Optimizing Recycling in Washington State:

Local Government Contracting and Solid Waste System Mapping

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Glossary of Terms & Acronyms

- **Basemap**—Basemaps serve as a reference map on which you overlay data from layers and visualize geographic information.
- **Contamination**—Per RCW 70A.205.070(4)(b), contamination refers to material not included in a local jurisdiction's acceptance list. More broadly, this term refers to collected materials that risk negative environmental, financial, or health impacts during sorting.
- **CROP**—Contamination Reduction and Outreach Plan. These must be included in most local solid waste management plans per RCW 70A.205.045(10). A State CROP was published in September 2020.
- **DropBox (or drop-off recycling)**—Collection sites for residential and commercial recyclables where residents can drop off materials to be recycled, a possible alternative for communities not offering curbside collection.
- **Ecology**—The Washington State Department of Ecology.
- **Embedded**—Using revenues generated from garbage collection to decrease or eliminate the costs of recycling or organics collection.
- **Feature (GIS)**—A "feature" is a single entity in GIS that has both geometry and attribute data. Attribute data can be a single ID number or encompass other data about the feature.
- **Feedstock**—Raw materials used for manufacturing.
- **Hauler**—Private companies that specialize in the collection of solid waste.
- **MRF**—Materials recovery facilities, sometimes called materials reclamation facilities or materials recycling facilities, are plants that separate and prepare single-stream recycling materials to be sold to end-buyers.
- **MRF-shed**—Geographic area for communities sending material for recycling to the same MRF for processing.
- **Organics**—Biodegradable waste such as food scraps and yard waste.
- **Polygon (GIS)**—A polygon feature is a GIS object that stores its geographic representation (a series of X and Y coordinate pairs that enclose an area) as one of its properties (or fields) in a row in a database.
- **RCW**—Revised Code of Washington.
- **RFP**— Request for Proposal
- **SCAP**—Strategic Climate Action Plan.
- **SWD**—Solid Waste Division (or Solid Waste Management Division, SWMD).
- **SWMP**—Solid Waste Management Plan. Counties and municipalities must participate per RCW 70A.205.040.
- **Tipping Fee**—Fee paid to transfer stations or waste disposal facilities.
- **WUTC**—Washington State Utilities and Transportation Commission.
- **WDOH**—Washington State Department of Health.
- **WSDOT**—Washington State Department of Transportation.

Executive Summary

Project Statement

This project's purpose was to research and outline avenues for optimizing Washington State's recycling programs through solid waste system mapping and regulatory analysis. The research was conducted with the goal of finding opportunities to ensure that solid waste services across the state are provided in an efficient, coordinated, equitable, climate-friendly, and sustainable manner. At this time, there is limited statewide and regional visibility into how the solid waste system in Washington is currently functioning. This includes basic information on how jurisdictions contract for collection and other services, varying service types, levels, and costs, and where materials are taken for recycling or disposal.

Research Questions

This project began with the broad scope of bringing transparency to how the state recycling system operates and identifying opportunities to reduce contamination and thus improve efficiency as well as improve equitable access to solid waste services. This led to the following two primary research questions and their affiliated sub-questions:

What is the current state of Washington's recycling system?
- How are local recycling programs connected?
- Where is there overlap between haulers and facilities?
- Where are curbside recycling services accessible?

Where are the most compelling opportunities for local governments to achieve their sustainability and equity goals?
- What barriers exist and how can they be overcome?
- What policies can reduce recyclable contamination?

Key Themes & Background

Contamination reduction has always been a goal for efficient recycling, but it became an urgent priority in 2018 when China set a contamination threshold of 0.5% for imported materials. This is known as the "National Sword" policy, and it effectively made it impossible for haulers in the Pacific Northwest to sell collected materials to China. In response to National Sword, jurisdictions began designing Contamination Reduction and Outreach Plans, or CROPs, including one for King County. CROPs intend to improve the marketability and environmental benefits of recycling. The Washington State Department of Ecology (Ecology) also prepared a statewide CROP to assist local governments in preparing and implementing their local plans.

Second, our definition of **equity** involves working to ensure that everyone in the state has access to sustainable recycling services. Essential public facilities need to be distributed equitably and negative impacts should not unfairly burden any single community more than others.

Research Methods

Research began with a focused **literature review** using data sources provided to the project by Ecology. This is where the project identified contamination as a major barrier and equity as a key goal. Our sources also allowed us to examine contracts from various localities to compare rates and important provisions. Ecology also provided researchers with extensive **GIS data** on solid waste management jurisdictions, haulers, and the locations of Materials recovery facilities (MRFs) and compost facilities. The project's maps combine different layers and add new data including waste-sheds and demographics. This research informed the design of the project's interview protocol for **interviews with key stakeholders**.

Research Findings

From GIS Data:

- *Solid Waste Service Type Distribution*—Sixty-two % of Washington's solid waste jurisdictions are served directly by the UTC-franchised hauler. These jursidctions are concentrated predominantly in rural counties. Third-party contractors serve 28% of jurisdictions and are concentrated in the densely populated regions in King, Pierce, Snohomish, Benton, and Spokane counties.

- *Solid Waste Hauler Owners' Service Areas*—The top five individual hauler owners (by number of jurisdictions served) are Waste Connections, Waste Management, Republic Services, Darrick Dietrich, and Consolidated Disposal. They constitute 66.4% (255 of 384) of service provisions across the state. Small third-party owners account for 10.15% (39 of 384) of jurisdictions and municipalities account for 5.47% (21 of 384).

- *MRF Service Areas*—Washington State has seven MRFs that process commingled residential recycling. Of Washington's 39 counties, 74.3% (29 of 39) are served by at least one MRF, while ten have no access. Focusing on the counties that lack MRF service, 100% (10 of 10) are classified as rural, with 80% (8 of 10) concentrated in the eastern region of the state. The remaining 20% (2 of 10) of these counties are clustered in the state's southwest region. Regarding the population not served by MRFs, it is a small percentage of Washington residents, only 1.8% (143,062 of 7,707,047).

- *Curbside Recycling Access*—71.7% (28 of 39) counties have access to curbside recycling services while the remaining 28.3% (11 of 39) do not have access. 56.5% (217 of 384) of jurisdictions offer curbside recycling services while the remaining 43.5% (167 of 384) do not. 88.4% of the state's population currently has access to curbside recycling services.

From Contract Analysis:

- Of the ten sampled cities that contract for solid waste services, all provided curbside garbage, recycling, and organics collection. For residential customers, all ten cities offered at least 96-gallon recycling bins at no extra charge with Bellevue and Kirkland further offering organics collection. In all cases, the largest fee-based solid waste collection type was garbage collection.

- Auburn, Kirkland, North Bend, and Seattle are the four (of ten) sampled cities that offer rate reductions to their residents. These rate reductions are offered based on a resident being low income, disabled, or having senior citizen status.

From Key Informant Interviews:

- Interviewees identified the following list as the primary goals of their solid waste management programs: (1) customer service, (2) contamination reduction, (3) waste prevention, (4) equitable services, and (5) environmental consciousness.

- The key obstacles for solid waste management identified by interviewees are lack of personnel, cost efficiency, and access to quality data. Personnel training, standardized and uniform recyclables materials list, streamlined contracting provisions, improved outreach material and initiatives, and promoting information sharing were identified as opportunities for additional support from the state.

Recommendations

This project's recommendations provide several options for Ecology to support more efficient and equitable service statewide and for local jurisdictions to address their unique goals and barriers. Maintaining focus on the individual needs of local governments is a crucial consideration as most contracting and enforcement authority concentrates at the local level. Six core recommendations have been sorted into three distinct categories, each dealing with a specific theme. They are listed as follows:

Recommendations for **Standardization**:

- *Acceptable Materials List*
  Although different localities and jurisdictions face unique needs, our analysis of collected materials and contracts revealed significant overlaps and opportunities to mitigate contamination through the standardization of Acceptable Materials Lists. This action is projected to improve efficiency and transparency within the existing system and combat contamination by lowering levels of confusion among residential recyclers. A standardized list developed by Ecology could remain non-binding (to serve as an educational tool) and iterative so it can be adjusted as haulers report changes in commodity values and end-markets.

- *Educational Resources Dashboard*
  An Educational Resources Dashboard could be expanded and used for public distribution of items like a standardized acceptable materials list. Waste management professionals would also be able to access Solid Waste Management Plans, CROPs, and statewide survey data. This platform already exists but expanding its scope and sharing access with statewide partners would be an essential step toward streamlining the wider system and achieving benefits like reduced contamination rates and more efficient processing.

