A Characterization of Nova Scotian Litter

2004 Litter Survey

Presented by:

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Executive Summary

A province-wide litter survey was conducted in the summer of 2004. The study was conducted by a four member Nova Scotia Youth Conservation Corp team and supervised by the Solid Waste Management division of the Nova Scotia Department of Environment and Labour. Its objective was to characterize Nova Scotian litter by material, origin and brand.

Litter has become a noticeable problem in Nova Scotia. Its most visible effects are impacts to the beauty of the province's natural landscapes, and cityscapes. However, it can also affect industries such as tourism and agriculture, impact public health and safety, and cause harm to wildlife.

In 1988, a Minister's task force was assembled to develop a litter strategy for Nova Scotia. The group recommended an increase to littering fines, public education, and recycling programs to divert some waste and litter to reusable materials. As a result, many programs were initiated. In 1991, a deposit-refund system was established for all alcoholic beverage containers. In 1996, the program was expanded to include all beverage containers, except milk. One important outcome of this program has been fewer beverage consumers littering the landscape.

Community groups and non-governmental organizations were also established to combat litter. Clean Nova Scotia and RRFB Nova Scotia are particularly active in such initiatives. These organizations are sponsors of The Great Nova Pick Me Up and the Adopt-a-Highway Program, which are two of the provinces' most successful litter clean up programs.

Private industries have only recently begun to address the issue of litter in a serious manner. For instance, in 2001, Tim Hortons began sponsoring a yearly community clean up. Other quick service restaurants also help in campaigning against litter.

While many positive changes have been made, it appears that greater action needs to be taken to combat the problem of litter. The present study contributes to a better understanding of the problem, which is an important step towards alleviating the litter situation.

The 2004 characterization of Nova Scotia litter uses statistically proven and recognized methodology which was derived from the 1993 directive from the Florida Legislature in which the Florida Centre for Solid and Hazardous Waste Management developed a methodology for surveying litter.

Sites were randomly selected throughout the seven solid waste regions, using the 2000 Canadian Census and a random number database. A total of 55 sites were surveyed, with approximately one site for every 20,000 residents of Nova Scotia (Appendix 1).

Each litter item was categorized according to material, source, and brand. Material categories included plastic, expanded polystyrene, metal (aluminum, steel, and miscellaneous), glass, paper, wood, rubber, cloth and composite (more than one material). Source categories consisted of:

quick service, snack food, tobacco, grocery and drink container.

A total of 4093 items of litter were collected during the course of the study. Total litter composition by material showed plastic, paper and composite to be the most prevalent materials collected. These three materials made up 86% of all litter collected. Plastics and composites (which are often made up of plastic and another material) present particular challenges in waste management. These materials are difficult, if not impossible to recycle. They also breakdown extremely slowly, so that littered items remain in the environment for long periods of time.

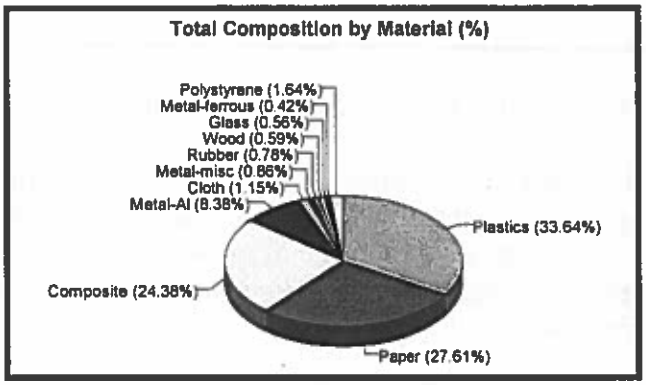

Figure 5.1.1 Total composition of litter by material type.

By source, litter from the quick service industry made up approximately 40% of all identifiable litter, followed by snack foods at 27% and tobacco products at 22%.

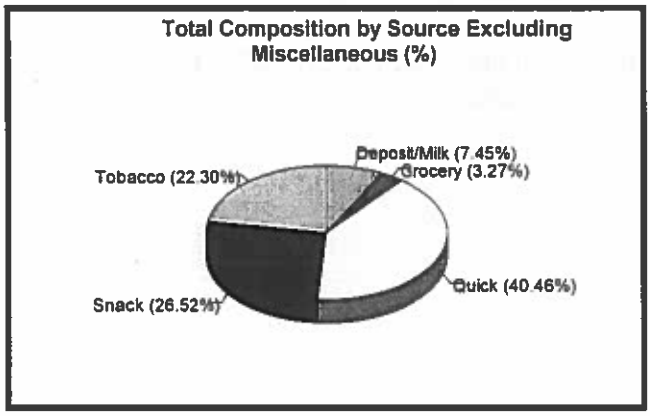

Figure 5.1.2 (b) Total composition of litter by source, excluding miscellaneous.

Tim Hortons, McDonald's, and Cadbury were the three most common brands collected, accounting for approximately 18%, 6%, and 5% of all brands respectively. The majority of Tim Hortons litter consisted of disposable drink cups.

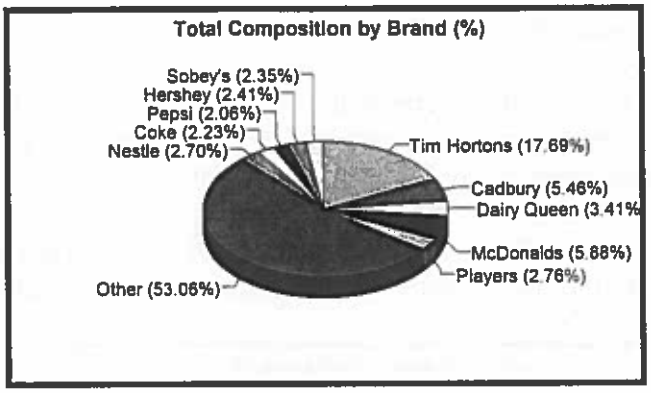

Figure 5.1.3 (a) Total composition of litter by brand, excluding 'unknown' brands.

As the number one identifiable source of litter, disposable drinks cups were further broken down according to material, and contribution to total drink container litter. Together with lids and straws, disposable cups made up 15% of all identifiable litter. 86% of the cups collected were made of composite material (primarily paper with a plastic coating). Disposable cups, lids and straws made up 72% of all drink container litter.

Litter abatement strategies are recommended in three key areas: education, clean up and monitoring, and enforcement. Specific recommendations include an increase in the number of receptacles for waste, recycling, and cigarette butts, as well as increased enforcement efforts.

Stewardship initiatives by industry are also encouraged. Litter abatement strategies which have been successful in other jurisdictions may serve as a model for Nova Scotia.

It is hoped that this survey will help in understanding the litter problem in Nova Scotia, and ultimately aid in the campaign against litter.

1.0 Introduction

Nova Scotia is an international leader in waste-resource management. Visitors throughout the world have come to Nova Scotia to learn about its strategy. Nova Scotia is famous for the ways in which it reduces, re-uses, and recycles.

Unfortunately, these same visitors are likely to notice the litter that lies on roadsides and parks. Litter remains a major challenge in Nova Scotia. Littered items are found throughout the province, from urban areas to rural roads, highways, and recreational areas. The most noticeable consequence of litter is its visual impact on the natural landscape; however it can also affect public safety, and the quality of the environment.

The present study was undertaken to gain a better understanding of the litter problem in Nova Scotia. Its objective was to characterize Nova Scotian litter by material, origin and brand. The study is in part an elaboration of a 1998 study conducted by the Nova Scotia Youth Corp and the Department of Environment, 'A Characterization of Nova Scotian Litter'. The 1998 study provided a characterization of litter across Nova Scotia by item and brand, and served as a baseline for this study and others to follow.

The current study uses statistically proven and recognized methodology for the purpose of conducting and analyzing litter data collected from surveys. It is structured upon the Toronto litter survey of 2002. This study was, in turn, derived from the 1993 directive from the Florida Legislature in which the Florida Centre for Solid and Hazardous Waste Management developed a methodology for surveying litter.

The results of the present study can assist the province in developing strategies to abate litter.

1.1 Acknowledgments

To complete this survey the following organizations provided their support:

Adopt-A-Highway Program
Clean Nova Scotia
Nova Scotia Department of Transport and Public Works
Nova Scotia Department of Environment and Labour
Nova Scotia Youth Conservation Corps

2.0 Background

2.1 The Issue

Litter is found throughout Nova Scotia, from urban parks and streets to highway roadsides, and waterways. Even in the most isolated areas of the province, littered items can be found. It is often thought to be an aesthetic problem, taking away from the natural beauty this province possesses. However, its impacts go further. Litter can impact tourism and agriculture; it can affect public health and safety, and it can be destructive to natural ecosystems, particularly the marine environment.

Tourism
Tourism is one of Nova Scotia's most important industries. The province attracts visitors from all over the world. Nova Scotia prides itself on the beauty of its natural surroundings. The province's scenic coastlines serve as a major draw for tourists. In fact, Cape Breton Island was ranked second in the world among 115 destinations, in a survey conducted by *National Geographic Traveler*[1] magazine.

Even the smallest piece of litter can alter a surrounding habitat and take away from the appeal of an area as a tourist attraction. When large amounts of litter scar the landscape, visitors may leave with a negative impression, and feel reluctant to return.

Agriculture
The Agricultural industry is another industry at risk from litter. Glass, plastic and shards of metal have been discovered in bales of hay and in pastures. This is hazardous to livestock if ingested, causing damage to the stomach and other internal organs. It can also cause economic problems for farmers due to the resulting loss of production. Glass and metal that have been collected from open fields can also be damaging to farming equipment, resulting in costly repairs.

Health and Safety
Litter can be hazardous to public health and safety. Serious injuries can result from broken glass. Littered organic material can attract rodents and other vectors, resulting in the potential risk of disease. Litter also poses a problem on highways due to uncovered loads and loose vehicle parts, creating a higher risk for accidents. Dumpsites have also created a problem; they can be a prime location for mosquito breeding grounds due to the collection of stagnant water created by empty containers.

Marine
The impacts of litter are not limited to land. Litter also causes significant problems in marine ecosystems. The province is considered 'Canada's Ocean Playground', but marine litter and

[1] Tourtellot, Jonathan B. "Destination Scorecard: 115 Places Rated". *National Geographic Traveler*. March 2004: 60-66.

debris have caused the ocean surrounding the Nova Scotia coastline to be hazardous to marine species. In the mid-1980's, for example, Sable Island (about 200 kilometres south-west of Halifax) was used as a sampling station to measure the volume of marine litter, as well as material types, and trends. Over the course of a month, approximately 8000 plastic items were found to accumulate. More recently, researchers have noted an increase in hazardous materials washed up on the beaches of this island, which can be particularly damaging to marine life. Litter is an aesthetic problem that takes away from the natural beauty of our land. It is a hazard to people, many forms of wildlife, marine species and ecosystems.

2.2 Litter Abatement in Nova Scotia

2.21 Provincial Initiatives

In 1988, a Minister's task force was assembled to develop a litter strategy for Nova Scotia. The group concluded that stricter punishments should be applied to offenders, including heftier fines[2]. The task force also recommended that the province better educate citizens about the consequences of litter, and provide more signage throughout Nova Scotia, indicating that littering is a punishable offence. Recycling programs were recommended to divert some waste and litter to reusable materials.

Four significant programs emerged from this task force: the creation of Clean Nova Scotia (1988), the deposit-refund system for alcoholic beverage containers (1991), increased litter fines (1995), and the creation of the Nova Scotia Adopt-a- Highway Program (1997).

In 1996, as part of the province's new solid waste-resource strategy, a deposit-refund system was expanded to include all beverage containers, with the exception of milk. Citizens can return their beverage containers for a refund at any of the province's ENVIRO-DEPOTS™. The program is administered by the Resource Recovery Fund Board[3] (RRFB Nova Scotia).

In addition to boosting recycling rates for beverage containers in Nova Scotia, the deposit-refund system has provided an incentive to keep containers off of our roadsides.

RRFB Nova Scotia has also taken initiative in addressing the litter problem, particularly through education. They have developed innovative and successful methods of maintaining high public awareness of waste management issues, such as litter. These include Moby S. Loop, an interactive educational robot used in schools and public events, school resource material (including a childrens' book about litter), and sponsorship of clean up programs. In 2003, RRFB Nova Scotia sponsored a contest challenging students to research the relationship between youth

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[2] "The Minister's Task Force on Litter Abatement. Report". Nova Scotia Department of the Environment. October 1988.

