OREGON DEQ RFI RESPONSE: PAPER CUPS

Oregon Statewide Recycling Collection List and Producer-Collection Materials for Recycling

This information is submitted by the Foodservice Packaging Institute in response to the February 3, 2022 Request for Information: Oregon statewide recycling collection list and producer-collected materials (for recycling).

We welcome questions and can provide additional details upon request. Please contact:
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Background

The Oregon Department of Environmental Quality has requested technical information that can be used to evaluate materials against evaluation criteria set forth in statute. The Oregon Plastic Pollution and Recycling Modernization Act was passed into law in 2021 requiring numerous changes that are intended to modernize and stabilize recycling services in Oregon.

The Foodservice Packaging Institute (FPI) was founded in 1933 and is the leading authority for the North American foodservice packaging industry. FPI encourages the responsible use of all foodservice packaging through promotion of its benefits and members' products. FPI's core members are foodservice packaging manufacturers and their raw material and machinery suppliers. With over 75 members, FPI includes approximately 90% of converters and suppliers in the foodservice packaging industry in North America, and over 200 foodservice operators, distributors, and educational institutions.

FPI is committed to reducing the impact of its products on the environment and is dedicated to making sure these items recovered and diverted from the landfill. FPI has a separately funded recovery group with a focus on paper and plastic cups, containers, bags, and boxes. Since 2011, this group has been working with communities, recycling facilities, composters, and end markets to expand to find stable and sustainable recovery solutions for these valuable materials. This group receives technical support from Resource Recycling Systems (RRS).

Through the Community Partnership program that launched in 2017, FPI has partnered with 15 residential programs to add foodservice items to their accepted material lists. The specific items are determined through consultation with the individual program, the Material Recovery Facilities (MRF) and end markets that process the community's' materials. Once FPI determines viability for inclusion of foodservice packaging materials into the prospective community recovery program, FPI works with the city and/or municipality to educate residents on best practices for recovery. Because these efforts are market-based, they have proven stable and sustainable without further assistance from FPI, and the partners report numerous benefits to their programs[OBJ].

A number of years ago, in an effort to accelerate the adoption of paper cup recycling, a select group of FPI members decided to commit additional funds for paper cup recovery in the U.S. This group includes many key stakeholders of the value chain such as manufacturers, users, and recyclers of paper cups. The paper cup recovery efforts complement the Community Partnership program and include market development work and equipment grants for MRFs who require additional sorting to process paper cups.

This RFI submission provides information regarding recyclability factors related to paper cups, to support decisions around their inclusion in the uniform statewide collection list (USCL). The data has been compiled with the assistance of technical consultant, RRS, who has conducted ongoing research on recycling and recyclability of these materials for FPI and other clients.