Recommendations for **Contracting**:

- *Informational Forums on Contracting*
  While the Planning and Waste Reduction Resource Library provides important information for city staff, navigating the information can be time consuming and difficult. This is particularly true given the complexity of the statewide solid waste management system. Ecology can work with recycling partners like the Washington State Recycling Association to facilitate regular educational forums for municipal solid waste management staff. These forums would allow for greater coordination between cities by improving the accessibility of essential information.

- *Best Practices & Information Sharing*
  Ecology should play a role in the development of best practice guidelines for solid waste contracting. This could include guidance on services cities can contract for and ways to improve education and outreach efforts. Materials can build off of insights and findings from solid waste contracting forums, further increasing opportunities to coordinate.

Recommendations for **Accessibility**:

- *Equitable Grantmaking Practices*
  The Local Solid Waste Financial Assistance grants program can be adjusted to distribute funding based on equitable access to recycling services across the counties with the most need (rather than the current system of equal shares between counties).

- *Expansion of Rate Relief Programs*
  Contract analysis and interview findings have revealed a general desire to improve the equitability of service provisions and inconsistencies in rate relief structures across solid waste contracts. As the plan reviewer, and through contracting support, Ecology has a unique opportunity to encourage widespread adoption of rate relief provisions.

Future Research

As this project's research limitations prevented consultants from comprehensively addressing the wider scope of its research questions, the following topics have been identified as opportunities for Ecology to expand further upon the research presented in this report.

- *Service Rate Analysis*—Ecology can conduct a study comparing service rates statewide, how and why they differ, and their impact on overburdened communities.

- *Quantitative Modeling*—Research can be furthered with quantitative modeling of waste disposal trends among Washington's counties and jurisdictions.

- *Environmental Policies*—Further research could be directed into the intersection of solid waste management and forward-thinking environmental policies.

- *Dynamic GIS Mapping*—The current map set serves as a static baseline, and Ecology can leverage the use of ArcGISOnline for more dynamic mapping that expands engagement.

Acknowledgments

Chapter 1: Project Description & Research Questions

Project Overview

Ecology's Solid Waste Management (SWM) Program works to ensure that solid waste services in the state are provided in an efficient, coordinated, equitable, climate-friendly, and sustainable manner that protects public health and the environment. Because the statewide system is highly fragmented and lacking in transparency, Ecology's understanding of how it currently functions is somewhat limited.

This lack of transparency makes it more challenging for Ecology to determine system performance and to measure progress toward achieving its goals. For example, the fragmented nature of the system leads to higher levels of recycling contamination by causing confusion among residents regarding which materials should be recycled, composted, or sent to landfills. This hampers the efficiency of the entire recycling system by preventing recyclable materials from being processed due to contamination. Additionally, Ecology's limited understanding of the statewide system inhibits the ability of local governments to identify and pursue regionally focused solutions, implement the most effective policies for contamination reduction, and increase equitable access to solid waste management services. This is made more complicated by the state's fragmented regulatory system for solid waste haulers and the differences in service provision types between neighboring localities.

Washington's solid waste services were put under further pressure in 2018 when China introduced its *National Sword* policy, which effectively halted the export of plastics and other recyclable and solid waste materials from haulers in the Pacific Northwest. As a result, Washington needed new mechanisms for managing municipal solid waste and recyclables. In response to this policy change, in 2019 the Washington State Legislature passed House Bill 1543, creating the Recycling Development Center and requiring Ecology to develop a statewide Contamination Reduction and Outreach Plan (CROP). The State CROP was published in September 2020 and included guidance for local governments to develop similar plans.

Addressing climate change and promoting environmental justice are critical issues that Ecology is pursuing through the implementation of the State Solid and Hazardous Waste Management Plan, the State CROP, the HEAL Act, and other related initiatives. Ecology's solid waste management program can address these issues by pursuing policies that minimize waste generation, promote material reuse, and responsibly manage solid waste throughout the state.

Optimizing local recycling systems aligns with Ecology's goals for reducing the amount of solid waste sent to landfills while opening opportunities for public education and mitigating the regional impacts of climate change.

Ecology Objectives

As part of Ecology's implementation of the statewide CROP, this project was commissioned through a partnership with the Evans School of Public Policy and is designed to expand transparency into how the state's solid waste system functions. This includes a clear definition of the regulatory, policy, and contracting options available to local jurisdictions, the identification of service types and their costs, as well as where materials are taken for disposal, recycling, or composting. By expanding Ecology's understanding of the current system, this report is intended to foster regional and cross-jurisdictional planning to lower costs, reduce contamination, and ensure the management of materials in an environmentally and socially responsible manner.

Research Questions
This project's central research questions and their affiliate sub-questions are outlined below:

Primary Question 1
What is the current reality of Washington's solid waste and recycling system?

Secondary Questions
   a. How are local solid waste and recycling programs and services connected to the larger solid waste management system in Washington state and the Pacific Northwest?
   b. Where is there overlap across communities between haulers, Material Recovery Facilities (MRFs), composting facilities, and disposal sites?

Primary Question 2
Where are the most compelling opportunities for local governments to achieve their sustainability and equity goals?

Secondary Questions
   a. What are some barriers facing these opportunities and how can they be overcome?
   b. What policies significantly reduce the degree of material contamination?
   c. What policies or service providers offer the most equitable service access?

It should be noted that most compelling opportunities is a metric dependent on a municipality's specific circumstances. Given that contracting authority is local, this project seeks to provide a flexible range of policy and regulatory options for implementation.

Like the "best options" metric, "equitable access" is primarily defined at the municipal level. For this report, this term focuses on access to curbside recycling services while "equity" will be used more generally. The breadth of definitions for equity is discussed in more detail in **Chapter 2** (Literature Review Summary).

Additional Research Questions

The process of reviewing and analyzing literature helped our team identify gaps in available information. Listed below, these gaps are outlined in the form of more granular research questions that will guide further research efforts and help inform this report's findings and recommendations.

- Why do some jurisdictions directly provide services or contracts to third parties while others defer to UTC franchises?
- Where does mandatory garbage collection occur? Why is garbage collection not mandatory in other regions?
- What are some best practices for contamination reduction that specific cities can use based on their unique needs?
- What are some best practices for equitable access that specific cities can use based on their unique needs?
- Do specific contractors offer more equitable service options than others?
- Which contracting options provide the most equitable access to solid waste management—specifically curbside recycling—services?
- What are the geographic parameters of the recyclable- and MRF-sheds?

Research Methods

In coordination with our partners at Ecology, this project used the following methods to collect and analyze data to inform this report. Together, they served as a roadmap for answering the project's core research questions.

Literature Review of Existing Research

Most this report's literature review consisted of identifying and summarizing insights from jurisdictional data, statewide policies, and county-level planning documents provided by Ecology. This information included reports from third-party organizations, such as Zero Waste Washington, and other state agencies. This review provided insight into contracting processes, jurisdictional waste management plans, and existing or proposed legislation.

Expert Stakeholder Interviews

Otherwise referred to as key informant interviews, Ecology provided a selected sampling of professional contacts in solid waste management as an initial list of interview candidates for this report. The project team created an interview protocol to elicit insights into current practices and barriers to reducing contamination rates and promoting equitable access to services.

Statewide GIS Mapping Data

Ecology provided that most data sources used for mapping with supplementary data from the Washington Department of Health (DOH), the Washington Utilities and Transportation Commission (WUTC), and the Washington Department of Transportation (WSDOT) collected by the consulting team. The primary purpose of the mapping is to visualize and analyze statewide solid waste services. The maps supplement the data analysis in this report and provide an easily accessible visualization of important aspects of the statewide system, including access to curbside services, tipping fees, hauler types, and service areas, as well as where materials are taken for disposal, recycling, and composting.

Research Limitations

This section overviews broad limitations constraining the findings of this report. A detailed explanation of limitations specific to interviews and GIS mapping is outlined in **Chapter 3**.

Data Limitations

This report is limited by the availability of data on population counts and jurisdictional borders in unincorporated areas. Incorporated cities have accurate population data available, but unincorporated areas lack reliable population counts. While there is population data available on each census tract, these tracts are often split between multiple solid waste jurisdictions. As a result, this report estimates unincorporated populations based on subtracting the population of incorporated areas from the county's total population and dividing this remainder by the number of unincorporated jurisdictions in the county.

Project Scope & Timeline

This project took place over a six-month period, limiting the availability of municipal and regional stakeholders for interviews and the amount of data that could be collected and analyzed to inform this report's recommendations. This limitation is addressed in-part by the additional research questions outlined above and our recommendations for future research in

Focus on Residential Solid Waste

The project focuses on residential solid waste management practices as there is limited available data on commercial sources. If recycling or organics collection is offered to commercial customers, many opt to sell their waste to firms that specialize in commercial waste. Companies such as Cedar Grove and Seadrunar Recycling process waste outside of the standard collection systems and can do so regardless of the certificated or contracted hauler in the region. Along with this, commercial waste has a lower contamination rate relative to residential recycling (Peter et al., 2020).