[3] RRFB Nova Scotia is a non-profit corporation, whose mission is to ensure that the people of Nova Scotia receive the maximum environmental benefits associated with responsible solid-waste management. Information about the RRFB and its programs can be found at www.rrfb.com

and littering. They have also provided litterbags for waste and recyclables at tourist centres. These bags are distributed to travelers in efforts to prevent roadside litter, and educate them about waste reduction practices followed in Nova Scotia.

2.22 Anti-Litter Legislation

Legislation on litter and littering in Nova Scotia is found under the Environment Act administered by the Nova Scotia Department of Environment and Labour, and the Motor Vehicle Act, administered by the Nova Scotia Department of Transportation and Public Works. Complete regulations are found in Appendix 3.

Under the Environment Act, a first time littering offender may be subjected to a summary offence ticket of $445.00 in an out of court settlement. Under the Motor Vehicle Act, the fine for littering is $387.50. In default of payment, the offender may be subject to imprisonment for up to fifteen days. Offenders are also liable for the expense of removing the litter, refuse, garbage or other materials.

2.23 Community Initiatives

Community groups and non-governmental organizations are responsible for a number of successful clean up initiatives in the province. Some of these are one-time events, while others are annual or ongoing programs. Two examples are The Great Nova Pick Me Up and the Adopt-a-Highway Program.

Each spring, municipalities and community groups organize "The Great Nova Scotia Pick Me Up" with clean up activities taking place during Environment Week. The program encourages people to pick up litter in their communities, while educating them on the effects of litter on our environment. This program is sponsored by RRFB Nova Scotia and Clean Nova Scotia.

The Adopt-A-Highway program is another program which aids in the roadside clean-up of litter across the province. The program, which is international in scope, was begun in 1991 in Nova Scotia by the Women's Institutes of Nova Scotia, the Lions Clubs and Clean Nova Scotia. Community groups adopt a stretch of highway, which they clean up on a periodic basis. They are recognized for their efforts by highway signs along the adopted section of roadway. Over 100 sections of highway have been adopted in the province, covering 700 km, and more than1000 volunteers participate in Nova Scotia each year. The Departments of Environment and Labour, Tourism and Culture, Transportation and Public Works and RRFB Nova Scotia support this program.

Another significant clean up initiative takes place on McNab's and Lawlor Island. Large-scale cleanups are held on each of these islands each spring and fall. Over 5000 bags of trash have been collected since 1991 when the program started. The beach clean up is funded by the Shell Environment Fund, the Department of Natural Resources and Parks Canada, with funding support from others such as RRFB Nova Scotia. Clean Nova Scotia provides supplies, such as garbage bags.

2.24 Industry Initiatives

Private industry has also made some efforts towards litter abatement. In the quick service industry, Tim Hortons has been active in helping to organize and promote community clean-ups across Canada. The company has also implemented an anti-litter advertising campaign. Other quick service chains have contributed towards responsible waste management, by implementing source separation programs, and advertising about littering.

In efforts to reduce disposable cup waste, a number of coffee shops in the province give patrons a discount for reusable coffee cups. Examples in Halifax Regional Municipality include Tim Hortons, Perk's, Timothy's, and several smaller independent cafés. Common discounts are $0.05 to $0.10 off the price of a coffee, with others offering 15% off or simply charging a flat rate for any size cup. This type of economic incentive promotes a reduction in disposable cup use, and thus, a reduction in this type of litter.

2.25 Current Status of Litter in Nova Scotia

Despite all of the efforts across Nova Scotia, litter remains a significant issue. A recent report prepared by GPI*Atlantic*[4] identified litter as a solid waste problem in the province. Although improvements have been made since the initiation of the 1995 Environment Act and the beverage container program, litter continues to be visible along Nova Scotia's streets, and highways.

Recognizing that litter is a problem in Nova Scotia, the government has proposed amendments to the Environment Act which toughen anti-litter legislation. Such amendments include increasing the amount of litter fines and creating a minimum fine for offenders, defining the term litter and including it in the Act, differentiating between individual offenders and businesses, as well as allowing the courts to order an offender to clean up a site. The department has also proposed removing restrictive language to make it easier to prosecute offenders.

As part of the government's efforts to address the litter problem in Nova Scotia, the Department of Environment and Labour has sponsored the present study.

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[4] GPI*Atlantic*. "The Nova Scotia GPI Solid Waste-Resource Accounts." July 2004.

3.0 Terms

For the purposes of this study the following terms are defined:

Accumulated Litter

Litter that has collected over time.

Brand

A trademark or distinctive name identifying a product or a manufacturer[5].

Cap

The aluminum covering on a glass (normally beer) bottle.

Composite Item

A single item made up of more than one type of material. Examples are candy wrappers, chip bags, candy bar wrappers and disposable cups.

Deposit/Milk Container Litter

Litter originating from deposit containers and milk containers. To maintain consistency with the 1998 litter study, this category includes labels, but excludes bottle lids, caps, sealers and six pack rings. These last four items are classified as miscellaneous.

Deposit Container: Any beverage container[6] in which a deposit is paid when purchased in Nova Scotia, and a refund given when returned to an ENVIRO-DEPOT.™ Deposit containers include refillable beer bottles as well as non-refillable containers, such as plastic pop bottles.

Milk Container: A container which holds a dairy beverage. Examples are cartons, plastic jugs, and plastic bags. These containers are not included in the province's deposit-refund system.

Disposable Cup

A cup which is intended to be used once, and not refilled. Examples are coffee cups and cold drink cups served at quick service restaurants.

Expanded Polystyrene

A rigid, white foam plastic (resin code #6) that is commonly used in items such as disposable cups. It is commonly referred to by the trademark name Styrofoam™. To maintain consistency with the 1998 litter study, expanded polystyrene forms its own category, separate from other plastics.

Fresh Litter

Litter that collects after accumulated litter has been removed from a site.

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[5] www.dictionary.com

[6] As defined by Nova Scotia's solid waste-resource management regulations, "beverage" means any liquid that is a ready to serve drink, but does not include milk, milk products, soya milk or concentrates; "beverage container" means a container of less than 5 litres which contains or has contained a beverage and was sealed by the manufacturer after the beverage was placed in it.

Grocery Store Litter

An item originating from a grocery store, which is not categorized as a snack food, deposit/milk container or tobacco product. Items include grocery bags, large food packaging and packaging for household products.

Hazardous Material

Any material having properties that may result in risk or injury to health, destruction of life or facilities. Hazardous materials, as defined, include toxic, flammable, corrosive, asphyxiating, and explosive materials.[7]

Identifiable

...By Brand

An item which is marked by a brand name, symbol or other characteristic which distinguishes its brand.

...By Source

An item which can be distinguished as belonging to one of the five source categories used in this study.

Item

A single piece of litter which is collected in the process of the litter survey. Fragments of a broken glass item, such as a container are counted as one item. In this study, cups and lids/straws found together were paired up and counted as one single item. Extra disposable cups, lids, and straws were recorded as separate items.

Litter

An article of human made or human transported solid waste that had been deposited or disposed of in an improper place. Excludes natural flora and fauna, dog and cat litter, agricultural products and tree bark. Articles below bottle cap size (25 mm diameter) such as cigarette butts are excluded.[8]

Litter Catch Point

The obstacle where litter collects on the edge of a site. Examples are fences, tall grasses, hedgerows, and ditches.

Miscellaneous Item

Any item whose source cannot be classified into one of the five categories used in this study (i.e. quick service, deposit/milk container, snack food, tobacco product, or grocery store product). Examples are papers, unidentifiable packaging, metals, construction debris, cloths, lottery tickets, and bus transfers..

Miscellaneous Metal

A metal item, which could not be identified by its specific metal type (i.e. steel, aluminium or other)

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[7] Occupational Health & Safety Division. Nova Scotia Department of Environment and Labour. " Reference Guide to the Workplace Hazardous Material Information System Guide". http://www.gov.ns.ca/enla/pubs/ohs/whmis.pdf

[8] Syrek, Daniel B. and Resource Integration Systems Ltd. "Ontario Litter: 1990." The Institute for Applied Research. January 14, 1990. p. 29.

Other

Identifiable items (i.e. distinguishable brands) which were not found in significant numbers.

Quick Service Litter

Litter originating from items distributed by a quick service restaurant (commonly referred to as 'fast food'). Items include, but are not limited to plates, paper bags, condiment packaging, cutlery, napkins, disposable cups from the quick service establishment, straws, food containers and wrap, and cup trays.

Sealer

The disc-shaped covering underneath the lid on a deposit or milk container.

Site

The specific location of each litter survey. The area of a site is made up of two 100-metre sections of roadside, with a maximum width of eight meters on either side.

Snack Food Litter

Litter originating from items sold as packaged 'snacks'. Examples are chip bags and wrappers from chocolate bars, candies, gum, and cough drops.

Tobacco Litter

Litter originating from the packaging of cigarettes and other products containing tobacco. Examples are cigarette packs, foils, and plastics.

Unknown Item

An item which cannot be identified by brand name due to weathering, decomposition, damage or the absence of a brand name or symbol.

4.0 Methodology

The Nova Scotia litter study is a count of accumulated visible litter. Items the size of a bottle cap or larger (25 mm diameter) were included in the survey.

Litter was collected from 55 sites across the province. The distribution of these sites was based on population (2000 Canadian Census) with approximately one site for every 20 000 residents. The sites were randomly chosen throughout the seven solid waste regions, and attempts were made to have a minimum of one site per county (Appendix 1, Figure 1).

While cigarette butts were not included within the main study survey, a separate small survey was conducted in Halifax Regional Municipality to obtain an approximate estimate of the proportion of cigarette butts that make up litter. The results of this survey are found in Section 7 of this report.

4.1 Safety Precautions

Ensuring the safety of crew members was a primary concern in this study. Three main hazards were identified: motor vehicles, dangerous terrain and potentially harmful litter (ie. broken glass,

biohazardous material). Appropriate precautions were taken to minimize risks from these hazards.

Crew members underwent Occupational Health and Safety training at the Nova Scotia Department of Environment and Labour to increase awareness of potentially hazardous situations and materials. The crew also received emergency first aid training.

Permits to conduct the survey, obtained from the Department of Transportation and Public Works, outlined specific safety conditions. The crew was required to wear proper safety apparel, confine litter pick up to behind the ditch line, work only during daylight hours and exclude 100 series highways from the survey.

4.2 Materials

The materials and equipment chosen for this study served several purposes: ensuring the safety of crew members, serving in the collection of litter, ensuring accuracy in measurements, and providing a means of recording data.

Safety Equipment

- Cut resistant gloves
- Boots (steel toe)
- Vests
- First aid kit
- Cell phone
- Pylons (Markers)

Litter Collection

- Measuring tape (100m)
- Garbage bags
- Recycling bags
- Flagging tape

Data Collection

- GPS (global positioning system)
- Digital camera
- Data sheets/ clips boards
- Pens

Transportation

- Rental Vehicle

4.3 Site Selection

A process of random site selection was used to ensure an unbiased method. Site selection was completed prior to fieldwork. Directions to each site were included to assure no prejudice in the field.

The number of sites selected for the 2004 Nova Scotia litter survey were determined by population statistics per county collected from the 2000 Canadian Census. With a 1:20 000 apportionment the number of sites surveyed was determined to be 55. There were 220 randomly chosen sites with centre line locations entered into a random number database (Quattro Pro 9), with the population ratio constant. From this database the final 55 sites were selected and directions were determined from the destination-ns website (http://temp.destination-ns.com/common/directory/places.asp). Note that sites were surveyed in every county of the province with the exemption of Digby, due to its small population size.

An additional three sites for each county were randomly chosen as 'back up' sites. If any of the initial sites fell into one of the following categories, it was discarded and one of the back up sites for that county was used.

Features of Sites Excluded in Survey
major highway (100 series highways)
location on bridge
location within construction area
location on railway
on water
hazardous location
access difficult or impossible
location within private or industrial lands
Adopt-a-highway section (Noted if site was adjacent)

4.4 Site Survey

Surveys were conducted in the month of July and the first week of August 2004. A tape measure was used to measure 100 linear meters on each side of the roadway, and the width of each site was recorded on the summary sheet for that site. Width was measured from the side of the road to the litter catch point, or to a maximum of eight meters. A GPS (global positioning system) reading was taken at the start point of each survey to record site coordinates, and a photograph of the site was taken from both the start and end points. Special features of the site were also recorded. A sample site sheet is found in Appendix 5.

