Phase II

Textile Transformation Nova Scotia



Part 1 of 3

Waste Characterization Study

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October 2026

NACTR

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Textile Transformation Nova Scotia (TTNS) Phase II

Textile Waste Characterization Study, Donation Etiquette Analysis, & End-Use Pathways Brief

Prepared for:

The National Association for Charitable Textile Recycling (NACTR)

Prepared by:

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Report Authorship

This volume brings together three deliverable reports plus the master document prepared under TTNS Phase II. Authorship, contributions, and reviewers for each report are listed below.

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0	Master Report	Charlotte Genge	Dr. John Fiset, Sasha Barnard
1	Waste Characterization Study	Charlotte Genge, Claire Theaker-Brown, Dr. John Fiset	Dr. Rachel McQueen, Tonny Colyn, Sasha Barnard
2	Donation Etiquette Analysis	Charlotte Genge, Dr. John Fiset	Dr. Rachel McQueen, Claire Theaker-Brown, Tonny Colyn, Sasha Barnard
3	End-Use Pathways Brief	Charlotte Genge	Dr. John Fiset, Tonny Colyn, Sasha Barnard

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Genge, C. (2026). End-use pathways brief. In Textile Transformation Nova Scotia (TTNS) Phase II. Prepared for National Association for Charitable Textile Recycling.

This report is one of three integrated deliverables produced through **TTNS Phase II**. Together, the reports examine Nova Scotia's textile system from material, behavioural, and market perspectives. The overall project context and relationship among the reports are presented in the **TTNS Phase II Master Report**. The present **Waste Characterization Study** focuses specifically on the physical characteristics of post-consumer textiles entering Nova Scotia's reuse and recovery system.

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0.0 Executive Summary

Nova Scotia's textile donation stream contains far more value than is currently being captured. Across 4,664 donated items assessed in all seven of the province's solid waste-resource management regions (SWR), an estimated **47% were immediately suitable for resale**, and a further **20% required only minor cleaning or repair** before they could re-enter the market (Grade D1).

Even textiles unsuitable for resale represent a diverse, largely single- or two-fibre material stream that could serve as feedstock for recycling and manufacturing where appropriate sorting, processing capacity, and end markets exist.

This report presents Nova Scotia's first province-wide characterization of donated textiles, examining garment condition, fibre composition, product categories, brand ownership, and material suitability for downstream recovery pathways. The findings establish the material evidence base that the rest of **TTNS Phase II**, and any future textile policy or investment decision in the province, builds on.

Why this matters

Until now, little was known about what actually makes up Nova Scotia's post-consumer textile stream. Decisions about recycling infrastructure, policy, and investment cannot be made without knowing what materials exist, in what condition, and in what quantity. This report begins to close that gap.

Several of this study's findings have direct implications for next steps in infrastructure and policy development. For example, cotton and polyester dominated the sample, together accounting for nearly 82% of all fibres identified, and 84.8% of items contained only one or two fibre types, a composition that meaningfully improves suitability for future sorting and recycling. Denim in particular stands out as a promising feedstock for insulation manufacturing given its high cotton content, although the presence of elastane in many garments creates a processing challenge that must be addressed in developing this pathway.

Key findings

The study identifies three distinct material streams, each requiring a different management approach:

Immediate reuse. An estimated **47% of donated items are in resaleable condition** without any repair intervention required, confirming that reuse remains the highest-value recovery pathway and the first priority for any investment.

Repair and value recovery. A further **20% (Grade D1) require only minor repair or cleaning** before resale, representing a clear opportunity for repair-to-resale programs and social enterprise employment.

Material recovery. Items unsuitable for resale remain **valuable feedstock for insulation, nonwovens, industrial wiping cloths, and future fibre-to-fibre recycling**, provided fibre content can be reliably determined.

The analysis also found that a relatively small number of parent companies are responsible for a disproportionate share of donated clothing: **the top 25 companies accounted for 34.1% of items** while owning only 5.9% of identified brands. This concentration provides a clear and practical starting point for establishing producer accountability under a future EPR framework.

Recommendations

The report identifies **material-level ("MAT") priorities** for strengthening Nova Scotia's textile recovery system. The following recommendations are drawn from the full analysis; codes in brackets (e.g., MAT-1) correspond to the numbered recommendations in the report:



Engage the concentrated parent companies identified in this study as the foundation for producer accountability and closing the stewardship infrastructure gaps their concentration reveals. (MAT-1, MAT-2)



Formally include textiles in provincial and municipal waste strategies and audits, using a definition harmonized with NACTR and other Canadian jurisdictions. (MAT-3)



Explore procurement mandates and consumer incentives, such as recycled-content purchasing requirements and sales tax exemptions on used textiles, as near-term demand-side levers. (MAT-4, MAT-5)



Explore methods of extending wearable garment lifetimes by considering repair subsidies and eco-modulated producer fees that reward circularity-enabling product design. (MAT-6, MAT-8)



Improve fibre-content transparency through standardized labelling and digital product information to support fibre-specific recycling. (MAT-7)

1.0 Introduction

There is a pressing need to examine alternative waste pathways that restore economic value to the textiles entering Nova Scotia's donation stream. Because processing options depend on a wide variety of material characteristics, quantifying what exactly is in the textile waste stream is a necessary first step. Recycling solutions, for example, can be fibre-dependent, while resalability is significantly affected by an item's brand and condition *(Botticello, 2012; Cura & Mäkelä, 2024)*. Nova Scotia's textile collection and processing is currently undertaken primarily by for- and non-profit thrift organizations whose operations include receiving, sorting, reselling, and other handling of donated items. Thus, an understanding of what Nova Scotians are donating can illuminate potential resources for and barriers to alternative circular pathways for textiles.

This study is Nova Scotia's first investigation into the item type, textile construction, fibre content, condition, and reusability of donated textiles in the province. The primary objective of this research is to provide baseline data that can inform future product stewardship obligations.

Textile samples were primarily collected from Salvation Army Thrift Store retail locations across Nova Scotia's seven SWR, with over 4,500 items examined.

The central question that this work seeks to answer is:

What is entering and exiting Nova Scotia's charitable textile reuse stream?

The findings presented in this report provide the material foundation for the other **TTNS Phase II** deliverables. The **Donation Etiquette Analysis** examines the behavioural factors that contribute to the material characteristics documented here, while the **End-Use Pathways Brief** uses these findings to evaluate the most appropriate recovery and manufacturing opportunities for Nova Scotia.

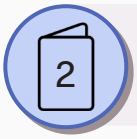
A detailed breakdown of data collection and analysis can be found in the following section. Of note is that the research methods used for this project were designed to build on previous Canadian textile waste characterization studies *(Degenstein et al., 2020, 2021; Mak et al., 2025; Sterling et al., 2026; Weber et al., 2017, 2023)*. The data collected can thus contribute to a harmonized Canadian data set that can inform domestic textile waste diversion policy development across jurisdictions.



Master Report
Including appendices and references



Waste Characterization Study
Investigation of donated textiles



Donation Etiquette Analysis
Examination of donor behaviour



End-Use Pathways Brief
Evaluation of potential opportunities

2.0 Methodology

2.1 Sampling Approach

This study examined post-consumer textile donations collected through charitable reuse systems across Nova Scotia's seven SWR (**Figure 1**). Data collection was conducted via two sorting sessions through a partnership with The Salvation Army Thrift Store, one of the province's largest charitable textile collectors and retailers.

For **Sort 2**, a sample of textiles collected from donation bins provided by Big Brothers Big Sisters of Greater Halifax was also assessed.

To facilitate analysis of material flows through the charitable reuse system, textiles were classified into three categories based on their stage in the sorting process: credentials, rejects, and ragout.

- **Credential:** donated items that had not yet been sorted at the store level,
- **Rejects:** items deemed unsuitable for resale during initial store-level sorting, and
- **Ragout:** items initially accepted for resale but subsequently removed from inventory after failing to sell within their allotted retail period, typically four weeks.

This classification provided a framework for examining how textile **quality, composition,** and **reuse potential** vary across different stages of the charitable reuse system.

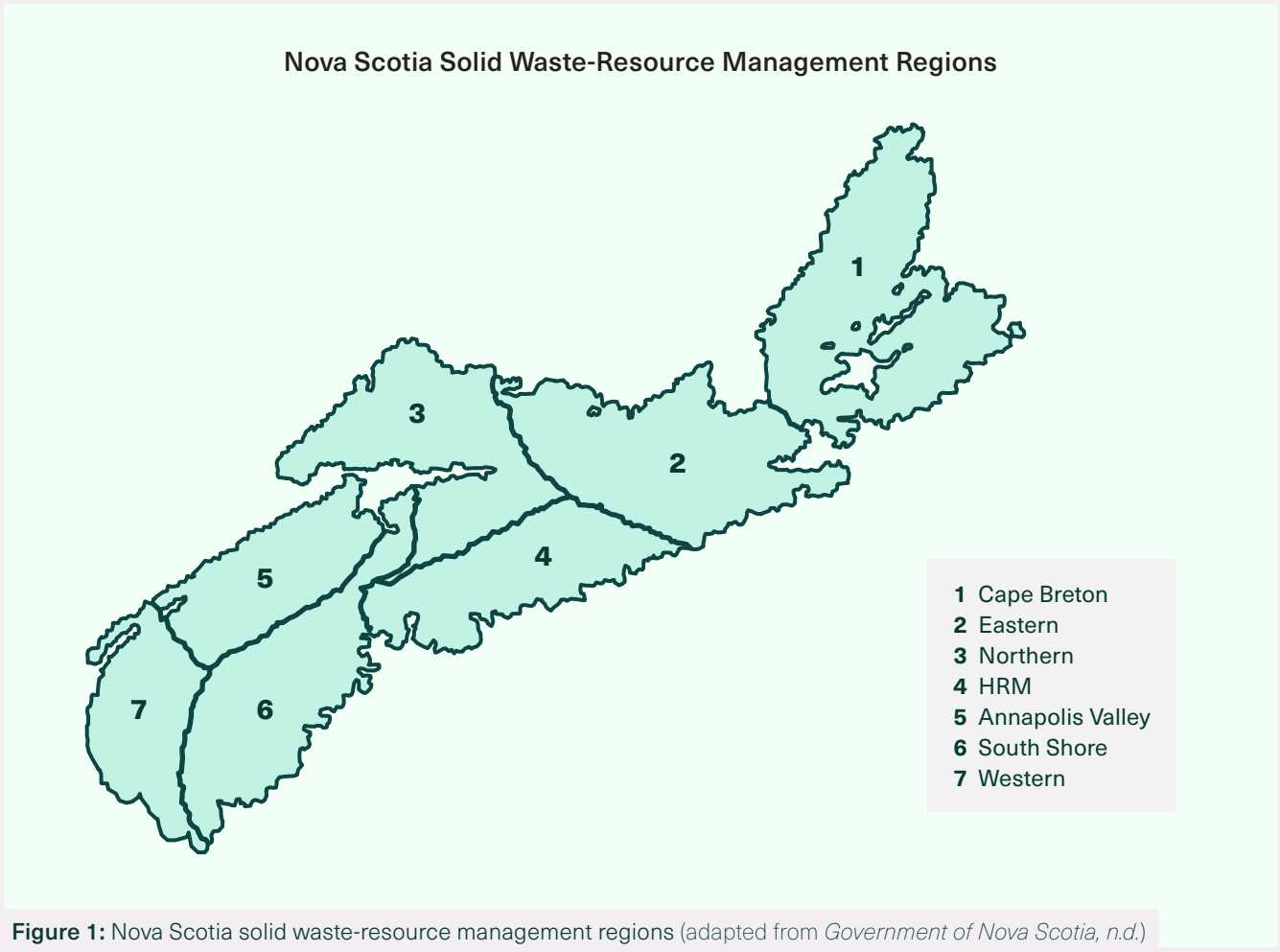


Figure 1: Nova Scotia solid waste-resource management regions (adapted from *Government of Nova Scotia, n.d.*)

The sorting sessions were conducted between February and April 2026 at the Salvation Army Thrift Store Distribution and Recycling Centre (DRC) in Dartmouth, Nova Scotia. This approach served two purposes. First, conducting the sessions in winter and spring helped limit potential seasonal bias in donation patterns, such as the overrepresentation of winter apparel during colder months. Second, the sessions examined textiles at different stages of the charitable donation and sorting process, providing insight into how their composition and condition varied across the reuse system (see **Table 1**).

For each session, the Salvation Army Thrift Store provided one 64-cubic-foot pallet box of between 200 and 300 pounds on average, of requested samples collected from stores in each of Nova Scotia's waste regions (see photo in **Appendix A4 in the Master Report**). The pallet boxes were transported from their regions of origin to the DRC, where all sorting and data collection activities were conducted. As a complement to **Sort 2**, a supplementary sample of 301 credential textile items collected from donation bins operated by Big Brothers Big Sisters of Greater Halifax were assessed. In total, **4,664 donated items** weighing **2,975 lbs (1,349 kg)** were evaluated across the sorting sessions.

Sort 1: Ragout and Rejected Donations

The first sorting session, conducted over five days in February 2026, examined textiles that had already undergone initial processing within the charitable reuse system. Store staff were instructed to assemble samples that, to the best of their ability, reflected the types and relative proportions of unsold textiles scheduled to be returned to the DRC for further sorting and processing, including both ragout and rejected items. While the exact proportions may not perfectly mirror the broader return stream, all major textile categories were represented in the sample.

It is important to note that although stores were instructed to provide only reject and ragout items, a small amount of credential material was also included in some samples due to sorting and handling practices at the store level. This is discussed further in **Section 5.1 – Limitations**.

Sort 2: Credential/Unprocessed Store Donations

The second sorting session (**2A**), conducted over five days in April 2026, focused on credential donations received directly at Salvation Army Thrift Store locations, along with a subsample of credential donations (**2B**) collected through charitable donation bins. Similar to **Sort 1**, retail thrift stores located in each of Nova Scotia's seven waste regions were instructed to assemble a pallet box containing a representative sample of textiles entering the charitable reuse system, this time consisting of store-based donations of credential textiles. Each pallet was weighed upon arrival and again after data collection was completed, with the difference used to calculate the total weight of the items assessed. To support balanced regional representation, approximately 50 items from each region were evaluated in rotation. After all seven regions had contributed 50 observations, the process was repeated until the target sample of approximately 300 items per region was reached.

Donation Sorting Sessions

Session	Session Date Range	Primary Sample Composition
Sort 1	February 9-13, 2026	Ragout & Rejects
Sort 2A	April 13-17, 2026	Credential
Sort 2B	March 1-14, 2026	Credential

Table 1: Summary of sorting sessions and associated sample composition

As a complement to the store-based sample, credential donations collected from charitable textile donation bins throughout the Halifax Regional Municipality (HRM) were also assessed. This additional sample allowed us to examine whether donation channel was associated with differences in the quality, condition, or composition of incoming textiles. Unlike the donations assessed from Salvation Army Thrift Store locations, these materials had been deposited in unattended collection bins. At the time of the study, researchers had access only to bins within the HRM, so comparisons of donation quality between rural and HRM bins were outside the scope of this research.

To preserve the integrity of the donation stream, bags remained unopened until they arrived at the sorting location. In total, 40 donation bags collected from a wide range of donation bins across the HRM were weighed and processed. An average of eight items was randomly selected from each bag, resulting in a final sample of **301 items**. This approach captured variation across multiple donation events while maintaining a manageable sample size. For analytical purposes, the donation-bin sample was treated as an eighth region, and all items were assessed using the same procedures applied in the other sorting exercises.

For reporting purposes, the store-based sample is designated as **Sort 2A (store donations)** and the donation bin sample as **Sort 2B (donation bins)**. References to **Sort 2** denote the combined dataset comprising both **Sort 2A** and **Sort 2B** (see **Figure 2** for the sample structure). **Figure 3** presents the total sample weights associated with each sort.

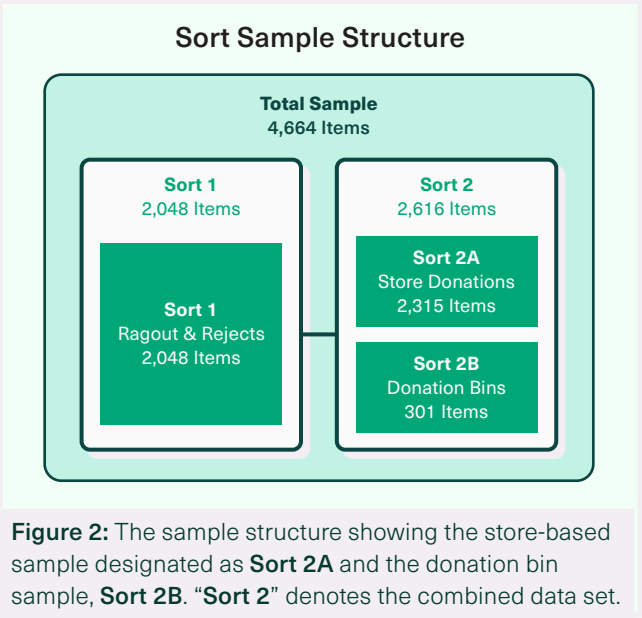


Figure 2: The sample structure showing the store-based sample designated as **Sort 2A** and the donation bin sample, **Sort 2B**. "**Sort 2**" denotes the combined data set.