Focus on King County

This report focuses largely on King County as a case study for solid waste management policies, and the interviews conducted for this report provide a comprehensive representation of policies exclusively within this jurisdiction. While interviews included rural and urban communities, King County is one of the wealthiest and most densely populated counties in the state. As such, only limited recommendations can be drawn from King County's example, as many counties across Washington State do not have comparable fiscal resources or population density.

Remaining Report Summary

Chapter 2 offers a summary of key findings and insights from the literature review process. The literature review examined existing municipal solid waste management and recycling contracts, third-party and government-produced reports on solid waste services access, and datasets on service provision and contamination levels.

Chapter 3 identifies and explains the research methodologies used in this report: GIS Mapping, stakeholder interviews, and analysis of solid waste contracts and municipal solid waste plans.

- *GIS Mapping*—This method provided maps generated in ArcGIS Pro that show Washington's solid waste management jurisdictions and their affiliated haulers. Additionally, these maps show compost and MRF facility locations and which jurisdictions have access to these services. These maps provide the basis for spatial analysis of the statewide system and for identifying disparities across service access.

- *Stakeholder Interviews*—Key stakeholders were identified and interviewed to examine the relative benefits of contracting options and to garner insights on professional experiences within the solid waste management system. A qualitative analysis based on interview coding was conducted to analyze interview results.

- *Contract and Solid Waste Plan Analysis*—Contracts from select municipalities were analyzed for common themes including rationale for the type of service provision, types of services provided, service rates, and contamination reduction policies.

Chapter 4 provides a detailed analysis of the information gathered during the literature review and interview process as well as insights from GIS mapping. This analysis used qualitative and quantitative data to examine the overall system (for example, where service gaps exist and where SWM resources are concentrated) through the lenses of contamination and equity.

Chapter 5 provides the consulting team's recommendations for a range of policies that Ecology can leverage to help local governments reduce recycling contamination and improve equitable access to services. These recommendations are intended to be processed and developed by Ecology at the state level and dispersed to jurisdictions across the state.

Chapter 2: Literature Review Summary

This literature review explores existing research on the solid waste management system in Washington State. Researchers reviewed material on contracting processes, jurisdictional waste management plans, and existing or proposed legislation at the state and local levels. This review helped the project outline the impacts of excessive contamination and barriers to equitable service access statewide.

Included in this chapter is an overview of the state's recycling program and an exploration of how authority is dispersed throughout the state. Also included is our team's summation of the current state of Washington's solid waste management systems, research on relevant legislation and policies, and a rundown of notable practices for reducing contamination and expanding equitable access statewide.

As stated in **Chapter 1**, this project addresses a series of challenges facing recycling services across the State of Washington. Primarily, there is a lack of understanding across regions on how recyclable materials are processed statewide. Cities and counties are often unaware of service and contracting decisions in neighboring jurisdictions, and best practices for contracting are not highly visible. This has led to variations in how solid waste is contracted and regulated, making it difficult for the state to identify the best path toward its waste reduction goals.

Due to significant shifts in the global market for exported waste materials, the need for reliable domestic processing infrastructure has never been more urgent. The King County Responsible Recycling Task Force offers examples of how contracting structures can address issues with sustainable processing and contamination reduction. Contracts between local governments and private haulers can be used to prioritize domestic sorting over export markets (Responsible Recycling Task Force, 2019). Prioritizing domestic recycling can help develop domestic recycling capacity and reduce overall emissions. Local sorting also makes monitoring and verification of end markets more feasible (Responsible Recycling Task Force, 2019).

Additionally, solid waste contracts help develop domestic markets by reducing contamination at the source. Outreach programs can help improve residential waste disposal practices and cart tagging can prevent the collection of contaminated materials. Reduced contamination improves the economic feasibility of recycling by lowering the costs associated with removing non- recyclable materials.

Policy Background

Recycling rates in the United States have increased dramatically since 1960. The charts below show the proportion of solid waste materials that have become qualified recyclables. Notable

increases in this proportion occur between 1990 and 2005. Meanwhile, landfill waste has decreased nationally from 94% of solid waste generated in 1960 to about 50% in 2018. The portion of solid waste that is recyclable increased from 10% in 1985 to 35% in 2017 (EPA).

Fig.1: National Municipal Solid Waste by Type 1960-2018
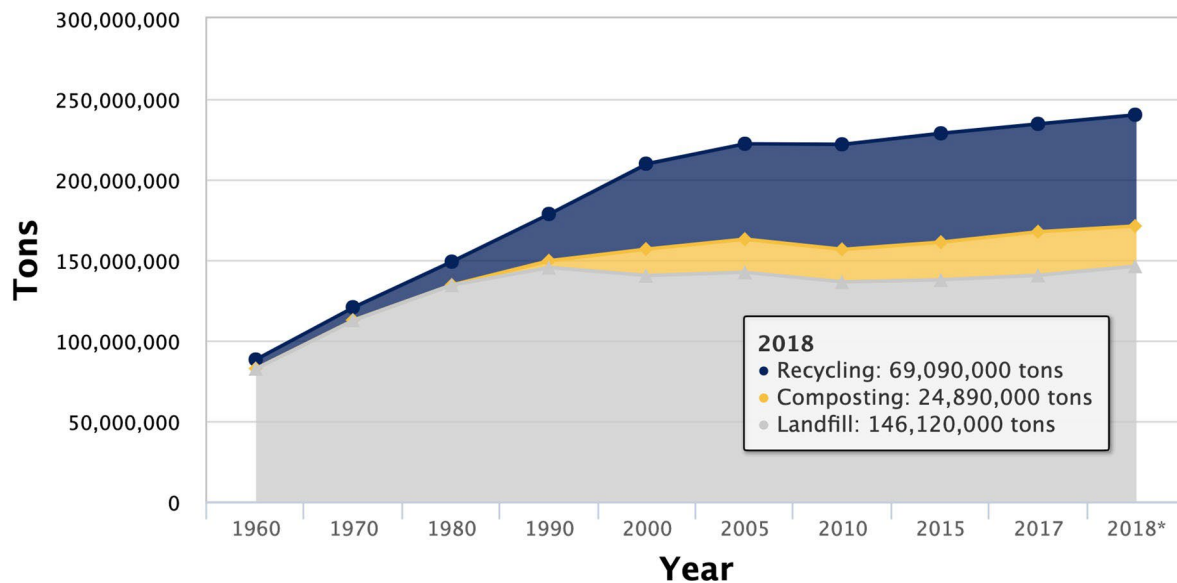
Fig.2: National Municipal Recycling by Material 1960-2018
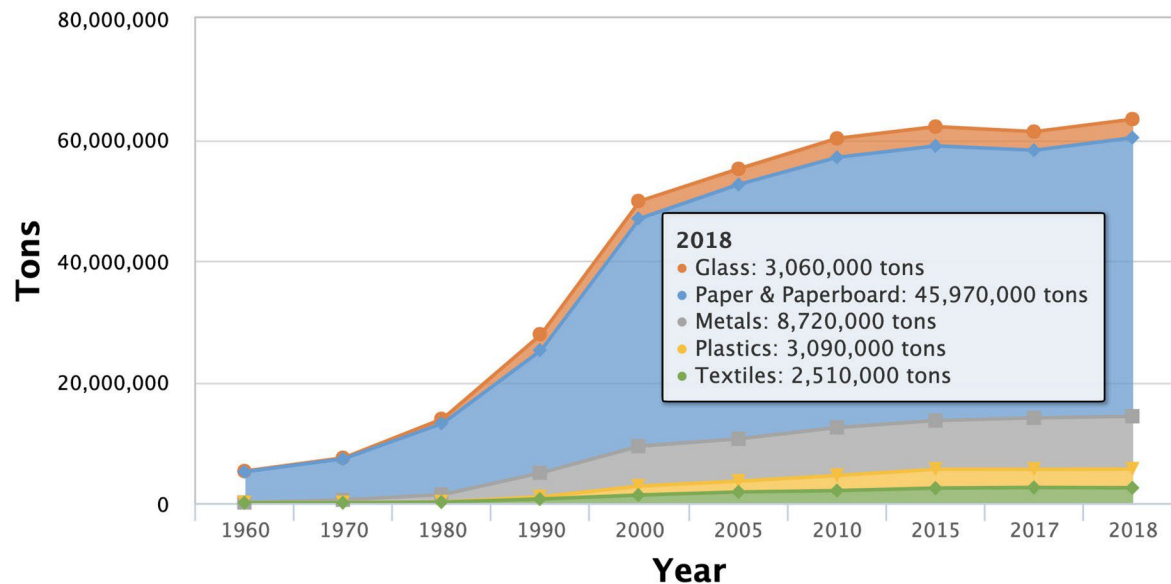
Along with increased amounts of recycled materials in the United States came an increased need to have them processed. As of 2018, China was the world's largest importer of recycling, and its processing infrastructure had developed heavily after over 20 years of accepting materials from other countries (Upadhyaya, 2019).

