

Recycling Infrastructure in Washington State

Material Recovery Facilities and Paper and
Plastic Reprocessors

June 30, 2021

This report was produced for King County through a grant from the Department of Ecology's Recycling Development Center by Cascadia Consulting Group and Herrera Environmental Consultants.



Table of Contents

Table of Contents.....	2
Introduction.....	4
Background.....	4
Approach and Data Sources.....	4
Research Limitations.....	6
Findings.....	7
MRFs.....	7
Plastic Processors.....	8
Paper Processors.....	8
Future Research and Development.....	9
Appendix 1 Contact list.....	11
Appendix 2 Additional Facility Identification Data.....	attached Excel spreadsheet

Introduction

Background

As King County pursues its Zero Waste of Resources goal, the lack of a comprehensive infrastructure analysis has posed a challenge for making informed planning decisions. On behalf of King County, the consultant team—primarily consisting of Cascadia Consulting Group (Cascadia) and Herrera Environmental Consultants (Herrera), with assistance from Resource Recycling Systems (RRS)—developed a foundational framework and initiated an infrastructure analysis for paper and plastic processing facilities in Washington State. For this project, “processing facilities” is defined as material recovery facilities (MRFs), consolidation points that bale and transfer materials, and secondary processing facilities for paper and plastic (e.g., plastics reclaimers, paper pulping operations).

The purpose of this research was to build a foundational dataset and visualization tool that can be expanded to additional materials or broader geographic scope in the future and, ultimately, enable better policy decisions for resource allocation to the recycling infrastructure system for paper and plastic and for community equity considerations.

This memorandum summarizes the team’s approach and data sources, findings, and future research recommendations.

Approach and Data Sources

The team first reviewed and compiled available data on processing facilities from existing sources and several recently completed studies, including several produced by project team members. Sources referenced include:

- Data and findings from a plastic packaging infrastructure study completed by Cascadia in 2020 for the Washington State Department of Ecology (Ecology), which included two specifically relevant reports:
 - 1) [Recycled Content Use in Washington: Assessing Demand, Barriers, and Opportunities](#) includes facility information and findings from interviews of regional plastic reproprocessors and plastic packaging manufacturers around demand, barriers, and opportunities.
 - 2) [Plastic Packaging in Washington: Assessing Use, Disposal, and Management](#) includes facility information for in-state MRFs and data on the generation quantities and current management pathways for plastic packaging in Washington State.

- Data and findings from a [MRF Assessment](#) conducted by Cascadia in 2019 for King County, which included additional facility information collected through interviews with select MRFs as well as characterization of processed recyclables.
- Data and findings from a [paper recycling market assessment](#) completed by Herrera for King County, which included interviews with select pulp and paper mills in Washington.
- Publicly available information provided by Ecology on pulp and paper mill facilities operating under [industrial facility permits](#).
- Data and findings from a [paper released by the Recycling Development Center](#) on recyclable paper.
- Information about scrap plastics processing facilities included in the publicly accessible [PlasticsMarkets.org online database](#) maintained by STINA.

The team also requested public records from the Washington State Department of Ecology for all mandatory data reported by MRFs, plastic processors, and paper processors. Cascadia cross-referenced the data shared by Ecology (representing data reported by facilities in 2018, the most recent year for which comprehensive records were available) to identify additional facilities that reported—or were reported as destination facilities by others—to receive significant quantities of paper and plastic materials generated in Washington. We also cross-referenced contact information to identify additional potential facility representatives to contact for interviews.

In addition, the team reached out to the American Forest & Paper Association (AF&PA) in an effort to ensure that the facility list was comprehensive and as current as possible.

Referencing pre-existing data, team and external expertise, and public records, the team developed a list of desired data points and associated database template that included facility details, information about incoming materials, market details, and demographics of facility leaders and employees. Cascadia and Herrera then initiated outreach to all identified in-state facilities. Outreach included a request for review and confirmation of any pre-existing data compiled on the facility as well as a request to schedule an interview with a facility representative to gather additional information.