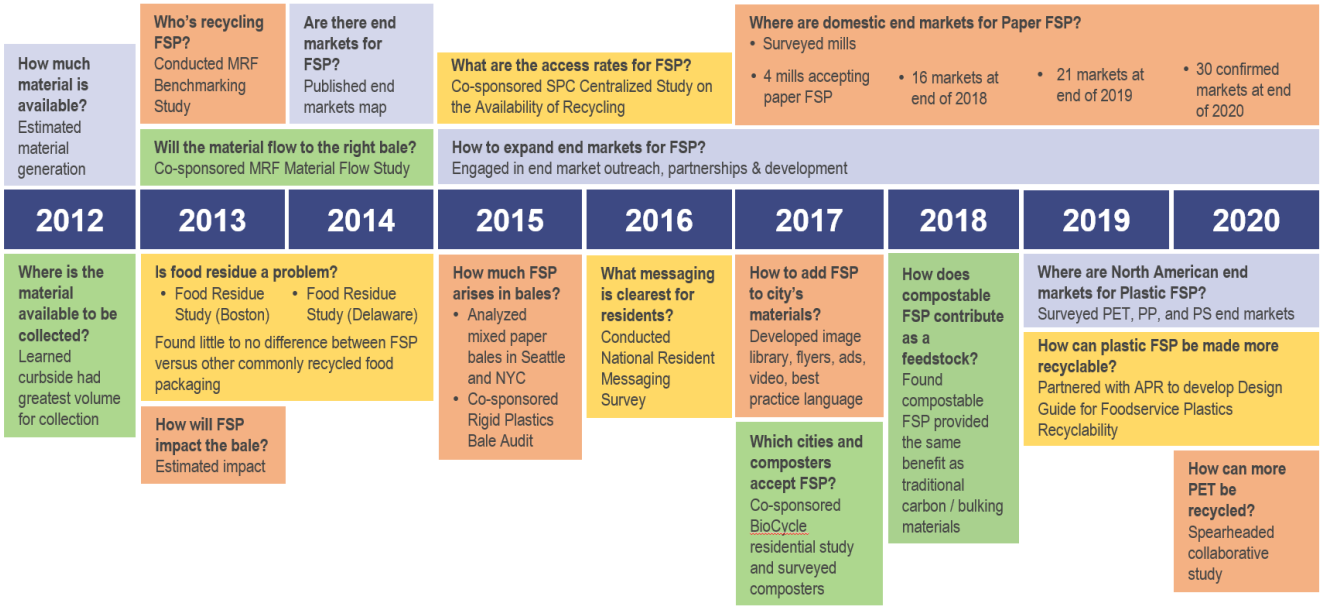
Fiber: Paper Cups and Paper Containers

This submission focuses on polycoated paper beverage cups. Most paper cups used in the US are made from solid bleached sulfate (SBS) white paperboard and are traditionally lined with polyethylene (PE). A very small percentage are lined with polylactic acid (PLA). Unless otherwise specified, the term "polycoat" cups refers to both PE and PLA-lined cups. Cups used for hot beverages have the polycoat layer only on the inside, whereas cups used for cold beverages have a second layer of coating on the outside to protect the integrity of the cup from condensation. Wax-coated cups no longer play a significant role in the paper cup market.

FPI Research

Since the inception of FPI's recovery efforts over ten years ago, FPI has been conducting research on recyclability of foodservice packaging in order to understand and overcome potential barriers to its recovery. This research has provided the foundation for FPI's successful Community Partnership program. Many of these studies have been collaborations with other industry stakeholders including the Association of Plastic Recyclers and the Sustainable Packaging Coalition, and since 2012, much of this research has been conducted with technical support from RRS and other technical experts including Cascadia Consulting, DSM, Stina (formerly More Recycling), and Moore and Associates. Below is an overview of these research efforts and the questions they were designed to address.

Overview of FPI's Foundational Research



Overviews of studies are available at www.recycleFSP.org

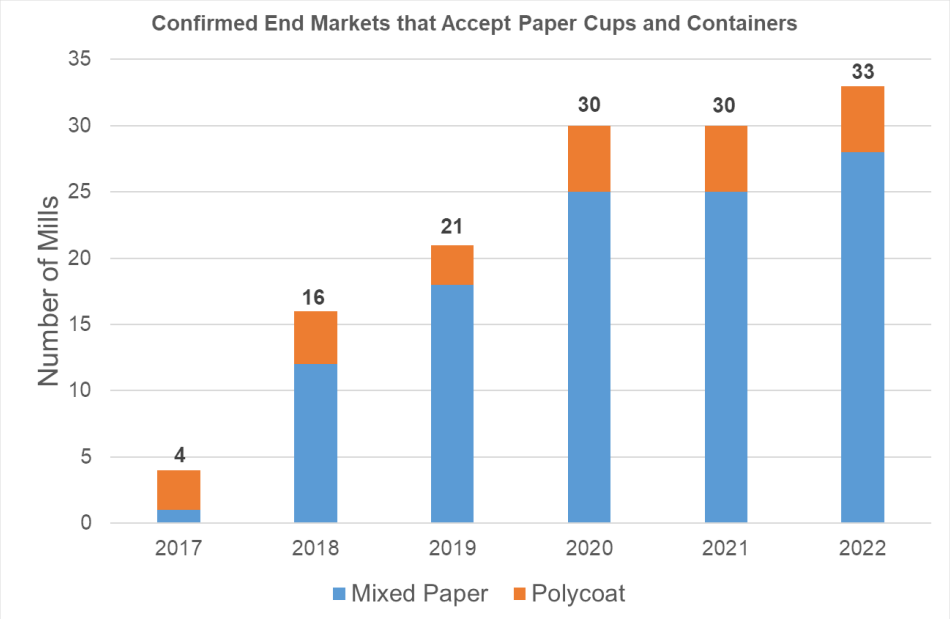
Studies of particular relevance for paper cups and containers are:

