



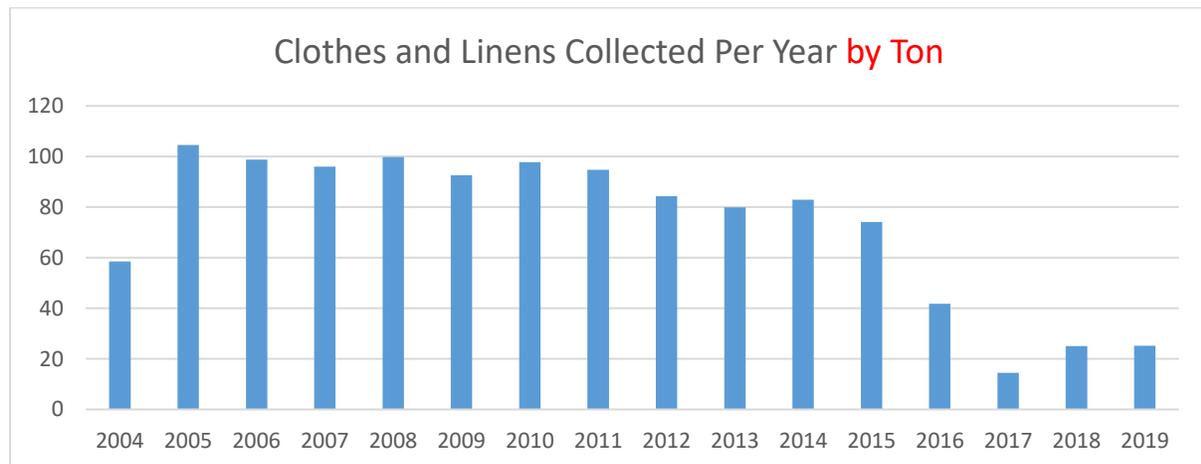
Eureka Recycling Clothes and Linens Collections Study Methodology and Summary of Findings

20017-2019

About us: Eureka Recycling is a 501c3 non-profit organization with a mission to demonstrate waste is preventable, not inevitable. We do this through self-sustaining Zero Waste programs and services and apply for grants and donations to conduct outreach, advocacy, and research such as this study.

Project background: Eureka Recycling’s origins are in the residential recycling program of the City of Saint Paul, managed by the Neighborhood Energy Consortium. (Eureka spun off as an independent Zero Waste non-profit to operate and manage the program in 2002.) Collection of clothes and linens in Saint Paul’s program started in the 1990s when the program was “source separated”, meaning materials were segregated at the point of collection (glass put out by residents in one container or paper bag, paper in another, aluminum in another, etc.), and clothes and linens were collected in sturdy, labeled bags transported to the facility in the cab of the trucks.

When we switched to dual stream in 2004, we continued collecting textiles put out by residents in a separate bag. At this time we found that textiles could be easily collected with paper because both tended to stay dry; then our staff would remove them during processing in the Material Recover Facility (MRF). We transitioned our facility and collections programs to single stream in 2014, and by 2016 all of our customers were being collected in single stream carts. That transition included some compaction of the single stream material in the trucks, and we found the bags broke and clothes decreased in quality significantly. Additionally once residents had carts many of them stopped setting out clothes and linens with their recycling. You can see a dramatic drop in tons starting in 2016 and continuing into 2017.



Study Design

The impacts on textiles collection with the transition to carts and single stream led us to design and implement a study on effective methods for collecting textiles, and measuring such methods in terms of participation by residents, cost of collection, and environmental impact. We also included in the study a thorough examination into the composition of the textiles collected, in terms of grades and value of material collected, to determine the highest and best use possible for the material. The research was done over a three and a half year period and was funded primarily by the Minnesota Pollution Control Agency with additional support from US'Again and the Salvation Army.

The study areas were distributed throughout the City of Saint Paul and covered a total of approximately 25% of residents in single-family homes, ensuring various methods of testing in a diversity of income categories and recycling participation rates.