In collecting litter items, the crew was divided into two teams of two members, with each team surveying one side of the road. All collected litter was brought back to the base of the site for classification.

4.5 Classification of Litter

Classification of litter was recorded by two team members on separate data sheets to ensure accuracy. Data sheets were compared for consistency prior to disposing of the litter. One datasheet was used for each site, and litter items were recorded in three categories: material, source, and brand. (Appendix 4). Each category was broken down as follows:

Material

- plastic
- expanded polystyrene
- metal (aluminum, steel, miscellaneous)
- glass
- paper
- wood
- rubber
- cloth
- composite

Source

- fast food
- deposit/milk container
- snack food
- tobacco product
- grocery product
- miscellaneous item

Brand

- Tim Horton's, McDonald's, Players, KFC etc

4.6 Methodological Challenges

Once the study began, some unexpected challenges arose while categorizing litter items. Below is a list of items which should be taken note of in future studies.

Brands

In this study, brands recorded in the field were from names and symbols found on litter items. However, for purposes of analysis, when items were found that had a larger parent company, they were categorized under the parent company name. For example, items such as O' Henry bars, Jolly Ranchers, and Twizzlers were grouped together as Hershey items, since this corporation owns these products. A list of such items with their respective parent companies is found in Appendix 6.

When comparing brand results from this study to those from other studies, this method of analysis should be kept in mind. Ownership structures among brands change from time to time.

Napkins and paper towels
Where a brand was not distinguished, napkins were placed in the 'napkin/paper towel' category, and the 'Miscellaneous' source category. If a napkin displayed a brand which could be traced back to a particular source it was characterized under that source. (For example, napkins from McDonalds are clearly marked and are categorized under 'quick service.')

Condiment packaging
It was often difficult to determine the specific quick service source of a condiment. For example, a ketchup package from a quick service restaurant may be labelled by the ketchup brand (i.e. Heinz) rather than by the restaurant name. All condiment packaging was classified under quick service litter even if the source was not marked.

Disposable cup brands
Some quick service restaurants sell drinks in 'Coke' or 'Pepsi' cups. In this case, the exact restaurant origin could not be distinguished.

Multiple Sources
Some quick service restaurants, such as Tim Hortons sell deposit beverages under their own company labels, causing a 'blurring' of categories. Tim Hortons brand bottles and cans were placed in the deposit/milk category in this study.

Also, some items originated from more than one source. An example is straws. In this study, all straws were classified as 'quick service' although it is recognized that a small portion may have come from convenience stores.

5.0 Results

5.1 Total Litter Composition

Over the course of this study, 4093 pieces of litter were collected. Items were classified by material, source and brand.

5.1.1 Characterization of Litter by Material
Items were classified into one of 11 material categories: plastic, composite, paper, metal-ferrous, metal-aluminum, metal- miscellaneous, glass, wood, rubber, cloth, and expanded polystyrene.

Figure 5.1.1 indicates the most abundant materials found. Plastic, paper, and composite items made up about 34%, 28% and 24% of all litter, respectively. Together, these three materials constituted 86% of the total litter collected, leaving a small slice of the pie representing the remaining eight categories.

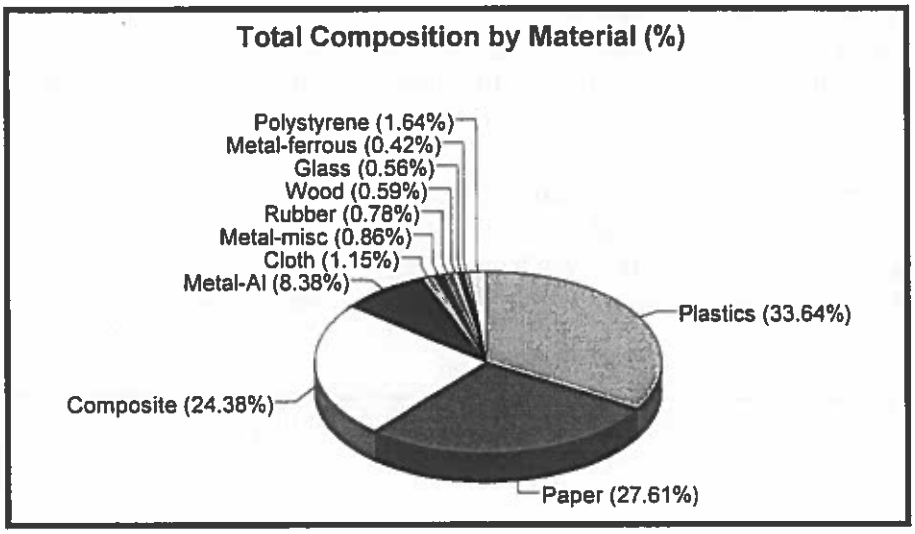

Figure 5.1.1 Total composition of litter by material type.

5.1.2 Characterization of Litter by Source

Items were classified into one of five source categories: quick service, snack food, tobacco, grocery, and deposit/milk container; 57% of all litter items were placed into these categories, with the remaining 43% categorized as "miscellaneous."

Excluding miscellaneous items, 40% of all litter was from the quick service industry. Items in this category included disposable cups, lids, straws, food packaging and other "fast food" items. The second most abundant source of litter was from snack foods at 26%, followed by tobacco products at 22%. Excluding miscellaneous items, these three sources made up 90% of all litter collected.

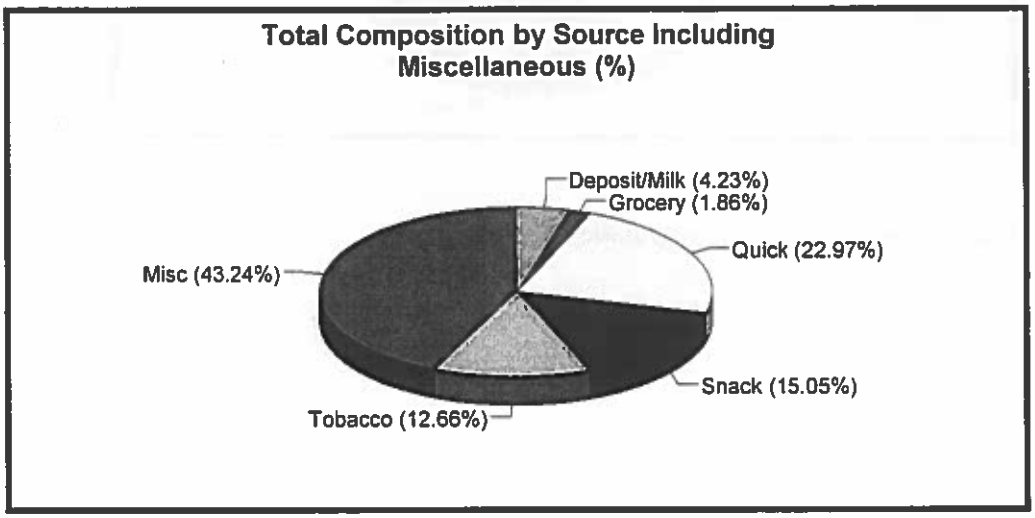

Figure 5.1.2 (a) Total composition of litter by source, including miscellaneous.

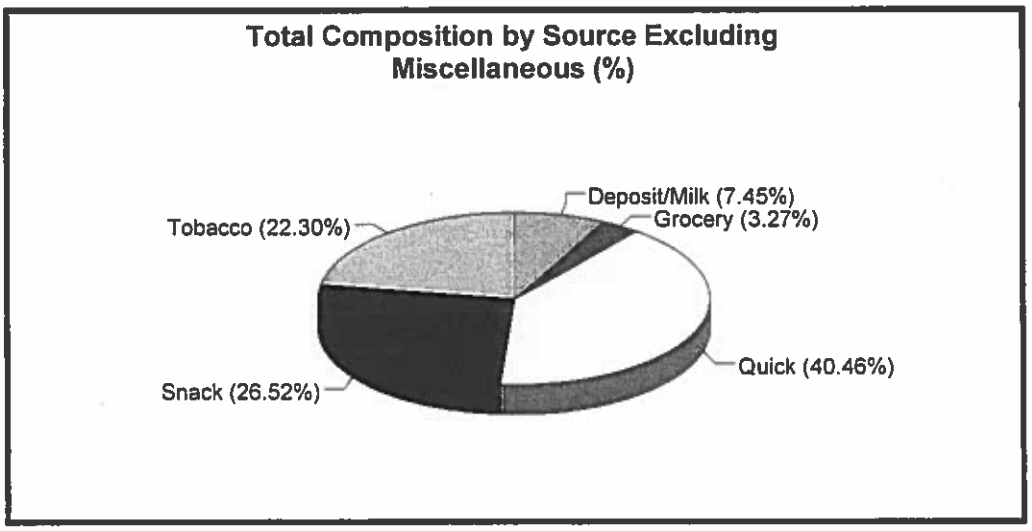

Figure 5.1.2 (b) Total composition of litter by source, excluding miscellaneous.

5.1.3 Characterization of Litter by Brand

Brands could be distinguished for 41% of the total litter items collected. The remaining 59% of the litter found was without a brand, damaged, or unidentifiable due to weathering and decomposition. Most unknown brands fell into the miscellaneous item category.

Tim Hortons was the most common brand collected, making up 18% of all identified litter brands in the province, followed by McDonalds and Cadbury.

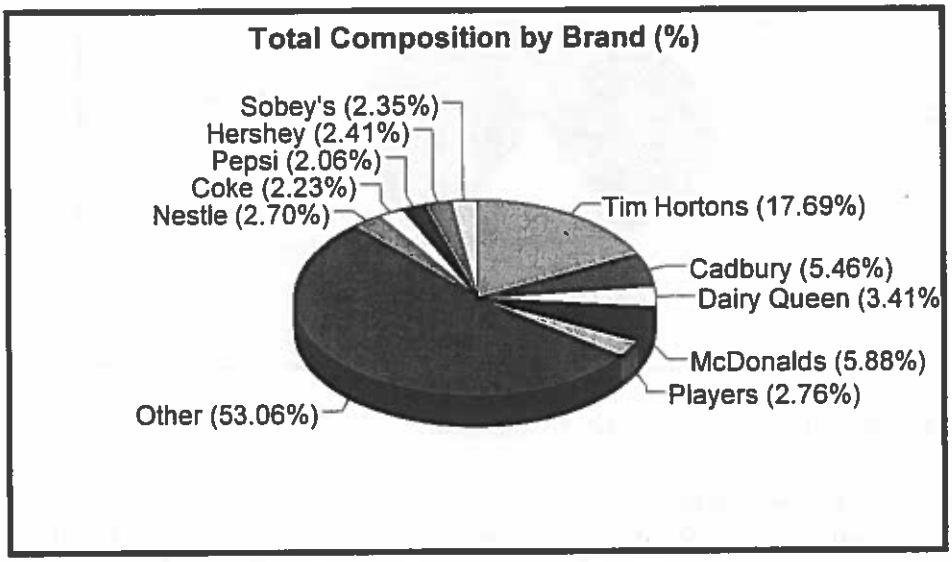

Figure 5.1.3 (a) Total composition of litter by brand, excluding 'unknown' brands.

Rank	Brand Name
1	Tim Hortons
2	McDonalds
3	Cadbury
4	Dairy Queen
5	Players
6	Nestle
7	Hershey
8	Sobey's
9	Coke
10	Pepsi

Table 5.1.3 (b) Top ten brands of identifiable litter

5.2 Quick Service Litter Composition

5.2.1 Quick Service Litter by Material

The majority (83%) of quick service litter consisted of composite materials, and plastics, made up of items such as disposable cups, straws, and utensils. Paper food wrap and paper bags also contributed to this category. Polystyrene and aluminum made up a small proportion of this litter, while materials such as glass and wood did not contribute at all to quick service litter.