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In 2016, China imported 45 million tons of plastic and paper, or roughly half of all exported plastic and paper in the world. Of that amount, the United States contributed 16 million tons, or 36% of all Chinese imported materials. This represents roughly half of all American exports of paper and plastic in 2016 (Mosbergen, 2018).

"National Sword" in China

Excessive contamination of recyclables exported to China led to the implementation of the *National Sword* policy in 2018. This policy set strict contamination standards for recyclable material imports to China that could not be met by most exporters in developed nations. The policy was enacted after the previous year's announcement during the National Sword customs contamination enforcement action (to which the ban is sometimes erroneously referred). Both the ban and National Sword are placeholder terms to describe the outsized economic impact of this large export market disruption (estimated to be one-fifth of all commodities markets).

With the United States lacking a national recycling strategy, American cities and states have turned to alternative recyclable importers and domestic markets. Consequently, local recycling infrastructure has grown in response to the changing market and many MRFs have invested in more efficient sorting and cleaning machines (Mars, 2019). Locally, many Washington jurisdictions began developing contamination reduction strategies for their recyclable materials.

In King County, a Responsible Recycling Communications Consortium was formed in 2018 to standardize regional messaging and communications with the public. The core theme from the Consortium focused on emphasizing that public recycling efforts were "still environmentally valuable" and that materials need to be empty, clean, and dry. Priority items were listed as paper, cardboard, plastic and glass bottles, and metal cans. This ultimately led to the formation of several Contamination Reduction and Outreach Plans (or CROPs) throughout Washington State, including a 2021 version specific to King County.

Contamination Reduction & Outreach Plans (CROPs)

CROPs intend to improve the uniformity, marketability, and environmental benefits of recyclable material streams. Ecology prepared a State CROP to assist local governments in preparing and implementing their local CROPs.

Previous research identified municipal contracts with solid waste haulers as an area for significant progress in reducing contamination rates (Heubach, 2019). Municipal contracts ultimately determine which services are provided and which residents have access to them.

At the direction of the state legislature in 2019, Ecology collaborated with stakeholders to create a Washington State CROP. This plan encourages cooperation and develops guidance on best practices for reducing contamination in the recycling process. Ultimately, CROPs are designed to reduce material contamination collected from residential, dropbox, and commercial recycling programs through ongoing engagement with local cities, haulers, and other stakeholders.

In September 2020, Ecology released a statewide action plan for contamination reduction and outreach. Outlined below are the plan's four main components:

1. **Align and harmonize statewide recycling programs**
   a. Support the *Recycling Steering Committee* and *Recycling Development Center*
   b. Promote a statewide list of acceptable recycling materials
   c. Support community use of recycling data to inform local materials lists
   d. Expand statewide contamination reduction campaigns like *Recycle Right*

2. **Support regional solid waste planning and joint contracting services**
   a. Use MRF-shed maps and other resources to identify collaboration opportunities
   b. Convene regional meetings to promote joint planning
   c. Share MRF contracting information to promote local contamination reduction

3. **Collect and distribute data on recycling system performance**
   a. Gather contamination data and other key metrics
   b. Develop and maintain an accessible statewide database

4. **Pursue legislative, funding, and policy solutions**
   a. Advocate for increased state and federal funding for local government programs
   b. Foster new and existing public-private partnerships to reduce contamination
   c. Evaluate targeted legislative opportunities, possibly:
      i. Extending producer responsibility for end-of-life material management
      ii. Ban or restrict problematic products or packaging
      iii. Policies to increase demand for recycled feedstocks
      iv. Right-to-repair legislation to reduce overall waste generation

In July 2021, CROPs became a required component of Solid Waste Management Plans (SWMPs) for counties with a population of more than 25,000 residents and for cities with independent waste management plans as per the Revised Code of Washington (RCW) 70.A205.

CROPs typically include actionable steps for developing customized implementation plans and serve as guides for stakeholders in the local recyclable materials processing ecosystem. This may include information on local landfills, materials and strategies for outreach and education, and information on private material haulers.

The King County CROP, for example, is specifically focused on reducing material waste, promoting a circular economy, and mitigating the impacts of climate change by diverting materials with economic value from reaching landfills.

Federal Policy

While there are no federal recycling policies, the EPA has supported recycling initiatives through non-binding agreements and grants (Schultz & Kristen Hildreth, 2020). In April 2022, the EPA's Northwest regional office (Region 10) presented an overview of a national recycling strategy to the Ecology-led *Recycling Coordinators' Meeting*. Using federal funding, the new strategy (released in 2021) focuses on the following five core objectives:

1. Improving markets for recyclable materials
2. Improving materials management infrastructure
3. Reducing contamination
4. Supporting circularity through enhanced policies and programs
5. Increasing data collection and standardizing measurements

The EPA also recommends expanding outreach and education efforts to reduce contamination in the waste stream. The agency notes the importance of common messaging for outreach materials to prevent confusion on recycling best practices.

Statewide Service Provisions & Contracting

Washington state solid waste services are provided through either one or a combination of the following methods:

1. Through certified waste haulers determined by franchise areas that are regulated by the Washington UTC
2. Cities directly contracting with solid waste haulers
3. Municipal or tribal solid waste hauling

While most jurisdictions provide solid waste services using only one method, 6% provide service through a combination of provider types (Huarnez, 2019).

UTC Franchises

In the 1960s, Washington State divided itself into 46 solid waste franchise areas and awarded them to individual solid waste haulers. These franchises grant the hauler exclusive rights to provide solid waste services in each area unless a city specifically contracts with a hauler or directly provides its own services within its jurisdiction. For unincorporated areas, the franchise hauler is the only solid waste option available unless the county chooses to contract with another private entity (Huarnez, 2019).

The services offered in a franchise area—including frequent curbside pickups, service fees, and curbside composting and recycling collection services—are outlined in a county solid waste management plan. Services may vary between separate franchises despite the UTC managing implementation and regulation in both franchise areas.

Rates set by the UTC remain as close to at-cost as possible while still allowing the solid waste hauler to earn a profit determined by the UTC. Rates set for garbage, recycling, and organic waste collection must all be independently self-sufficient, preventing the ability to use funds collected from garbage fees to reduce costs of recycling or organics collection (Cost Assessment Guidelines, 2019). Per RCW 81.77.185, Haulers are able to use half of the revenue generated by the sale of recyclable materials as long as the funds are used for educational outreach.

Solid Waste Contracting

Nearly one-in-three jurisdictions in Washington choose to contract with private haulers rather than receive services through the UTC (Huarnez, 2019). Cities can choose to contract with any hauler regardless of the franchise holder in the area. Contracts can stipulate payments to the city and give greater control over customer service quality, service offerings, and joint development of related outreach. Cities can also contract for additional services such as waste disposal at city events and litter clean-up. Generally, contracts offer cities greater control over hauler activities without the capital costs required to provide solid waste services directly.

A chart featuring statistics on the frequencies of each of these service types statewide can be found in **Figure 11** in **Section 4.1**.

Under the Washington State Interlocal Cooperation Act (Ch. 39.34 RCW) municipalities can jointly contract with another agency, but this option is rarely used (MRSC Solid Waste Collection, Recycling, and Disposal, n.d.). Under UTC regulation, recycling and garbage

collection must support itself through rates and fees. By contracting, cities can increase monthly rates on garbage collection to decrease rates on recycling and organic waste. In many cases, cities charge a single fee covering the cost of all waste collection.

City-run solid waste hauling is the least common form of solid waste management in the state. Only 26 municipalities operate a municipal solid waste hauling program, and of those, only 10 offer curbside recycling. Enumclaw is the only city in King County that offers municipal curbside recycling collection service (Huarnez, 2019).

Material Recovery Facilities

A material recovery facility (MRF) collects, compacts, repackages, sorts, or processes solid waste for the purpose of recycling. Regions that send their waste to be processed at a common MRF are considered part of a respective MRF-shed. MRF-sheds face potential impacts from vertical integration as a company that owns a waste hauler and an MRF has an economic incentive to prioritize its own facilities.

There are seven MRFs across Washington State processing commingled residential recycling, four of which are concentrated in King County. These facilities serve as processing and consolidation points where materials are sorted and sent to secondary processing facilities such as plastic reclaimers or paper-pulping firms.