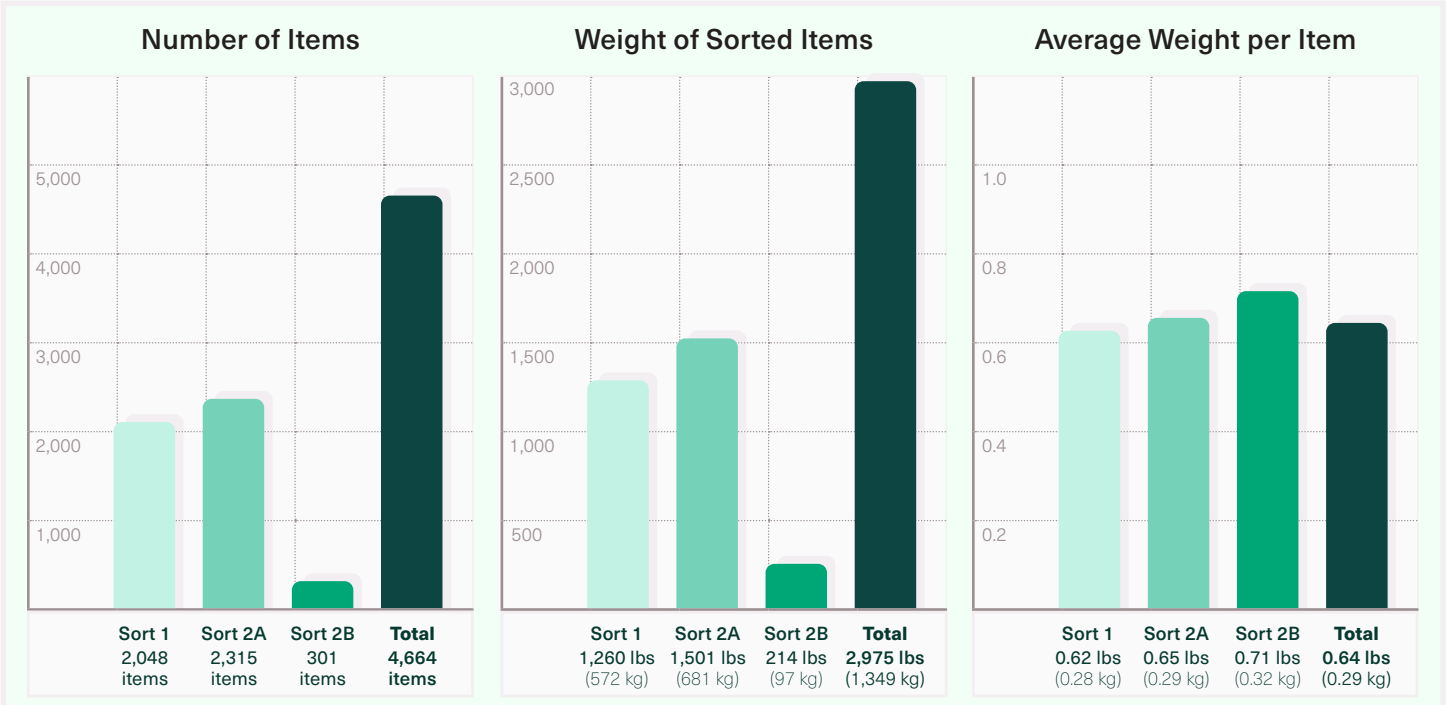


Figure 3: The weight of items in the sample by sort

2.2 Sorting procedure

Before data collection began, members of the research team were trained in item classification, condition assessment, fibre identification procedures, and data recording protocols. Following this training, each item was individually assessed by a trained researcher.

Each item underwent a detailed visual inspection covering the following attributes and condition indicators:

- **Attributes**
  - Retail section, category, and subtype
  - Brand
  - Textile construction
  - Fibre content
- **Condition**
  - Grade
  - Visible defects and contamination, including moisture and odour
  - Value assessment, including characteristics that may add to or detract from potential market value

Photographs were taken of each item to support verification of classification, fibre content, and condition assessments. For a complete list of data points, data collection form, sample item photographs from **Sorts 1 and 2**, and photos of commonly observed defects, see **Appendix A5 in the Master Report**. Data collection procedures evolved over the course of the study. **Sort 1** employed the use of photographs and the submission of a digital data collection form after the sorting session based on the photographs, which was replaced solely by a digital data collection form completed in-situ for **Sorts 2A and 2B**.

The streamlined digital system improved data collection efficiency and supported the inclusion of additional variables while maintaining comparable item assessment rates. It is also worth noting that items commonly donated in pairs, like socks and gloves, were logged as separate items (i.e., a pair of socks would be assessed separately as two separate items).

2.2.1 Item classification

Items were classified using a three-level hierarchy consisting of **Retail Section** (home/pet items, men's apparel, women's apparel, children's apparel, and unisex/other), **Item Category** (e.g., tops, accessories, sleepwear), and **Item Subtype** (e.g., "button-down shirt," "hat," "pyjama top"). All classifications were selected to align with common sorting and merchandising practices used by thrift retail organizations.

Retail Section, referred to as gender and age classification in some previous studies, was included because it reflects how garments are typically sorted, stored, and displayed within resale environments and may also influence consumer demand and resale value *(Mizrachi & Ori, 2025)*. Efforts were also made to align item categories and subtypes with classifications used in prior textile characterization studies *(Sterling et al., 2026; Weber et al., 2023)* to facilitate future comparative analyses and dataset harmonization across studies.

2.2.2 Brand

Brand information was recorded for each item whenever it could be reliably identified. Brands were tracked for three primary reasons: First, brand identification provides insight into **item volumes by producer**, information that may be relevant as manufacturers become stakeholders in future policy discussions. Second, it helps illustrate the extent to which **fast fashion and hyper-fast fashion** have affected textile donation volumes and quality. Third, it enables analysis of the relationship between brand and **potential resale value**.

Brand information was recorded at two levels: during the initial sort, the individual brand displayed on the item was recorded. Subsequently, during analysis, brand parent companies or broader brand group that owned the brand at the time of data collection was recorded.

For example, an item labelled Banana Republic was recorded under Banana Republic as the individual brand and Gap Inc. as the parent company. Tracking both levels made it possible to preserve distinctions between consumer-facing brands while also examining the combined presence of brands operating under the same corporate ownership.

Brand identification was based primarily on manufacturer labels. Where labels were absent or illegible, alternative identifiers such as logos, embroidery, printed graphics, or branded hardware were used when available. If no reliable brand identifier could be located, the item was recorded as "Unknown".

2.2.3 Textile construction

Each item was assessed for textile construction, defined as the method by which fibres, yarns, or other materials are assembled to create a fabric. Textile construction was recorded because processing, recycling, and repair options are often influenced by both fabric structure and fibre composition. Three construction categories were used in this study: **woven**, **knit**, and **nonwoven**. **Woven** fabrics are produced by interlacing yarns at right angles, whereas **knit** fabrics are created by interlooping yarns, resulting in greater elasticity and stretch. **Nonwoven** materials are formed through the bonding, entangling, or interlocking of fibres or materials rather than through weaving or knitting (e.g., felt and leather). **Figure 4** *(Yan, Kasal, & Huang, 2016)* illustrates the different textile construction types.

Textile Construction Types

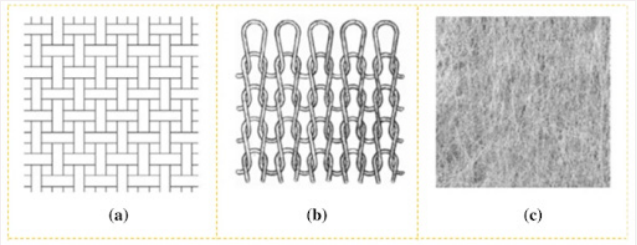


Figure 4: Construction types of textiles: (a) **woven**, (b) **knit**, (c) **nonwoven** from *Yan, Kasal, & Huang, 2016*

2.2.4 Fibre content

Each item was assessed for fibre composition, as fibres are the fundamental building blocks of fabrics *(Lomov & Verpoest, 2005)* and can be classified as **natural** (e.g., cotton, linen), **synthetic** (e.g., polyester, acrylic), or **man-made cellulosic** (e.g., rayon) fibres. Documented fibre types aligned with those documented in previous studies to allow for data harmonization *(Mak et al., 2025; Sterling et al., 2026)*. Where available, fibre content information was obtained directly from fibre content labels. When labels were missing or illegible, fibre composition was assessed using a FabriTell Near-Infrared Spectroscopy (NIRS) scanner manufactured by Matoha (**Figure 5**). The same scanner model has been employed in previous textile characterization studies conducted in Alberta, Saskatchewan, and Ontario, facilitating comparison across datasets *(Mak, McQueen, & Kozlowski, 2025; Sterling et al., 2026; Weber et al., 2023)*. Items for which neither label information nor scanner results provided a reliable identification were classified as "Unknown."

FabriTell Fibre Scanner



Figure 5: Matoha FabriTell NIRS scanner *(photo taken from www.matoha.com)*

2.3 Condition

Condition is a key factor in determining reusability and resale value. For the purposes of this study, condition was defined as the extent to which an item retained its original functionality and appearance relative to its condition at the time of purchase. Condition assessments focused on **observable wear**, **damage**, **contamination**, and **other factors affecting resale or reuse potential**.

2.3.1 Grade

Items were assigned a condition grade using the framework adapted from *Sterling et al. (2026) and Weber et al. (2023)*. Grades ranged from **A (new with tags)** to **F (contaminated or unsuitable for reuse and recycling)**. **Table 2** shows each grade and its definition.

For this study, grades **A** through **C** were considered '**rewearable**,' meaning the item could reasonably be placed on a retail sales floor without additional intervention. Grade **D1** and **D2** items were both classified as '**recoverable**,' meaning they retained the potential for reuse following cleaning, repair, or refurbishment. Grade **D1** items required relatively minor intervention before they could be resold, whereas Grade **D2** items required substantially greater effort, resources, or processing before a resale attempt could be considered. In practice, a Grade **D2** assignment required not only that repair be technically feasible, but that the repaired item would be reasonably likely to sell in a secondhand market; items where this was judged unlikely, even if technically repairable, were graded **E** rather than **D2** (e.g., a blown-out crotch seam in a pair of jeans is repairable, but the repaired item is unlikely to be resaleable). This threshold may account for some of the cross-study variation in **D2** and **E** proportions discussed in **Section 4.0 – Discussion**. Grades **E** and **F** were considered '**unwearable**,' as neither category was suitable for direct reuse or resale. However, Grade **E** items retained the potential to be **recycled** or otherwise **recovered** through downstream processing, whereas Grade **F** items were considered unsuitable for recycling due to severe contamination or other characteristics that rendered the item ineligible for material recovery.

Donation Condition Grading System

	Grade	Definition
REWEARABLE	A	**Perfect**; has original tags/packaging
	B	**Excellent**; very few or no signs of use
	C	**Good**; some visible use but salable as-is
RECOVERABLE	D1	Unacceptable for immediate sale; shows signs of wear, damage, and/or staining but could become resaleable with **minor cleaning and/or repair**.
	D2	Unacceptable for immediate sale; may become resaleable after **deep cleaning and/or repair**.
UNWEARABLE	E	Not repairable, but fibres are uncontaminated and could be **recycled or recovered** through downstream processing.
	F	Fibres are **contaminated** (mould, strong odour) and cannot be recycled.

Table 2: The grading system used to assess the condition of donated textiles in the study.

2.3.2 Defects & Contamination

Each item was also assessed for the presence of specific defects and contamination types, including **staining, tears, missing components, pilling, odours, moisture damage, pet hair,** and **other indicators of deterioration.** A complete list of the defects and contamination categories tracked in this study is provided in **Appendix A1 in the Master Report.** The complete project methodology is shown in **Figure 6.**

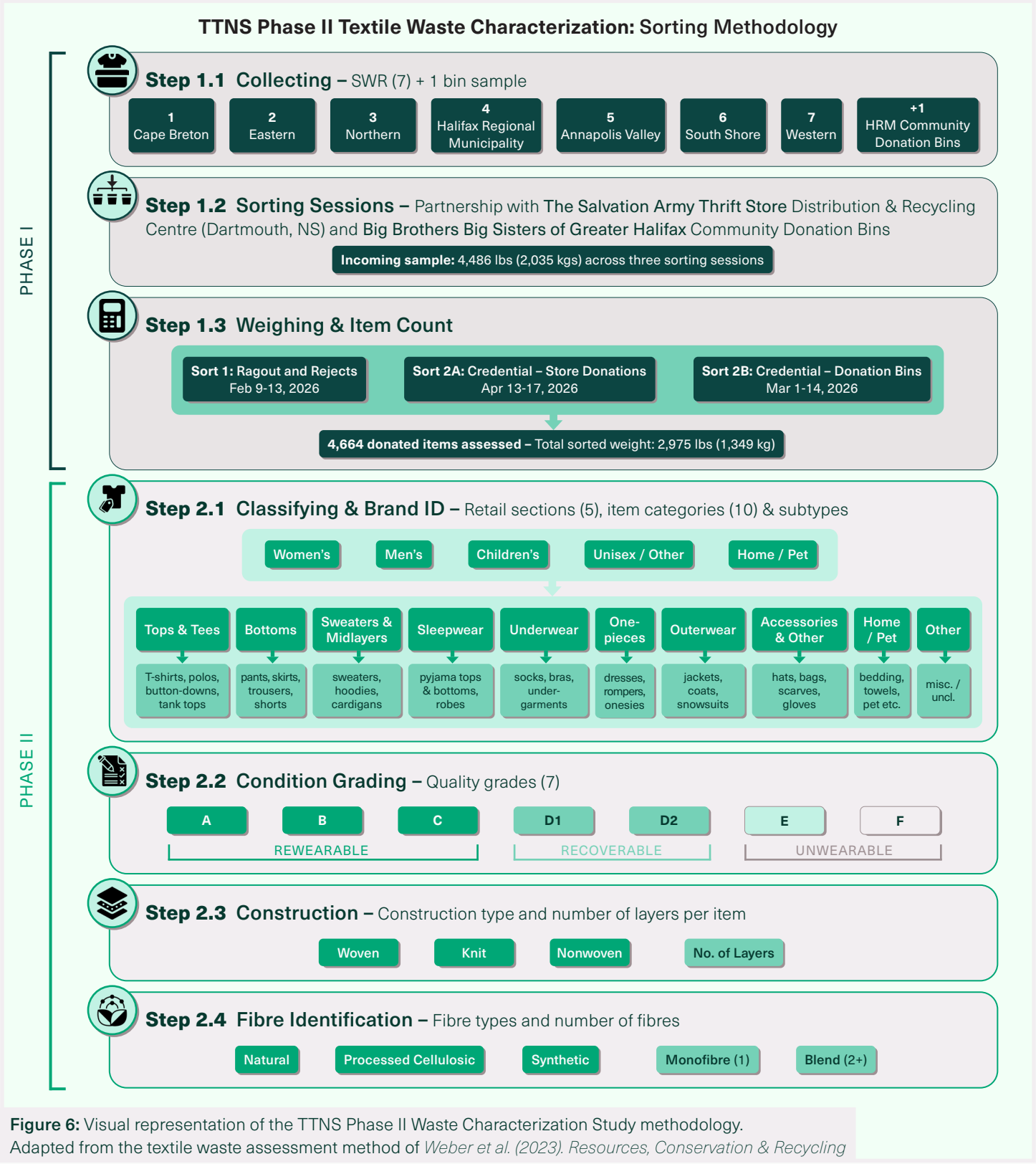


Figure 6: Visual representation of the TTNS Phase II Waste Characterization Study methodology. Adapted from the textile waste assessment method of *Weber et al. (2023). Resources, Conservation & Recycling*

2.3.3 Value Assessment

Items in **Sort 2** were also assessed for additional characteristics that could positively or negatively influence resale potential but were not adequately reflected by condition scores alone. **Value-add characteristics** included attributes associated with increased consumer demand, such as **vintage appeal**, **premium brands**, **collectible merchandise**, and other desirable features. **Value-detracting characteristics** included factors that could reduce marketability despite favourable physical condition, such as **low-quality construction**, **undesirable branding**, or **other factors affecting consumer demand**. These variables were included to provide a more nuanced understanding of the factors influencing reuse and resale outcomes beyond physical condition alone.

Value-adding attributes: Recognizing that value is subjective and varies across second-hand textile users, the assessment focused specifically on attributes likely to influence a thrift shopper's perception. Value-adding attributes were informed by common sorting and merchandising practices, such as placing vintage items in dedicated sections, displaying premium brands or collectable fanwear in boutique areas, and storing seasonal merchandise until the appropriate time of year.

Value-detracting attributes: Characteristics that could reduce marketability despite an item's otherwise acceptable condition, such as personal nametags, previous alterations, or event-specific and promotional customization. These criteria were informed by existing resale protocols and observations made by the research team.

Table 3 outlines the "value-add" and "value-detract" categories that were identified.

2.4 Analytical Approach

Descriptive statistical analyses were used to identify patterns within the textile donation stream and to characterize the materials entering and exiting Nova Scotia's charitable reuse system. Following data cleaning and validation, datasets were consolidated and reformatted for analysis. **Summary statistics**, **frequency distributions**, **cross-tabulations**, and **comparative analyses** were conducted using *IBM SPSS Statistics (Version 29)*. Results were used to examine **regional differences**, **material composition**, **fibre distributions**, **condition outcomes**, and **relationships between donation channel and textile quality**.

Several data collection variables evolved over the course of the study. Observations from **Sort 1** informed refinements to both the data collection protocol and condition assessment framework used in **Sort 2**. Additional variables, including **value-add** and **value-detract** characteristics, were introduced in **Sort 2** but are not directly comparable between certain variables collected during **Sort 1**.

Donation Value Addition and Detraction Categories

Value Add	Value Detract
Vintage	Promotional merchandise/swag
Collectable fan gear (e.g., sports team, band shirt, cartoon character)	Company uniform
Made in Canada	Part of an incomplete set (e.g., pajama top without pants)
Premium/luxury brand	Previous customization (e.g., a personal name tag) or alteration (e.g., hemming or patching)
Notably high-quality materials or construction	Notably low-quality materials or construction

Table 3: The categories for value-add and value-detract determined during Sort 1 and subsequently assessed during Sort 2A

3.0 Results

3.1 Items by type

Retail Section: Of the 4,664 items examined:

womenswear was the largest Retail Section (n=2,236, 47.9%), followed by

menswear (n=977, 20.9%),

children's apparel (n=793, 17.0%),

home and pet items (n=403, 8.6%), and

unisex apparel (n=255, 5.5%).

The proportions of womenswear and children's apparel were broadly consistent with global apparel retail industry estimates of 51.0% and 15.3%, respectively *(Uniform Market, 2025)*. Menswear accounted for a smaller proportion of the study sample than of the global apparel market, where it represents an estimated 32.8% *(Uniform Market, 2025)*. However, this difference may partly reflect the classification of some items as unisex apparel that might conventionally be placed within the menswear section in retail settings.

Item Category:

Tops were the most common Item Category, accounting for nearly one-third of all items examined (n=1,361, 29.2%).

The next most prevalent categories were **bottoms** (n=778, 16.7%),

accessories (n=700, 15.0%), and

sweaters (n=553, 11.9%).

For most item categories, the proportions observed in this study were broadly consistent with previous textile characterization research, though individual comparisons varied. *Weber et al. (2023)* found a lower proportion of clothing in Ontario's residential waste streams but higher proportions of accessories, footwear, and home items, whereas *Sterling et al. (2026)* reported the opposite pattern. **Sleepwear** was a clear exception to this general consistency: it made up a much larger share of the present sample (n = 308, 6.6%) than in either comparison study (2.0% in *Weber et al., 2023*; 4.1% in *Sterling et al., 2026*).

Item Subtype:

Short-sleeved T-shirts and **polo shirts** were the most common item subtypes (n=561 items, 12.0% of the total sample).