- Food Residue Studies
- MRF Flow Studies
- Mixed Paper Bale Audits

In addition, a recent white paper by Moore & Associates summarizes the landscape and developments related to recycling of paper cups.

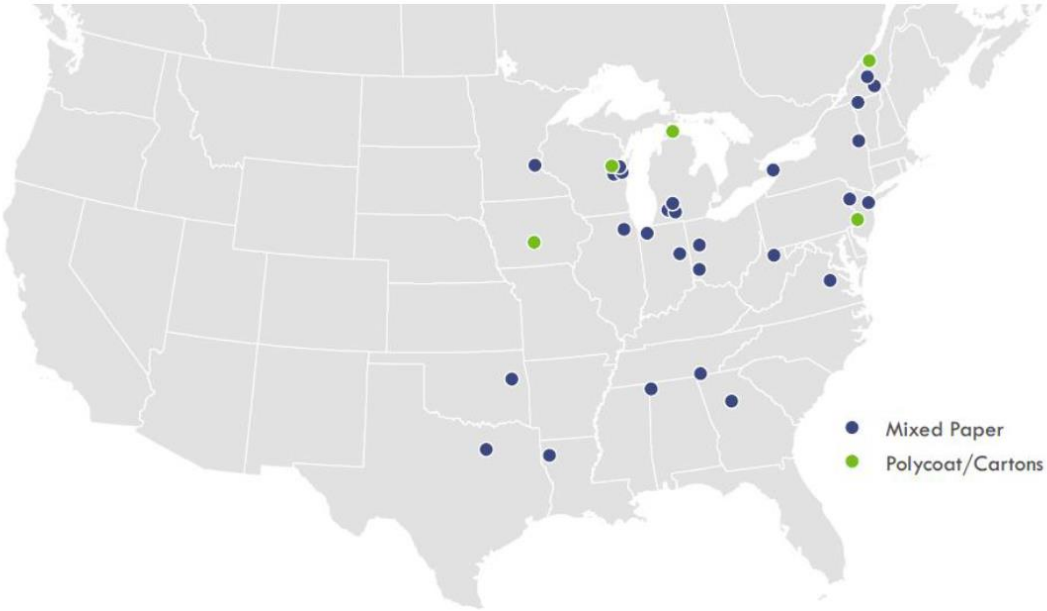
The Stability, Maturity, Accessibility and Viability of Responsible End Markets

The paperboard in paper cups contains long, strong fibers that are desired by mills. Traditionally, paper cups and other polycoated items have not been sought by recycled paper mills due to their coatings. However, fiber market trends such as the declining supply of recovered printing grades (e.g., sorted office paper) and the overall desire of the fiber industry to recover more fiber are driving growing interest in this material. Numerous companies have conducted trials of paper cups in their mills and begun to accept post-consumer paper cups as part of their furnish. The following table illustrates the change in end market acceptance over the last several years.



Growth in end markets for post-consumer paper cups, 2017-2022

As of March 2022, there are 33 confirmed end markets in the US and Canada that formally accept post-consumer polycoated (i.e. PE-coated or PLA-coated) paper cups. Of these, 28 accept cups in residential mixed paper. Another 5 end markets purchase polycoat bales consisting of cartons and cups. FPI maintains a list of end markets for cups (included as an appendix) and an interactive end markets map that are updated to reflect any changes.



End markets that accept paper cups. Source: https://www.recyclefsp.org/s/End-Markets-for-Paper-Cups.pdf

As of March 2022, this list includes the following end markets:

Mixed Paper Markets

The following mills purchase residential mixed paper bales containing paper cups. Some also accept other paper foodservice packaging.

