To me it's demonstrated a shift in attitude."
Academic research	"I think Atlantic Canadians have already expressed their overwhelming support of such a ban."
Waste management	"I think it will be well received by the majority of people."
Prince Edward Island¹	
Government	"A lot of people were really excited, and a lot of people were really annoyed. But it was implemented over a long period of time, there was a lot of notice, and people adapted incredibly well."
Waste management	"I was amazed at how receptive the public were to the plastic bag ban. I thought the public would be against it but there weren't any negative comments. It seemed like everyone wanted it to happen."

¹ For PEI, the question was adapted to "How did the general public respond to the plastic bag ban?"

Ideally, legislation to address plastic pollution can serve a dual purpose of reducing the targeted item while also encouraging the public to make a conscious effort to reduce their use of other SUPs. Predictions on the potential of a plastic bag ban to reduce the prevalence of other SUPs in society were uncertain. Participants from NB were largely skeptical,

arguing that some SUPs are practically impossible to avoid in today's market, and therefore change is only possible through government intervention. Participants from other three Atlantic provinces were hopeful, while recognizing the need for further monitoring to confirm any definitive changes in the amount of SUPs reduced. Across Atlantic Canada, government workers were the most critical sector, claiming it is too soon to determine public response. ENGO workers, academics, and waste managers were more confident in the reduction of other SUPs, trusting the potential for behavioural change (Table 2).

Table 2. Interview participants views on the potential for a plastic bag ban to reduce society's use of other SUPs.

Question: Do you think the plastic bag ban will also reduce people's use of other single use plastics such as straws, plastic to-go containers or take out coffee cups?

New Brunswick	
Government	"I'm not sure if there's any evidence to prove that or not right now"
ENGO	"I think it would start a domino effect. I think that people would start to realize there are other ways they can reduce their single use plastic use."
Academic research	"Until plastic becomes less convenient than some other material, [society is] going to keep using it unless the government steps in and says otherwise."
Waste management	"It helps raise awareness of other single use plastics. Whether that changes people's behaviour, we'll have to see"
Newfoundland and Labrador	
ENGO	"To some degree it is starting to change the behaviour...but there are also those people who just wait for [government legislation]."
Nova Scotia	
Government	"It is definitely a way to get people thinking...and if it's messaged properly then it's even more likely"
ENGO	"It could have a positive influence. It will make people think a little more about other [plastic] products that might not be banned."
Academic research	"We see this as a gateway plastic...so if you reduce plastic bags, it will lead to other positive reduction in consumer behaviour."
Waste management	"I think so because it's become an education piece...and people are looking at things differently."
Prince Edward Island¹	
Government	"There isn't much of an effect, but it is bringing it into the conversation. It might be a little bit too soon to get a good idea of it."
Waste management	"Yes, I believe we've seen a big shift. It has definitely had a ripple effect to other single use plastics."

¹ For PEI, the question was adapted to "Has the plastic bag ban helped to reduce people's use of other single use plastics such as straws, plastic to-go containers or take out coffee cups?"

4. Discussion

There is an increasing interest in the public over government action on environmental issues due to growing concerns about environmental sustainability and climate change [25]. Skepticism of government-led action on environmental issues is often associated with a lack of involvement, communication, and evidence of success [26]. However, Konisky et al. [27] show that the public attitude on environmental policy differed strongly across issues, with pollution and pollution abatement as strongly supported even by those who identified as skeptical of environmental issues [27]. Our survey strongly supports this notion. We found strong public support for government-led action on single-use plastic bags across Atlantic Canada, which corroborates higher regional motivation of consumers to reduce use of SUPs [16]. Equally important, predisposition to recognizing plastic pollution as a problem expectedly translates to a lack of support for government action on the reduction of plastics.