1. We knew that maintaining quality textiles was critical if we were to continue to collecting them at the curb. For collection type we decided to test the following: A separate collection with a smaller vehicle only dedicated to collect textiles
2. Co-Collection on route with recycling but in a separate compartment (this meant that occasionally that compartment would fill up so we would still need to send over a separate truck now and then)

Additionally we tested the following participation options with those two types of collection methods:

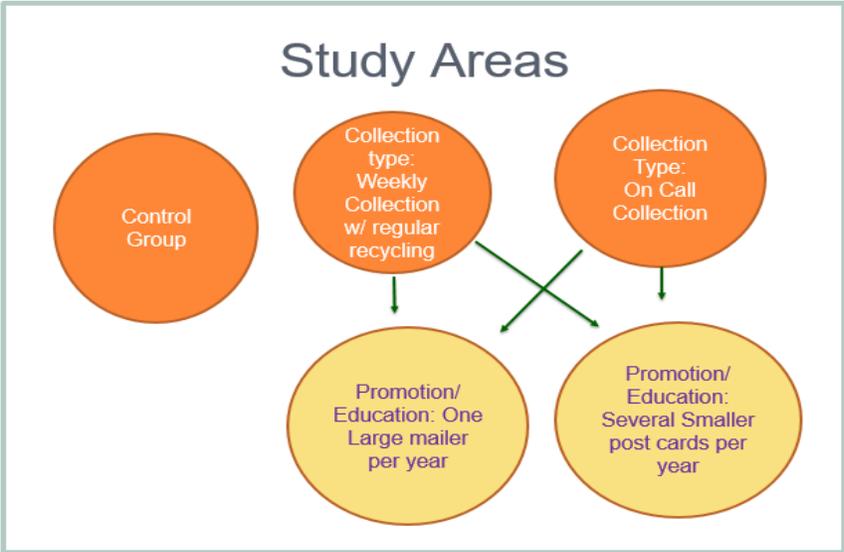
1. Weekly collection to line up with a resident's designated recycling collection day
2. On-call, but with your recycling day (so we'll only pick up your material if you called ahead to schedule)
3. Monthly set out (so we only collect your clothes and linens one day of the month)

Lastly, we tested the following communication methods, which had the same budget, but different approaches:

1. One detailed large mailer per year
2. Several smaller post cards throughout the year

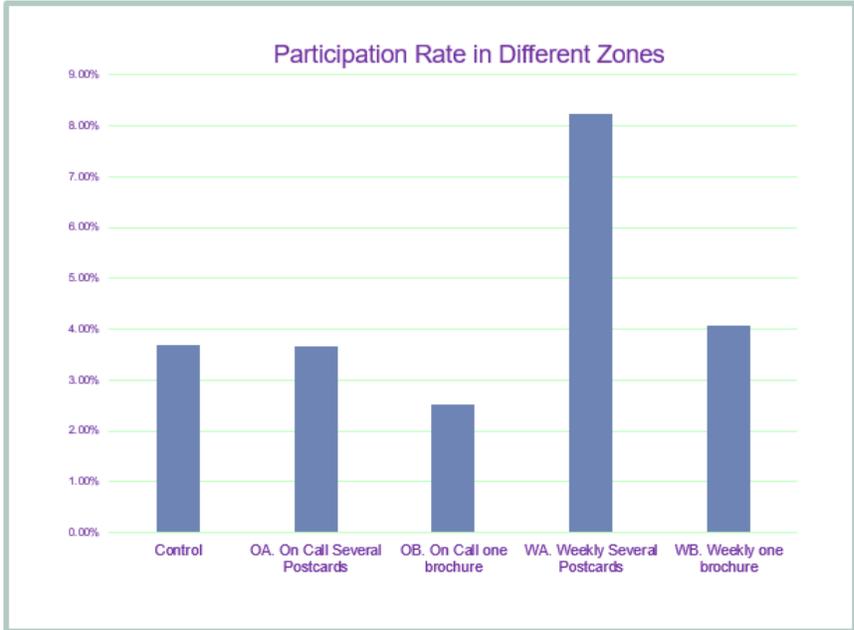
For our study area, we created four separate zones and one control zone to evaluate the impacts of the different communication and participation options. We then tracked every address who participated as well as how much they set out (both pounds and volume) and used time studies and route mapping to compare collection types. See below for groups.

Each study zone consisted of about 1000 households per day , equaling 5000 households in all. When we selected the zones we also tried to look at recycling participation and other demographics so they were balanced and comparable.