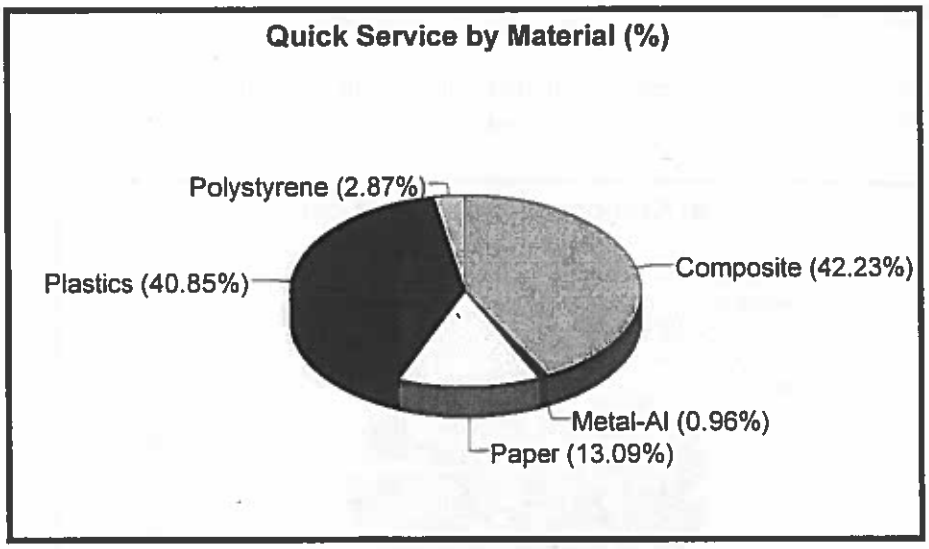

Figure 5.2.1 Quick service litter composition, by material.

5.2.2 Quick Service Litter by Brand

Brands could be distinguished for 88% of the quick service items collected. Tim Hortons products made up almost half of all identifiable quick service litter, followed by McDonald's and Dairy Queen. Other brands included Heinz (condiments), Wendy's, KFC, and Burger King.

5.3 Snack Food Litter Composition

5.3.1 Snack Food Litter by Material

Snack food litter included items such as candy wrappers, bar wrappers and chip bags. Composite materials made up 69% of all snack food litter items collected, followed by plastic materials at 20% and paper at 7%. Note that most composite materials include some form of plastic. Chip bags are an example.

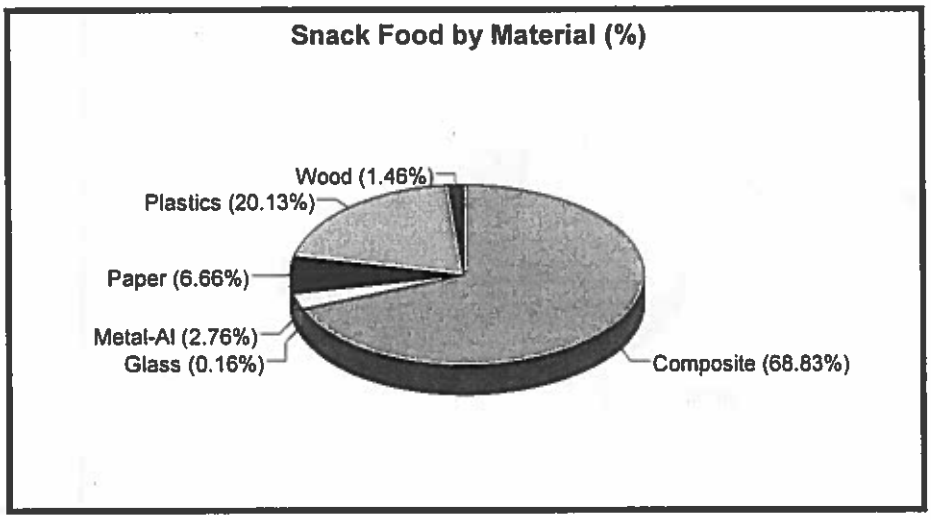

Figure 5.3.1 Snack food litter composition, by material.

5.3.2 Snack Food Litter By Brand

Brands could be distinguished for 82% of the snack food items collected. Cadbury was the most common snack food brand, followed by Nestle and Hershey. Other brands included Wrigley's, Mars, Frito-Lay, Dare, Storck, Unilever, and Humpty Dumpty. Unilever items included ice cream product brands such as Good Humour, Popsicle and Revello. Storck items included Campino and Werthers' brand candy wrappers.

5.4 Tobacco Litter Composition

5.4.1 Tobacco Litter by Material

Aluminum foil from cigarette packaging made up 39% of all tobacco litter, followed by plastic wrap (33%) and paper packaging (27%). Composite materials, such as matchbooks and lighters made up the remainder of this category.

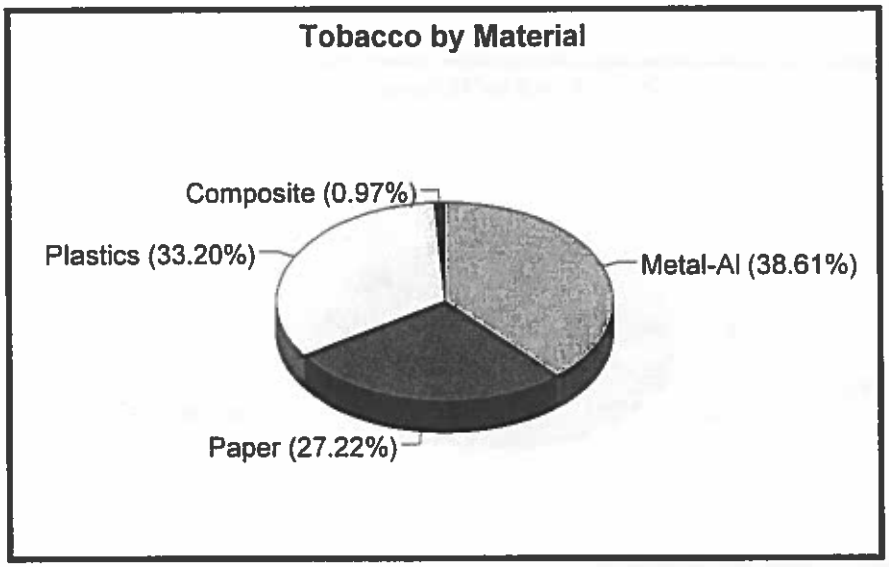

Figure 5.4.1 Tobacco litter composition, by material

5.4.2 Tobacco Litter by Brand

Brands could be distinguished for only 26% of the tobacco products collected, since much tobacco packaging consisted of unmarked foil and plastic wrap. Players , Du Maurier, and Export A were the most common brands of identifiable tobacco litter. Other brands included Number 7, Belvedere, and Peter Jackson.

5.5 Deposit/Milk Container Litter Composition

5.5.1 Deposit/Milk Container Litter by Material

Plastic deposit containers were the predominant type of drink container litter, with this material making up 40% of drink container litter. Aluminum cans and composite containers (milk cartons and tetra packs) followed at 30% and 14% respectively. Paper indicates labels from deposit containers.

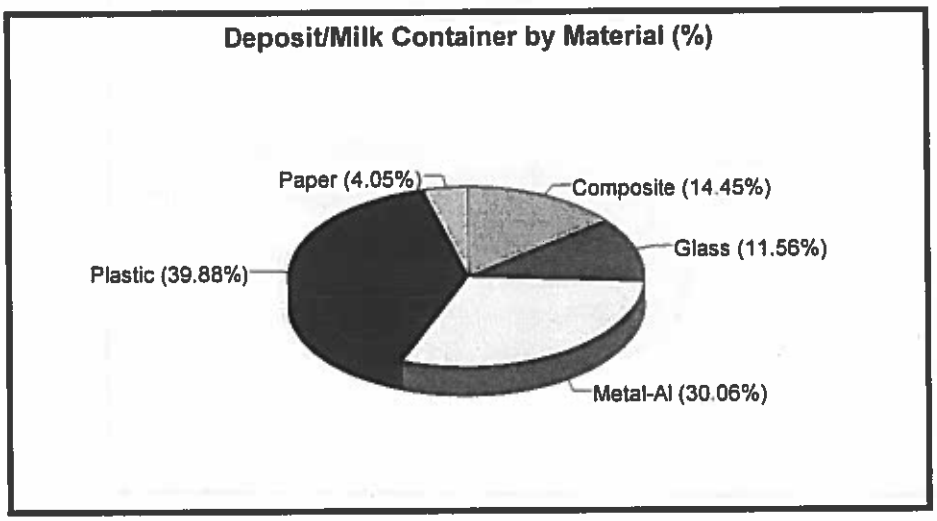

Figure 5.5.1 Deposit/milk container litter composition, by material.

5.5.2 Deposit/Milk Container Litter by Brand

Brands could be distinguished for 86.7% of the deposit/milk container items collected. Pepsi, Coke, and Labatt were the most common brands. These three companies own several other brands of beverages (Appendix 6). Other brands included Scotsburn, Farmers, Kraft, and Dole.

5.6 Grocery Litter Composition

5.6.1 Grocery Litter by Material

Plastic items (primarily grocery bags) made up two thirds (67%) of all grocery product litter gathered. Paper also contributed significantly to grocery litter with items such as boxboard packaging and advertisements (flyers).

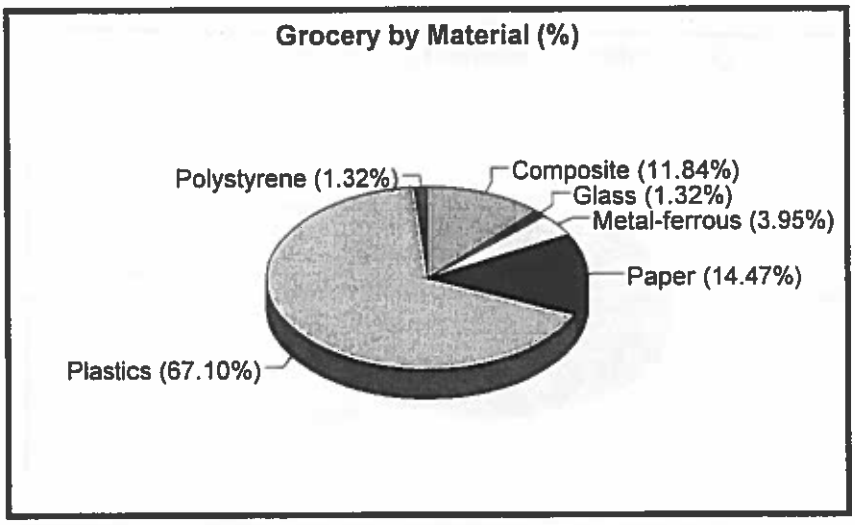

Figure 5.6.1 Grocery litter composition, by material

5.6.2 Grocery Litter by Brand

Brands could be distinguished for 53% of the grocery items collected. Sobeys and Superstore were the most common grocery store brands found, followed by Shoppers Drug Mart. Other brands, included small quantities of grocery product brands. (Examples are McCains, Tide, Ben's, and White Swan).

5.7 Significant Items

5.7.1 Most Common Items

Figure 5.7.1 shows the top ten individual litter items. These items made up 35% of all litter. Disposable cups were the most common littered item, making up approximately 9% of total litter items. Together with individual lids and straws, disposable cups made up 15% of the total litter collected (including miscellaneous items).

Rank	Individual Item	% of Total Litter
1	Disposable cups	9.28
2	Napkins/paper towels	7.53
3	Straws	3.59
4	Chocolate bar wrappers	3.23
5	Plastic bags (grocery & 'other')	3.18
6	Cup lids	2.27
7	Condiments	2.20
8	Utensils	1.32
9	Bottle lids	1.15
10	Chip bags	1.12
		34.87

Figure 5.7.1 Top 10 items collected

5.7.2 Disposable Cups by Material

The vast majority (89%) of all disposable cups were made of composite materials. These cups are primarily paper cups with a plastic coating on the inside, such as coffee cups and soft drink cups.