They were followed by **sweaters** (n=271, 5.8%),

socks (n=266, 5.7%),

long-sleeved T-shirts and polo shirts (n=253, 5.4%),

pants and trousers (n=209, 4.5%),

tank tops (n=184, 3.9%),

hoodies (with or without a zipper; n=164, 3.5%),

sports or athleticwear (n=152, 3.3%), and

outerwear (n=144, 3.1%).

Together, these nine item subtypes accounted for **47.3%** of all items examined, illustrating that a relatively small number of common garment types comprised a substantial proportion of donated textiles.

Example: Sorting Items by Type



Donated items were classified by:
retail section (e.g. womenswear),
item category (e.g. tops), and
item subtype (e.g. T-shirt).

3.2 Brand

Brand: Brand information was available for **3,654 items** (78.3%) and unavailable for 1,010 items (21.7%) because the identifying label was missing or illegible.

Figure 7 shows the brand identification across the full sample. At the individual-brand level, **1,181 distinct brands** were identified, revealing a highly fragmented brand distribution in which most brands appeared infrequently.

Six brands (0.5%) appeared **50 or more times,**

22 brands (1.9%) appeared **20-49 times,**

28 brands (2.4%) appeared **10-19 times**, and

345 brands (29.2%) appeared **2-9 times.**

The remaining 780 brands (66.0%) were observed only **once.**

Figure 8 shows a breakdown of the frequency that brands were found in the sample.

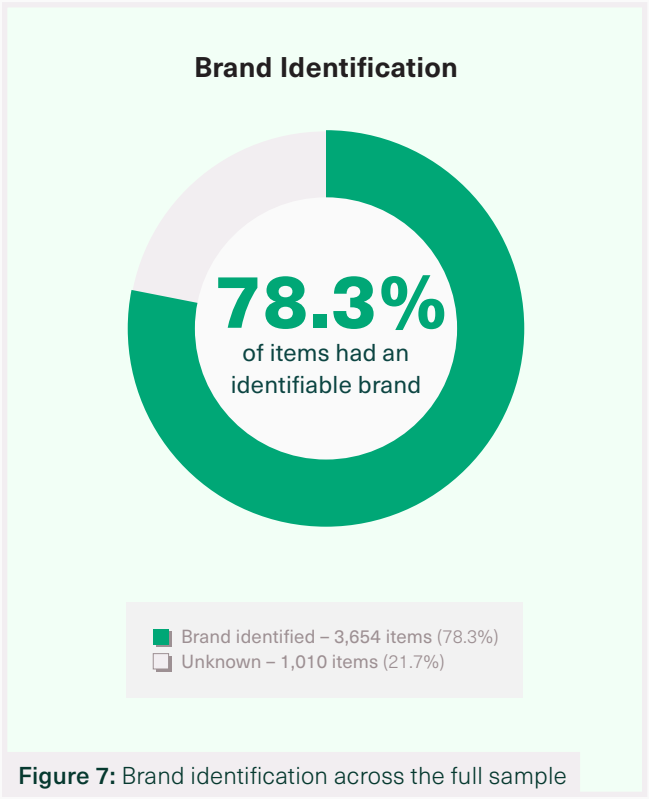


Figure 7: Brand identification across the full sample

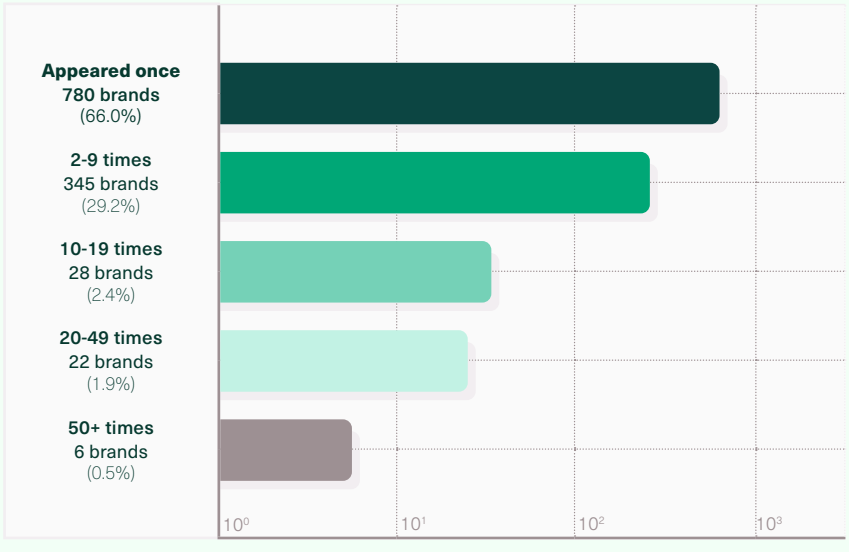


Figure 8: Frequency that brands appeared in the sample

Missing brand information was not evenly distributed across item types. When accessories and home/pet textiles were excluded from the sample, leaving **3,561 clothing items**, the unknown-brand rate dropped from 21.7% to **12.4%** (n=442). This implies that the 1,103 accessories and home/pet items removed from this comparison accounted for a disproportionate share of unidentifiable brands: 568 of these items, or 51.5%, lacked a usable brand label, more than four times the rate observed among clothing items.

Socks were a particularly notable driver of this pattern: of the 267 socks examined, 157 (59.0%) had no identifiable brand, the highest unknown-brand rate of any item subtype and nearly five times the clothing-level rate. Socks alone accounted for 15.5% of all unknown-brand items in the sample despite representing only 5.7% of items overall.

Figure 9 shows a breakdown of the unknown brand rate variance by item type. This is consistent with the expectation that small accessory items such as socks are less likely to carry a durable or legible brand label than garments, and suggests that brand-based analyses in this report may be most reliable when interpreted at the clothing level rather than across the full sample.

The 50 most frequently identified brands, along with their parent companies and countries of origin or head-office locations, are listed in **Appendix A7 in the Master Report**. The 20 most common brands accounted for 1,156 items, representing 24.8% of the total sample. George was the most frequently observed brand (n=195), followed by Old Navy (n=156) and Joe Fresh (n=119). This is comparable to findings from *Sterling et al. (2026)* in a sample collected from Alberta, Ontario, and Saskatchewan.

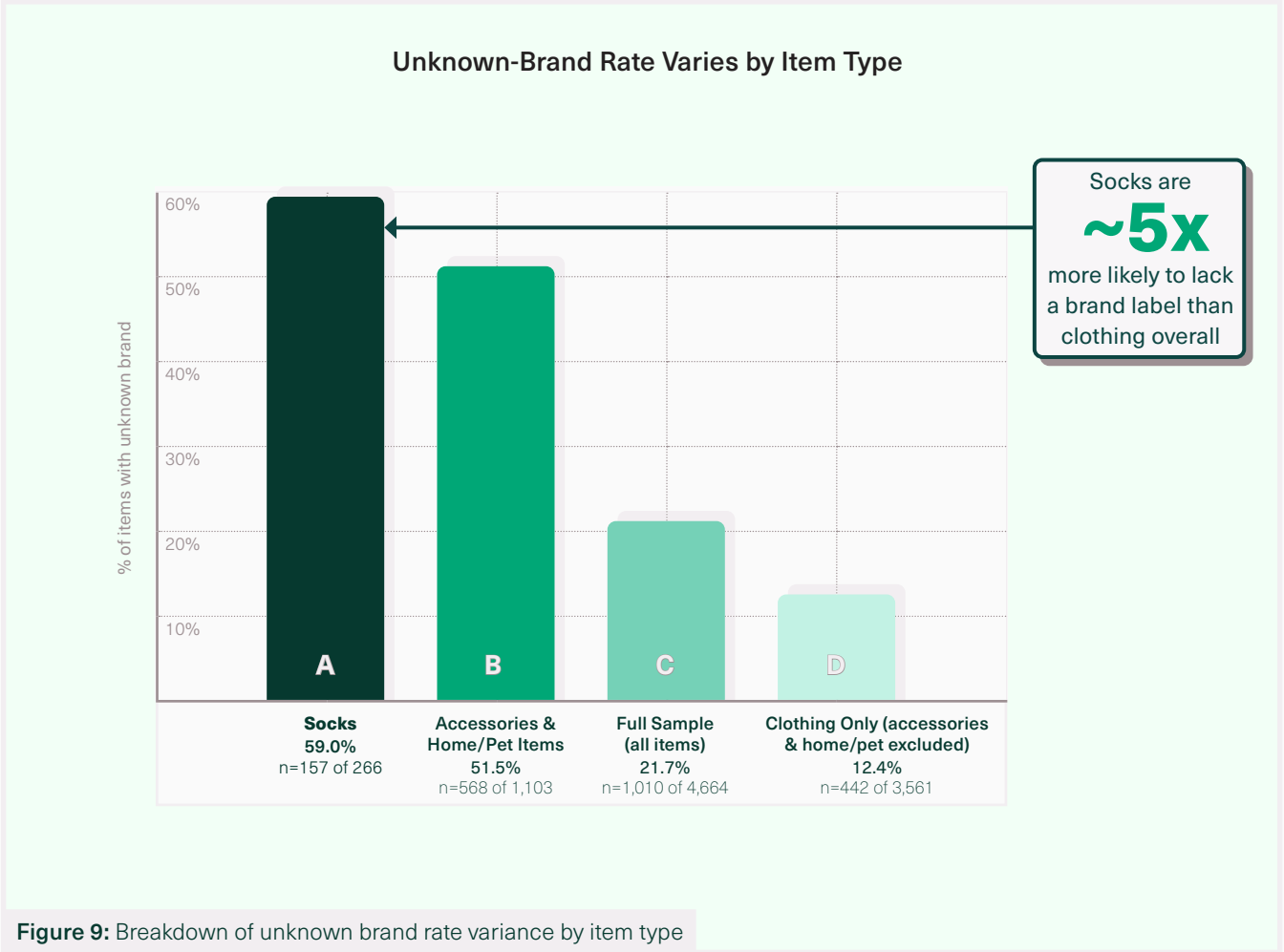


Figure 9: Breakdown of unknown brand rate variance by item type

Examining brands at the parent-company level revealed an even greater concentration of donated items among a relatively small number of apparel companies (see **Appendix A8 in the Master Report**).

Gap Inc. (United States) was the most frequently represented parent company, accounting for 251 items across four brands (Old Navy, Gap, Banana Republic, and Athleta).

Walmart Inc. (United States) followed closely with 246 items spanning nine brands (George, Athletic Works, Cherokee, Mainstays, NOBO, Faded Glory, HomeTrends, Tranquil Nights, Walmart), while

Loblaw Companies Limited (Canada) ranked third, with 119 items represented entirely by its Joe Fresh brand.

Other highly represented parent companies included:

H&M Group (Sweden; 85 items across two brands),

Giant Tiger Stores Limited (Canada; 79 items across seven brands),

Carter's, Inc. (United States; 59 items across one brand),

American Eagle Outfitters, Inc. (United States; 58 items across two brands),

Authentic Brands Group (United States; 57 items across eight brands),

Reitmans Canada Limited (Canada; 57 items across four brands), and

PVH Corp (United States; 52 items across two brands).

Figure 10 shows the top 10 parent companies by donated item volume.

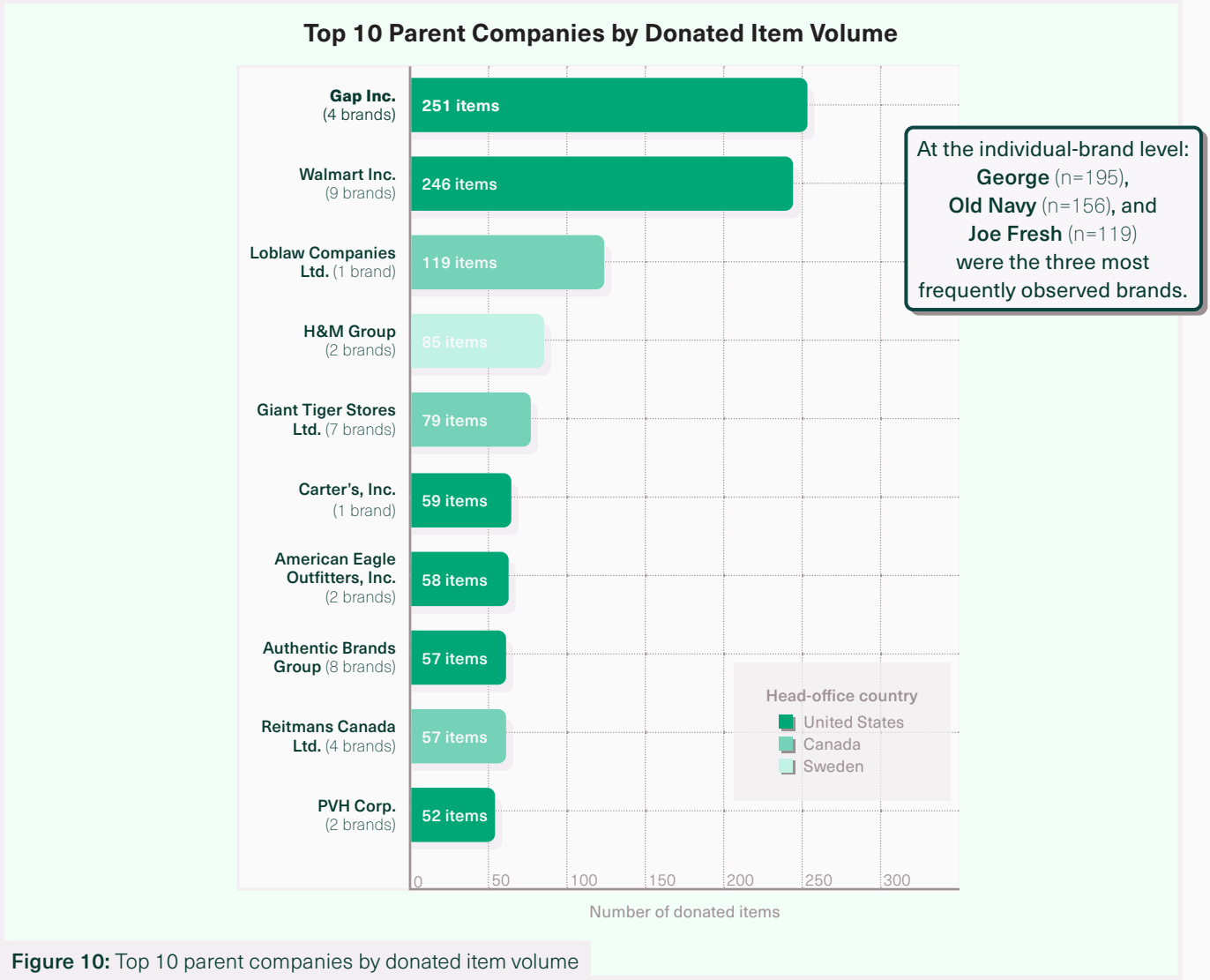


Figure 10: Top 10 parent companies by donated item volume

This concentration becomes especially apparent when the leading parent companies are considered collectively. Although 1,181 unique consumer-facing brands were identified, the top 25 parent companies collectively owned 70 of these brands (5.9%). Each of these parent companies was represented by at least 20 items, and together they accounted for 1,590 items (34.1% of the total sample). Thus, while the donation stream appeared highly diverse at the individual-brand level, a substantial proportion of items could be traced to a relatively small group of corporate owners. **Figure 11** shows the contrast between the share of unique brands and the share of all donated items for the top 25 parent companies.

Importantly, the list of parent companies also includes retailers, making this distinction especially relevant in the context of Extended Producer Responsibility (EPR). In this context, the term producer may refer not only to a brand owner or manufacturer but also to the actor responsible for placing a product on the market *(Ellen MacArthur Foundation, 2024)*. Large Canadian retailers may therefore be considered producers when they import, commission, or sell products under private labels, licensed brands, diffusion brands, or other brand arrangements, even when they do not manufacture the products themselves.

Because retailers may sell goods across multiple consumer-facing brands, parent-company ownership alone may not fully capture responsibility for placing textile products on the Canadian market. Further investigation into the retail origins and market pathways of branded textile goods is therefore recommended.

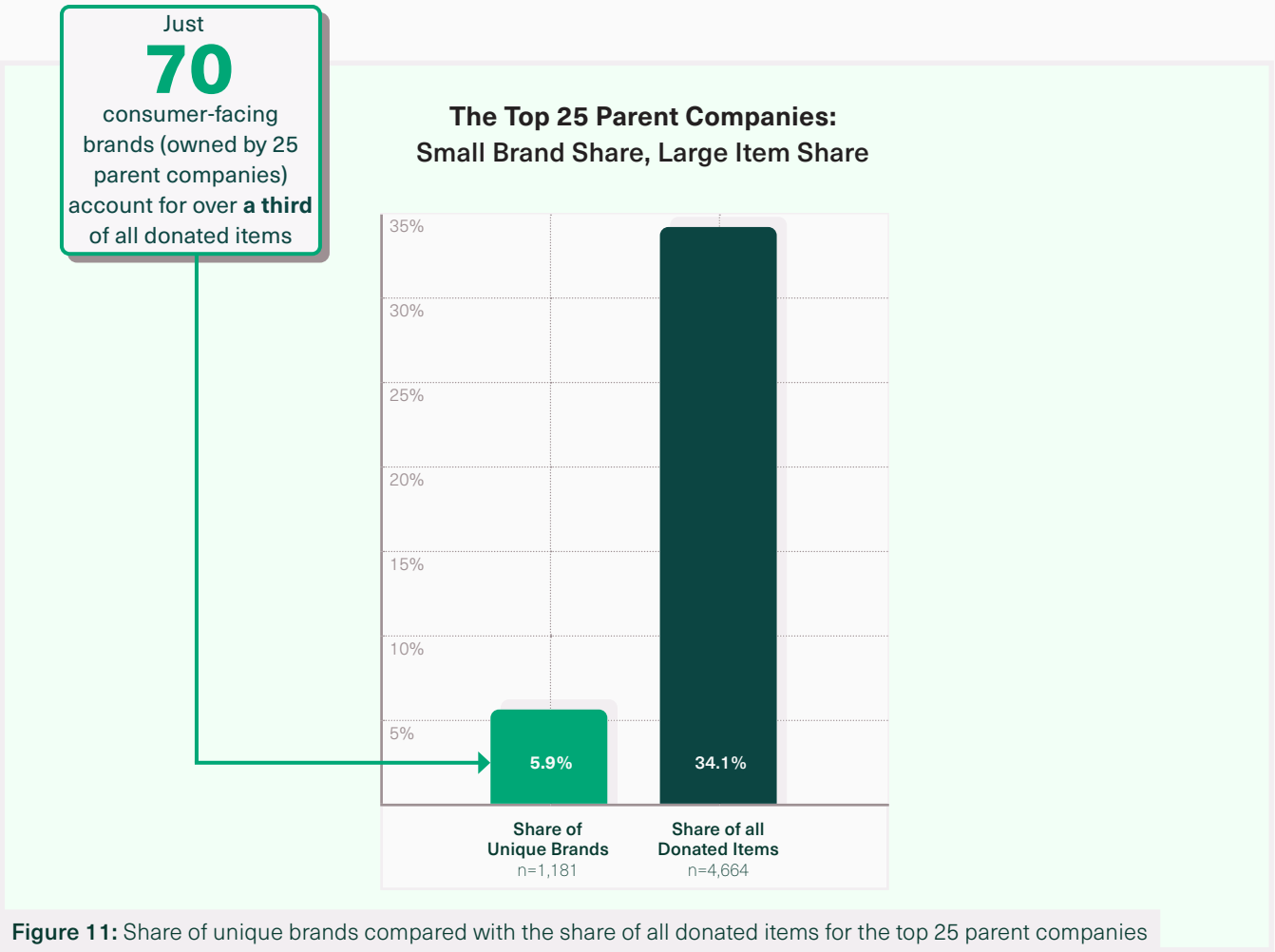


Figure 11: Share of unique brands compared with the share of all donated items for the top 25 parent companies

3.3 Textile construction

- **Knits, wovens, and nonwovens:**

  Knitted textiles made up more than two-thirds of the sample (n = 3,142, 67.4%), while

  woven textiles accounted for most of the remainder (n = 1,411, 30.3%).