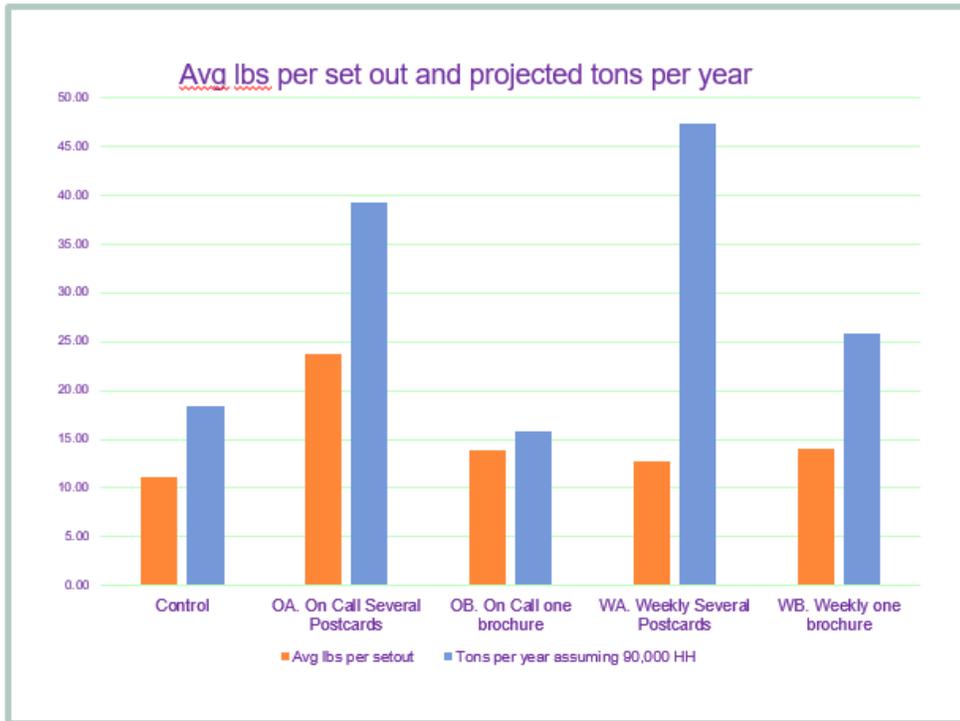


Participation Results

Multiple post cards yielded significantly higher participation



The On-Call method yielded the highest pounds per set out. However, when we combined pounds-per-set-out with participation over the entire year to project total tons per year, weekly collection with several postcards showed the most potential.



Environmental and Economic Impact of Collection

On-call zones had lower participation and therefore fewer miles and hours driven. Co-collection was the most efficient in terms of miles and hours because the vehicle was already collecting the recycling of a household. This method does not result in more miles and takes minimal amount of extra time to pick up the bagged textiles and store in the separate compartment on the truck. An important note to co-collection is that there are spikes in textiles set outs such as spring cleanups or when school starts in the fall. Other trucks in the area need to have extra capacity to take in that material, and so during these times of the year there will be extra miles and hours. Still, overall co-collection is the most efficient in terms of cost and environmental impact of collection.