Cascades, Ashland, VA (operational Q1 2023)
Cascades, Kingsey Falls, QC
Cascades, Niagara Falls, NY
Essity, Barton, AL
Essity, Menasha, WI
Essity, Middletown, OH
Essity, South Glens Falls, NY
Georgia-Pacific, Green Bay, WI
Georgia-Pacific, Muskogee, OK
Graphic Packaging International, Battle Creek, MI
Graphic Packaging International, East Angus, QC
Graphic Packaging International, Middletown, OH
Graphic Packaging International, Kalamazoo, MI
Green Bay Packaging, Green Bay, WI
ND Paper (sourcing via ACN), Fairmont, WV
Pratt, Conyers, GA
Pratt, Shreveport, LA
Pratt, Staten Island, NY
Pratt, Valparaiso, IN
Pratt, Wapakoneta, OH
WestRock, Aurora, IL
WestRock, Battle Creek, MI
WestRock, Chattanooga, TN
WestRock, Dallas, TX
WestRock, Eaton, IN
WestRock, Missisquoi, VT
WestRock, St. Paul, MN
WestRock, Stroudsburg, PA

Polycoat / Carton Markets

The following end markets purchase bales containing paper cups along with aseptic and gabletop cartons.

Continuus, Des Moines, IA
Continuus, Philadelphia, PA

Great Lakes Tissue, Cheboygan, MI
Sustana (Breakey Fiber), Levis, QC
Sustana (Fox River Fiber), DePere, WI

Notably, the 28 mixed paper mills that have formally confirmed their acceptance of paper cups represent over 75% of the US/Canadian mixed paper market by tonnage consumed. FPI facilitates a mill task force that is working to increase recovery of paper cups and paper foodservice packaging. The companies in that task force were joined by several other mill companies to release a joint mill statement of their cup acceptance and commitment to paper cup recycling. This statement is included as an appendix.

At this time, the landscape of mills that explicitly accept cups is concentrated on the eastern half of the US. This is in part a function of the overall distribution of paper mills in the US, which skews toward the east, and also a reflection of the global market dynamics which have long resulted in recovered materials from the western US flowing to overseas markets. While FPI's focus and priority has always been on strengthening North American end markets, some MRFs and brokers do send fiber bales with cups from the western states to Asian markets. Considerably less mixed paper is flowing offshore than it did a few years ago due to changes in China's policy, but a number of Asian markets do play a role in recovering mixed paper, and several South Korean mills consume polycoat/carton bales.

Today, there are mills that do not accept paper cups in their furnish. There is a need for more domestic/North American outlets for materials arising on the west coast and FPI continues to address this challenge and work on end market development. This work includes its mill task force, collaboration with AF&PA to develop information for mills, and direct engagement with mills to offer technical assistance and to facilitate mill trials for paper cups. FPI is particularly interested in increasing end markets in the western US and is in dialog with a paper mill in Washington regarding its acceptance of paper cups and other foodservice items.

The Anticipated Yield Loss for the Material During the Recycling Process

MRF Capture / Yield loss

In a 2015 MRF flow study co-sponsored by FPI (see appendix), approximately one-quarter of the paper cups flowed to the fiber line, and approximately three-quarters flowed to the container line. These numbers represent the average of results from five MRFs with very different configurations and represent a baseline, i.e., MRFs that were not optimized to capture paper cups.

Based on our work with MRFs, a common assumption is that paper cups that are flattened during collection will flow with fiber, while only round cups will flow to the container line.

FPI has conducted several more recent RFID tests, using both flattened and intact cups, to help MRFs understand where and how to best capture cups. These studies have shown that around 70% to 90% of 3-dimensional cups flow to the container line, and approximately 60% to 80% of flattened cups flow to the container line.