  Nonwoven materials, including leather, represented a comparatively small share of the sample (n = 111, 2.4%).

The predominance of knitted textiles is consistent with the high frequency of garment categories such as T-shirts, sweaters, socks, hoodies, and athleticwear, which are commonly produced using knitted constructions. Woven textiles were more often associated with items such as trousers, button-down shirts, jackets, and household textiles.

- **Number of layers:**

  Most items consisted of a **single textile layer** (n = 4,168, 89.4%), while smaller proportions had

  two layers (n = 313, 6.7%) or

  three layers (n = 183, 3.9%).

Among single-layer items, **knitted constructions** were most common (n = 2,967, 71.2%), followed by **woven constructions** (27.5%) and **nonwoven materials** (1.3%). Single-layer knitted items alone accounted for **63.6%** of the total sample.

The construction of the outer shell differed among multilayer items.

For two-layer items, **woven shells** were most common (n = 146, 46.6%), followed by

knitted shells (n = 127, 40.6%) and

nonwoven shells (n = 40, 12.8%).

This pattern was more pronounced among three-layer items, of which

121 (66.1%) had **woven outer shells,**

48 (26.2%) had **knitted shells,** and

14 (7.7%) had **nonwoven shells.**

Nonwoven outer materials (e.g., leather) were therefore more prevalent among two- and three-layer items than among single-layer items. The inside layer of a three-layer item was not determined since it wasn't visible, however, these are likely in many cases to be nonwovens (batting or padding).

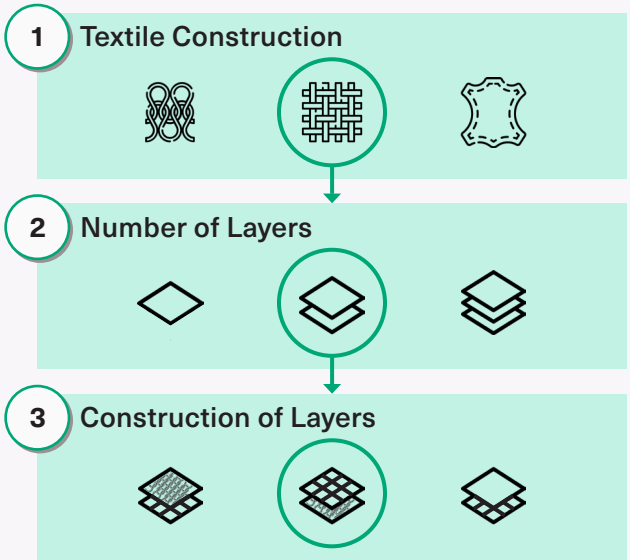
The inner layers of multilayer items also frequently used the same textile construction as the outer shell.

Among two-layer items with a knitted outer shell, 92 (72.4%) also had a **knitted second layer**.

Similarly, 61.5% of items with a woven outer shell also had a **woven second layer**.

These results suggest that although multilayer items were more structurally diverse than single-layer items, their individual layers were often constructed from the same general textile type.

Example: Determining Textile Construction



Donated items were classified by:
construction (e.g. woven),
number of layers (e.g. two), and
construction of layers (e.g. woven shell, knitted inner).

3.4 Fibre content

Fibre-content labelling:

Fibre-content labels were present on 3,420 items (73.3% of the sample).

For an additional 954 items (20.5%), fibre content was **identified using a fibre scanner**.

The fibre composition of the remaining 290 items (6.2%) **could not be determined**, primarily because of textile coatings, multilayer construction, or technical limitations of the scanner.

Figure 12 shows the fibre-content availability for the sample.

Fibre Composition: Excluding items with unknown fibre content (n = 290, 6.2%), most textiles in the sample contained either:

one fibre (n = 2,021, 43.3%) or

two fibres (n = 1,942, 41.6%).

Three-fibre blends accounted for 362 items (7.8%), while 49 items (1.1%) contained **four fibre types**.

Overall, **84.8%** of all items in the sample consisted of one or two fibre types, indicating that relatively simple fibre compositions predominated. This is an encouraging finding from a circularity perspective, as textiles composed of fewer fibre types are generally easier to **sort**, **separate**, and **recycle** than complex fibre blends, which often require more specialized processing technologies and have fewer viable end-use pathways *(Wagaw & Babu, 2023)*. **Figure 13** shows the fibre composition across the sample.

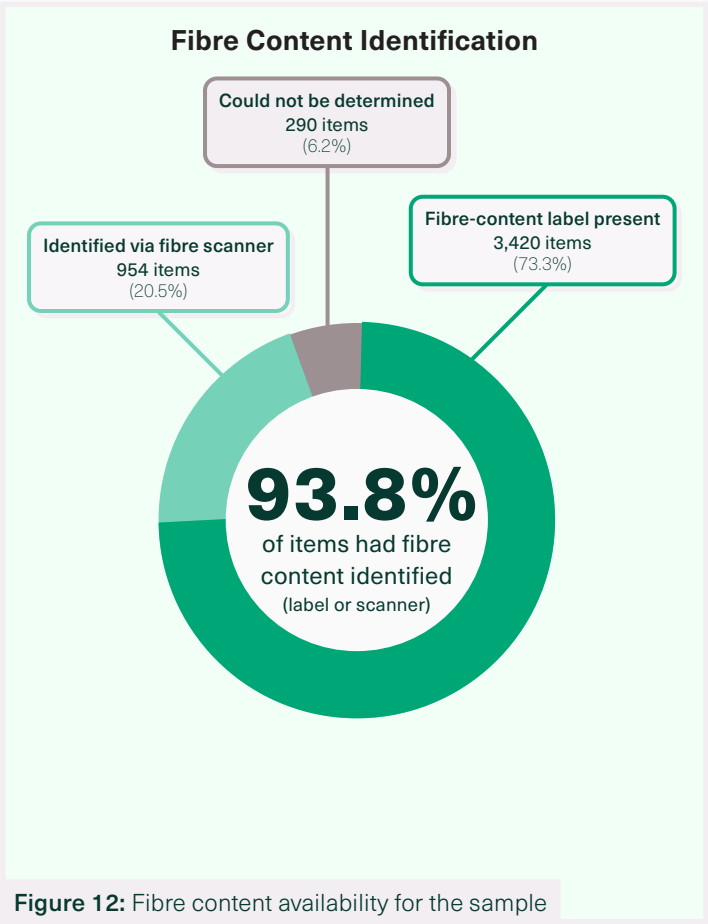


Figure 12: Fibre content availability for the sample

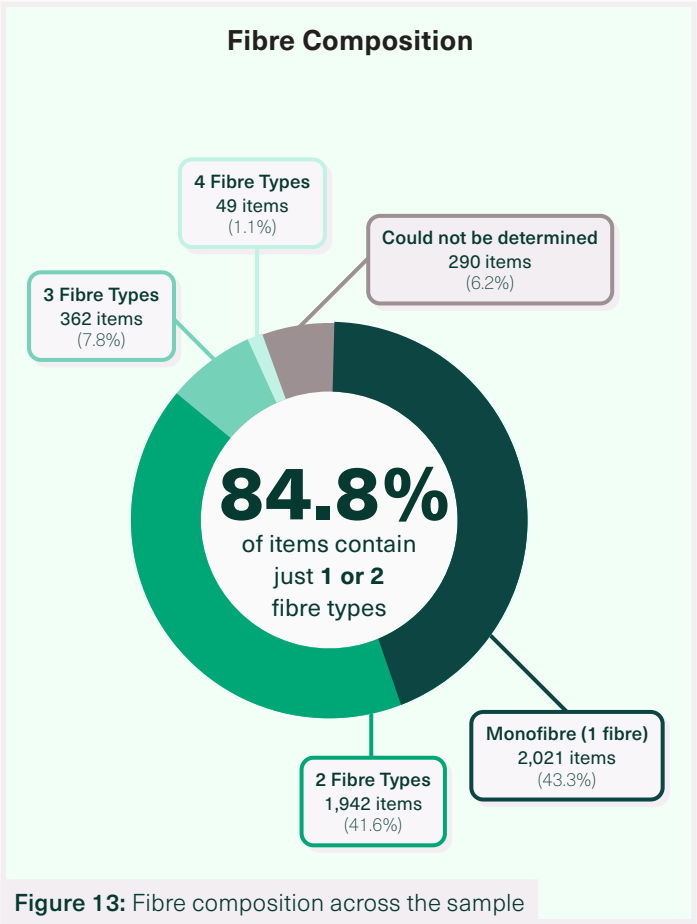


Figure 13: Fibre composition across the sample

Fibre Type: Across the sample,

polyester was the most prevalent fibre, appearing in 2,284 items (49.0%), closely followed by

cotton, which was present in 2,148 items (46.1%).

Elastane was the third most common fibre, occurring in 1,105 items (23.7%), reflecting its widespread use to provide stretch and improve garment fit.

Rayon was also common, appearing in 624 items (13.4%), followed by

nylon (377 items, 8.1%) and

acrylic (198 items, 4.2%).

All remaining fibres were present in fewer than 2% of items, including **wool** (n=80, 1.7%), **linen** (n=41, 0.9%), **leather** (n=23, 0.5%), **silk** (n=14, 0.3%), **metallic fibres** (n=9, 0.2%), and **acetate** (n=6, 0.1%).

In addition, the scanner classified the fibre content of 227 items (4.9%) as "**contaminated**," meaning that the percentage of the fibre was too low to be accurately identified by the scanner. **Figure 14** details the fibre type prevalence across the sample.

Monofibres: A total of 2,009 (43.1%) items contained only **one identified fibre type**, making monofibres the largest fibre-count category in the sample. Their relatively simple composition makes them especially useful for analysis because they can be linked more directly to established and emerging recycling pathways without the added complications created by fibre blends.

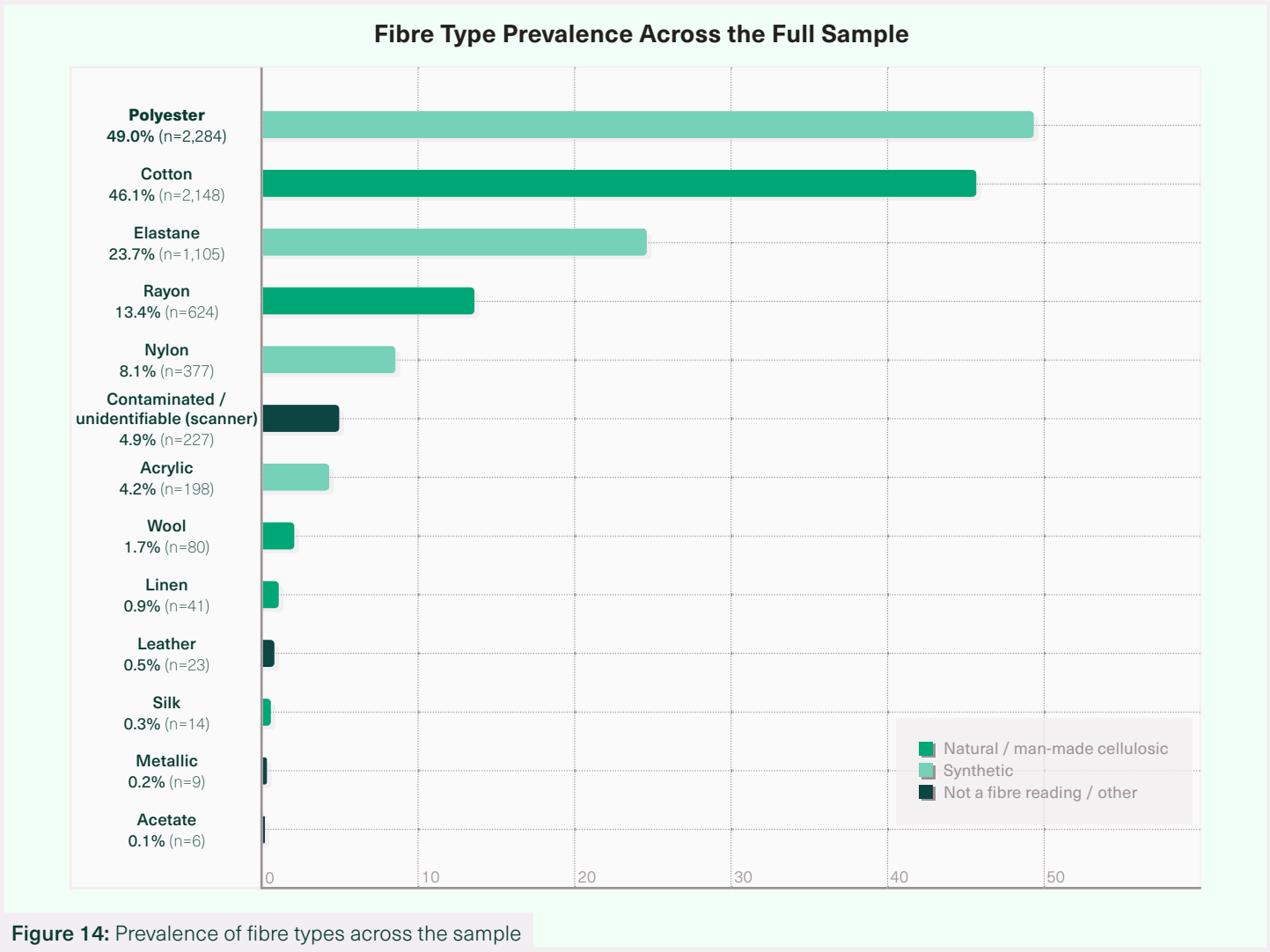


Figure 14: Prevalence of fibre types across the sample

Natural and regenerated cellulosic monofibres, including **cotton**, **rayon**, **wool**, **silk**, and **other cellulosic fibres**, accounted for 996 items (49.6% of monofibres). Synthetic monofibres, including **polyester**, **acrylic**, **nylon**, and **other synthetics**, accounted for 994 items (49.5%). Nonwoven fibres like **leather** accounted for 19 items (0.9%).

Cotton was the most common monofibre, accounting for 901 items (44.8%), followed closely by **polyester** at 823 items (41.0%). Together, these two fibres represented **85.9%** of all monofibre items. Both have comparatively well-established recovery pathways. Mechanical recyclers can process cotton and polyester textiles, including T-shirts, into wiping rags and feedstocks for industrial applications. At the same time, much innovation is currently being undertaken in chemical recycling focused on recovering polyester, cotton, and poly-cotton blends for fibre-to-fibre recycling, creating potential end markets for these textiles *(Andini et al., 2024; Juanga-Labayen et al., 2022)*.

Wool represented approximately 1.1% of monofibre items. Although present in relatively small quantities, clean and uncontaminated wool may retain value across reuse and fibre-recovery applications. Wool can also be processed through relatively decentralized systems, potentially allowing smaller-scale enterprises to participate in fibre preparation and product manufacturing *(Fibershed, 2026)*. However, this value depends heavily on the absence of other fibres, as blending can reduce the feasibility and quality of wool recovery. **Figure 15** shows the monofibre composition across the entire sample.

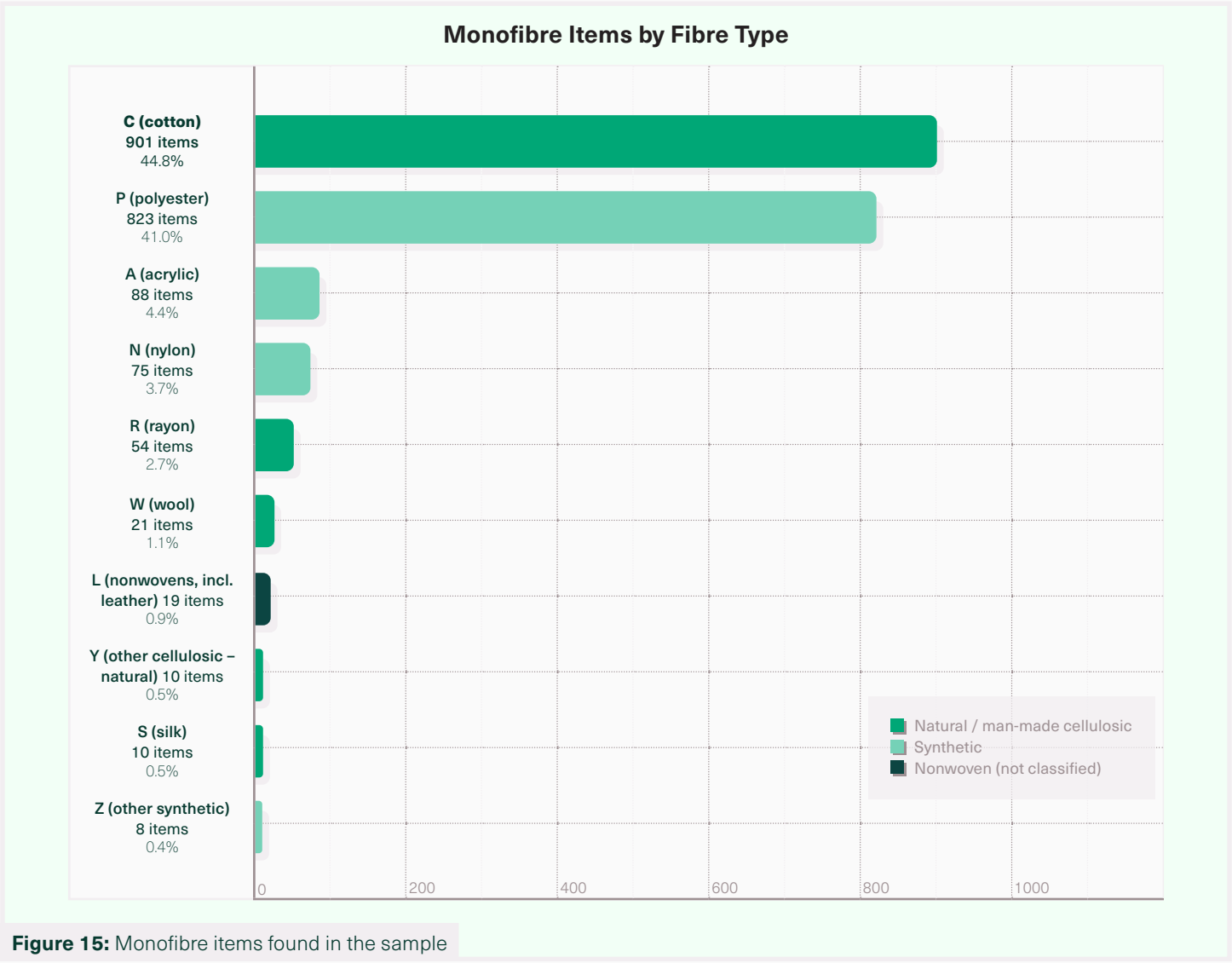


Figure 15: Monofibre items found in the sample

Synthetic and Natural Fibres:

Natural fibres were the dominant fibre type in 50.6% of all items, while

synthetic fibres were dominant in 42.5%.