We found a notable difference in support between whether the participant is concerned for the impacts of plastic in the environment or not. The majority of those who are concerned about plastic are also supportive of a bag ban; whereas the majority of those who are not concerned about plastic, or the environment are also unsupportive of a bag ban. This is an unsurprising pattern as those who are environmentally conscious are likely to support environmental initiatives [28]. This extreme dichotomy between the two groups is important to consider when planning for future SUP mitigation efforts, especially for targeting education and communication efforts. The lack of environmental concern could be attributed to a false sense of security, or a blind turning eye [29]. At the time of our survey, the government of PEI had already implemented a ban on SUP bags, which was acknowledged and supported by a clear majority of our survey respondents. After one year of a plastic bag ban, PEI has eliminated more than 16 million plastic bags from the waste stream [30]. However, not all provinces shared the enthusiasm expressed by respondents from PEI. For example, lower support was identified for NS compared to the other provinces in Atlantic Canada, with semi-structured interviews suggesting this could be a result of poor communication on currently proposed legislative action. Currently, each provincial plastic bag ban includes its own exceptions to the legislation, which are not consistent across jurisdictions [31]. Province specific exceptions can create confusion amongst businesses in terms of what is expected of them, and for the public when only certain items are available.

Demographic factors were found to be a large contributor to differences in support for legislative action on plastic pollution. We found a linear decline in support as age increases, with a lower support seen with after each consecutive age group. Those < 35 years of age were the most enthusiastic for government-led action on plastic pollution. This is consistent with Reinhart (2018) and Ballew et al. (2019) who note that those < 35 years of age are most likely to believe that climate change will pose a serious threat and be the most engaged in climate activism [32,33]. In recent years there has been a surge in youth-led climate justice movements [34]. Millennials and Gen Zs show a high concern for environmental issues [15,16]. Social media has allowed the spread of information faster than ever before, which has created a positive feedback loop where the more attention a movement receives, the more that younger people are drawn to that movement [35].

Higher level of education was found to be more supportive of government-led action. Education is often correlated with environmental awareness. Education can lead to the development of new perspectives and moral-based transformations, which encourages a more environmentally conscious mindset [36]. Studies have found that educated individuals have higher levels of environmental concern, and thus are more likely to participate in eco-friendly behaviours [37,38]. We also found that females are more likely to be supportive of a plastic bag ban than males. This ideology, termed the “eco gender gap”, has already been documented by Mintel (2018), who found that in the United Kingdom, 71 %

of women are making a conscious effort to live sustainably compared to only 59 % of men. The difference in behaviours may be attributed to disproportionate marketing and/or underlying gender roles [39]. Eco-friendly campaigns and green products are often advertised toward female audience, as if sustainability is “women’s work” [40]. The innate mindset of females being the caregiver can create negative stereotypes and further exacerbate the collective effort to become more environmentally sustainable. Additionally, research has found men are less likely to participate in environmentally friendly activities for fear of being perceived as effeminate or to protect their gender identity [41,42]. This includes carrying reusable bags, purchasing green branded products, or even adopting a vegetarian diet [43].

We did not find a clear pattern behind support for government-led initiatives based on employment status; yet our survey does indicate that the least supportive participants are those who are unemployed, followed closely by those who are retired. While age and education may be conflating factors, the lower support among those not in the workforce may also be attributed to the limitation that these individuals are not as exposed to social norms common in the workplace and/or do not have the financial capacity to fund being plastic free. Pro-environmental behaviours within the workplace have been known to influence an individual’s attitude towards making sustainable actions [44]. Additionally, economic costs of transition to a plastic free lifestyle can often be more expensive for the individual.

We note that this research was conducted during the Covid-19 global pandemic. As such, it is difficult to determine typical behaviours and perceptions during this time since the use of SUPs has increased. The data collection period occurred during the months of July and August 2020, before the provincial plastic bag bans were implemented in NL, and NS. Therefore, responses from these provinces represent participants’ anticipated behaviour. The participants of the study are a volunteer sample and represent only a certain percentage of the population. Further, the majority of those who participated in the survey likely already care for the environment which could create a bias in the data. There was a disproportionate number of survey respondents with a university level education, increasing the potential for survey results to be positively skewed towards a more environmentally educated mindset. There was also a positive skew toward the representation of females to males; however, this is typical in online surveys in Canada [45]. For both the survey and semi-structured interviews, there was an unequal representation between provinces with NS and NB receiving considerably more survey responses than NL and PEI. Therefore, it is likely that results from NS and NB are a more accurate representation of the public consensus on a plastic bag ban. Following results from the survey and interviews with key stakeholders, there are several recommendations for the future of plastic pollution legislation in Atlantic Canada.