If the targeted bale is mixed paper, cups that enter the container line do not necessarily represent yield losses, as MRFs that accept paper cups will generally capture them from the container line using manual sortation or automated technology. If the targeted bale is a polycoat bale, the percentage of cups that flow to mixed paper do not necessarily represent yield losses, because they also can be recovered through that bale. The rate of successful capture to the target bale depends on a variety of factors including which bale is targeted, the MRF's 2D/3D screening system, the size and weight of the cup, and the use of manual or automated cup sortation. FPI does not yet have data on MRF capture/yield loss from MRFs that are actively targeting cups.

Mill Recovery / Yield Loss

Yield varies significantly according to a mill's technology and its furnish. Because this is proprietary, FPI does not have comprehensive data on cup yield. Based on information reported by several members of FPI's mill task force, yield from the cup is in the 70 to 90% range, depending on whether the cup has single- or double-sided coating and on the pulping system in use.

The Material's Compatibility with Existing (Oregon) Recycling Infrastructure

According to FPI research, most foodservice packaging is discarded at home or in the workplace. This means that residential curbside collection offers significant potential for capturing this material to achieve optimal diversion. Due to conditions spurred by the ongoing pandemic, takeout and delivery have likely prompted more opportunity for at home collection.

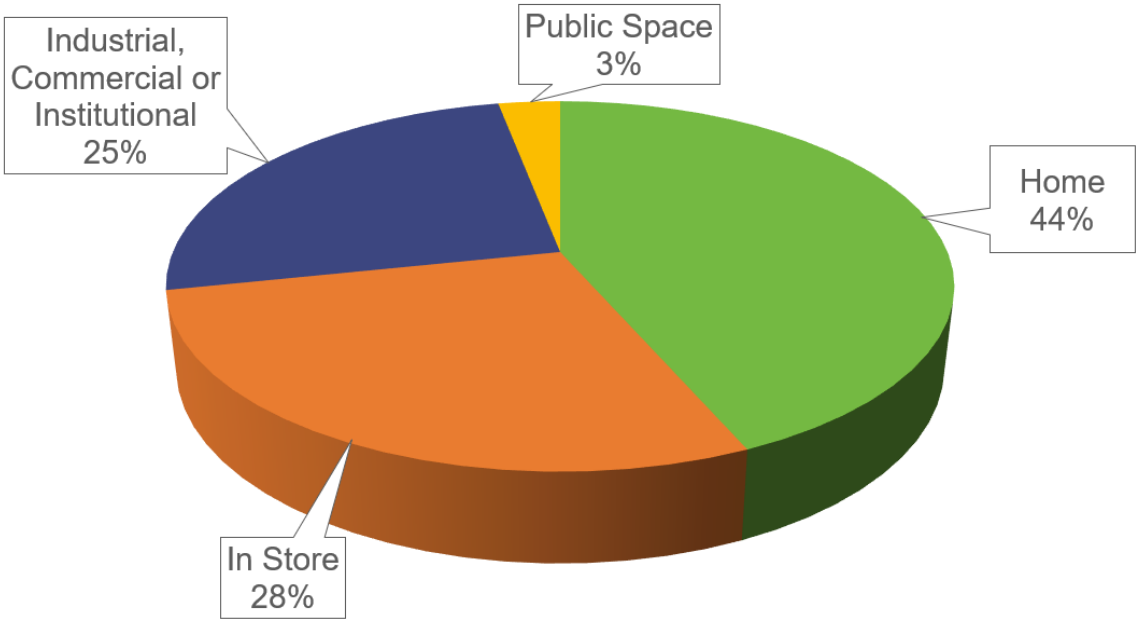


Chart showing breakdown of foodservice packaging by point of disposal

Paper cups are not yet generally accepted in Oregon's franchise agreements, but if they were accepted, residential education could be updated to reflect this. An FPI-sponsored study is currently underway which will provide more detailed insights into whether any Oregon communities accept paper cups in residential programs.

As FPI is aware of very few Oregon recycling programs accepting paper cups, we do not have information on how specific Oregon MRFs are handling cups they do receive but would expect that they are allowed to flow to mixed paper and/or residue.

The Amount of the Material Available

According to industry estimates, there are roughly 600,000 tons of paper cups produced annually in the US.