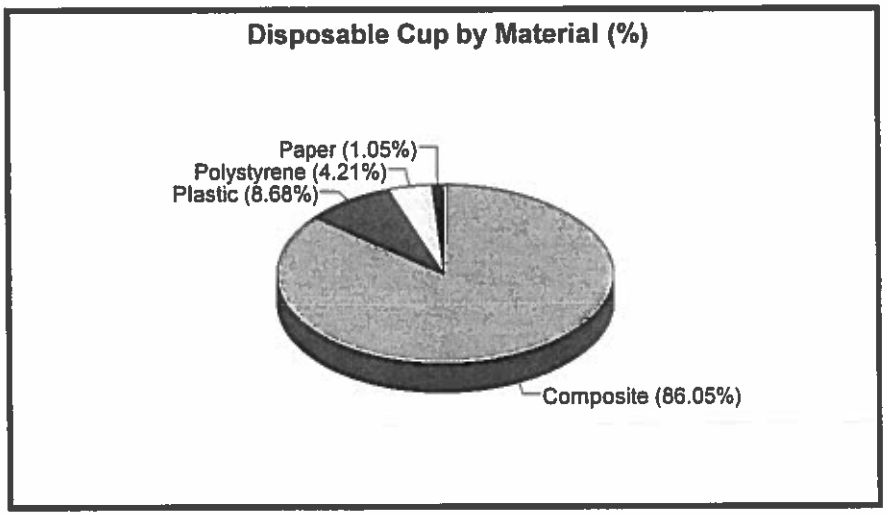

Figure 5.7.3 Disposable cup composition, by material (excluding lids and straws).

5.7.4 Drink Container Breakdown

Disposable cups made up the majority of all drink container litter, at 44%. When combined with lids, and straws, this figure rose to 72%. Deposit containers made up only 12% of drink container litter, and 26% when combined with labels, bottle lids, caps, sealers, and six pack rings. Milk containers contributed little at only 2%.

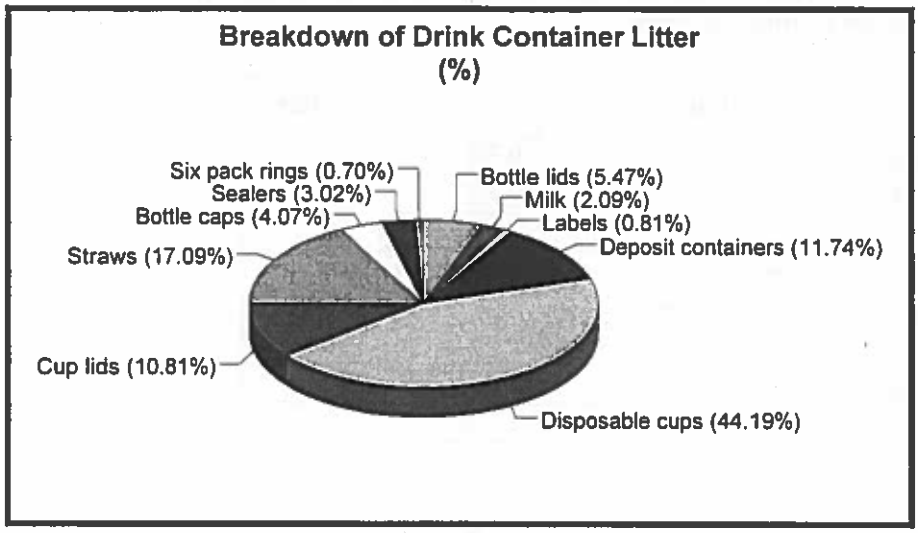

Figure 5.7.4 Breakdown of drink container litter

5.8 Comparison of Total Composition with Previous Studies in Nova Scotia

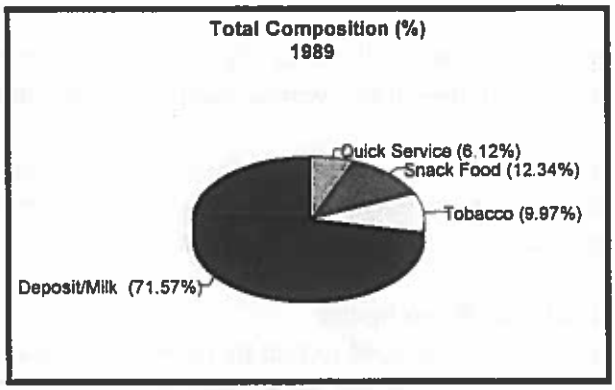

Figure 5.8.1 Results from 1989 litter characterization study

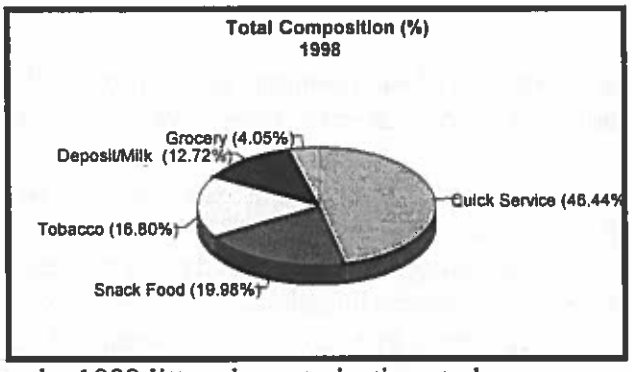

Figure 5.8.2 Results from the 1998 litter characterization study

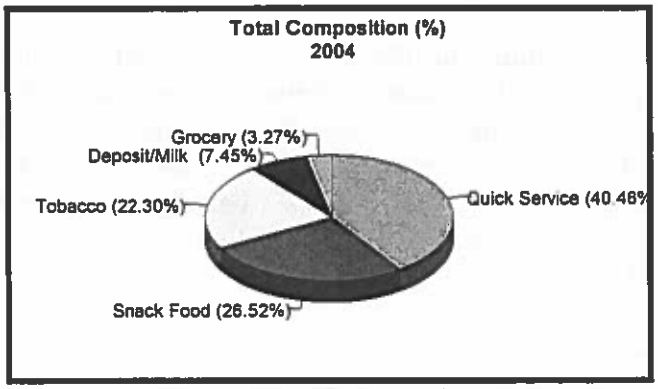

Figure 5.8.3 Results from 2004 litter characterization study

*Note: In the 1989 and 1998 studies, the term' beverage container' was used to refer to all deposit containers as well as milk containers. The present study refers to these same items as 'deposit/milk containers'. The change in terminology was made to avoid any confusion with the definition of 'beverage container' as found in the Nova Scotia Department of Environment and Labour's Solid Waste-Resource Management Regulations.

6.0 Discussion

The data collected from this survey summarizes the characterization of litter in Nova Scotia in 2004, by material, source, and brand. It also shows which specific items contribute most to litter.

Findings from this study give us a better understanding of the current litter problem in Nova Scotia. When results are compared with previous studies in Nova Scotia, overall trends in litter characterization can also be observed.

Comparison with Previous Studies in Nova Scotia
When total litter composition in 2004 is compared to that in 1998, each source of litter was found to have the same rank, in terms of its contribution to total litter. In both 1998 and 2004, quick service was the primary source of litter, followed by snack food, tobacco, deposit/milk container, and grocery (Section 5.8).

At the same time, the specific contribution of each category to total litter differed between the studies. Some litter sources showed a relative decrease from 1998, while others increased.

Contribution from the quick service industry did not change significantly, with these items making up 40% of total litter in 2004, compared to 46% in 1998. However, the 2004 study shows higher percentages of items originating from snack foods and tobacco products, compared to 1998. Snack food litter increased from approximately 20% in 1998 to 27% in 2004. Similarly, the percentage of tobacco products, by source, was 5% greater in 2004 than in 1998, perhaps due to the rise of smoking by-laws, where people are no longer permitted to smoke in indoor public establishments, such as restaurants and coffee shops.

Comparing the 2004 litter study to studies in 1989 and 1998, the most significant change was observed in the category of deposit/milk containers. Between 1989 and 1998, there was a steep drop in deposit/milk containers, reflecting the success of the province's deposit-refund system in reducing this form of litter. Deposit/milk container litter continued to show a decrease in 2004, making up only 7.5% of litter, compared to 13% in 1998. This figure is even lower (5.9%) in 2004, when milk packaging and paper labels are excluded. Perhaps this further decrease reflects increased public awareness of the deposit refund system[9].

Additional Findings in 2004
Material composition was not determined in the 1998 study. In 2004, it was found that only three material categories made up 86% of all litter – plastics, paper and composites. Most composite items consisted of a combination of paper and plastic or foil and plastic. This is an important finding, since plastic and composite items present particular challenges in waste

[9] It should be noted that in the 1998 study, it was not specified whether or not bottle coverings (caps, lids and sealers) were recorded in this category. When these items are classified as deposit/milk items, this category's contribution to total litter composition (excluding miscellaneous) increases to 12%. This is very close to the 1998 figure.

management. Both of these materials degrade extremely slowly (if at all), so that littered items remain in the environment for long periods of time. Furthermore, they are difficult to recycle. Some plastic types (for example #3 through 7 containers) are not accepted in Nova Scotia's municipal recycling programs. Similarly, most composite items, such as gum 'blister packs', chip bags and chocolate bar wrappers, are not recyclable.

In terms of individual items, disposable drink cups were found to be a significant source of litter. These cups were the number one litter item in 2004, with cup litter found at nearly every site visited in this study. With the exception of the small number of paper cups found, disposable cups, lids and straws are neither recyclable nor compostable in Nova Scotia.

An estimated 400 million disposable cups are used in Nova Scotia each year, based on a recent survey[1] and population figures from the 2001 Statistics Canada census. This gives an idea of the magnitude of a single item, in terms of its contribution to solid waste and the corresponding litter problem.

7.0 Litter Abatement Strategies

7.1 Recommendations

Litter abatement strategies should focus on three key areas:

- Education
- Clean up and monitoring
- Enforcement

Specific recommendations within these broad areas include an increase in the number of receptacles for waste, recycling, and organics, as well as increased enforcement efforts.

Stewardship initiatives by industry are also encouraged.

Education

In order to continue reducing the amount of litter along our roadways, education is vital. When people are aware of the nature of the litter problem, they are more likely to become interested in prevention.

Clean up and monitoring

Continuous clean ups and monitoring of the problem are also essential in order to keep records of any progress that is made in reducing litter.

Clean up programs, such as The Great Nova Scotia Pick Me Up, and the Adopt-a-Highway Program have been important in reducing the amount of litter in our province. The province must continue to support these types of programs, and similar clean up initiatives.

A commonly overlooked component of clean up is the presence of receptacles for potential litter items. Many areas visited throughout the study did not have nearby access to a garbage can, and this appears to reflect the situation throughout the province. A representative of the Nova Scotia Tourism Industry Association noted that a lack of waste receptacles is a common complaint from tourists to the province[2].

"Cigarette butt stops" are also recommended, particularly in urban downtown areas. Cigarette butts were observed in significant numbers in the course of this study, yet butt stops were rarely observed. As easy as it is to throw a butt to the ground, the presence of a disposal area would likely reduce this practice.

In the case of urban litter, municipalities should ensure that receptacles for waste, recyclables, and organics are placed in convenient locations, and at frequent intervals, particularly in downtown areas. Rural areas, which attract visitors, also must have proper disposal areas for waste.

Enforcement

Enforcement of the province's litter laws is also an important part of litter reduction. Enforcement is often a challenge, particularly when municipalities and provincial authorities do not have the resources to focus on litter offenders. However, litterers would think twice about tossing their trash into our environment if they were forced to pay a fine.

Other - Industry Stewardship Initiatives

It is also recommended that private industry take more initiative towards abating litter. Anti-litter campaigns are a good start, but further action is needed.

7.2 Litter Strategies

The following are strategies developed by other jurisdictions, focused on enforcement activities. Some of these may be appropriate actions for Nova Scotia.

Toronto, Ontario

The City of Toronto has committed to placing greater priority on litter ticketing, including an enforcement blitz that includes a fine of $130 per offence. A litter hotline (39-CLEAN) is expected to help enforce anti-litter efforts. The hotline is being promoted as the public's contact to report litter, over-flowing receptacles and illegal dumping.

Mississauga, Ontario
In the City of Mississauga, people can report a violation online when they see someone littering from their vehicle.

United States
In several states in the US, it is common to assign community service to a littering offender, depending on the number of littering offences he/she has committed. For example, in Pennsylvania, a first offender must spend between 8 and 16 hours cleaning up litter; on a second conviction, the conviction is increased to between16 and 32 hours and on 3rd and subsequent convictions, the offender must pick up and remove litter for 40 to 80 hours.

Ireland
In Limmerick, Ireland, officials have installed video surveillance in highly littered areas and hot spots in order to catch offenders in the act of littering. Being able to identify littering offenders is one major issue with litter law enforcement and the use of video monitoring is one way to surpass this problem.