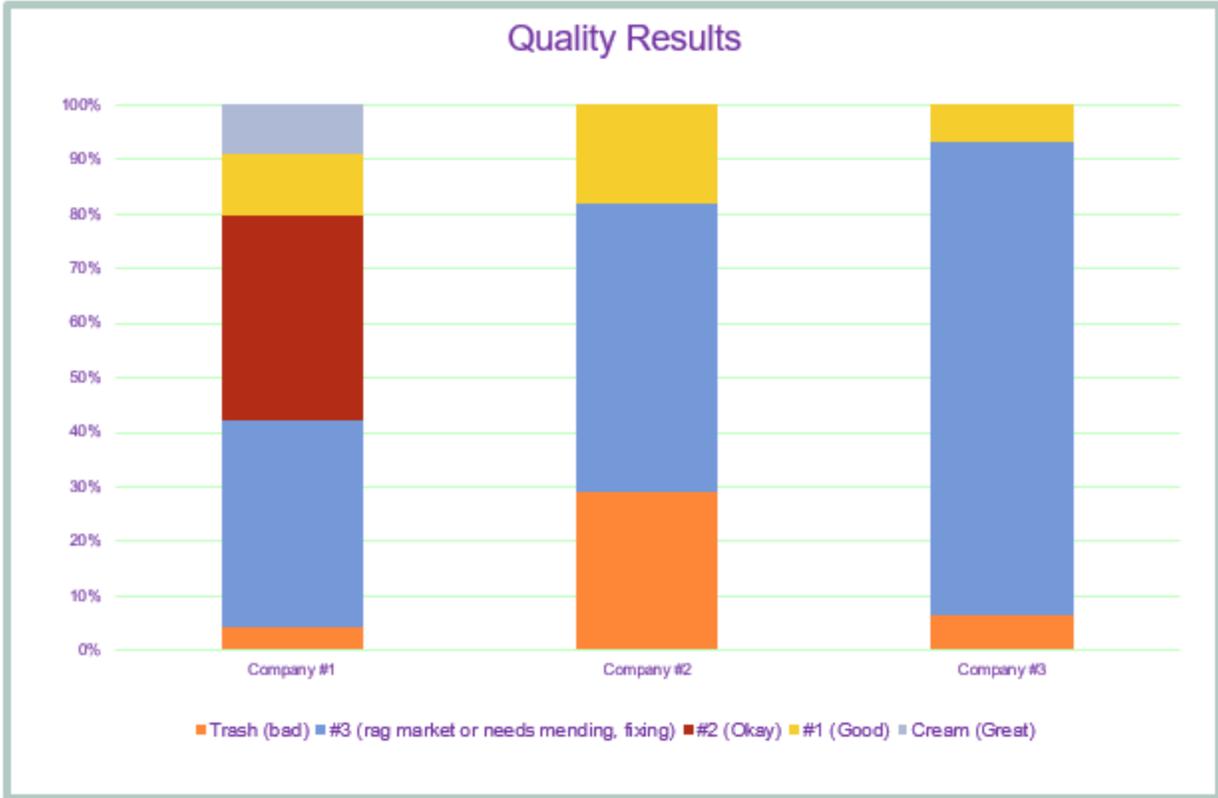


Quality Analysis

We had three companies, The Repair Lair, The Renewal Workshop, and the local Salvation Army, look at material we collected and give us feedback on quality and potential for use in their business models. These companies all have slightly different standards but we grouped them into four main categories (though only one used the 4th category of “Cream” to indicate really nice material).

We weren’t able to identify any trends by study group but as a whole estimated that only 5 – 20% of the material we collect was of quality that could easily be reused domestically. The largest portion was considered rag quality. Rag quality might be recycled into some sort of product somewhere (ie: insulation) but may just take a really long route to the trash. There was no traceability into the supply chain to understand exactly what happens to what portion of the rag-quality material. In our research we were unable to identify any places that actively take mixed worn and torn clothing and turn them into any specific products, though some places will take specific cast-offs such as jeans and some markets may do further grading of rag quality.

We conducted an opt-in online survey where many respondents stated that nicer quality items tend to go to shops for resale or to friends and family. The survey showed many residents think of setting clothing out as part of their recycling program as something to do with lower quality items, bringing their nicer outfits to resale shops, online or retail directly, or give them away to friends and family. However, we have also heard across the industry that there is a general decline in quality of clothing with a decrease in all-cotton or natural fiber items and fewer textiles designed to last for more than a few wears.



The survey had 10 questions and garnered 591 responses. The questions primarily focused on what residents do with their clothes once they no longer want them and the primary reason they participate in a textile collection program. As noted already, nicer quality clothes tend to go to thrift shops, friends, and family. Regarding motivation, most were more motivated by the environmental benefit of not letting clothes go to waste rather than the social benefit of helping others (though that was a close second).

Results:

Based on all of these findings we have created recommendations for textiles collection as part of municipal recycling programs, which can be found on our website.

Recommendations for Municipalities:

1. Worth saying again, focus on reduction, reuse, and repair education, policy, and programs before implementing collection as part of a recycling program. True with any material, the social and environmental impacts of using what we have and consuming less are unmatched. Many cities and counties are promoting these upstream solutions through education, programming, and policy.

2. While upstream strategies are being developed, improve current diversion of reusable and repairable textiles from landfills and incinerators. While the data collected in this study isn't conclusive, the analysis of the surveys together with quality/composition studies of material collected curbside seems to indicate that residents that previously used drop off or donations view curbside collection of textiles differently than existing reuse opportunities. In the curbside collection they put out additional lower-quality textiles (one sock with a hole, old college choir shirt with paint on it, etc.), and while this may increase diversion at the curb, as discussed in this report, challenges remain in finding markets for low quality textiles and much of that material is likely becoming trash somewhere else.