The remaining 6.9% were classified as **unknown** or **other**, including leather and nonwoven materials (**Figure 16**).

Consistent with the findings of *Sterling et al. (2026)*, **cotton** was the most dominant fibre, accounting for 1,926 items, or 41.3% of the total sample. Fibre dominance, however, should be distinguished from fibre concentration.

Figure 17 provides an illustrative example of the difference between fibre dominance and fibre concentration.

For example, although 41.3% of items were cotton-dominant, cotton represented 35.8% of all fibre content recorded across the sample.

Polyester also represented 35.8% of total fibre content, despite being the dominant fibre in a smaller proportion of individual items.

Figure 18 shows the fibre dominance and fibre concentration findings for the two most dominant and concentrated fibres in this study, cotton and polyester.

Fibre dominance identifies the fibre present in the largest proportion within an individual item, whereas **fibre concentration** reflects the share of a particular fibre across all fibres identified throughout the sample.

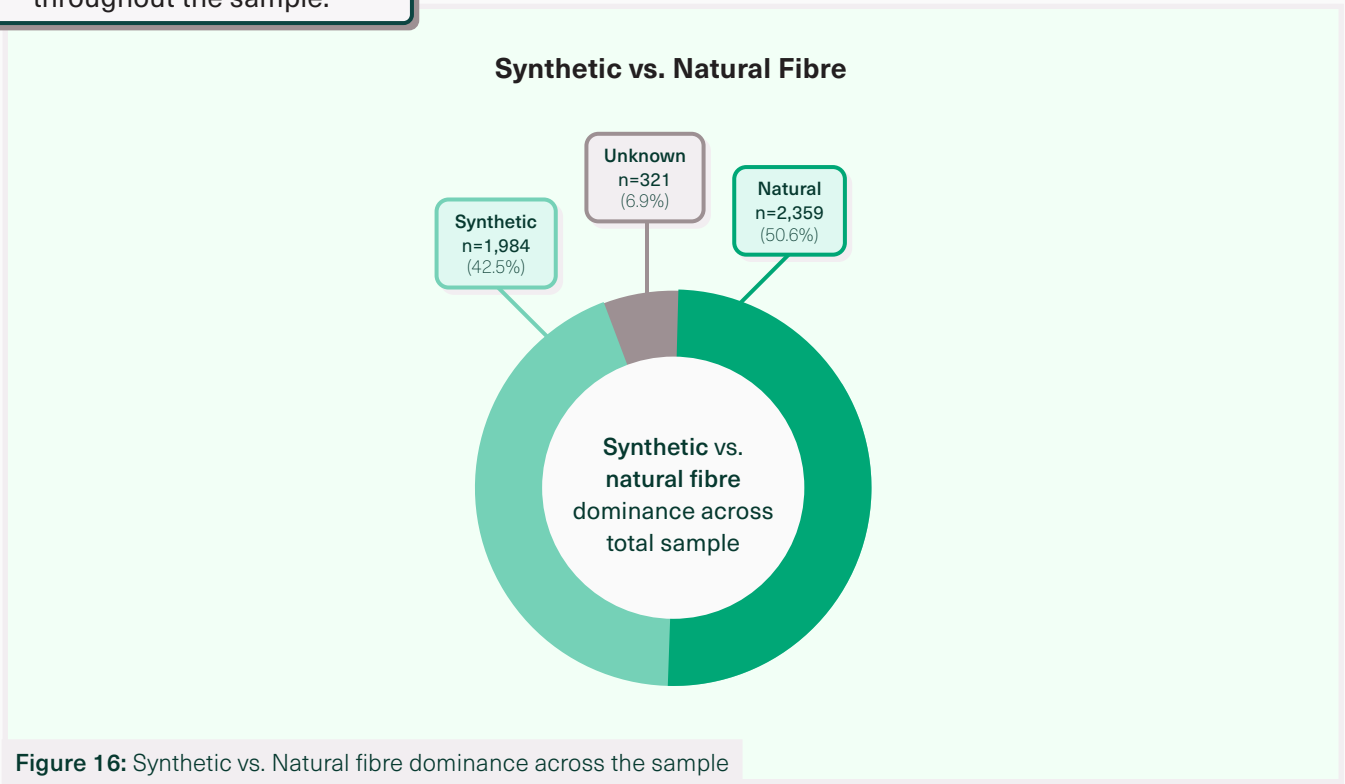


Figure 16: Synthetic vs. Natural fibre dominance across the sample

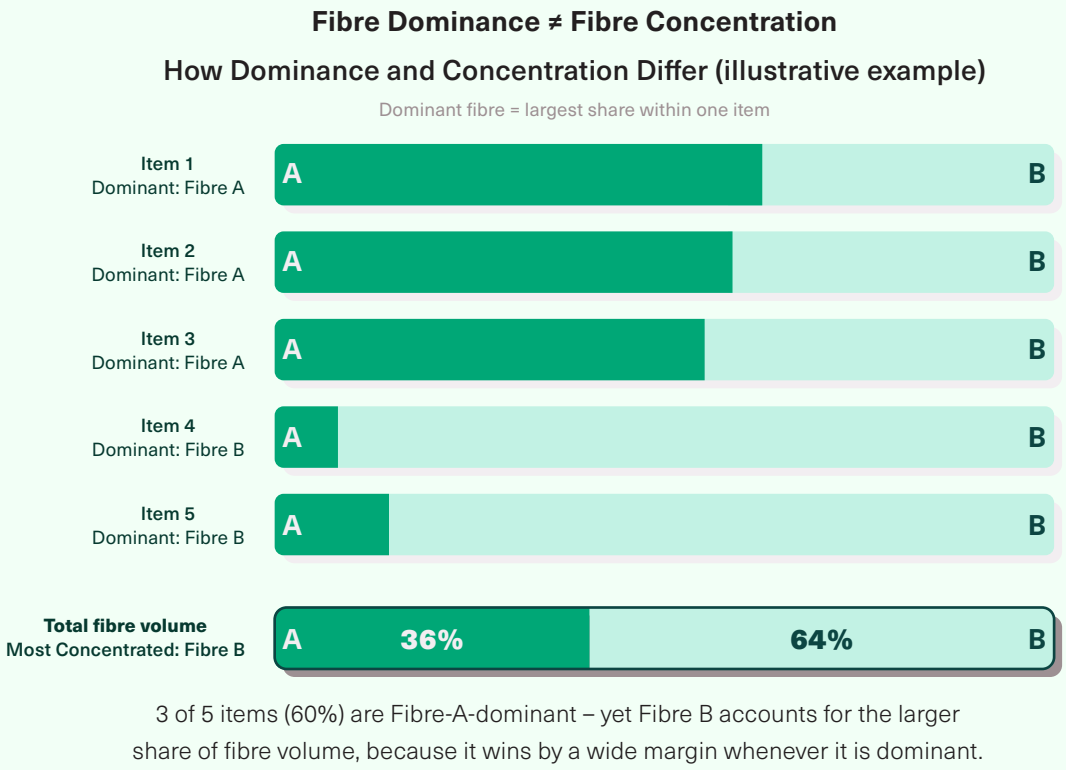


Figure 17: Illustrative example of the difference between fibre dominance and fibre concentration

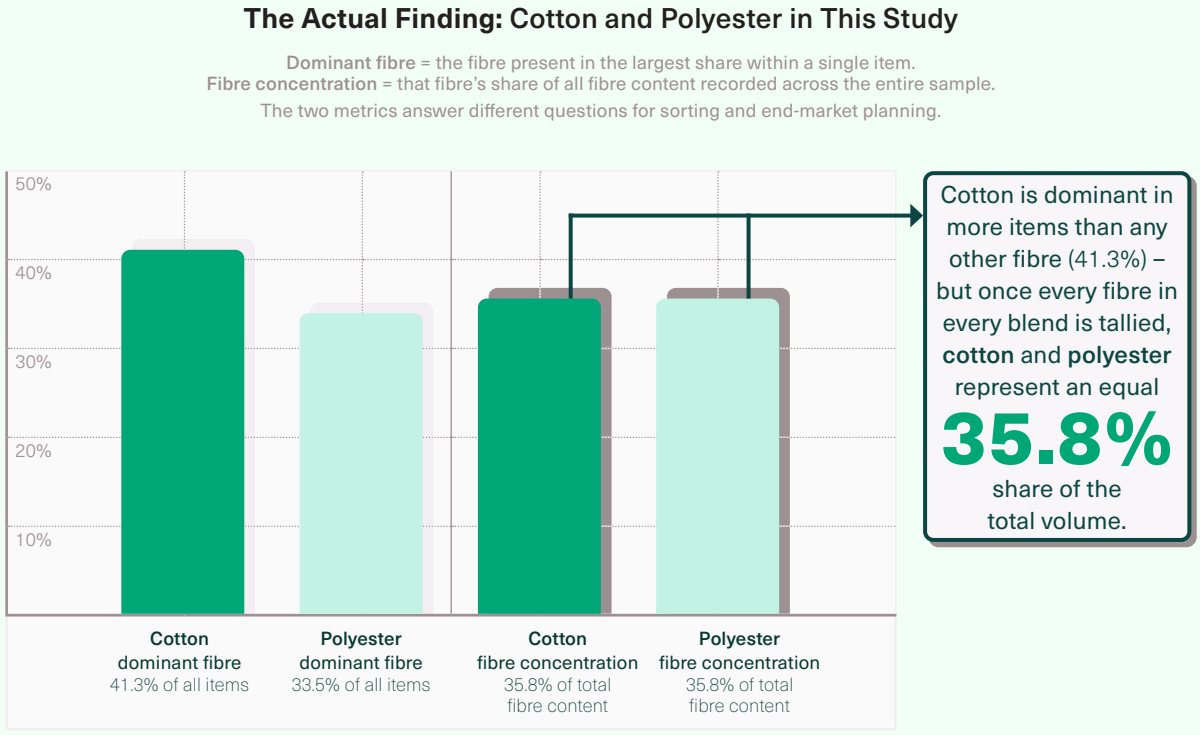


Figure 18: Findings for the **most dominant fibre** (cotton) and **most highly concentrated fibres** (cotton and polyester) in the study

This distinction has important implications for textile sorting, processing, and end-market development.

Dominant-fibre data helps identify how individual products may be classified or directed toward particular pathways, while

fibre-concentration data provide a clearer picture of the total volume of each material available across the waste stream.

Fibre Blends: A total of **136 distinct fibre blends** were identified across the 4,664 items examined, highlighting the complexity of textiles as a waste stream. The five most common blends were:

- **cotton-dominant cotton/polyester** (CP, 18.6%),
- **polyester/elastane** (PX, 13.6%),
- **cotton/elastane** (CX, 9.3%),
- **polyester-dominant polyester/cotton** (PC, 5.4%), and
- **nylon/elastane** (NX, 5.3%).

Together, these five combinations accounted for **52.2% of blended items.** The remaining 47.8% was distributed across 131 other fibre combinations**, each** occurring in relatively small quantities.

Figure 19 below illustrates this considerable complexity in fibre blends.

136 Distinct Fibre Blends: A Long Tail of Complexity

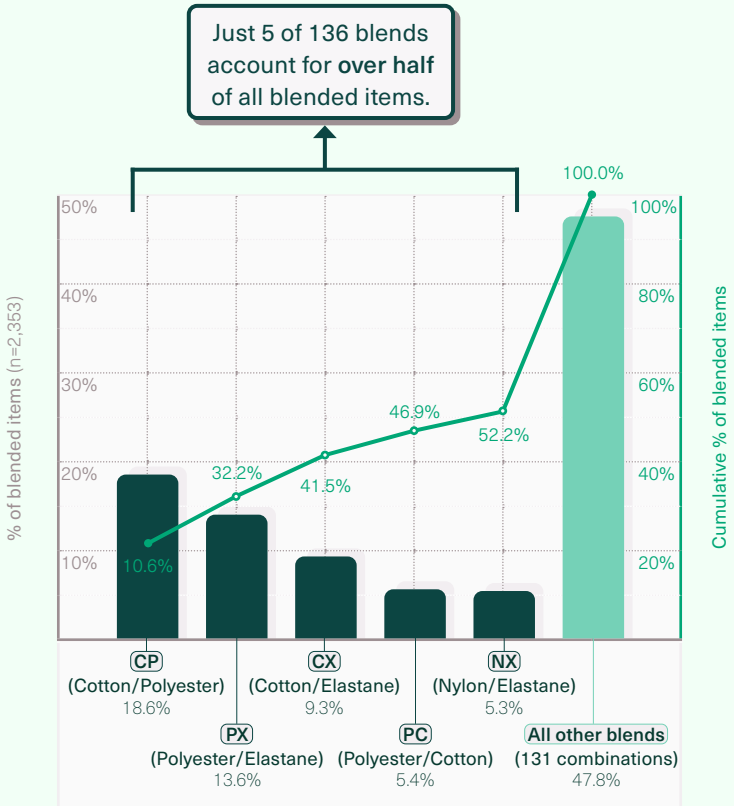


Figure 19: The distribution and complexity of blended items in the sample

3.4.1 Elastane and recycling interruptors

Of particular note is the presence of elastane ("X") in **23.8%** of the sample (n = 1,109). Elastane therefore potentially prevents nearly one-quarter of the sampled items from being processed through conventional mechanical recycling systems.

Elastane's elasticity causes problems during shredding and fibre opening, leading to clumping, machine blockages, reduced shredding efficiency, and lower-quality recycled fibres *(Choudhury, Tsianou, & Alexandridis 2024; Rodrigues et al., 2025)*. Elastane was found primarily in apparel, with only 0.5% of home and pet items containing the fibre.

Elastane was especially prevalent in women's apparel, appearing in:

37.3% of women's items, compared with

15.7% of menswear,

13.8% of children's apparel, and

4.7% of unisex items.

This pattern suggests a need to disincentivize unnecessary elastane use, particularly in women's garments designed to provide stretch but that may be more difficult to reuse, repair, and recycle than more durable, tailored woven garments. Manufacturers should be encouraged to use elastane more selectively and to consider alternative garment designs that preserve functionality without compromising circular end-of-life pathways.

Figure 20 shows the elastane concentrations by retail section.

Note: Elastane appears in **23.8%** of all items (n = 1,109) and complicates mechanical recycling; it stretches rather than cutting cleanly, and can accumulate in or damage processing equipment.

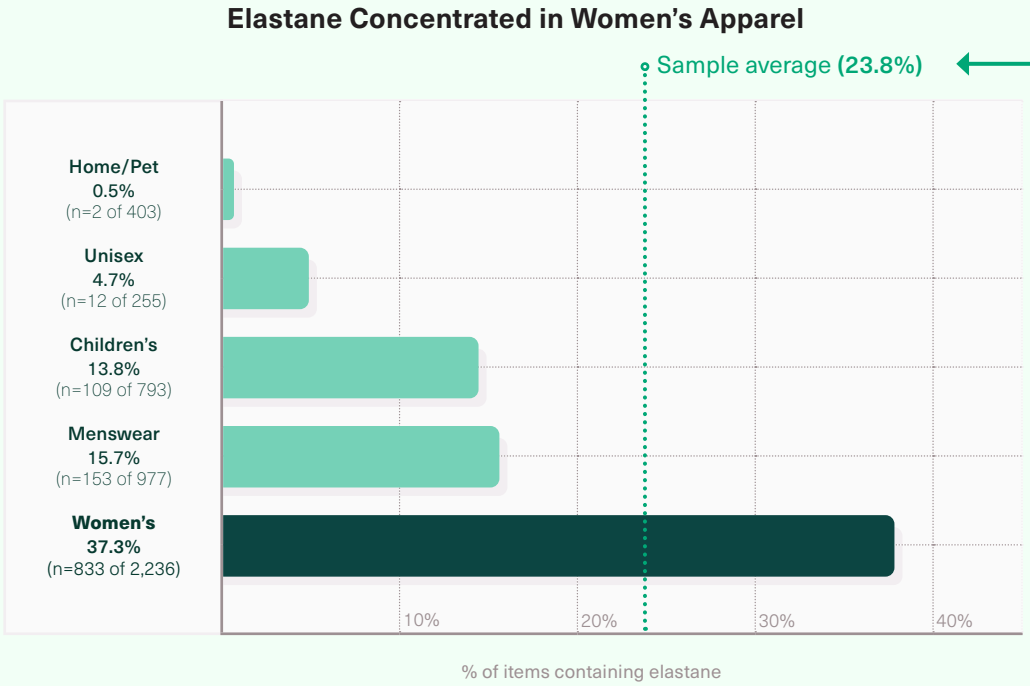


Figure 20: Distribution of elastane content by retail category throughout the sample

Denim Case Study

The proportion of denim was also tracked because of emerging denim-specific end-market opportunities, including the manufacture of **insulation products** *(Islam et al., 2022; Read, 2021; Krippendorf, 2011)*. Denim accounted for 3.1% of the overall sample (n = 143). However, 67.8% of these denim items contained elastane (n = 97). Eliminating elastane from the denim items would have more than doubled the number of cotton monofibre denim items (see **Figure 21**).