8.0 Conclusion

In many aspects, litter is a serious problem. It hinders the beauty of this province, and can be unsafe for wildlife and for people. Litter can also leave a bad impression with tourists that come to Nova Scotia. Yet, it is a problem that can be alleviated.

The present study has met its objective of characterizing litter in Nova Scotia by material, origin and brand. It has also provided useful analysis, such as specific information on disposable drink cup litter, and a 'snapshot' survey of cigarette butt litter.

By material type, plastic items were the most common. Plastic items made up 34% of the litter collected. Paper and composite items were the next most common materials. These three materials made up 86% of all litter collected.

Quick service products were the most commonly collected pieces of litter by source, making up 40% of the litter (miscellaneous excluded). Snack food products, and tobacco products also made up a significant proportion of litter collected.

Tim Hortons was the most commonly identified brand for all litter items, making up 18% of the total identifiable litter brands found. McDonalds was the second most common brand; however, litter items from this restaurant were only one third of the Tim Hortons litter collected. To see these results and others, refer to section 5.0 of this report.

The results from this study should help to give insight to the problem of litter and the possible ways that it can be abated. This study can be used as a source for statistics, research and as a reference for future studies.

Recommendations include strategies in the areas of education, clean up and monitoring, and enforcement. Specific strategies include an increase in the number of anti-litter signs, waste receptacles and recycling bins. "Butt stops" could also reduce the number of cigarette butts littered in urban areas.

In order to continue reducing the amount of litter along our roadways, education and awareness of the problem are important. Continuous clean ups and monitoring are also essential in order to keep records of any progress that is made in reducing litter. Enforcing the litter laws is also an important part of litter reduction.

The movement to prevent litter is not solely the responsibility of the government, or the retail outlets from which the litter originates. They do share a part in the obligation to help clean up litter already distributed, and to prevent future litter. Nevertheless, it is the individual that litters, and it is the individual who must take responsibility for his or her actions. Nova Scotia is a beautiful and scenic place to live.

Appendices

Appendix 1: Map of Nova Scotia and Litter Survey Sites

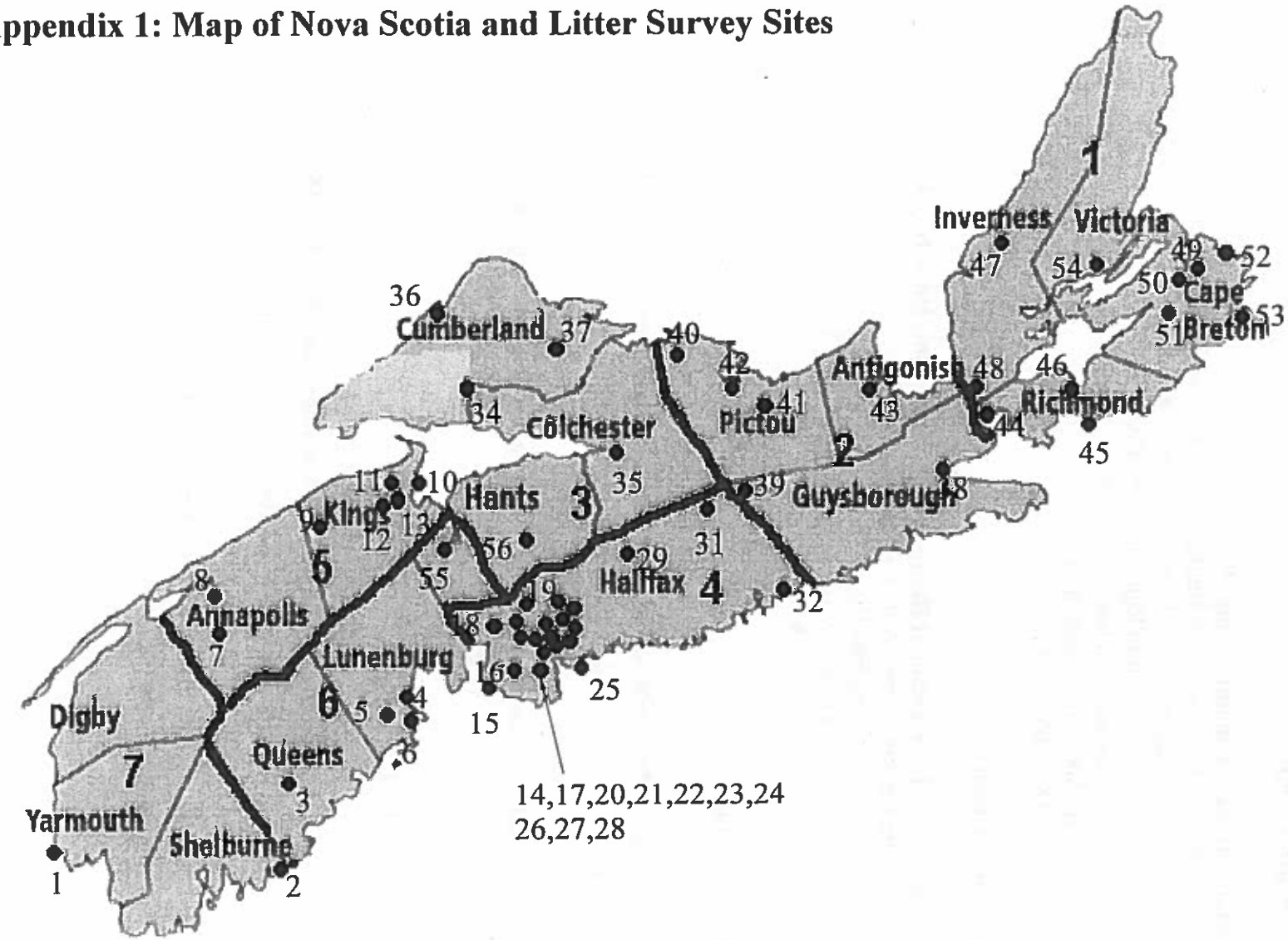

Figure 1: The map of Nova Scotia displays the seven solid waste region, the 19 counties, and the 55 sites where the litter survey was conducted.

Appendix 2: Sites and Directions

Yarmouth County

1. Main Street, Yarmouth – July 19

- Highway 103 west out of Halifax until Yarmouth is reached.
- Left on Hardscratch Rd. (Highway 103 ends at Hardscratch Rd.)
- Travel ~500 m and turn Right on Starts Rd.
- Travel ~1 km and turn Left on Main St.
- Travel ~500 m to 520 Main St.
- 43°50'18"N, 66°07'14"W

Shelburne County

2. Sable River, Intersection of Highway 3 and East Sable Rd. - July 19

- From Halifax travel SW on Prov. Highway 103
- Highway 103 turns into Highway 3
- ~ 1.5km before Highway 103 returns turn left onto East Sable Rd.
- 43°50'30"N, 65°02'55"W

Queens County

3. Middlefield, 500m NW of intersection of Highway 8 and 210- July 15

- From Halifax, travel on Prov. Highway 103 to Highway 3
- Take Liverpool exit to Highway 8 NW
- Travel 25km until the intersection of Highway 210 and Highway 3
- 44°12'30"N, 64°51'59W

Lunenburg County

4. Rose Bay, intersection of Highway 332 and Kingsburg Rd.- July 15

- From Halifax, travel on Prov. Highway 103 to exit 11
- 324 to 325 NE to 332
- Travel until the intersection of Kingsburg Rd and Highway 332
- 44°17'54"N, 64°18'18W

5. Bridgewater, 325 and Pearl Rd. - 15 July

- From Halifax take Prov. Highway 103 to exit 13
- Take the 325E for a km until intersection with Pearl Street
- 44°22'35"N, 64°31'05"W

6. Mahone Bay, 325 and Clearwater St.- 15 July

- From Halifax take Prov. Highway 103 to exit 11 to 324
- Take 324 to 325 E for ~3 km until intersection with Clearway St.
- 44°26'59"N, 64°22'57"W

Annapolis County

7. West Dalhousie, intersection of West Dalhousie and Morse Rd. - July 20

- From Halifax, travel on Highway 101
- Exit Right at Bridgetown (exit #20)
- Continue West on Route 1 for 1 km
- Left on Morse Rd. until West Dalhousie Rd. is met
- 44,43'08"N, 65,13'33"W

8.Bridgetown, Highway 1 and Inglewood Rd.- July 20

- From Halifax take 101 to exit 21 to highway 1W
- Travel west down highway 1 for ~2.5km until intersection with Inglewood Rd.
- 44°50'29"N, 65°17'22"W

Kings County

9. Greenwood, intersection of route 201 and Rocknotch Rd. - July 20

- From Halifax, travel on Prov. Highway 101
- Take exit 16 and travel South on Victoria Rd.500 m until Route 1 is met.
- Turn Right on Route 1 and travel ~7 km
- Turn Left on Route 201 (travel south for ~6 km until Route 201 takes 90 degree turn west)
- Travel on Route 201 ~1 km until the intersection of Rocknotch Rd. is met (on right side)
- 44,58'18"N,64,56'03"W

10. Kentville, 500m up from highway 1 from highway 12 -July 21

- From Halifax take 101 until exit 13
- From 101 take highway 12 NE for ~ 3km
- From highway 12 take highway 1W for 500m
- 45°04'35"N, 64°29'40"W

11. Centerville, intersection of route 221 and route 359 - July 21

- From Halifax, take Prov. Highway 101
- Exit Right at Kentville (exit #12)
- Drive ~7 km until the intersection of Route 221 and Route 359
- 45,07'00"N, 64,34'01"W

12. South Alton, intersection of Route 12 and English Mountain Rd. - July 21

- From Halifax, travel on Prov. Highway 101
- Take exit 13, and travel south on Route 12
- Travel ~0.5 km until the intersection of
- Route 12 and English Mountain Rd. is met
- 45,01'16"N, 64,32'16W

13. Wolfville, Highway 1 and Old Dyke Rd. - July 21

- From Halifax take 101 until exit 10 to Highway 1W
- Take highway 1 for ~5km until intersection with Old Dyke Rd.
- 45°05'28"N, 64°21'33"W

County of Halifax

14. Halifax, intersection of North and Windsor- July 12

- Intersection of Windsor and North
- Take Robie to North St. go west on North till intersection with Windsor
- 44°38'52" -63°36'18"

15. West Dover, intersection of highway 333 and West Dover Rd - July 14

- From Halifax, travel on Prov. Highway 103 to exit 2
- Take 333 to West Dover Road

- Travel ~500m along West Dover Road to the intersection with private road
- 44°29'35"N, 63°52'21"W

16. Shad Bay, intersection of highway 333 and intersection with Terrence Bay Rd.- July 6

- From Halifax, travel on Prov. Highway 102 to exit 2
- Take 333 to intersection with West Prospect Road ~ 5km past Brookside and Terrence Bay Rd.
- 44°31'31"N, 63°46'12"W

17. Halifax, Intersection of South St. and Oxford.- July 13

- Intersection South St. and Oxford Rd.
- Take South St. Until intersection with Oxford.
- 44°38'02"N, 63°35'42"W

18. Brookside, intersection of Brookside Rd. and Mitchell Dr.- July 14

- From Halifax, travel on Prov. Highway 102 to exit 2
- Take 333 to intersect with Brookside Road (SW side) ~ 3km pass Hatchet Lake
- Intersection with Mitchell Dr. ~2km from highway 333
- 44°32'55"N, 63°43'18"W

19. Yankeetown, intersection of Yankeetown and highway 213 - July 6

- From Halifax, travel on Bedford Highway (2) to Hammonds Plain Rd. (213)
- Take 213 to intersect with Yankeetown (SW side) ~ 1km before Flatlake Dr.
- 44°42'42"N, 63°50'19"W

20. Bedford, intersection highway 2 and Meadowbrook Dr.- July 13

- From Halifax, travel on Bedford Highway (2)
- Intersection with Meadowbrook Drive (West Side) ~ 2km from highway 213 turn off
- 44°43'55"N, 63°39'24"W

21. Sackville, intersection of Highway 324 and Old Sackville Dr. - July 13

- From Halifax, travel on Bedford Highway (2) to Highway 101 Exit 2
- Take Highway 324 for ~500m until intersection with Old Sackville Road
- 44°47'24"N, 63°42'55"W