Contamination Reduction

As shown in **Figure 3** below, King County is responsible for processing over 43% of all curbside residential recycling material statewide. This is an outsized share, as King County residents only comprise 29% of the state's population, but it should be noted that a county-wide recycling rate of 54% is one of the highest in the nation (King County CROP, 2021). Therefore, this literature review focused specifically on King County Solid Waste Management Division materials addressing both contamination and equity.
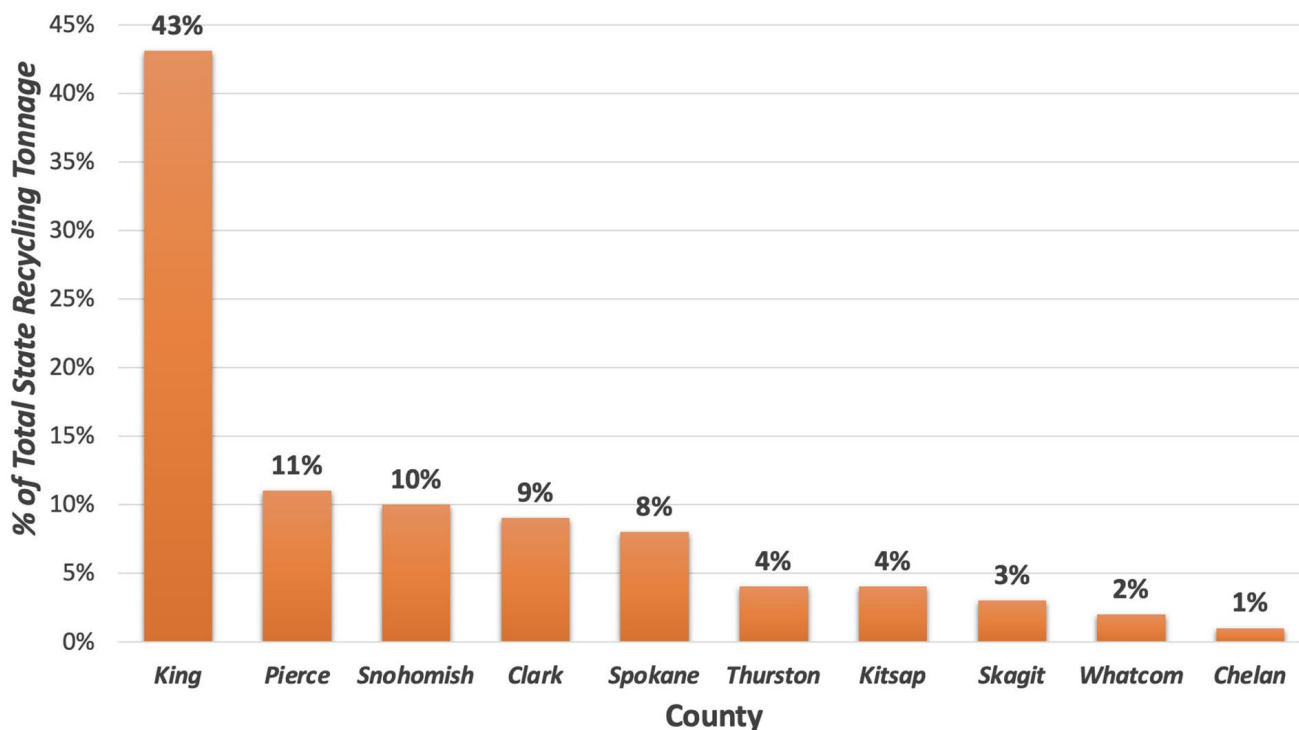
Fig.3: 2019 Curbside Recycling by County, Statewide

King County prioritized solid waste contamination as a means of achieving "Zero Waste of resources by the year 2030." En route to this goal, King County aims to reach its interim goal of recycling 70% of solid waste through waste prevention strategies, including education and outreach. Based on 2015 data, only 62% of King County solid waste was designated "readily recyclable," while 8% presented "limited recyclability." The remaining 30% was not recyclable at all (King County CROP, 2021).

Reaching the goal of 70% recyclability within this decade will require a focus on ensuring that the approximately 8% of solid waste with limited recyclability can become more readily recyclable. King County believes this can be achieved through the promotion of efficient collection and processing systems that minimize contamination and maximize diversion from landfill disposal (King County CROP, 2021).

King County has taken steps toward prioritizing collection consistency between smaller jurisdictions in the region with the goal of reducing contamination and expanding channels of communication and data collection. To this end, the county's solid waste division sends an annual questionnaire to residential recycling service providers to collect information on the impacts of various recycled materials (see Figure 4).

Fig.4: King County Residential Recycling Service Questionnaire

Questionnaire Outline: King County Acceptable Materials List	
Recipients	• Waste Management, Republic, Recology, Cedar Grove
Materials	• Cardboard, plastic jugs, glass, plastic film, etc.
Parameters	• Are these materials considered contaminants? • Are these materials creating processing issues? • Are there issues with market viability for these materials?

Using feedback garnered from this process, King County developed an iterative list of acceptable materials for recyclable processing. Based on this list, **Figure 5** (below) shows that the most common contaminants from residential recycling were non-recyclable paper, non-recyclable plastics, non-recyclable glass, and contaminants.

Fig.5: King County Residential Recycling by Material, 2019
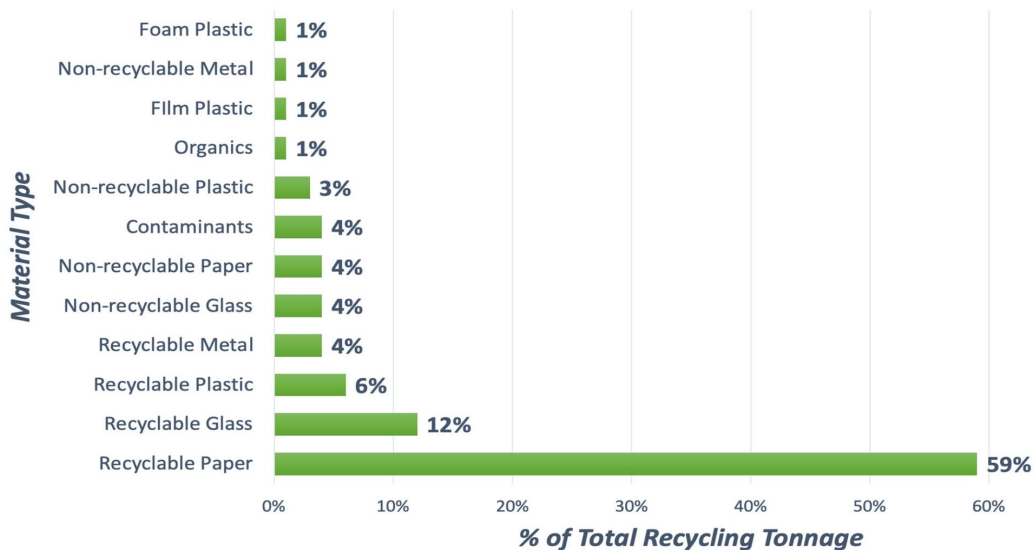
This process also led to the exclusion of both plastic bags and plastic film from residential recycling collection. A study from Seattle Public Utilities (SPU) in 2018 revealed that "plastic bags and film have emerged as the most costly and pervasive problem items at MRFs." Reports from service providers explained that plastic film causes processing lines to be shut down for up to an hour multiple times each day while MRF workers remove these contaminants manually.

Private providers estimate that 20-30% of recycling center labor is used to correct these interruptions. This is especially important considering that plastic bags and plastic film are lighter than most other incoming materials, accounting for only 0.2% of daily material by weight, or about one bale per day (King County CROP, 2021).

The King County CROP highlights that residential recycling contamination can be mitigated through outreach and education by addressing the following challenges:

5. Public confusion about what materials are recyclable, in large part due to the varying accepted materials between solid waste service areas.
6. A culture of "wishful recycling" where residents feel guilty about placing recyclable materials in the trash, leading them to place materials in their recycling bin as their "default." This contributes to contamination as much of this "wishfully recycled" material is non-recyclable.
7. Assumptions by the public that food-soiled or contaminated materials are cleaned at processing plants (and that there is no need to clean and dry materials at home).
8. Materials falsely labeled as recyclable by manufacturers when they are incompatible with local recycling systems.
9. Local collection methods that contribute to increased contamination (for example, cart lids left open by residents), or automated collection systems that do not allow haulers to check for contamination or disperse educational materials.

In response to these challenges, the King County Responsible Recycling Task Force was formed in 2018. This task force produced a report the following year to address these challenges and China's new recyclable material import policies. This considerable shift in the recyclable materials market led the Task Force to develop the following key recommendations for King County recycling moving forward:

1. A comprehensive statewide stewardship policy approach is the most important action needed for a successful long-term recycling program.
2. Focusing on developing domestic recyclables processing infrastructure would

build system resilience, create local jobs, and minimize greenhouse gas emissions.