These findings provide further evidence of the need either to disincentivize elastane use in denim manufacturing or to invest in recycling technologies capable of processing elastane-containing materials.

Without such changes, the widespread inclusion of elastane may continue to restrict access to emerging denim recycling and insulation markets.

Removing elastane would **more than double** the number of cotton-monofibre items available for established recycling and insulation-manufacturing pathways.

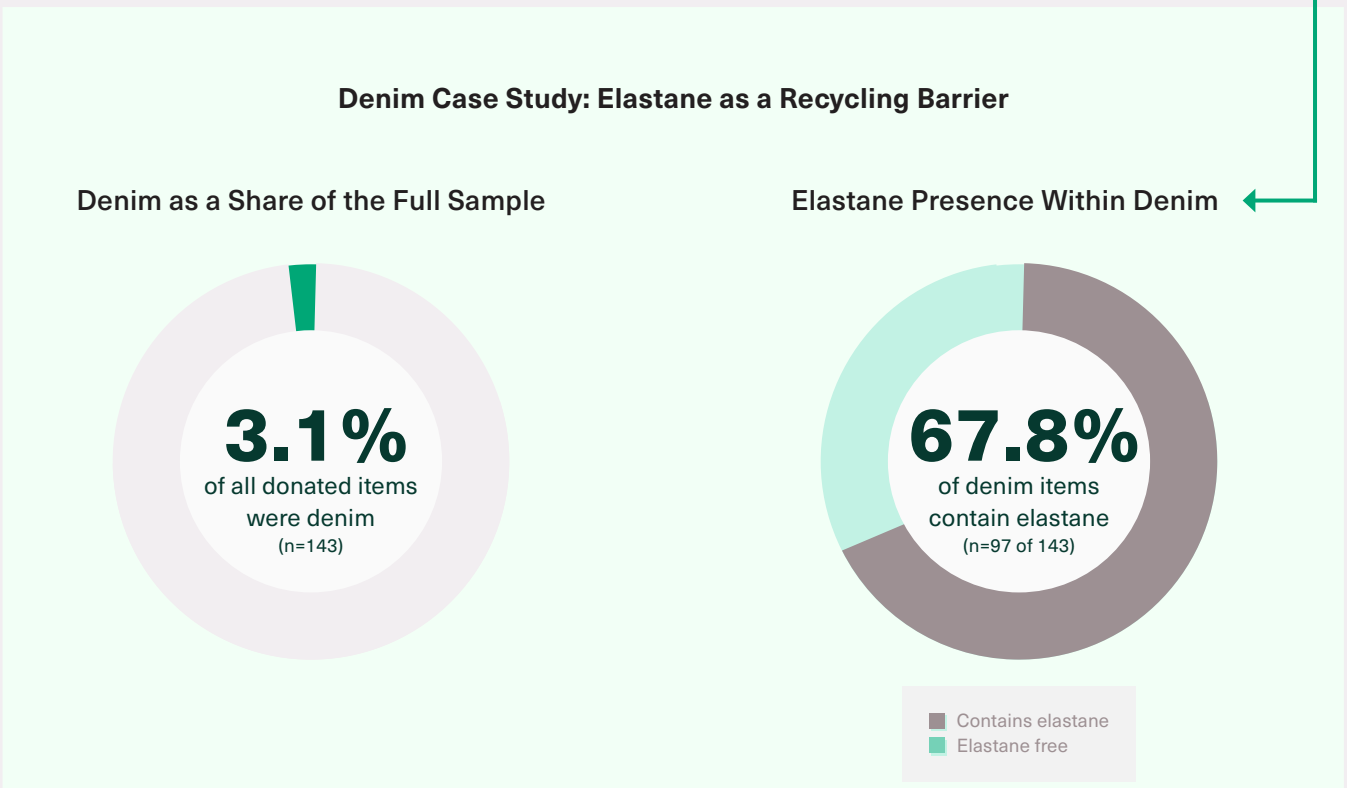


Figure 21: Demonstration of the barrier presented by elastane content

3.5 Condition of items

Grade: Using the adapted **A-to-F grading system** applied in previous studies *(Sterling et al., 2026; Weber et al., 2023)*, most items demonstrated some form of reuse or recovery potential. Nearly half of the sample (n=2,188, 46.9%) was **immediately suitable for resale**, including:

- **60 Grade A items** (1.3%),
- **899 Grade B items** (19.3%), and
- **1,229 Grade C items** (26.4%).

A further **906 items** were classified as **Grade D1** (19.4%) and **621** as **Grade D2** (13.3%), meaning that 32.7% of the sample could **potentially become resaleable** through cleaning or repair. Another **840 items** (18.0%) were classified as **Grade E** and were unsuitable for rewear but contained fibres that could potentially be **recycled or repurposed**. Only **104 items** (2.2%) were classified as **Grade F** because odour, mould, paint, glue, or other contaminants rendered them **unsuitable for reuse or recycling**.

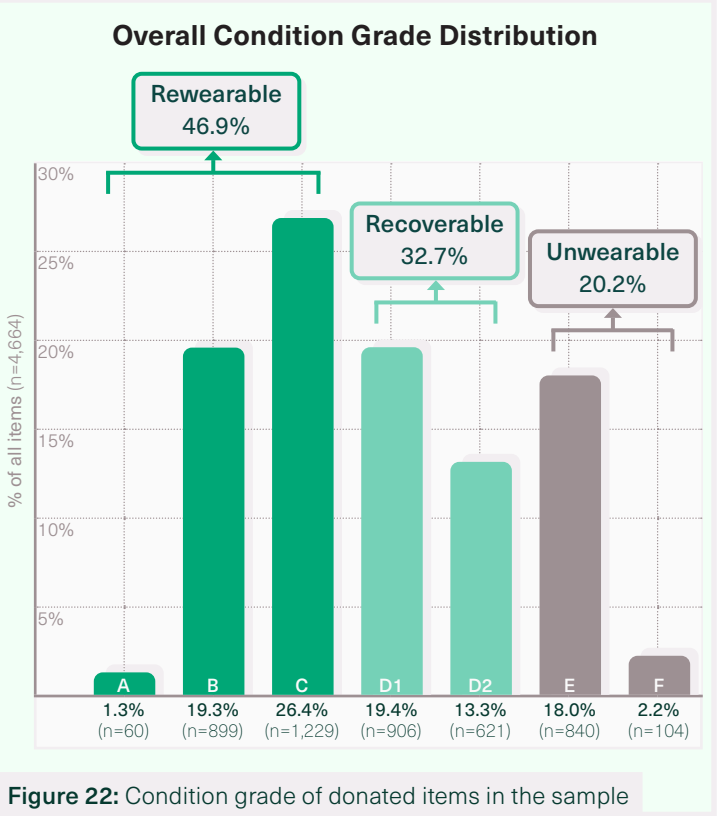


Figure 22: Condition grade of donated items in the sample

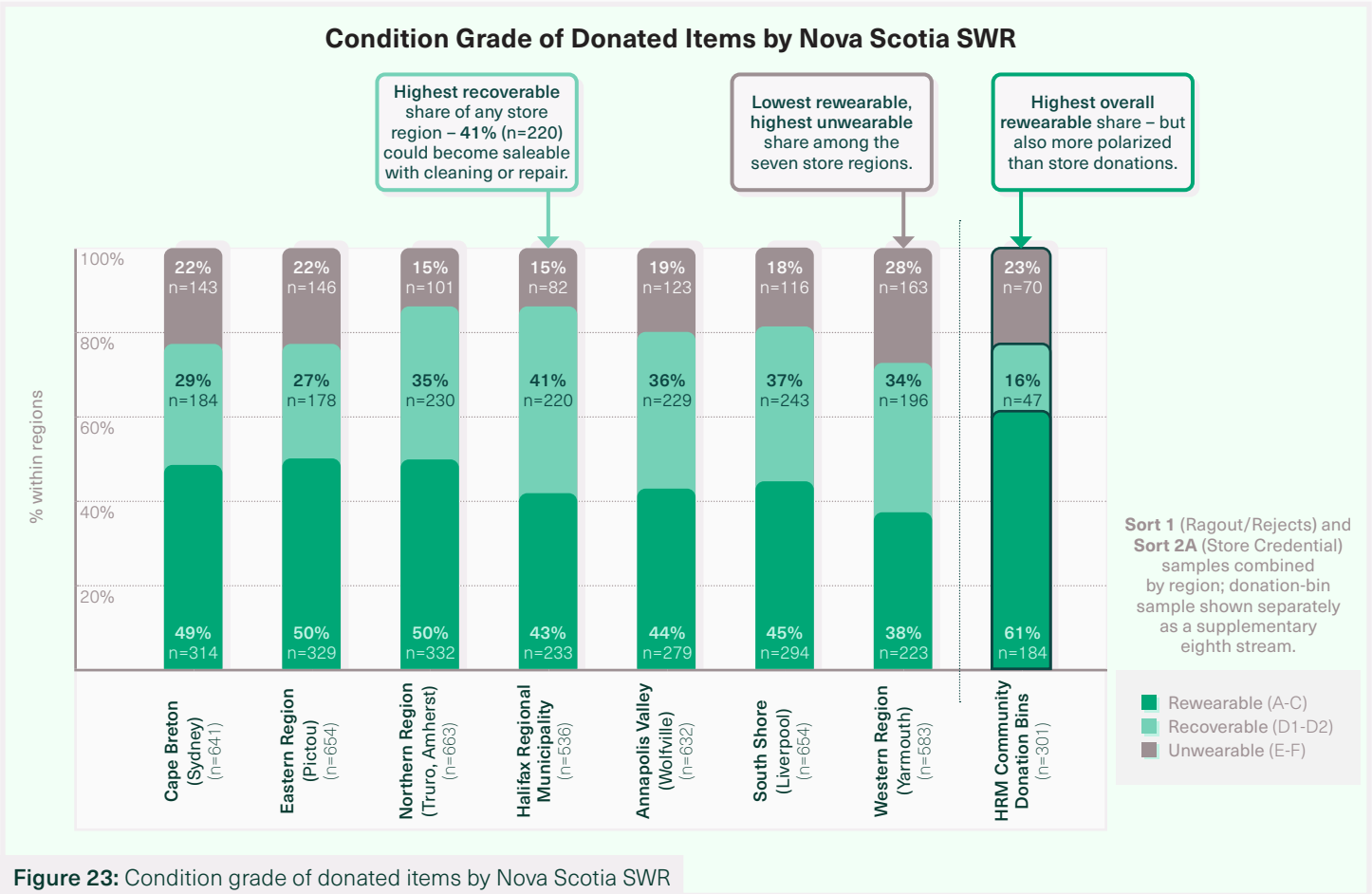


Figure 23: Condition grade of donated items by Nova Scotia SWR

Figure 22 shows the condition grade of donated items for the overall sample. **Figure 23** shows the condition grade of donated items broken out by waste region.

The distribution of grades, however, varied significantly across the three sampling streams. Relative to expected values, **Sort 1** contained significantly fewer A-, B-, and C-grade items and substantially more D2-, E-, and F-grade items. **Sort 2A** showed the opposite pattern, with significantly more A-, B-, and C-grade items and fewer D2-, E-, and F-grade items.

Sort 2B contained relatively more A-, C-, and F-grade items but fewer D1- and D2-grade items than expected. Taken together, these findings indicate that the ragout and rejects represented by **Sort 1** contained considerably poorer-quality textiles than the Credential-store donations represented by **Sort 2A**.

Credential-bin donations represented by **Sort 2B** exhibited a more polarized distribution, containing relatively high proportions of both the best- and worst-quality items.

Figure 24 shows grade outcome by donation stream.

In addition, grade distributions differed significantly across the five Retail Sections. Home and pet items exhibited the clearest concentration of lower grades, with significantly fewer Grade B and C items and more Grade D2, E, and F items than expected. In contrast, women's apparel contained significantly more Grade B and C items and fewer Grade E and F items. Children's apparel contained more Grade B items and fewer Grade F items, whereas menswear contained fewer Grade B items than expected. Unisex items were disproportionately represented among Grade A items. **Figure 25** shows the variance of condition grade by retail section.

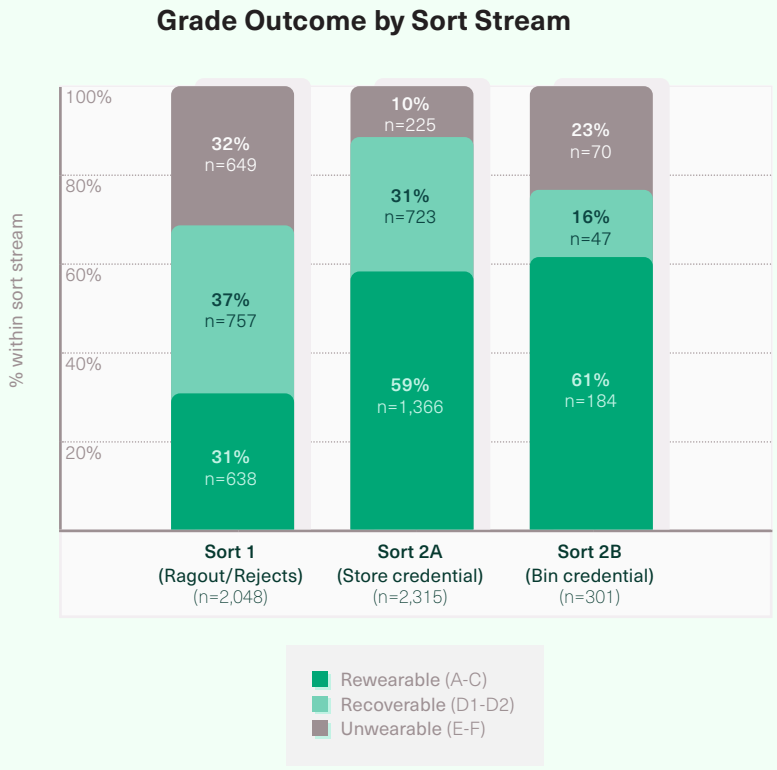


Figure 24: Condition grade outcome by donation stream

Damage and Defects: Combining major and minor occurrences, the most common issue in **Sort 1** was

staining, affecting 727 items (35.5%), followed by

pilling (n=632, 30.9%),

fading (n=625, 30.5%),

thinning (n=413, 20.2%), and

dust or lint (n=379, 18.5%).

In **Sort 2**, the most prevalent issue was

pilling (n=883, 33.8%), followed by

staining (n=565, 21.6%),

fading (n=540, 20.6%), and

dust or lint (n=492, 18.8%).

Across the full sample, the most frequently observed issues were

pilling (n=1,515, 32.5%), followed by

staining (n=1,292, 27.7%),

fading (n=1,165, 25.0%),

dust or lint (n=871, 18.7%), and

thinning (n=620, 13.3%).

Because individual items could exhibit more than one issue, these percentages are not mutually exclusive. Several of the most commonly observed issues, particularly **dust or lint** (18.7%), **minor staining** (9.2%), and **odour** (4.0%) are conditions that donors can often prevent or address before donation through laundering, drying, and appropriate storage.

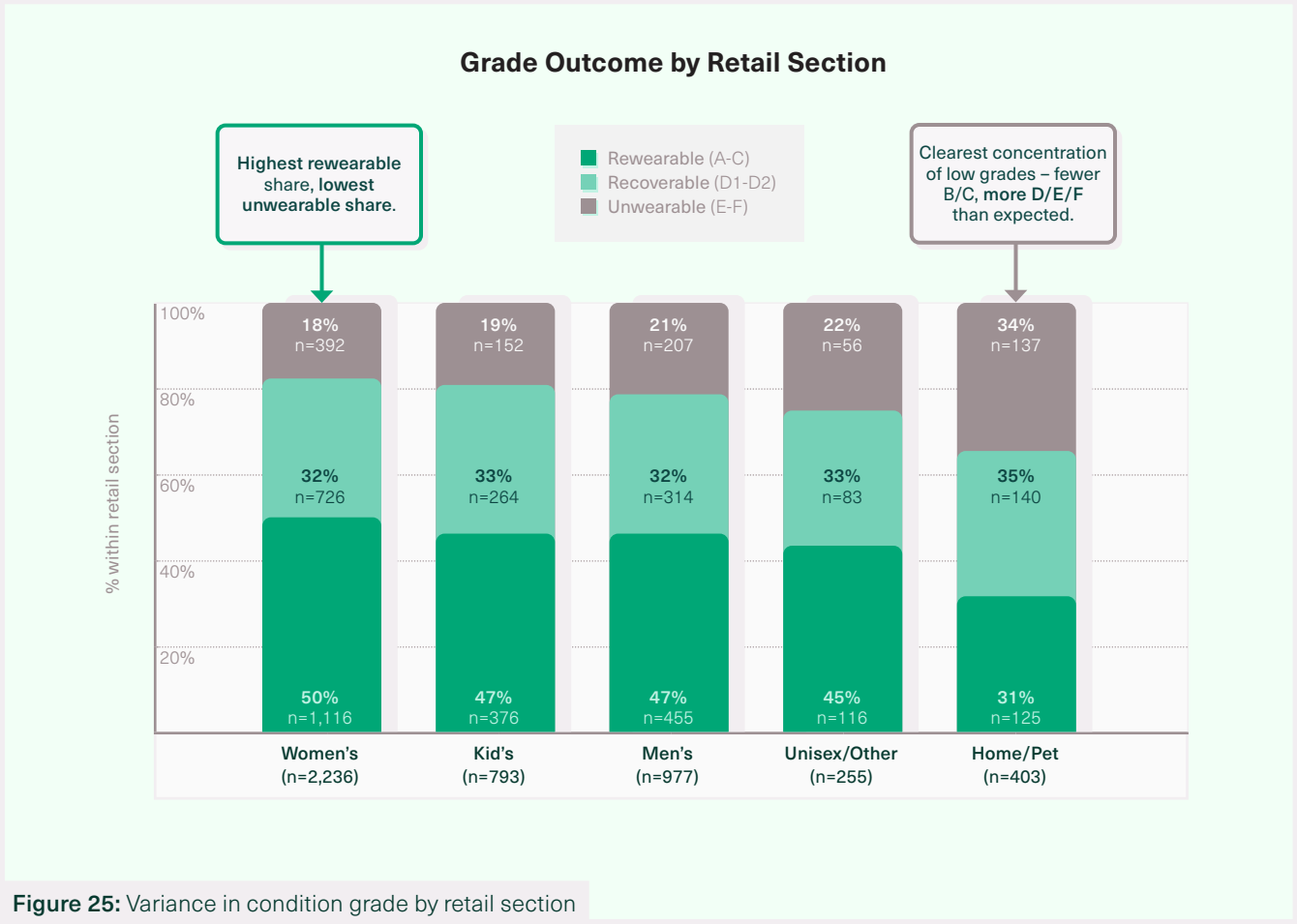


Figure 25: Variance in condition grade by retail section

Together, these issues were observed on at least 1,467 items (31.5% of the sample), although some items exhibited more than one of these conditions. This finding highlights the potential value of donor education around simple pre-donation practices, as relatively minor improvements in cleanliness could substantially increase the proportion of items immediately suitable for resale while reducing processing time and costs for charitable organizations. The implications of these findings for pre-donation practices and donor education are discussed in greater detail in the **TTNS Phase II Donation Etiquette Analysis**.