While chemical recycling is one area that could potentially address low value textiles in the future, there are significant issues around economics, processing and sorting technology as well as the human health and environmental impacts that need to be understood and addressed.

3. When launching a curbside collection program:

a. Set collection of textiles to occur on same day as recycling. This results in more participation than on-call service. While on-call service results in higher pounds of material per set out, likely due to residents searching for everything they want to recycle since they called in, collection on the designated recycling day results in more pounds/household on average due to higher participation resulting from the convenience of participating throughout the year on one's scheduled recycling day.

b. More frequent smaller pieces of education with any type of collection method results in higher participation than one-time, elaborate mailings. This shows the potential for continued engagement through social media and other low cost channels that can keep the issue on people's mind as they engage opportunities to dispose of clothing.

c. Co-collection of material with recycling in a separate compartment:

- Textiles can be very cost effective to collect as part of a curbside program, resulting in an increased cost as low as \$.01/household/month.
- Bagged textiles should always be collected separately. Given the quality issues and sensitivity of the market for both single stream recycling in general, as well as specifically for textiles, allowing clothing to comeingle with single stream is a bad idea.
 - It results in bagged material, which is contrary to the message of single stream. Bags/film/etc. in single stream programs is already a serious challenge in terms of worker safety as well as significantly increasing program costs.
 - When bags break the quality of clothing is deteriorated and also results in the contamination of the single stream. Textiles on the single stream sort line causes serious issues with sorting equipment. (Since Eureka does not comeingle

the textiles with recycling in compactor trucks bag breakage was not measured. When textiles are collected separately the bag breaking is not as much of an issue and the textiles do not get contaminated with glass and food waste from recyclables.)

- Co-collecting in a separate compartment on the same truck for recycling collection reduces transportation emissions by half compared to a separate truck on a dedicated route. Results from the collection pilot show that collection on one's designated recycling day results in more participation and overall higher diversion than a call-in. In this case the lower set out weights facilitate co-collection as a viable option in terms of capacity on trucks that generally have little additional space with separate compartments. Automatic weekly collection also resulted in about 40 percent higher tonnage collected compared to on-call.
 - If placing textiles in a separate compartment or area is not possible, the recycling collection driver can make a note of set-out textiles on route resulting in a much more efficient designated route.
 - This does result in additional labor costs for collection (in an automated collection program) as drivers must exit trucks, however, the labor costs are significantly lower than running a separate route (about 1/3).

4. Focus educational messaging on environmental impact. Our survey results clearly showed this is the most compelling motivation for residents to reuse and recycle textiles, well above providing financial support for nonprofits.

5. Support the development of end markets for the evolving textile stream. As stated above, the proliferation of fast fashion has drastically changed the quality and value of recovered clothing, in part because there is more polyester, less cotton, and ever-emerging new fibers and mixes of materials. Current end markets have not adapted, likely resulting in an increased percent of clothes being disposed of and not reused. While upstream strategies provide far greater long term benefit, in the short term the following is needed:

a. We need public and private investments to understand and implement new sorting techniques/equipment for clothing to achieve the highest and best use while we simultaneously develop markets for the lower value clothing until policies and standards reduce this burden. While there needs to be more and better markets for textiles this must be done ethically with greater transparency in the marketing of textiles, particularly to overseas markets. Further study and investment (by industry) is needed to better understand the strategies to both sort clothing for highest and best use and develop markets for the lower value clothing.

b. We need a coordinated effort among stakeholders (local and state government, thrifts, retail stores, repair shops, other reuse and recyclers) to develop and promote local reuse and repair policy, educational materials, and programs and services.

c. Focus "upstream". Whenever curbside recycling of textiles is implemented it needs to be preceded and continuously augmented with messages that encourage thrift, resale and repair options, before putting it at the curb or alley.

d. Educate residents on the importance of putting the right materials out for the program in their community. Let them know why the program limits what is accepted, as well as which items are more likely to be reused and recycled. This starts with program designers understanding what and if there are marketing opportunities for high quality materials all the way down to the worn, torn and stained items prior to promoting the program.