3. Contamination from consumer confusion could be reduced significantly if all regions adopted consistent messaging about acceptable materials and practices.

4. Focusing on increasing demand for recyclable materials with domestic end markets through procurement ordinances and partnerships with local companies.

5. Policies should be developed to ensure that waste materials are clean and suitable for processing before being delivered domestically or internationally.

6. Manufacturers' package design should encourage recyclability and changes in product design could improve recovery rates.

Because successful recycling in King County (along with most jurisdictions) is hampered by high levels of contamination caused by wet or food-soiled items, King County embarked on a *Recycle Right* public awareness campaign in 2019 using materials from the Ecology-led campaign of the same name. This campaign used imagery such as that shown in **Figure 6** (below) to motivate behavioral changes by explaining how and why recyclables need to be clean, dry, and empty.

Fig.6: King County Educational Campaign Ad, 2019
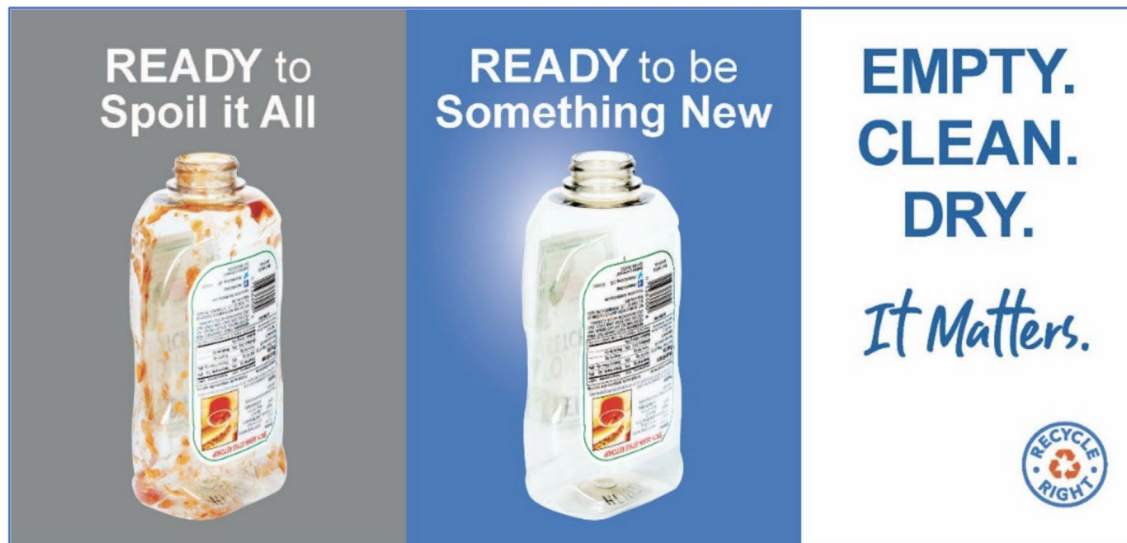
This campaign was followed by a collection of social media comments, which revealed potential objections and concerns from the public about their relationship with the recycling process. Comments were aggregated and sorted into the following general categories:

● Concern about the amount of water wasted while cleaning containers.
● Belief that recycled items generally end up in landfill facilities anyway.
● "It's not my job" or "It's too much work" to clean the items.
● Misconceptions that the recycling process includes comprehensive cleaning processes.
● Belief that the recycling industry or processors should clean items because they profit from the materials while residents must pay for recycling services.

King County Solid Waste Code

Solid Waste Code 10.18 applies to unincorporated areas in King County, but the county's Solid Waste Division also assumes that code provisions apply to cities served by the UTC. The following subjects—pertaining to contamination reduction and equitable access—are outlined in the code as follows:

Contamination Mitigation

- Unmarketable materials must be disposed of at the county-owned Cedar Hills regional landfill (**10.18.010.E.6**)
- As collection and processing technologies change, haulers may need to collect additional materials to those listed in (**10.18.010.E.7**)
- Local or domestic end-markets for recycled materials should be prioritized for the purposes of processing, handling, or remanufacturing materials (**10.18.010.E.5**)

Equitable Access

- Rates for elderly and low-income program participants can be made lower through discounts as permitted by the Washington UTC (**10.18.020.A.10**)
- Waste Management tariffs state that customers with documented disabilities under the ADA will not be charged for carry-out services (Item 80). Note that this provision does not apply to Republic, Inc. tariffs.
- Haulers must report to the county SWD on a quarterly basis on participation in recyclable materials collection programs (**10.18.060, A**)

Equity & Environmental Justice

The 2021 HEAL Act (Healthy Environment for All) was the first law in Washington to create a coordinated state agency approach to environmental justice. This legislation defines environmental justice in the following way:

> "The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, rules, and policies. Environmental justice includes addressing disproportionate environmental health impacts in all laws, rules, and policies by prioritizing vulnerable populations and overburdened communities, the equitable distribution of resources and benefits, and eliminating harm."
>
> —Environmental Justice, Washington State Department of Health

The following state agencies are bound to the HEAL Act: Ecology, Health, Agriculture, Commerce, Natural Resources, and Transportation. The HEAL Act builds on and implements several key recommendations from these agencies about their experience with performing environmental justice assessments when making decisions that impact overburdened communities. This law also established the Environmental Justice Council to coordinate equitable environmental action for the seven agencies bound to the law.

In the scope of Ecology's jurisdiction and the focus of this report, equity refers most specifically to universal access to curbside recycling services. This definition can be expanded, however, to include aspects of environmental justice and climate resilience and mitigation.

Each jurisdiction has its own priorities and needs regarding equity, and thus this report provides a range of options for promoting equitable access to recycling services. Of the several Solid Waste Management Plans examined for this literature review, equity was only mentioned frequently in the 2019-2024 King County Solid Waste Management Plan (SWMP). The county acknowledges that principally, equity in this realm relates to a fair distribution of transfer facilities, services at these facilities, and resources like educational materials. When designating locations for new transfer facilities, the King County Solid Waste Division commits to engaging with communities to ensure equal opportunity for involvement in the decision-making process.

King County Solid Waste currently uses demographic data to ensure that public facilities are distributed equitably throughout the county and that negative environmental or public health impacts caused by the facilities do not disproportionately burden any single community.

Because educational campaigns are critical to reducing recycling contamination in King County, the Solid Waste Division prioritizes the availability of outreach materials in relevant languages and culturally compatible mediums. For example, rather than directly translating materials into Spanish, Solid Waste representatives in King County have worked with members of Spanish-speaking communities to develop new programs specific to their needs—a process the Division refers to as *transcreation*.

Environmental Justice Outcomes

Efforts to address and combat the impacts of climate change have implications for equitable policy outcomes. In King County, the 2019-2024 Solid Waste Management Plan addresses both environmental justice and climate change. The plan acknowledges that proper solid waste management plays a significant role in reducing regional greenhouse gas (GHG) emissions, through efficient collection methods and an increased emphasis on domestic processing. The

King County Sustainability Report from 2011 documents that GHG emissions from county operations (i.e., sources other than mass transit) have stabilized and even begun to decline.

This momentum incentivizes more ambitious county-level emissions targets. These goals are led by a commitment to reduce countywide GHG emissions by 80% below 2007 levels by the year 2050. The King County Solid Waste Division aims to reach carbon neutrality by the year 2025 to meet this commitment. King County separates its emissions actions into three primary strategies outlined in the county's Strategic Climate Action Plan (SCAP). The county's plan focuses on reducing GHG emissions, supporting sustainable and resilient frontline communities, and preparing for climate change. **Figure 7** (below) provides examples of these strategies.

Fig.7: King County Primary Climate Strategies

Primary Climate Action Strategies (King County Solid Waste SCAP)	
Mitigation	• Reduced fuel and vehicle use, use of hybrid vehicles and alternative fuels, promoting waste prevention and recycling
Adaptation	• Modifying facilities and procedures, use of drought-tolerant plants on-site at facilities, identifying alternative routes to avoid potential delays from flooding
Sequestration	• Removing CO2 from the atmosphere and depositing it into natural "carbon sinks," planting more trees around existing facilities, using compost to replenish depleted soils

Mitigation strategies, such as those listed above, are the strategies that most tangibly and directly affect the work of regional haulers. For example, the promotion of waste prevention and recycling would reduce demand for the extraction of natural resources and emissions from both manufacturing and processing activities. **Chapter 3** of this report explains the project's research methodology in greater depth and demonstrates our research team's plan for filling the information gaps listed above.