1. Fee-to-ban transitions: This transition first implements a fee on the SUP in question, which over time becomes banned. It would generate the desired result of largely eliminating plastics; however, it allows for a more gradual transition for those who are slow to adopt the new legislation. Additionally, implementing a fee would generate revenue which could be used to fund environmental projects, sustainability initiatives and/or subsidies for local businesses to offset cost of zero plastic waste. Fee-to-ban transitions can be implemented prior to any government action for any SUP through business initiative.
2. Improved communication: There is a need to ensure there is clear communication and education to the public well in advance of any new legislation. It is especially critical for the demographics opposed to these initiatives. This is to increase awareness and allow the public to better prepare, which also decreases the risk and amount of

backlash following implementation. There also needs to be clear communication to businesses and retailers so they are aware what is expected of them. We encourage policy makers across Atlantic Canada to increase efforts in communication through education and awareness campaigns to assist in reducing the potential for the spread of misinformation.

3. **Improved collaboration:** Collaboration needs to be prioritized between all stakeholders. There are many organizations, both local and provincial, with their own initiatives and timelines for reducing SUPs. Improving and increasing collaboration, especially among provincial governments could help streamline programs and standardize legislation across Atlantic Canada which would simplify concerns for the public.
4. **Reduce rather than recycle:** The importance of plastic reduction needs to be highlighted to consumers. Recycling has become increasingly popular, and society heavily relies upon it as a form of waste disposal. It has become so mainstream that people often forget recycling is the last option following reduce and reuse. Society needs to focus efforts on reducing the amount of plastic being produced, instead of recycling the plastic that is already in existence.
5. **Extended producer responsibility:** There is a need for increased pressure on producers to ensure they are being held accountable for their use of plastic in their products by implementing extended producer responsibility programs. These are monetary incentive programs that put the management of the product at every stage of its lifecycle on the producer so, ideally, they will make more eco-friendly choices to avoid waste costs. Extended producer responsibility programs can be implemented at both the municipal and regional levels through government action.

5. Conclusions

Community survey and semi-structured interviews from Atlantic Canada suggest that the public perception of plastic bag bans is generally positive. Across the four provinces, strong support was expressed for provincial legislative action to ban single use plastic bags, as well as other forms for SUP mitigation strategies. Gender identity, age, education level, and employment status can all influence individual perspectives of government legislation, with young, educated females being the most supportive demographic. Ultimately, existing concern for the impacts of plastic pollution on the environment is the underlying factor in support for any type of environmental action. Results of this study highlight target populations for future education and awareness campaigns. Given the current response, future plastic pollution legislation can be anticipated to have greater effectiveness as public acceptance is an indicator of compliance. To improve future plastic pollution legislation, it is recommended that more attention be given to communication efforts for recalcitrant demographics and to strive for the harmonization of legislation across all jurisdictions. Legislation, reduction initiatives, and sustainability efforts are all useful strategies for mitigation the impacts of plastic pollution; however, clear communication of the guidelines and expectations are needed well in advance of implementation to improve public perceptions and acceptability.

Supplementary Materials: Attached.

Author Contributions: Conceptualization, S.M., S.J.S., T.R.W and A.S.M.; methodology, S.M.; software, S.M.; validation, S.M.; formal analysis, S.M.; investigation, S.M.; resources, S.M., S.J.S., T.R.W and A.S.M.; data curation, S.M.; writing—original draft preparation, S.M.; writing—review and editing, S.M., S.J.S., T.R.W and A.S.M.; visualization, S.M.; supervision, A.S.M.; project administration, S.M.; funding acquisition, S.J.S. All authors have read and agreed to the published version of the manuscript.

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