As shown in Appendix 1, the team contacted 11 MRFs, 6 plastic processors, and 16 paper processors via email and calls requesting a phone or video interview. The team made at least three rounds of contact for all facilities on the finalized list. The team interviewed five facilities in total: two MRFs, no plastic processors, and three paper processors. See Appendix 1 for the full list of facilities.

Research Limitations

In the course of research, the team encountered barriers that precluded us from gathering all requested information for the database. These barriers included:

- **Condensed timeframe for data collection.** The timeline for review of available data and additional information gathering was limited to two months. This timeframe proved a challenge when considering the time required to compile pre-existing data, go through Ecology's public record request process, initiate contact with facilities, and attempt to schedule interviews to match facility representatives' availability.
- **Limited public and updated information.** The most recent records available from facility reports submitted to Ecology were for 2018. From the facilities we interviewed, we found that 2018 data was not consistent with the facilities' most updated tonnage and market data reports, as recycling tonnages and markets have shifted significantly in recent years.
- **Unwillingness to participate.** A majority of the facilities declined requests for interviews or were unresponsive/minimally responsive to multiple rounds of contact. Most facilities in Washington must also submit information through annual recycling reports to Ecology. As noted, however, data from the annual recycling reports are several years old, and some of the desired information identified for this database is not covered in the recycling reports or is requested but not reported by facilities. While the team made every effort to pre-populate the database with previously reported data where available, the team still had to rely on the facilities to confirm or report much of the information desired for this database. Facilities' unresponsiveness during this project therefore significantly limited data gathering.
- **Confidentiality concerns.** Confidentiality was one of the main reasons facilities declined interviews. Even those that did participate in the interviews were not willing to answer all the questions and were particularly unwilling to share inbound and outbound tonnage and market destination information.
- **COVID-19 impacts.** The operational changes for the facilities due to or during the pandemic have made data we already had or data that they provided us not necessarily a reliable reference when using it to make future policy decisions. Additionally, though not directly reported in interviews, we believe that nonresponsive facilities may have been challenged by pandemic-related impacts on employees and operations, and representatives may have had less capacity to respond to interview requests due to these circumstances.
- **Lack of demographic data collection.** Many of the facilities that we interviewed, for example, did not collect comprehensive demographic data on gender and/or race of facility or company leadership or staff, and no prior research efforts attempted to collect demographic information from facilities, so no pre-existing data were available.
- **Data uncertainty due to anticipated organizational changes.** Some facilities that were willing to provide demographic information about their board members explained that they were expecting leadership changes in the near future.

Findings

This section summarizes findings on facilities and material processing details as well as the barriers and opportunities identified for MRFs, plastic reprocessors, and paper reprocessors. We summarized findings from the interviews conducted. Due to the research limitations discussed in the previous section, our team supplemented missing information with findings from previous research efforts.

MRFs

We identified and contacted 11 MRFs in Washington State that process paper and/or plastic materials. Of these, we were able to complete interviews to confirm/update available data with two facilities. **Eight** of the facilities are in the **Puget Sound region** (six in King County, two in Pierce County), and three facilities are outside (one facility each in Clark, Spokane, or Whatcom counties).

Of the 11 MRFs on our list, **five facilities** received **inbound loads from single-stream collection** (including paper and plastic commingled with other materials) **which includes glass**, and **two facilities** received inbound loads from single-stream collection (including paper and plastic commingled with other materials) **with separate glass collection**. Two received inbound loads from multi-stream/source-separated streams (including source-separated paper and plastic materials). We were not able to find information on the remaining two facilities, which were both indicated to be primarily paper-only facilities serving the commercial sector exclusively. For a majority of the facilities, these loads were **mostly from the residential sector**. Three facilities — Seadrumar, International Paper, and Iron Mountain — received loads exclusively from the commercial sector.

Facilities varied widely in terms of geographic (county) source of inbound loads. For instance, some facilities received loads from various counties in all regions of Washington State, while others like Recology received materials exclusively from jurisdictions in King County. Appendix 1 provides more details on the loads received by each facility by county.