Chapter 3: Research Methodology

The following chapter provides an overview of the design and methodology behind the research findings presented throughout this report. To facilitate our initial research method, Ecology provided the team with a list of primary resources featuring quantitative data, solid waste management plans, solid waste contracts between cities and haulers, and access to current and proposed state-level legislation.

Method One, Literature Review

As our initial method of research, our team conducted an in-depth literature review to develop familiarity with Ecology's work and the state of recycling programs statewide (see **Chapter 2**). This allowed the team to research and analyze the policy tools available to local governments for the regulation, collection, and processing of solid waste. This fragmented and multi-layered ecosystem of regulatory and contracting options varies significantly between jurisdictions.

Sources

Ecology provided research materials in several forms, including raw data on numerous existing contracts from solid waste management jurisdictions throughout the state. This data served as the foundation for the analysis described in Method 3 (**Section 3.3**). Additionally, Ecology provided the consulting team with access to resources such as the State CROP and King County's Responsible Recycling Task Force reports. Finally, the project reviewed current local solid waste and hazardous waste plans (including King County).

Method Two, Key Informant Interviews

To better gather evidence of existing conditions, key informant interviews were conducted with 11 solid waste management subject matter experts.

Candidate Sampling & Selection

The following metrics were used to identify key informant interview candidates for the purposes of this report:

- End Service Provider—The candidate pool was narrowed based on which hauler provided services in the area (e.g., Waste Management, Republic, or Recology).
- Solid Waste Management Service Provision—Another metric was based on how services were provided in the identified jurisdictions: contracting with a solid waste hauler, unincorporated UTC franchises, or city-provided services.
- Size—Geographic area and city population were categorized as small, moderate, and large. These two metrics were used to further narrow the pool of candidates.

- Contracting—Cities that contract for different scopes of service (e.g., for collection services and bill collection versus contracting for services alone).

To gain a more high-level insight into how solid waste management programs operate, key informant interviewees were also selected from outside of King County. These were subject matter experts who represented Washington UTC, private contracting consultants, the City of Olympia, and the King County Solid Waste Management Division.

Fig.8: Final Key Informant Selection

Jurisdiction or Organization	Owner Hauler	2021 Population (US Census Bureau)
Federal Way	Waste Management	99,037
Snoqualmie	Waste Management	13,810
Seattle	Recology, Waste Management	733,919
Covington	Republic Services	20,787
Auburn	Waste Management	85,699
Olympia	*Public*	55,919
Spokane	*Public*	229,071
Kent	Republic Services	134,835
King County	-	-
UTC	-	-

Protocol Design & Interview Questions

This project's interview protocol was designed in collaboration with our partners at Ecology. The protocol was based on key literature review findings and tailored to address this project's core research questions. Overall, the protocol included questions about the following topics:

1. General questions—This section gauged how the interviewee's current role aligns with the solid waste management field, and an overview of the solid waste management system of their specific jurisdiction.

2. Barriers and Opportunities—This section gauged the barriers that jurisdiction faces in providing solid waste management services, and how the identified barriers could be overcome with assistance from Ecology.

3. Contracting—Jurisdictions that provide solid waste services through private third-party contracting were asked questions about their choices and relevant experiences.

4. Referrals—In this section, key informants were asked to refer potential interviewees who may fit the criteria stated above to assist with increasing our interviewee candidate pool.

A sample of the project's interview protocol can be found on the following page.

Sample Interview Protocol

> **DISCLAIMER**—A summary of interview transcripts were provided to Ecology to become part of the public record. Names and identifying details were not shared. Quotations used in the report were shared with interviewees for review. Quotations do not include names but may reference jurisdictions. Researchers retained access to audio recordings for the purposes of collaboration. Audio recordings were discarded at the project's conclusion.

General Questions
1. Please briefly tell us about your role and how it relates to solid waste management.
2. What are three primary goals for your recycling and waste reduction programs?

Service Provision
3. What method of service provision did you choose and why?
4. How does your service provision help you achieve your solid waste management goals?
5. What are the advantages and disadvantages of your adopted method of service provision?

→ **If contracting**:
   A. How would you modify the contract to better achieve your program goals?
   B. What are the biggest barriers to achieving your primary contract management goals?
   C. What specific barriers would make it difficult to align your contract, or enter into a joint contract, with other jurisdictions?
   D. What ideas do you have about how to overcome these barriers?
   E. Who else is involved in contract negotiation, enforcement, or amendments? What are their roles in each of these processes?
   F. What are the biggest risks and benefits of contracting for solid waste services?

Barriers
6. What are the biggest barriers to achieving your overall solid waste program goals?
7. What ideas do you have for how to overcome these barriers?
8. In your opinion, how would you address these barriers?
9. What additional resources would be valuable to support your solid waste-related work?
10. What kind of external support from ecology or other partners would be most helpful?

Referrals
11. Is there anyone else you think we should speak with? Other people in your organization? Other cities or jurisdictions?
12. Is there anything we didn't cover that you would like to share?

Key Informant Interview Analysis

Once the interview process was completed, interviews were coded with an inductively made coding book, to provide key overarching themes which are discussed in detail in **Chapter 4**. This codebook was made by identifying key themes from the interview protocol (see **Figure 9** below). These themes were identified as the frequently mentioned items by the candidates during the interviews. Insights from these interviews allowed the team to capture discrepancies between existing data and solid waste management strategies in practice.

Fig.9: Codebook for Informant Interview Analysis

Code Name	Code Definition
Solid Waste Management Goals	
Providing exemplary customer service (+)	Solid waste program strives to provide better services to its customers.
Provision of efficient services (+)	Solid waste services are designed to be provided efficiently and effectively
Provision of equitable services (+)	Solid waste services are provided to individuals/families at discounted rates who are differently abled, marginalized communities, elderly individuals etc.
Contamination reduction (+)	Solid waste program strives to incorporate contamination reduction in the process.
Waste prevention (+)	Reduction of waste in solid waste gathering and processes.
Environmental Concerns (+)	Solid waste program incorporates environmental concerns in its processes.

Contracting Services: Reasons	
Takes the pressure off the city	Contracting out service provision helps free city resources.
Precedented practice	The city/jurisdiction has provided services through contracting for a long period of time and hence the practice continues.
Lack of resources	The city/jurisdiction does not have adequate resources to provide services as a municipality.
Barriers	
Lack of dedicated staff	The solid waste program does not have full time employees dedicated to running the program.
Quality of Data	Poor or better quality of data provided self-reported data vs. data which can be tracked
Data availability	Whether or not data is readily available to the program
Expensive to provide services	Costly to provide solid waste management services.
Opportunities	
Uniform recyclable list	A recyclable list which can be used by everyone i.e., numbers and symbols all mean the same to everyone.

Staff training	Providing training to new employees to better manage solid waste service provision.
Literature for contamination reduction	Literature centered around best practices to reduce contamination reduction.
Better outreach services	Improvement in outreach services to customers.
Partnering with neighboring jurisdictions	Willingness to partner with other jurisdictions.
Information sharing	Willing to share information regarding contracts with jurisdictions.
Provisions for contract management	Streamlining the RFP process and contracting process.
Granular Data	Avenues to provide distinct data to help understand the solid waste service provision better.
Diversity, Inclusion and Equity work (DIE)	Incorporating DIE efforts in service provision.

Method Three, GIS Dataset Mapping

The data used for the generation of GIS maps was provided by Ecology in the form of a spreadsheet created by Zero Waste Washington and its associated report on the state of residential recycling and organics collection in Washington (Díaz-Huarnez, 2019). This data source provided the names of all 384 solid waste management jurisdictions, their access to solid waste services (garbage, compost, and recycling collection, access to curbside recycling), the type of service provider (UTC, contract, municipal/tribal), as well as the name of the hauler serving each jurisdiction. Additional data was provided by Ecology on the location of compost facilities, the location and service areas of MRFs, and county tipping fee structures.

Apart from the data provided by Ecology, geospatial information for counties and municipalities was provided by the State of Washington's *Open Data* platform and the Washington Department of Transportation (WSDOT), respectively. Finally, information was collected from the Washington State Department of Health (DOH) on the urban/rural designation of each county and from Washington Demographics to identify each county's population.

Map-building protocol

Using the datasets provided by Ecology and collected from third-party sources, the consulting team constructed multiple statewide maps using ArcGIS Pro software. ArcGIS Pro is the desktop geographic information software application from ESRI. It allows users to explore, visualize, and analyze data through mapping and geospatial analysis tools. All maps are presented and explained in detail in **Chapter 4**.

The first map is a **Basemap** in which each of the 384 solid waste management jurisdictions is displayed. This required the layering of county geospatial information with WDOT geospatial data on the state's incorporated municipalities. The consultants then manually added polygons to this map to display jurisdictions that are not incorporated municipalities. A polygon is a GIS object that stores its coordinates as one of its properties in the database associated with the map. These jurisdictions include unincorporated county land, tribal lands, and cities with multiple solid waste jurisdictions within their boundaries.