The US EPA does not track paper cups specifically but estimates that there are 2.84 billion pounds of paper cups and plates in the municipal waste stream (2018 EPA SMM Facts and Figures).

In the case of paper cups, sources suggest that as much as 70% leave the store/restaurant and at least half end up in the home, where they are available to be recycled in the residential stream.

The Practicalities of Sorting and Storing the Material

Recovering paper cups does not require sorting them to a new bale; they can be recovered through either of the two existing commodities, mixed paper or a polycoat bale consisting of cartons and cups.

MRFs who choose to include cups in mixed paper can allow the cups on the fiber line to flow to that bale and can redirect cups from the container line to the fiber line or to mixed paper. Based on bale audits conducted by FPI (see appendix), paper cups make up a very small percentage of the bale (less than 0.5% by weight). However, MRFs handle large volumes of mixed paper, so storage (and storage time) would not be a concern.

Similarly, MRFs who choose to sort cups into a polycoat bale can pick the cups from the container line and direct them to that bale. This positive sort can be a manual sort, however some MRFs are investing in automated solutions (i.e., optical or robotic sorters) that can recover cups along with cartons and other polycoated fiber. Cups can contribute a significant quantity of material to a carton/polycoat bale, making up around 10-25% of that bale by weight. This additional volume can be welcome as it allows the MRF to reach truckload quantities sooner.

FPI has an equipment grant and technical assistance program for MRFs who require additional equipment to process paper cups.

Contamination

FPI commissioned studies of food residue on foodservice and food-contact packaging in the residential recycling stream in 2013 and 2014. These studies found that the amount of residue in foodservice packaging was similar to any other type of food contact packaging and determined to be consistent with what markets are accepting. Cups are used to contain liquids, and generally, residual liquid drains out of the cup by the time it reaches the MRF.

The real-world experiences of communities and MRF accepting cups indicate that with good resident education, paper cups and other foodservice packaging can be added successfully while reducing overall contamination. The communities and MRFs that have participated in FPI's Community Partnership program have not reported any problems with quality or marketability of bales as a result of adding paper cups, and the foodservice items added via the partnerships remain in their programs.

The Ability for Waste Generators to Easily Identify and Properly Prepare the Material

Paper cups are easily identifiable by resident, and easy to describe and depict in program guidance due to their distinct shape, and the consistent use of the term "paper cup" to refer to them, both in the recycling industry and among the lay public.

The only preparation needed is to empty the cup and remove the lid or any other ancillary items.

FPI inventoried the messaging used in leading recycling programs, the terminology recommended by several industry groups, and conducted a resident messaging survey, that is specific to foodservice packaging in order to develop best practices. FPI employs these findings in every Community Partnership program and resident communications for program additions. These best practices include recommended terminology, effective graphics, and simple preparation instructions aimed at promoting recycling of clean and empty items and minimizing contamination (the resident education kit, including the study results, is available for download). The recommended graphics feature clean, empty cups, with no lids or straws attached. This messaging strategy has proven effective, and our partner communities have reported reductions in residue following the communications campaign.

Economic Factors

Recent years have seen dramatic changes in market pricing for mixed paper, as well as fundamental changes in the supply of sorted office paper (SOP) and other grades. As with any material, strong pricing helps to drive MRF investments in sortation. Mixed paper has averaged $55/ton over the last 6 months and is currently trading at around $40 - 45/ton in the Northwest (based on data from recyclingmarkets.net). Due to different pricing dynamics for mixed paper vs. polycoat bales, the fact that cups may be marketed in more than one grade can be

an advantage; FPI has observed that some MRFs seek to maintain operational flexibility to direct cups to the most economically advantageous bale.

Appendices

- Moore & Associates: White paper
- Multiple companies: Joint mill statement
- FPI and AF&PA: FAQ for Mills
- FPI: FSP in Mixed Paper Bales: Audit Results
- FPI: End market list
- RRS, Reclay StewardEdge, and Moore Recycling: MRF Flow Study
- FPI: Food Residue Study Overview
- FPI: Community Partnership Results Summary