Facilities did not provide consistent data around how much of which specific materials are currently collected and sorted. Therefore, we are not able to confidently assess how much of which materials are captured in the existing system. We also found that there is **limited transparency around where materials, especially plastics, are sent after being processed into commodity bales**. As noted in the plastic packaging study, although recycling facilities in Washington are asked to report annually on the destination of materials handled (including the company name, city, state, and country to which each material type handled was delivered, as well as tons sent to each receiving facility within the past calendar year), many do not. Of all

plastic tons reported as collected from Washington generators and sent for reprocessing on recycling destination forms in 2018, only 16 percent of reported tons included destination facilities that are known plastics reprocessors or end users of recycled plastics, either in Washington or beyond. This data uncertainty is one of the main barriers to improving collection and processing in the current system.

Plastic Processors

The team identified and contacted six plastic processors in Washington but were not able to complete interviews with any facilities. Only a small number of facilities in Washington reprocess post-consumer plastics and few, if any, reprocess the types of scrap plastics produced by MRFs in the state. In Cascadia's interviews of in-state plastic manufacturers for the plastic packaging study, most manufacturers interviewed stated that they do not use recycled content. According to data reported to Ecology, most of the major known reprocessors are located out of state, and are assumed to supply recycled plastics mainly to manufacturers that are also out of state.

While there is very little information about end markets, it is clear that Washington is not benefitting from much of the plastic recycling activity occurring with plastic materials collected for recycling in the state.

One explanation for this is the mismatch between supply (the bale types that MRFs produce) and demand (the commodity types desired by in-state plastics manufacturers and reprocessed by in-state plastic reprocessors). In-state reprocessors, such as StyroRecycle, Pride Polymers, and Rainier Plastics, do not handle what the state's MRFs produce, which is primarily post-consumer bales of PET and HDPE bottles and mixed rigid plastics.

Cascadia and partner firms conducted a comprehensive assessment of the barriers and opportunities for improving the recycling system for plastic packaging in its final report submitted to Ecology in 2020. The full report, including a summary of barriers and opportunities, as well a list of recommendations for state action, can be found [here](#). Plastic reprocessing facilities that we interviewed for that study stated that contamination affects the quality of their products and impedes their ability to utilize scrap plastics as manufacturing feedstock.

Paper Processors

We identified and contacted 15 paper processors in Washington State and were able to complete interviews to confirm/update available data with three facilities.

There are multiple in-state paper processing facilities, several of which are significantly expanding or have recently expanded their processing and recycling capacity, and most of the

paper processors on the list purchase and use **post-consumer recycled fiber**. Ecology's 2021 recyclable paper study documents the materials collected and sorted in more detail.

Most facilities applied additional steps before using the fiber in their production processes; these additional steps included **cleaning, de-inking, screening, pulping, refining, and adjusting for size**. Many of them sourced their recycling fibers **from the Pacific Northwest region**, primarily in Washington, Oregon, and Idaho.

Paper processing facilities were more likely to predict that their use of recycled fibers will either increase or stay the same than they were to predict that their use will decrease. The facilities reported that factors that would help increase their use were upgrades to cleaning systems and screening equipment; access to overseas markets; and funding for the cost of upgraded capital. As documented in the 2021 Ecology study, other barriers to improve processing and the quality of recovered paper were contamination challenges and toxicity of recovered materials.

The 2021 Ecology study found that the end markets for recovered paper were shifting from foreign to domestic markets. Since 2018, exports to China, for instance, have decreased significantly, although it still remains the top export country for paper from Washington. In 2020, the top export countries for paper from Washington after China were Vietnam, Thailand, Taiwan, and South Korea. The shift from foreign to domestic markets can be explained primarily by import restrictions of recyclables imposed by China and other countries and by North Pacific Paper Company's (NORPAC) increased demand for mixed paper. The study also mentions that they expect the domestic demand for paper to continue to rise in the near future.