Figure 26 shows damage and defect prevalence across the reuse pipeline.

Figure 27 shows the percentage of items with at least one donor-preventable defect present.

Table 4 further details minor and major defect occurrences by sort session.

A supplementary set of six defect categories, introduced partway through data collection and recorded for **Sort 2** items only, is reported separately in **Appendix A9 in the Master Report**.

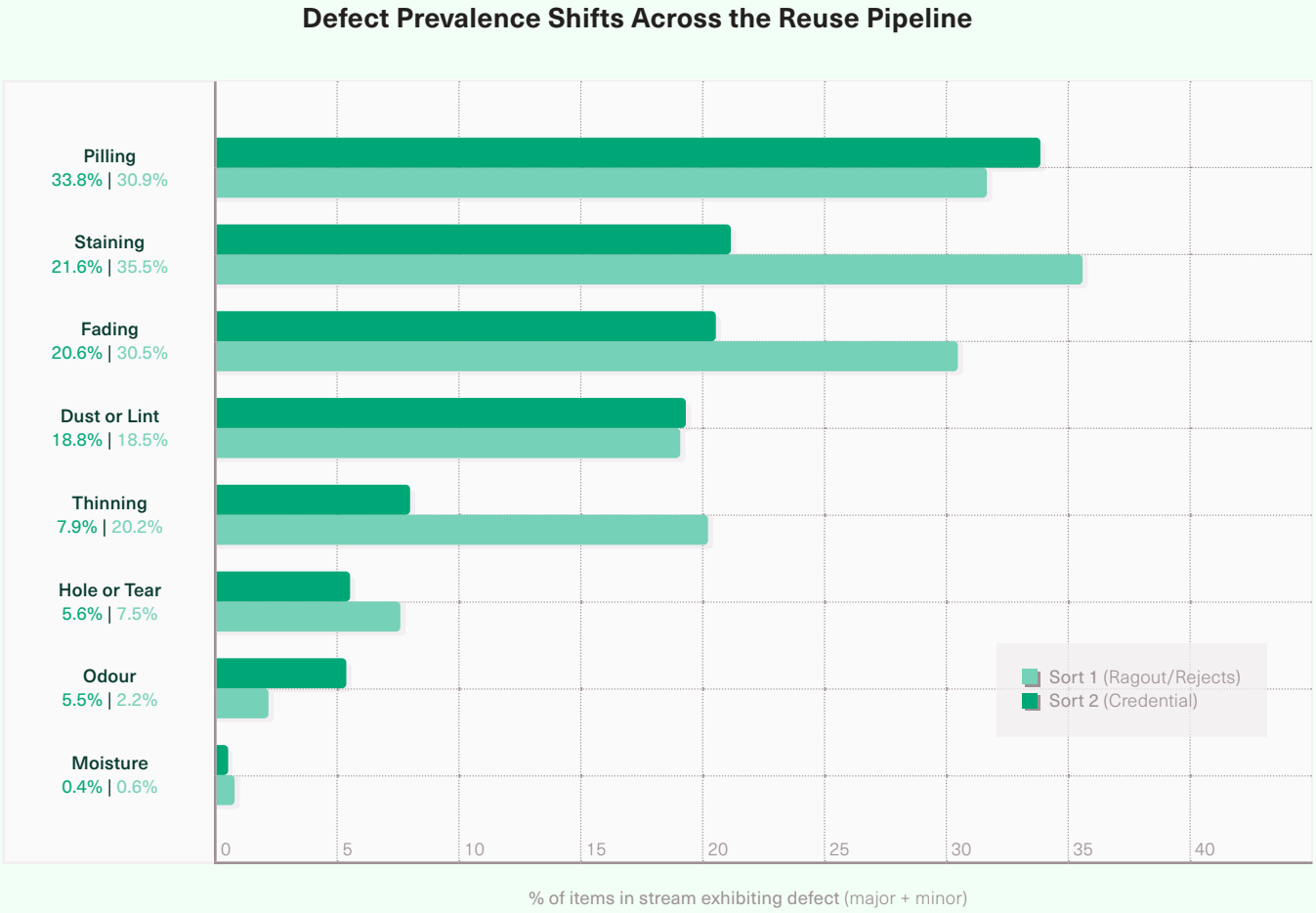
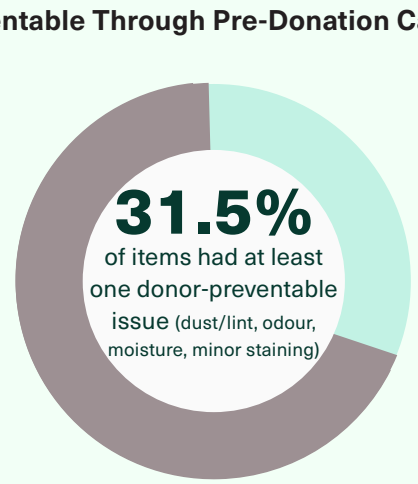


Figure 26: Damage and defect prevalence across the reuse pipeline



Note: Six additional defect categories: **dirty/needs a wash, hair or fur, wrinkling, snag or run, misshapen or stretched,** and **cracked or degraded print,** were introduced beginning with **Sort 2** and were not tracked during **Sort 1**. Because these categories cannot be compared across both sort sessions, they are not included in Table 4 below and are instead reported separately in **Appendix A9 in the Master Report**.

Figure 27: Items with at least one donor-preventable issue present upon examination

Instances of Defects

Defect	Sort 1 (n=2,048)	Sort 1 Total	Sort 2 (n=2,616)	Sort 2 Total	Combined Total	% of Sample (n=4,664)
Pilling	Major: 414 Minor: 218	632	Major: 351 Minor: 532	883	1,515	32.5%
Stain	Major: 514 Minor: 213	727	Major: 348 Minor: 217	565	1,292	27.7%
Fading	Major: 381 Minor: 244	625	Major: 198 Minor: 342	540	1,165	25.0%
Dust or Lint	Major: 195 Minor: 184	379	Major: 119 Minor: 373	492	871	18.7%
Thinning	Major: 239 Minor: 174	413	Major: 73 Minor: 134	207	620	13.3%
Hole or Tear	Major: 73 Minor: 81	154	Major: 77 Minor: 70	147	301	6.5%
Odour	Major: 0 Minor: 45	45	Major: 43 Minor: 100	143	188	4.0%
Moisture	Major: 13 Minor: 0	13	Major: 9 Minor: 1	10	23	0.5%

Table 4: Minor and Major defect occurrences across sort sessions

3.6 Value-Adding and Value-Detracting Attributes

This study also tested a **supplementary valuation scale** for items assessed in **Sort 2A** alongside the A-to-F condition-grading system. The research team identified several attributes that could meaningfully increase or decrease an item's resale or reuse value but were not fully captured by condition grade alone. Because new-with-tags status was already reflected in a Grade A classification, the supplementary scale focused on characteristics that added to or detracted from an item's value beyond its assigned grade.

Across **Sort 2A**, the research team found 429 items that had **value-adding attributes** and 390 items that had **value-detracting attributes**.

The most common value-adding attributes were:

- **premium brand status** (n=115, 26.8%),
- **remarkably high-quality handfeel or construction** (n=104, 24.2%),
- **vintage status** (n=78, 18.2%),
- **fanwear** (n=52, 12.1%), and
- **manufacture in Canada, the United States, or Europe** (n=45, 10.5%).

The most frequent value-detracting attributes were:

- **remarkably low-quality handfeel or construction** (n=145, 37.2%),
- **promotional branding or messaging** (n=112, 28.7%),
- **personalized clothing** such as items with nametags (n=45, 11.5%),
- **missing matching pieces** (n=41, 10.5%), and
- **uniforms** (n=37, 9.5%).

These findings demonstrate that items assigned the same condition grade may differ considerably in their likely resale value because of characteristics not captured by physical condition alone. (See **Figure 28** for more detail).

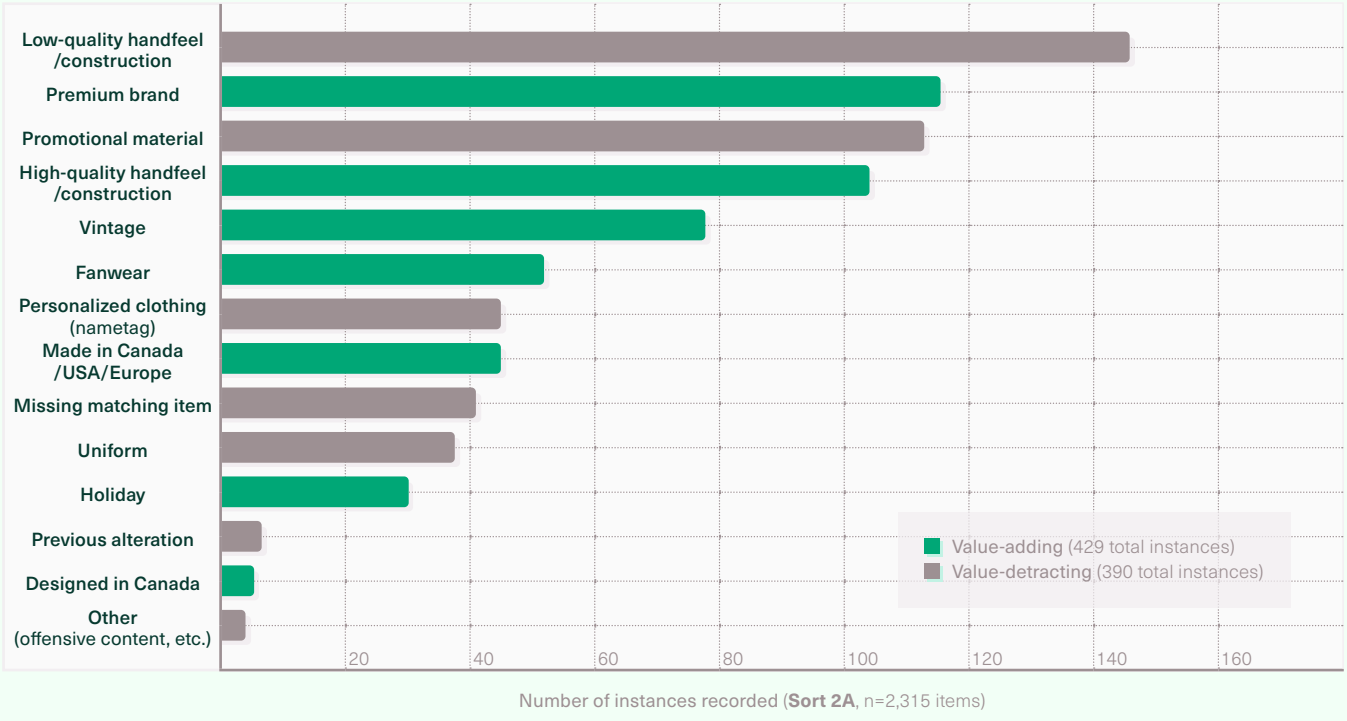


Figure 28: Summary of value adding and value detracting attributes by number of instances

4.0 Discussion

This study provides the most comprehensive characterization of donated textiles conducted in Nova Scotia to date, and contributes to a growing body of work characterizing Canadian textiles, examining 4,664 items collected across all seven of Nova Scotia's solid waste-resource management regions thereby capturing donations spanning the province. Clothing was collected from comparable retail locations across each region, providing broad geographic coverage of donation and resale conditions province-wide. The study examined two distinct textile streams: rejected and ragout items assessed after retail sorting and processing, and credential donations assessed before retail sorting and processing. Within the credential sort, a supplementary sample of textiles collected through donation bins was also included, allowing the quality of bin donations to be compared with items donated directly to stores. By documenting product characteristics, brand ownership, fibre composition, condition, and physical defects, the findings provide new insight into the composition of the charitable reuse stream and identify opportunities to improve textile circularity.

1,181 individual consumer-facing brands were identified, suggesting a highly fragmented marketplace. However, many of these brands can ultimately be traced to a much smaller group of corporate owners.

Although the 25 most represented parent companies owned only 6% of the identified brands, their products accounted for more than one-third (34.1%) of all items in the sample.

This concentration becomes even clearer when comparing item counts: this same group of 25 parent companies accounted for 1,590 items, nearly as many as the top 50 individual brands combined (n = 1,671). These findings indicate that, although consumers encounter a highly diverse array of brand names, responsibility for placing these products on the Canadian market is considerably more concentrated.

This has important implications for textile EPR, as engaging a relatively small number of retailers, private-label owners, and multinational apparel companies could address a substantial proportion of the products entering Nova Scotia's charitable reuse system.

Second, the donation stream retained considerable value. Nearly one-half of all donated items were immediately suitable for resale, while an additional one-third could potentially return to the market following cleaning or repair. Fewer than one in five items had reached the point where direct reuse was no longer appropriate but fibre recovery remained feasible, and only a very small proportion of donations were contaminated beyond practical recovery. To capture value beyond what the A-to-F condition grade alone reflects, the study also developed a supplementary valuation framework identifying value-adding and value-detracting attributes not captured by the letter-grade system. Whereas the letter-grade system assesses an item's condition and immediate potential for reuse or recovery, it does not capture characteristics that may increase or reduce its appeal and market value to an end customer. This supplementary framework helps close the gap between an item's condition grade and its likely market value, particularly as new reuse and resale applications emerge within the Canadian circular economy.

These findings reinforce that donated textiles should be understood as a resource stream with strong recovery potential.

Third, the findings underscore the importance of product design and condition in shaping future circularity. To examine this precisely, the study distinguished between fibre dominance within individual items and fibre concentration across the full sample, providing a more accurate account of fibre prevalence and the composition of the available material stream than a dominance-only analysis would allow.

Encouragingly, most items contained only one or two fibre types, suggesting that relatively simple fibre compositions remain common within the donation stream. This profile may not hold, however, as fast fashion continues to drive down the cost of clothing, blending fibres is often cheaper for manufacturers than single-fibre construction, and the current prevalence of simple compositions is at risk of eroding as production shifts further toward cheaper, blended fabrics *(Niinimäki et al., 2020)*.

At the same time, elastane emerged as a significant constraint. Present in nearly one-quarter of all items, elastane can disrupt established mechanical recycling processes and limit opportunities for fibre recovery. Its concentration in women's apparel and denim is especially important because these are high-volume textile categories that might otherwise offer strong recycling potential. **These findings suggest that improvements in textile circularity may depend as much on upstream product design decisions as on investments in downstream recycling infrastructure.**

Fourth, many barriers to reuse were behavioural rather than technological. **Although some defects reflected normal product aging, frequently observed issues such as staining, dust or lint, moisture, odour, and minor soiling could often be prevented or mitigated through laundering, proper storage, and more thoughtful donation practices.** Together with the accompanying donation behaviour research (see **TTNS Phase II Donation Etiquette Analysis**), these findings suggest that **relatively modest improvements in public education could increase the proportion of items suitable for immediate resale while reducing sorting time, cleaning costs, and disposal expenses borne by charitable organizations.**

Reuse is also constrained by a matching problem. Because donated clothing typically remains on store shelves for only a limited period, the consumer who wants or needs a particular item may never encounter it. The relatively consistent proportion of D1-grade items across the sampling streams further suggests that many functionally usable items attract limited consumer demand in their current condition. **Modest interventions on both sides of the reuse system, including improving donation quality while extending, diversifying, or better targeting opportunities for items to reach suitable buyers, could therefore increase successful reuse.** Donor education should thus be viewed as a critical component of textile circularity alongside improved product-consumer matching, recycling innovation, and producer responsibility.

Finally, the findings illustrate the importance of viewing charitable textile systems as one component of a broader circular economy rather than as the final destination for unwanted clothing. **Charities successfully extend the life of millions of garments, but they cannot overcome limitations created by product design, declining garment durability, contamination, or oversupply.** The prevalence of complex fibre blends, stretch fibres, and lower-quality construction shifts greater responsibility onto downstream organizations despite those decisions being made upstream during product design and manufacturing. Addressing these challenges will therefore require coordinated action across the textile value chain. **Producers can design and manufacture for item longevity and next-life readiness, governments can establish supportive policy frameworks, charitable organizations can continue optimizing sorting and reuse systems, and consumers can improve the condition of donated items through better care and donation practices.** Collectively, these interventions have the potential to increase textile recovery, reduce landfill disposal, strengthen charitable reuse systems, and improve the economic viability of emerging circular textile industries.

Taken together, this study demonstrates that Nova Scotia's charitable textile stream contains substantial untapped environmental and economic value. The results reveal a material stream characterized by concentrated producer responsibility, considerable remaining reuse potential, largely recyclable fibre compositions, and multiple opportunities for intervention before products reach end-of-life. Realizing this potential will require a systems-based approach that aligns product design, consumer behaviour, charitable operations, and public policy to support a more circular textile economy.

5.0 Recommendations

Findings from the **Waste Characterization Study** point to a textile stream that is large in volume, high in fibre and blend diversity, and split into three distinct outcomes: immediately resaleable, recoverable with intervention, and unsuitable for reuse. Findings also indicate that a relatively low number of parent brand companies are responsible for a large percentage of all items.

The recommendations that follow build directly on these findings and are identified with the prefix **"MAT"**, signifying "material", to distinguish them from recommendations presented in the other **TTNS Phase II** deliverables.

Master Recommendation Key

Waste Characterization Study
MAT = Material

Donation Etiquette Analysis
BEH = Behaviour

End-Use Pathways Brief
MKT = Market

Recommendation Summary

HIGH PRIORITY

MAT-1 **Engage concentrated companies in policy development**
Sharing this study with the top parent companies could result in more engaged stakeholders.

MAT-2 **Close EPR and stewardship infrastructure gaps**
Mapping retail origins and market pathways could reduce accountability gaps.