22. Halifax, 1km down 349 from Halifax Rotary - July 14

- Take Spring Garden to Robie.
- Across Robie to Quinpool
- Take Quinpool to Halifax Rotary

- Through Halifax Rotary to 349
- Take 349 south for 1km.
- 44°37'48"N, 63°37'04"W

23. Halifax, intersection of Highway 3 and Quarry Rd.- July 13

- Take Spring Garden to Robie.
- Across Robie to Quinpool, Take Quinpool to Halifax Rotary
- Through Halifax Rotary to 3
- Take 3 west for 1km until intersection with Quarry Rd.
- 44°38'11"N, 63°37'52"W

24.Halifax, Dutchvillage Rd. and Deal St. - July 12

- Take Spring Garden to Robie.
- Across Robie to Quinpool, Take Quinpool to Halifax Rotary
- Through Halifax Rotary to Dutch Village Rd.
- Take Dutchvillage NW for ~600m until intersection with Deal St..
- 44°38'44"N, 63 °37'39"W

25. Lawrencetown, intersection of 207 and Leslie Rd. - July 8

- From Halifax, travel on Highway 111 to Highway 207 exit 7
- Take 207 until intersection with Leslie Road ~5km past West Lawrencetown
- 44°38'46"N, 63°20'09"W

26. Dartmouth, Intersection Portland and Old Ferry Rd.- July 12

- Take Barrington to Macdonald Bridge turn right off of Bridge to Wyse Rd.
- Take Windmill to Portland
- Intersection of Portland and Old Ferry Rd.
- 44°40'04"N, 63°33'11 W

27. Dartmouth, 100m down Wyse Rd. from Nantucket- July 8

- Take Barrington to Macdonald Bridge turn right off of Bridge to Wyse Rd.
- Take Nantucket from the Bridge up to Wyse.
- 100 m to the east down Wyse Rd.
- 44°40'21"N, 63°34'22"W

28. Dartmouth, 100m past intersection of Cole Harbour Rd. & Forest Hill Parkway.- July 8

- Take Barrington to Macdonald Bridge turn right off of Bridge to Wyse Rd.
- Take Windmill to Portland
- Take Portland until it changes to Cole harbour Rd.
- Take Cole Harbour Rd. for ~1 km until intersection with Forest Hill Parkway.

- Continue down Cole Harbour Rd. from Parkway 500 m.
- 44°40'18"N, 63°29'10" W

29. Chaswood, 100m in one on the Lower Stewiacke Rd. from the 224- July 6
- From Halifax, travel on Highway 111 to highway 107
- Take354 from the 107 to the 357 West
- Take the 224 for ~ 6.5km until the intersect with Stewiacke Rd.
- 100m in on the Lower Stewiacke Rd from the 357
- 45°02'39"N, 63°13'14"W

30.Dartmouth, intersection of Highway 7 and Akerley Blvd.- July 12
- Take highway 111 across the Bridge from Halifax and take exit 2
- Exit 2 to Highway 7 NW for ~1.5 km until intersection with Akerley Blvd.
- 44°42'12" -63°36'41"

31. Dean, intersection of 336 and Dean Back Rd. - July 6
- From Halifax, travel on Highway 102 Exit 12 to 289 east
- Take 289 for ~34km until intersect with Alex Semble Rd.(336)(south)
- Take the 336 for ~ 10km until the intersect with Dean Back Rd.
- 45°11'42"N, 62°53'18"W

32. Moosehead, Route 7 and Stan Gammon Route- July 8
- From Halifax, travel on Highway 111 to Highway 107 exit 18
- Take 107 until route 7
- Take route 7 until intersection with Stan Gammon Loop the North side ~6km past Harrigan Cove
- 44°56'38"N, 62°15'59"W

Colchester County

33. Upper Rawdon, Intersection of 354 and Renfrew Rd. - July 26
- From Halifax, travel on Prov. Highway 102
- Take exit 8, travel NorthWest on Route 214
- Travel ~8-10km on Route 214 until Route 14 is reached
- Turn left on route 14 and continue for ~15km
- Once Upper Rawdon is reached turn Left (south) on Route 354 and continue on for ~1 km until the intersection of Renfrew Rd. and Route 354 is met.
- 45,04'03"N, 63,42'42"W

34. East Mapleton, ~2.5 km down Lynn rd from Route 2 - July 26
- From Halifax, travel on Prov. Highway 102
- At Truro, travel West on the Trans Canada Highway 104
- Take exit 5 and travel South West on Highway 142 for ~6-7km
- Turn Left on Route 2 and continue for ~12km (travel through Springhill)

- Turn Left on Lynn Rd. and continue into East Mapleton
- Pass East Mapleton and ~2.5km a fork in the road will be reached
- 45,33'34"N, 64,07'16"W

35. Truro, Highway 311 and Lorne St- July 22.
- From Halifax take 102 until exit 14
- Travel east on Highway 2 for ~4km
- Turn onto Highway 311 from 2
- Intersection of Highway 311 and Lorne St.
- 45°21'54"N, 63°16'48"W

Cumberland County

36. Amherst, highway 2 and Crescent Ave.- July 26
- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104
- Exit 3 on the 104 to Highway 6 travel ~2 km to highway 2
- Travel 500 m down 2 until intersection with Crescent Ave.
- 45°49'54"N, 64°12'33"W

37. Wentworth, 1 km past intersection of highway 4 and 307 - July26
- From Halifax take 102 until exit 15 W
- Travel west on Highway 104 for ~15km to exit 11
- Take highway 4 N for ~ 15km
- 1 km past intersection of Highway 4 and highway 314
- 45°40'26"N, 63°33'05"W

Guysborough County

38. Guysborough, intersection of Old Riverside Dr. and Tompkinville Dr.- July5
- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104 to exit 37
- From exit 37 take highway 4 for ~ 25 km to highway 16
- Highway 16 ~ 15 km until intersection with Old Riverside Dr.
- Turn NW on Old Riverside Dr. until intersect with Tompkinsville Rd.
- 45°23'33"N, 61°30'32"W

39. Cameron Settlement, 250m in Cameron Settlement Rd. - July 5
- From Halifax, travel on Highway 102 to Highway 104 exit 15
- Take 104 exit 24 to 374 South
- Take 374 until intersection Cameron Settlement Road ~40 km from exit 104
- 250m in Cameron Settlement Road
- 45°16'49"N, 62°27'15"W

Pictou County

40. Welsford, intersection of West Branch and Old Pictou Rd. - July 7

- From Halifax, travel on Prov. Highway 102
- At Truro, travel East on Trans Canada Highway Rd.
- Take exit 22 and travel to the outside of Pictou on Highway 106
- From Highway 106, take exit 3 in Pictou and travel West on Highway 376 for ~2-3 km
- Take a Right exit onto Highway 256
- Travel ~15-17 km on Route 256
- Continue until West Branch Rd. is met
- Take a Right (North) on West Branch Rd and continue for ~8-10 km until Welsford is reached
- The intersection of West Branch Rd. and Old Pictou Rd. is located in Welsford
- 45,43'21"N, 63, 03'38"W

41. Thourburn, intersection of Thourburn Rd. and MacPherson Mills Rd. - August 3

- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104 East
- Take exit 26 South West on Route 347
- Travel ~3-4 km on Route 347
- Turn Left (East) on Thourburn Rd.
- Continue on Thourburn Rd. ~2 km until the intersection of Thourburn Rd. and MacPherson Mills Rd.
- 45,33'55"N, 62,32'52"W

42. New Glasgow, 100m past intersection of highway 4 and 348 - July 7

- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104 to exit 25
- Take Highway 348 for ~ 2.5km until intersection with Highway 4
- Travel 100m past intersection
- 45°35'06"N, 62°38'42"W

Antigonish County

43. Antigonish, intersection of College St. and Saint. Mary's St. - August 3

- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104 to Highway 4
- Travel ~4km to College St. and go NW until intersection with Saint. Mary's St.& College St.
- 45°37'23"N, 61°59'29"W

Richmond County

44. Port Hawkesbury, 100m after intersection of Queen St. and Highway 4A - July 27

- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104 to Canso Causeway
- Take highway 4 after causeway travel ~ 25km to Port Hawkesbury
- Take highway 4A SW to intersection with Queen St.
- 100m after intersection to the west Queen St.
- 45°36'43"N, 61°20'42"W

45. Point Michaud, intersection of Route 247 and Rural Road ~12km down 247 - July 27

- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104East
- Continue travelling on Highway 104 until past theCanso Causeway
- Once in Cape Breton, continue on Route 4 through Port Hawkesbury to St. Peter's
- Continue through St. Peters and ~2 km after turn Right onto Route 247
- The intersection of Route 247 and rural road should be reached
- 45,35'24"N, 60,41'25"W

46. Barrahead, 5km past turn off for 247 in St. Peters. - July 27

- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104 to Canso Causeway
- Take highway 4 after causeway travel ~ 25km to Port Hawkesbury and continue on 4 until St. Peter's and intersection with West Bay Rd.
- Travel down West bay Rd. until changes to Oban Rd.
- 45°39'41" N, 60°52'44"W

Inverness County

47. Southwest Maragee., intersection of Route 19 and East Side southwest Maragee Rd.- July 29

- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104 East
- Continue travelling on Highway 104 until past the Canso Causeway
- Continue on Trans Canada Highway 105 for ~40-45 km
- At Whycocomagh, take Route 395 North (Left turn-exit 5)
- Continue on route 395 for ~45-50 km
- When Route 395 comes to an end, turn Right on Route 19
- Travel ~1 km until the intersection of Route 19 and East Side Southwest Margaree Rd. is met
- 46,16'51"N, 61,08'38"W

48.Queensville, intersection of McMaster Rd,. and Crandells Rd. - July 29

- From Halifax, travel on Prov. Highway 102

- At Truro, take the Trans Canada Highway 104 East
- Continue travelling on Highway 104 until past the Canso Causeway
- Continue on Highway 105 for ~12-13 km
- Turn right on MacMaster Rd. and travel ~1.5 km until the intersection of MacMaster Rd. and Crandall Rd. has been reached
- 45,43'59"N, 61,21'59"W

Cape Breton County

49.Sydney, 100m up Churchill Dr. from 327 - July 28

- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104 East
- Continue travelling on Highway 104 until past the Canso Causeway
- Take highway 4 until intersection with 327 in Sydney
- 327 to intersection with Churchill Dr.
- 100m up Churchill Dr.
- 46°07'38"N, 60°11'43"W

50. Marion Bridge, Intersection of Route 327 and Grand Mira Rd. N - July 28

- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104 East
- Continue travelling on Highway 104 until past the Canso Causeway
- Once in Cape Breton, continue on Route 4 through Port Hawkesbury to St. Peters
- Continue on Route 4 through St. Peters for ~60-65 km
- Continue past the junction of Route 4 and Route 216 for ~1.5 km and turn Right on Morley Rd.
- Continue on Morley Rd. for ~10 km
- Turn Left onto Grand Mira Rd. N. and continue for ~2 km until Grand Mira Rd. N. meets Route 327
- 45,58'54"N, 60,12'45"W

51.Sydney River, 250m past intersection of highway 4 and 305 - July 28

- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104 East
- Continue travelling on Highway 104 until past the Canso Causeway
- Take highway 4 until intersection with 305
- 250m down 305
- 46°06'46"N, 60°13'36W

52.Dominon, Intersecton Warburton Rd. and Route 28 - July 28

- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104 East
- Continue travelling on Highway 104 until past the Canso Causeway
- Once in Cape Breton, continue on Route 4 through Port Hawkesbury to St. Peters
- Continue through St. Peters on Route 4 until the of SydneyContinue on Route 4 through

Sydney for ~8-10 km
- Turn Left onto Gardiner Rd. for ~4 km
- Turn Right onto Route 28 for ~2 km
- The intersection of Route 28 and Warburton Rd. appear on the Right side
- 46,12'36"N, 60,01'31"W

53. Louisbourg, merging of New Boston Rd. and Old Louisbourg Rd - July 28
- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 104 East
- Continue travelling on Highway 104 until past the Canso Causeway
- Once in Cape Breton, continue on Route 4 through Port Hawkesbury to St. Peters
- Continue through St. Peters on Route 4 until the outskirts of Sydney
- Once Sydney is reached, take Prov. Highway 125
- 2 exits to Route 22 (exit 8)
- Continue on Route 22 for ~25-30 km until Albert Bridge
- Continue through Albert Bridge ~2 km turn Right on Old Louisbourg Rd.
- Continue on Old Louisbourg Rd. for ~4 km until it merges into New Boston Rd.
- 45,59'01"N 59,59'03"W

Victoria County

54.Baddeck, intersection of Jones St. and highway 205 - July 29
- From Halifax, travel on Prov. Highway 102
- At Truro, take the Trans Canada Highway 101 East
- Continue travelling on Highway 104 until the Canso Causeway
- After Causeway take Highway 105 to Highway 205
- Travel ~2km to intersection with Jones St.
- 46°06'04"N, 60°44'55"W

Hants County

55. Martock, 150m up Windsor Back Rd. from Highway 14 - July 22
- Take Highway 1001 from Halifax to Highway 14 (SW)
- Take Highway 14 until reach Martock and intersection of Windsor Back Rd. and Highway 14.
- 150m up Windsor Back Rd
- Travel 150m up Windsor Back Rd. from Highway 14
- 44°57'07"N, 64°09'18"W

Appendix 3: Provincial Litter Regulations

Nova Scotia Environment Act:

Part III - Litter Abatement

Prohibition against littering
19 No person shall release or cause litter to be released into the environment unless

(a) the litter is placed in a litter receptacle;

(b) the litter is disposed of at a disposal site for municipal solid waste or an area designated by a municipality having jurisdiction for the disposal of litter; or

(c) the litter is deposited in a location designated for that purpose by a municipality having jurisdiction during special clean-up days.