Based on destination data reported to Ecology, approximately 38 percent of recyclable paper collected in Washington and sent for recycling in 2018 was processed by in-state pulp and paper mills and other in-state end users. Another 13 percent was sent to other known paper processors located out of state. The majority of the balance, approximately 50 percent, is thought to have been brokered or directly exported. Given the recent dynamic market changes since then, it is expected that the portion of paper that is exported is now less. However, absent more recent data, we are not able to report on trends past 2018.

Ecology's 2021 study also includes information about barriers, opportunities, and recommendations to improve collection and processing in the current system.

Future Research and Development

The recycling infrastructure database and visualization tool developed for this project are a starting point for conducting a comprehensive infrastructure analysis. Because available data on facilities of interest were limited and most facilities did not respond to interview requests, many fields are incomplete. Additional efforts to gather information from listed facilities, especially in

the areas where existing data were limited—such as around the specific end markets of processed materials and the demographics of facility owners and employees—would be beneficial for developing a more complete understanding of the paper and plastics processing systems in Washington, and enabling use of the database and visualization tool to support market development efforts.

The recycling infrastructure database and map is also designed so that information about facilities that handle other recyclable materials—such as organics, glass, and metals—can be added in the future through additional research and data collection.

Ideally, in order to make the recycling infrastructure database and visualization tool most relevant and keep the information up-to-date, it should be integrated into ongoing recycling market development work through the Recycling Development Center and linked to existing data collection activities conducted by Ecology and the Department of Commerce. For example, the information compiled for the recycling infrastructure database could be aligned and coordinated with the annual facility reporting system—which collects much of the same information and could potentially be expanded to request additional details from specific facility types to support market development efforts—so that information gathered from facilities is streamlined and not duplicative or conflicting, and so that the database can be efficiently updated as new information is reported to Ecology.

Facilities could also be invited to submit updates to their own information or complete missing fields. The platform in which the database and visualization tool are based (ArcGIS) can be used to host a data submission form that feeds in—automatically or pending site administrator review and approval—to the database.

Appendix 1 Contact List

Facility	City	County	Interview Status
Material Recovery Facilities (MRFs)			
International Paper	Kent	King	No response
Iron Mountain	Tukwila	King	No response
NW Recycling	Bellingham	Whatcom	No response
Pioneer Recycling	Tacoma	Pierce	No response
Recology	Seattle	King	Conducted
Republic Services – 3rd & Lander	Seattle	King	Declined
Seadrunar	Seattle	King	Conducted
Waste Management – Cascade Recycling Center (CRC)	Woodinville	King	Declined
Waste Management – JMK Fibers	Tacoma	Pierce	No response
Waste Management – SmarT Center	Spokane	Spokane	No response
West Vancouver Material Recovery Center	Vancouver	Clark	No response
Plastics Processors			
Dart Container Corporation	Tumwater and Lacey	Thurston	No response
Flexible Foam Products	Longview	Cowlitz	No response
Full Container Recovery	Tacoma	Pierce	No response
Pride Polymers	Yakima	Yakima	No response
Rainier Plastics	Yakima	Yakima	Declined
Styro Recycle	Kent	King	No response
Paper Processors			
Caraustar Tacoma Paperboard	Tacoma	Pierce	No response
Georgia-Pacific Recycling	Camas	Clark	Declined
Inland Empire Paper Company	Millwood	Spokane	Conducted
International Paper	Kent	King	No response
Keyes Packaging Group	Wenatchee	Chelan	No response
McKinley Paper Company	Port Angeles	Clallam	No response
Michelsen Packaging	Wenatchee and Yakima	Chelan and Yakima	Conducted
Nippon Dynawave	Longview	Cowlitz	No response

Facility	City	County	Interview Status
North Pacific Paper Corporation (NORPAC)	Longview	Cowlitz	No response
Packaging Corporation of America	Walla Walla	Walla Walla	No response
Paper People	Vancouver	Clark	No response
Port Townsend Paper	Port Townsend	Jefferson	Conducted
Sonoco	Sumner	Pierce	No response
Westrock – Longview	Longview	Cowlitz	No response
Westrock – Tacoma	Tacoma	Pierce	No response