MAT-3 **Formally include textiles in waste strategies and audits**
Defining textiles as a waste stream category could enable better tracking for future decisions.

MEDIUM PRIORITY

MAT-4 **Consider fibre- and recycled-content procurement mandates**
Exploring policy options could increase transparency and signal demand.

MAT-5 **Explore consumer incentives**
Tax incentives could increase consumer demand for repaired textiles.

MAT-6 **Consider repair subsidies**
Incentivizing paid repair practices could improve diversion outcomes and create jobs.

MAT-7 **Address missing fibre content information**
Supporting labelling standardization could improve routing to fibre-specific recycling pathways.

MAT-8 **Explore eco-modulated producer fees**
Financial incentives could increase use of recyclable content.

MAT-1 Engage concentrated companies in policy development

Priority: High ▲

Audience: Policymakers; Active industry partners; EPR program developers

A relatively small number of parent companies account for a large share of the textiles entering Nova Scotia's donation stream. Policy interventions aimed at improving textile design, labelling, or end-of-life accountability can therefore be targeted efficiently at a handful of producers rather than spread thinly across a fragmented brand landscape. Without their direct engagement, EPR and stewardship policy development risks being designed around an assumed market structure rather than the concentrated reality this study observed.

Evidence from TTNS

- Top 25 brand companies accounted for 34.1% of all items assessed, despite owning only 5.9% of identified brands
- Gap Inc., Walmart Inc., Loblaw Companies Limited, H&M Group, and Giant Tiger Stores Limited were among the parent companies most represented in the sample.
- This concentration held despite a highly fragmented brand landscape overall, indicating that brand count alone is a poor proxy for market influence.

Recommended Actions:

- Convene the identified top parent companies as a standing stakeholder group for EPR and stewardship policy development.
- Share this study's brand concentration findings directly with these companies to establish a shared evidence base for policy discussions.
- Formalize their participation in provincial EPR framework consultations as they develop.

Expected Outcomes:

- A defined, engaged group of high-impact producer stakeholders participating in brand-led EPR policy development.
- Policy design informed by actual market concentration rather than an assumed even distribution across brands.
- Stronger producer buy-in ahead of eventual regulatory requirements.

MAT-2 Close EPR and stewardship infrastructure gaps

Priority: High ▲

Audience: Policymakers; EPR program developers

EPR frameworks depend on clearly identifying who is responsible for a product at end of life. This study found that brand ownership is far more concentrated than the number of distinct brands would suggest, and that retailers commissioning private-label or licensed goods may not currently be captured as "producers" under existing EPR thinking. Left unaddressed, this ambiguity risks a stewardship policy that fails to hold true producers accountable.

Evidence from TTNS

- Retailers that commission private-label or licensed goods are not consistently captured as "producers" under current EPR thinking, despite contributing meaningfully to the waste stream.
- No consistent system currently exists for allocating stewardship fees or tracking brand representation across this concentrated ownership structure.

Recommended Actions:

- Map the retail origins and market pathways of branded and private-label goods identified in this study.
- Identify where current EPR and stewardship definitions fail to capture retailers commissioning private-label or licensed products as producers.
- Develop fee allocation and reporting traceability mechanisms that reflect actual brand ownership concentration.

Expected Outcomes:

- A clearer, evidence-based definition of "producer" for EPR purposes that captures private-label and licensed goods.
- Fee and reporting structures that reflect actual market concentration.
- Reduced risk of accountability gap in future stewardship policy.

MAT-3 Formally include textiles in waste strategies and audits

Priority: High ▲

Audience: Provincial and municipal governments; Stewardship organizations; NACTR

Textiles cannot be managed as a priority waste stream if they are not consistently counted or defined within the systems provincial and municipal governments already use to set goals and track waste. Without a harmonized definition, Nova Scotia's data risks being incompatible with other Canadian jurisdictions, undermining the province's ability to benchmark progress or contribute to national policy development and datasets.

Evidence from TTNS

- This study is Nova Scotia's first dedicated textile waste characterization effort, indicating textiles have not historically been tracked with the same rigour as other waste streams.
- Existing Canadian textile waste characterization studies use varying methodologies and definitions, creating a need for harmonization across jurisdictions.
- NACTR is positioned as a natural convening body for defining textiles consistently across audits, given its national mandate.

Recommended Actions:

- Explicitly name textiles as a material category in provincial and municipal circular economy and waste reduction strategies.
- Include textiles as a defined category in future waste audits.
- Work with NACTR to adopt a standardized definition of textiles for audit purposes, aligned with other Canadian jurisdictions.

Expected Outcomes:

- Textiles formally recognized as a tracked material stream in provincial and municipal policy.
- Waste audit data that can be compared across Canadian jurisdictions.
- A stronger evidence base for future textile-specific policy and investment decisions.

MAT-4 Consider fibre- and recycled-content procurement mandates

Priority: Medium ▲

Audience: Provincial and municipal governments

Government procurement is one of the few demand-side levers available before broader producer responsibility policy is in place. Requiring fibre-content transparency or recycled content in publicly funded purchasing could create early, stable demand for better-labelled and more circular textile products, supporting the market conditions that make later EPR policy more effective.

Evidence from TTNS

- Fibre-content labels were unavailable for 21.7% of items, and fibre content could not be determined at all for 6.2%, indicating current market practice does not reliably support content-based purchasing decisions.
- No procurement mandates currently exist in Nova Scotia requiring fibre-content or recycled-content disclosure.
- Producer accountability mechanisms recommended elsewhere in this study depend on the standardized fibre-content reporting that procurement policy could help drive.

Recommended Actions:

- Explore procurement policy options that require fibre-content disclosure for textile purchases made with public funds.
- Consider phased recycled-content minimums for applicable government purchases.
- Align procurement requirements with the labelling and traceability mechanisms recommended in MAT-7.

Expected Outcomes:

- Increased fibre-content transparency among suppliers to government.
- An early demand signal for recycled-content textile products.
- Procurement practices aligned with future EPR requirements.

MAT-5 Explore consumer incentives

Priority: Medium ▲

Audience: Federal and provincial governments

Consumer-facing incentives can influence upstream purchasing and end-of-life behaviour without waiting for producer-level policy to take effect, offering a near-term lever to reduce the volume and improve the quality of textiles entering the waste and donation stream.

Evidence from TTNS

- An estimated 30-50% of textile donations are appropriate for resale *(NACTR, 2023; Weber et al., 2023)*, indicating a meaningful share of value is lost when items are discarded rather than resold or repaired.
- Canadian labour costs make refurbishment and repair economically unfeasible on a large scale without incentives *(Martin & Ulasewicz, 2025)*.
- No consumer tax incentives currently exist in Nova Scotia to encourage the purchase or resale of used textiles.

Recommended Actions:

- Explore a sales tax exemption on used textile purchases.
- Assess other consumer-facing incentive or disincentive mechanisms, such as tax credits or repair rebates.
- Evaluate the fiscal and behavioural impact of candidate incentives before implementation.

Expected Outcomes:

- Increased consumer demand for used and repaired textiles.
- Reduced volume of resaleable items sent for disposal.
- A stronger business case for resale and repair retail models.

MAT-6 Consider repair subsidies

Priority: Medium ▲

Audience: Provincial and municipal governments; Resale organizations

This study found a meaningful share of donated items are recoverable with intervention rather than immediately resaleable or entirely unsuitable for reuse, but Canadian labour costs currently make repair and refurbishment economically unfeasible at scale. Targeted subsidies could unlock this recoverable-but-not-resaleable portion of the stream while supporting local job growth.

Evidence from TTNS

- This study identifies a distinct “recoverable with intervention” category within the textile stream, separate from immediately resaleable and unsuitable-for-reuse items.
- Export, recycling, and disposal remain the default pathways for surplus donations in the absence of a viable repair economy.

Recommended Actions:

- Consider subsidies that incentivize paid repair practice for textiles.
- Pilot repair subsidies in partnership with existing charitable and for-profit textile recovery organizations.
- Monitor job creation and diversion outcomes from pilot projects to build the case for scaling.

Expected Outcomes:

- Increased repair activity and reduced disposal of recoverable items.
- Skilled job creation in the repair sector.
- A tested model for scaling repair subsidies provincially.

MAT-7 Address missing fibre content information

Priority: Medium ▲

Audience: Federal and provincial governments; Industry; Manufacturers; Research Institutions; Standards organizations

Recycling pathways are often fibre-dependent, so the inability to reliably determine what a garment is made of is a direct barrier to routing recovered textiles into appropriate end markets. This is one of the clearest, most concrete data gaps this study identified, and closing it would strengthen nearly every other recommendation in this report.

Evidence from TTNS

- Fibre-content labels were unavailable for 21.7% of items assessed, and fibre content could not be determined at all, even through inspection, for 6.2%.
- 23.8% of textiles assessed contained elastane, a blend component that creates recycling challenges when not accurately disclosed.
- 84.8% of items contained only one or two fibre types, indicating that improved labelling accuracy would support feedstock characterization for a large majority of the stream.

Recommended Actions:

- Support labelling standardization efforts for fibre content.
- Explore digital product passports as a longer-term traceability solution.
- Develop producer accountability mechanisms that tie fibre-content accuracy to stewardship obligations.

Expected Outcomes:

- A measurable reduction in the share of items with missing or unreliable fibre-content information.
- Improved ability to route recovered textiles to fibre-specific recycling pathways.
- A stronger evidence base for producer accountability mechanisms under future EPR.

MAT-8 Explore eco-modulated producer fees

Priority: Medium ▲

Audience: Provincial governments; Industry; Manufacturers; EPR program developers

Flat producer fees do not distinguish between garments that are easy to recycle and those that are not, so they do little to discourage the blend complexity and material mixing that make textiles harder to recover. Eco-modulated fees would tie financial responsibility to how recyclable a product actually is, creating a direct design incentive for producers.

Evidence from TTNS

- 84.8% of items contained only one or two fibre types, suggesting that a fee structure rewarding simpler compositions would apply meaningfully across the sample.
- Fibre-content information necessary to apply blend-based fee structures is not currently standardized *(see **MAT-7**)*.

Recommended Actions:

- Explore eco-modulated fee structures that account for blend complexity or number of materials.
- Design fee reductions or rewards for the use of recycled content.
- Align fee structures with the fibre-content standardization work recommended in MAT-7.

Expected Outcomes:

- Financial incentives for producers to design simpler, more recyclable garments.
- Increased use of recycled content and reduced use of blended fibres in new textile products.
- A fee structure that reflects actual end-of-life recyclability rather than a flat rate.

5.1 Limitations

The coding process involved some potential for interpretive bias, particularly when assigning condition grades and evaluating attributes related to aesthetic or utilitarian value. Because clothing functions both as a means of social expression and as a practical tool supporting a wide range of human activities, assessments of its value-adding and value-detracting attributes, as well as the severity of certain defects (e.g., holes or tears), may vary somewhat across individuals. To reduce this potential variation, all coders completed training in item classification, condition assessment, fibre identification, and data-recording procedures before beginning data collection. Coders also worked in close physical proximity to the research team throughout the sorting process, allowing questions, ambiguous cases, and inconsistencies to be discussed and resolved as they arose. Standardized grading criteria and data-collection protocols were used across the study, and photographs were taken to support the verification of classifications and condition assessments.

The study relied on fibre-content information obtained from garment labels and near-infrared spectroscopy (NIRS). Although NIRS is increasingly used in textile-characterization research and feedstock preparation, its relatively high cost can limit its widespread adoption, particularly among smaller research teams, charitable organizations, and textile-sorting facilities. The technology also has several recognized technical limitations *(Mak et al., 2025; McQueen et al., 2026)*. In particular, NIRS may not reliably identify more than two fibre types within the same item, detect fibres comprising less than approximately 10% of a blend, analyze fibres obscured by coatings or multiple fabric layers, or consistently distinguish among certain natural fibres. Conversely, reliance on fibre content labels can also have its limitations. In a recent EU report, 37% of fibre content labels did not accurately represent the fibre content of the samples tested *(European Commission, 2026)*.

These constraints may have reduced the accuracy of some fibre classifications and are consistent with limitations identified in previous textile characterization studies *(Mak et al., 2025; McQueen et al., 2026)*. More broadly, the limited availability of affordable and reliable fibre-identification tools created an efficiency challenge for this study and may continue to constrain the ability of researchers and industry actors to conduct fibre analysis at scale.

The regional sampling approach introduced some potential for sampling error. Textile composition within each of Nova Scotia's seven waste regions was estimated using randomly selected sample boxes assembled by staff at participating charitable retail stores. Although stores were instructed to provide representative samples of ragout and rejected textiles for **Sort 1** and credential donations for **Sort 2**, the boxes were not uniform in weight, and staff may not always have been fully briefed on the distinction between the two streams. There was some evidence that individual boxes contained items from the incorrect stream, including credential items in the ragout sort and ragout or rejected items in the credential sort. Although efforts were made to apply a consistent sampling approach across regions, these inconsistencies may have affected the representativeness of some regional, stream-level, and item-level comparisons.

Future studies should provide clearer written and verbal instructions to participating staff, supported by examples of eligible and ineligible items, standardized collection procedures, and additional check-ins during the sampling period.

For practical reasons, the study did not collect item-level weight, volume, or colour data. Although the variables included in the analysis were selected to address the study's primary objectives, additional item-level measures may become increasingly important as reuse, recycling, and manufacturing pathways develop within Canada.

A related limitation concerns the absence of fully standardized definitions for condition grades, item classifications, fibre compositions, and repair requirements. This study followed the same general A-to-F grading approach used by *Weber et al. (2023)* and adapted for thrift donations by *Sterling et al. (2026)*, including the classification of D-grade items as unsuitable for resale in their current condition. However, the distinction between Grade D2 and Grade E represents a relatively recent refinement of the A-to-F model. Under this distinction, D2 items may potentially be restored to rewearable condition through more substantial intervention, whereas E-grade items are considered unwearable but may remain suitable for fibre recovery or another form of repurposing.

Because the boundary between substantial repair and unwearability can involve some judgment, differences in how this distinction was operationalized may have contributed to variation across studies. For example, Grade E items accounted for 18.0% of the present sample, compared with 2.1% in *Sterling et al., (2026)*, while Grade D2 items represented 13.3% of the present sample, compared with 19.0% in *Sterling et al., (2026)*. These differences should not necessarily be interpreted as evidence of inconsistent grading practices, as they may also reflect genuine variation in the textile streams. Nevertheless, they reinforce the importance of developing shared operational definitions and decision rules so that findings from independent studies can be compared and, where appropriate, combined.

Greater consistency is also needed in distinguishing between major and minor defects or repair requirements. For example, a minor repair might be defined as replacing a button, laundering or de-linting, closing a small seam opening, or removing a localized stain through routine laundering. A major repair might involve replacing a zipper, repairing a large tear, reconstructing a damaged seam, removing extensive staining, or addressing damage that requires specialized equipment or skilled labour. Clear thresholds should also consider the time, cost, skill, and materials required to restore an item, rather than relying solely on the physical size of the defect. Establishing common definitions for these categories would improve estimates of how many damaged items could realistically be restored to rewearable condition.



Limitations and Mitigations Summary

The coding process has potential for bias
All coders received training and worked in close proximity to the research team using standardized protocols.

The study relied on fibre-content information obtained from garment labels and NIRS
MAT-7 would increase the accuracy and efficiency of future studies.

The regional sampling approach has potential for sampling error
Future studies should ensure staff are provided with clear and consistent written and verbal instructions.

The study did not collect item-level weight, volume, or colour data
Additional resources would need to be allocated in future studies to achieve this level of granularity as this data becomes increasingly important to diversion pathways.

There is a lack of fully standardized definitions for grading and classifications
Developing shared operational definitions and decision rules would ensure more accurate comparisons between independent studies; MAT-3 would help facilitate this process.

6.0 Conclusion

This study provides a province-wide characterization of post-consumer textiles by examining donated and discarded items collected across all seven SWR of Nova Scotia. By combining regional sampling with detailed assessments of item classification, condition, fibre composition, construction, brand ownership, and value characteristics, the study establishes an important evidence base for advancing textile circularity in the province and more broadly across Canada.

Several findings point to substantial recovery potential within the existing textile stream. The large majority of items contained only one or two fibre types, suggesting considerable readiness for mechanical recycling and emerging chemical recycling technologies that favour simpler fibre compositions. Nearly half of the items were immediately suitable for resale, while many others could potentially be restored through cleaning or repair. In particular, the prevalence of dust, odour, minor staining, and other cleanliness-related issues indicates that relatively simple pre-donation practices could preserve item value and reduce processing burdens. Public education campaigns focused on laundering, inspecting, and appropriately storing textiles before donation could therefore improve the quality of donated material with comparatively little intervention.

The brand analysis also provides encouraging evidence for the potential feasibility of EPR. Although the sample contained a large number of individual brands, a substantial share of the items was associated with a comparatively small number of parent companies. The 25 most frequently represented parent companies accounted for 1,590 items or 34.1% of the full sample, despite owning only 70 of the 1,181 identified brands (5.9%). This concentration suggests that responsibility for a meaningful share of the post-consumer textile stream may be distributed across fewer corporate actors than the diversity of consumer-facing brand names initially implies. An EPR system may therefore be more administratively feasible than first assumed, particularly if producer obligations are assigned at the parent-company or retailer level rather than separately to every individual label. The inclusion of retailers is especially important because companies that place private-label, licensed, or diffusion-brand products on the market may also qualify as producers.

The findings further demonstrate substantial opportunities for technological and organizational innovation. Accurate and affordable fibre-identification tools, automated sorting systems, and standardized grading and characterization protocols could support higher-volume processing and direct materials toward their most appropriate reuse, recycling, or repurposing pathways. These opportunities will depend on collaboration among charitable organizations, collectors, recyclers, manufacturers, retailers, technology providers, researchers, and governments. Greater knowledge sharing, common data standards, and coordinated investment could reduce duplication, improve market confidence, and accelerate the development of viable circular end uses.

Overall, the study identifies significant opportunities to strengthen economic, environmental, and social resilience through textile waste reduction. Action can occur at multiple levels: individuals can improve donation practices, communities and charitable organizations can expand repair and reuse systems, industry can invest in sorting and recycling infrastructure, and governments can develop coordinated policy instruments such as EPR. Taken together, these findings demonstrate that Nova Scotia's textile stream is not simply a waste-management challenge, but a resource base with substantial potential for reuse, recovery, innovation, and shared value creation.

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Textile Transformation Nova Scotia Phase II

0 Master Report

1 **Waste Characterization Study**

2 Donation Etiquette Analysis

3 End-Use Pathways Brief

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