Littering from buildings/structures
20 (1) No owner, operator or person in care, management or control of a commercial outlet, service outlet, plant, building, facility or thing shall permit the release of litter from the commercial outlet, service outlet, plant, building, facility or thing into the environment.

(2) A person described in subsection (1) shall clean up any litter discharged or released into the environment.

Construction sites
21 (1) No owner, operator, contractor or person in care, management or control of the construction, repair or demolition of a plant, building, facility, or thing shall permit the release of litter from the plant, building, facility, or thing into the environment.

(2) A person described in subsection (1) shall clean up any discharged litter released into the environment.

Convenience stores, fast food and vending outlets
22 (1) An owner, operator, or person in care, management or control of a business or operation

(a) where food or beverages are sold in cartons, containers, foils or papers and

(b) where cartons, utensils, containers, foils or paper are discarded in the vicinity by the patrons of the business or operation,

shall provide receptacles for litter and receptacles for recyclable materials in appropriate and easily accessible locations, and shall service, maintain and empty the receptacles.

(2) An owner, operator, or person in care, management or control of a business or operation shall keep the property and all public or private lands, streets, lanes, passageways, beaches or docks within 15 m of any boundary of their property free of all litter unless the landowner or operator denies access to their lands for this purpose.

(3) A person described in subsections (1) and (2) shall ensure that the discarded materials are collected and disposed of as prescribed in these regulations.

Public and private events
23 (1) A person who organizes or is responsible for a public or private event shall

(a) provide an adequate number of receptacles for litter and receptacles for recyclable materials in appropriate and easily accessible locations; and

(b) service, maintain and empty the receptacles as required.

(2) Every person who organizes or is responsible for a public or private event shall ensure that the property where the event takes place and all public or private lands, streets, lanes, passageways, beaches or docks within 15 m of the boundary of the property are free from all litter within 24 hours after the conclusion of the event, unless the land owner or operator denies access to their lands for this purpose.

Flyers/advertisements

24 (1) No person, including a sponsor, organizer, or promoter of an event or thing, shall attach or cause to have attached a flyer, brochure, advertisement or other literature on a utility pole, structure, fence, or other thing,

(a) without the prior approval of the owner of the utility pole, structure, fence, or other thing; and (b) without the prior approval of the municipality, city or town where the utility pole, structure, fence, or other thing is located.

(2) Subject to subsection (1), no person, including a sponsor, organizer or promoter of an event or thing, who attaches or causes to be attached a flyer, brochure, advertisement or other literature on a utility pole, structure, fence, or thing shall

(a) fail to put the posting date on the flyer, brochure, advertisement or literature;

(b) fail to remove the same within 30 days after the event; or

(c) fail to dispose of the same as prescribed in these regulations.

(3) No person, including a sponsor, organizer or promoter of an event or thing, shall distribute or cause to have distributed a flyer, brochure, advertisement or other literature by placing the same on a parked vehicle.

Structures/vehicles on ice

25 No owner, operator or user of a structure, vehicle or thing on the ice surface of a watercourse, shall

(a) abandon the structure, vehicle or thing unless it is made of snow or ice; or

(b) fail to remove and properly dispose of the structure, vehicle or thing before the ice surface of the watercourse melts.

Nova Scotia Motor Vehicle Act

Throwing object at vehicle or on highway

173 (1) No person shall throw any object at a motor vehicle or at a person in a motor vehicle or on a highway which may cause injury to such vehicle or to any person therein.

(2) No person shall throw, deposit, or knowingly leave on a highway any glass, nails, tacks, scraps of metal, or other materials that are liable to injure tires of motor vehicles.

(3) Subsection (2) does not apply to a police officer when using hollow spike belts to stop a motor vehicle where other reasonable methods of pursuit and apprehension have failed.

(4) No person shall throw or otherwise deposit from any vehicle on the highway any litter, refuse, garbage, rubbish or other matter.

(5) Any person who violates any of the provisions of subsections (1), (2) or (4) is guilty of an offence and is liable to a penalty of not less than two hundred and fifty dollars and, in default of payment, to imprisonment for a term not exceeding fifteen days.

(6) In addition to the penalty referred to in subsection (5), a person who violates any of the provisions of subsection (1), (2) or (4) is liable for the expense of removing the litter, refuse, garbage or other objects or material. R.S., c. 293, s. 173; revision corrected.

Appendix 4: Site Description and data sheets

Site Description		
Location		
Site Number		
Distance/Width		
GPS	Start a	
	End a	
	Start b	
	End b	
Litter Source 2km		
Garbage Bins		
Anti Litter Signs		
Special Considerations	Litter Catch	
	Road Type	
	Weather	
	Amount Collected	
	Special Items	
Other		
Photo Number		

Plastics	Site Number:	
Stage 1	Stage 2	Stage 3- Brand
Condiments	Fast Food	
Ice bags		
Milk		
Misc. Film		
Disposable Cups	Beverage containers	
Grocery bags		
Other bags		
Jars, bottle, boxes		
lids		
packaging	Snack Foods	
plates		
reusable cups		
plastic/ paper packaging		
six pack rings	Grocery Products	
pop bottles		
sports/ other bottle	Misc.	
Utensils		
sandwich bags		

Metal -Steel	Site Number:	
Stage 1	Stage 2	Stage 3- Brand
aerosol cans	Fast Food	
	Beverage containers	
steels cans	Snack Foods	
	Tobacco Products	
Miscellaneous	Grocery Products	
	Misc.	

Metal -miscellaneous	Site Number:	
Stage 1	Stage 2	Stage 3- Brand
	Fast Food	
	Beverage containers	
	Snack Foods	
	Tobacco Products	
	Grocery Products	
	Misc.	

Metal -Aluminum	Site Number:	
Stage 1	Stage 2	Stage 3- Brand
Aluminum Cans	Fast Food	
Beer Cans	Beverage containers	
Foil Packaging	Snack Foods	
Foil/ pie tins	Tobacco Products	
Pop cans	Grocery Products	
	Misc	

Cloth	Site Number:	
Stage 1	Stage 2	Stage 3- Brand
	Fast Food	
	Beverage Containers	
	Snack Food	
	tobacco products	
	grocery products	
	Misc.	

Paper	Site Number:	
Stage 1	Stage 2	Stage 3- Brand
Corrugated cardboard	Fast Food	
Lottery		
Misc. Cardboard		
Misc. paper	Beverage Containers	
Misc. paperboard		
Newspapers, books/mags/adver		
beverage casing	Snack Food	
cups		
food wrap		
bags	tobacco products	
packaging		
plates		
trays	grocery products	
paperboard boxes		
stationary		
towels, napkins	Misc.	

Glass	Site Number:	
Stage 1	Stage 2	Stage 3- Brand
Jars, bottles	Fast Food	
Beer bottles	Beverage containers	
Liquor	Snack Foods	
broken glass	Tobacco Products	
	Grocery Products	
	Misc.	

Styrofoam	Site Number:	
Stage 1	Stage 2	Stage 3- Brand
Misc. polystyrene	Fast Food	
Foam Clam Shells	Beverage containers	
Foam cups	Snack Foods	
Foam packaging	Tobacco Products	
Foam plates/bowls	Grocery Products	
Foam trays		

Rubber	Site Number:	
Stage 1	Stage 2	Stage 3- Brand
	Fast Food	
	Beverage Containers	
	Snack Food	
	tobacco products	
	grocery products	
	Misc.	

Wood	Site Number:	
Stage 1	Stage 2	Stage 3- Brand
	Fast Food	
	Beverage Containers	
	Snack Food	
	tobacco products	
	grocery products	
	Misc.	

Composite	Site Number:	
Stage 1	Stage 2	Stage 3 - Brand
Chip Bags	Fast Food	
Chocolate Bars	Beverage Containers	
Flavoured Milk	Snack Foods	
Disposable Cups		
Miscellaneous	Tobacco Products	
	Grocery Products	
	Misc.	

Appendix 5: Brand Structures

The following is a list of visible brands, categorized by parent companies. Brands were analyzed according to parent brands. Frito-Lay and Quaker Brands were analyzed separately, although these brands are owned by PepsiCo Inc.

Parent Brand	Visible Brand
Cadbury Schweppes	*Dr. Pepper, 7UP, Canada Dry, Clamato, C-plus, Hawaiian Punch, Motts, Schweppes, Snapple* Cadbury Trebor Allan Caramilk, Cherry Blasters,Crispy Crunch, Crunchie, Dairy Milk, Fruit and Nut, Fushion, Fuzzy Peach, Gummies, Maynards Wine Gums, Mr. Big, Sour Patch Kids, Wunderbar, Cadbury Adams Bubbaloo, Bubblicious, Certs, Chiclets, Cinna-A-Burst, Clorets, Dentyne, Halls, Trident
Coca-Cola	A&W Root Beer, Barq's, Bacardi Mixers, Coca Cola, Crush, Dannon, Dasani, Evian, Five Alive, Fresca, Fruitopia, Minute Maid, Nestea, Nature's Own, Planet Java, Powerade, Spring Water, Sprite, Sunkist, Seagrams, Wink
Frito-Lay	Lay's, Cheetos, Cracker Jack, Doritos, Fritos, Hickory Sticks, Hostess Potato, Miss Vickies, Munchies, Munchos, Rold Gold, Ruffles, Sunchips, Tostitos,
General Mills	Betty Crocker, Bugles, Fruit Snacks (Fruit by the Foot), Haagen-Dazs, Nature Valley, Old El Paso, Pillsbury, Yoplait
Hershey Canada	Jolly Ranchers, Glosette, Oh Henry, Reese, Skor, Pot of Gold, Twizzlers, Whoppers
Kraft	Crystal Light, Country Time, Cheez Whiz, Delissio, Del Monte, Jello, Kool-Aid, Life Savers, Lunchables, Mr. Christie (cookies and crackers)
Labatt	Blue, Olands (Keiths)
Mars (Effem Inc.)	3 Musketeers, Bounty, Kit Kat, Mars, M&M's, Milky Way, Skittles, Snickers, Starburst, Twix
Molson	Canadian, Export
Nestle	Aero, Baby Ruth, Big Turk, Butterfinger, Coffee Crisp, Drumstick, Kit Kat, Mirage, Rolos, Quality Street, Smarties, Sweetarts, Turtles, Willy Wonka (Nerds, Gobstoppers, etc)
Pepsi-Cola	Aquafina, Gatorade, Mugs, Pepsi, SoBe
Sobey's Inc.	Foodland, Needs, Price Chopper, Sobeys
Storck	Campino, Riesen, Werthers
Tootsie Roll	Blow Pop, Charms, Dots, Frooties, Tootsie Pop
Unilever	Breyers, Good Humour (Klondike), Popsicle, Revello Lipton, Red Rose, Salada
Vachon	Ah Caramel, Joe Louis, Passionflake
Wrigley's	Excel, Extra, Freedent, Juicy Fruit

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