The **Hauler-Type Map** displays the type of service provider for each jurisdiction. This map was created by using the Basemap and attaching information to each jurisdiction on the type of service provider that served their county. Each of the provider types was designated a color to represent them on the final map. Another hauler map depicts the haulers for each solid waste jurisdiction. This map was built in the same manner as the **Service Provider Type Map** with the exception that the information attached to the Basemap is the jurisdiction's solid waste hauler (rather than the provider type). Each hauler was assigned a unique color to display the haulers for each jurisdiction visually.

The **MRF Map** created shows the location of the MRFs in Washington that process residential commingled recycling. This map also shows the counties that are served by each MRF. Unlike the earlier maps, this one does not display jurisdiction-level information but instead county-level data. To create this map, the consulting team started with a basic map of Washington counties provided by the state's open data platform. The consultants then uploaded coordinate information for each facility to place its location on each map. Finally, the team attached information to each county that identified what MRFs served their jurisdictions.

Similarly, the **Compost Facilities Map** displays the location of compost facilities and is based on

the basic map of county boundaries. Then the consultants added coordinate data for each facility to display its location in each county. The **Tipping Fee Map** displays tipping fee data and is based on the basic county boundary map (like the MRF Map and Compost Facilities Map).

Instead of adding coordinate information for facilities, tipping fee information for each county was directly attached to county map features. The fee levels were then sorted into five color- coded categories to display which counties charged within a high- or low-fee range.

Contract Analysis

To develop a diverse sample of municipal solid waste contracts, cities were selected for contract analysis based on several factors. This included their selected solid waste hauler, urban and rural classifications, city population, and per-capita income. The final non-random sample included 10 cities in King County and 11 solid waste contracts.

Seattle was the only sampled city with two identical solid waste contracts, one with Waste Management and one with Recology, Inc. Waste Connections was the only hauler operating in King County that was not included in the contract sampling. This hauler operates exclusively on Vashon Island, limiting the applicability of findings to other regions. The final sample included five contracts with Waste Management, three with Republic, Inc., and three with Recology. For a complete list of contract samples, see **Figure 10** below.

Fig.10: Contract Sampling Pool

City	Hauler	Population (2020)	Per-capita Income (2016-2020)
King County	Multiple	2,269,675	$55,374
Bellevue	Republic Services	151,854	$71,633
Federal Way	Waste Management	101,030	$32,788
Kirkland	Waste Management	92,175	$64,268
Maple Valley	Recology Cleanscapes	28,013	$43,234
Seattle (a)	Waste Management	737,015	$63,610
Seattle (b)	Recology Cleanscapes	737,015	$63,610
North Bend	Republic Services	7,731	$51,763
Snoqualmie	Waste Management	14,121	$59,174
Shoreline	Recology Cleanscapes	58,437	$46,184
Covington	Republic Services	20,777	$41,927
Auburn	Waste Management	87,256	$35,288

Once the sample contracts were identified, they were reviewed with a focus on contamination reduction, outreach and resident communication, data reporting, enforcement provisions, and equity considerations. Since most of the reviewed contracts were implemented prior to CROPs that were developed in 2019, cities may have implemented contamination reduction strategies that were not captured in the contract review.

Limitations

- Literature Review—The primary constraint of the literature review was the limited time span for this project in the face of a considerably wide project scope. While Ecology provided the consultants with most data resources, the consulting team was unable to comprehensively review the majority of CROP or Solid Waste Management Plans statewide. Ultimately, this constraint led to a more specific focus on King County.

- Key Informant Interviews—The limited scope of this project limited the consultants' ability to interview a broader variety of subject matter experts, instead focusing our efforts on King County. Furthermore, not every interviewee was well versed in the subject matter, which caused a burden on time to gain more interviewees to better inform the existent reality of that particular jurisdiction. Moreover, since the total interviews conducted were 11, it makes quantifying and generalizing the data difficult.

- GIS Dataset Mapping—The generation of GIS maps was limited by the availability of geospatial data. Currently, there are no maps that specifically delineate the location of unincorporated solid waste jurisdictions. Therefore, consultants had to estimate when manually adding in polygons to represent these jurisdictions. The information for these jurisdictions is unclear as to the exact location of their borders, making it challenging to accurately determine each jurisdiction's scope of authority. This lack of geospatial data also inhibited the consulting team's ability to estimate populations for each jurisdiction. While there is accurate data for each incorporated municipality and each county, there is no clear information for unincorporated jurisdictions.

- Census tracts do not neatly fit into each jurisdiction, forcing the consultants to create an estimate by subtracting the incorporated jurisdictions' populations from the total county population and then dividing the remainder by the number of unincorporated jurisdictions in the county. Additionally, ArcGIS mapping software is split into two parts - ArcGIS Desktop Pro and ArcGIS Online. ArcGIS Desktop Pro offers more tools of in-depth analysis but can only produce static maps. ArcGIS Online has fewer analysis tools but creates dynamic, public-facing maps that individuals can interact with. The consultants only had access to ArcGIS Desktop Pro, limiting them to creating only static maps.

- Contract Analysis—Because the selected contracts were identified through a non-random process, findings are not applicable to contracts outside of King County. King County is also the most densely populated county in the state, meaning it has more cities that are large enough to benefit from contracting with a solid waste hauler. King County also has more MRFs than any other county, making recycling collection more feasible.

Chapter 4: Findings, Analysis, Alternatives, and Trade-offs

This analysis identifies, contextualizes, and explains the current state of Washington's solid waste management system through quantitative and qualitative lenses. After establishing this foundation, this analysis identifies and analyzes jurisdictional policies that mitigate recycling contamination and increase equitable access to solid waste services.

This is done primarily through a case study of various municipalities in King County—the most populous county in Washington—that includes rural and urban communities for comparison.
This analysis draws upon data from Zero Waste Washington and Ecology, regional and municipal solid waste plans, service provision contracts, and key informant interviews with solid waste management officials.

Overview of Current Statewide Solid Waste and Recycling Services

This section provides an analysis of several features of Washington's solid waste services, including waste collection system types and solid waste hauler types and service areas.

Waste Collection System Types

Figure 11 (below) shows the number and percentage of solid waste management jurisdictions that operate each type of solid waste collection system.

Fig.11: Frequency of Disposal Systems by Type (of 384)

Legend:
- Commingled Recycling (190)
- Garbage Only (158)
- Two- or Three-Bin Recycling (32)
- Garbage/Compost Only (4)
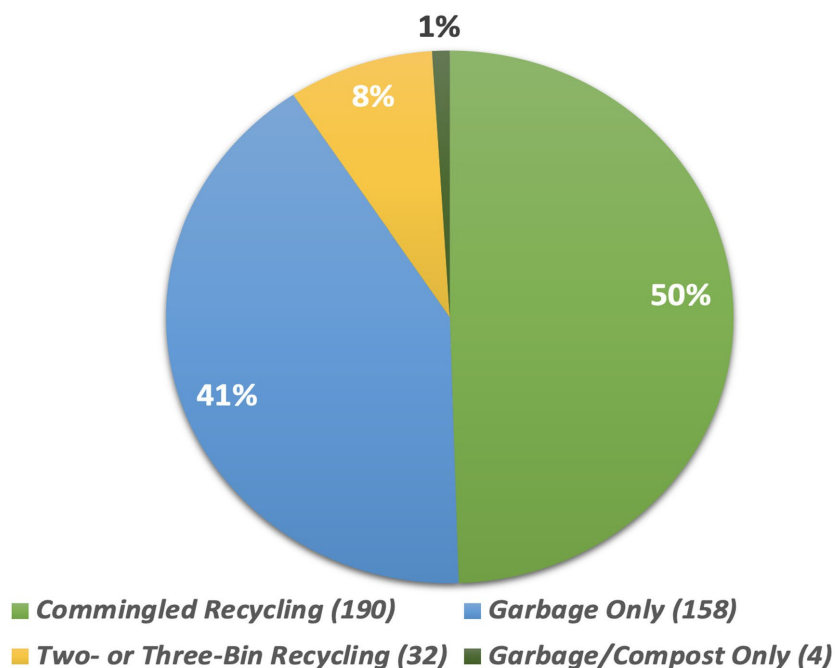
This breakdown of the collection system shows that commingled recycling systems are the most common, with garbage-only systems a close second. Despite this, commingled recycling collection systems account for fewer than half of all jurisdictions, and jurisdictions with any type of recycling collection system account for only 57.77% (222 of 384) of all jurisdictions.

The remaining 162 solid waste management jurisdictions (42.23%) do not have any recycling collection services. Of these, 97.5% (158 of 162) only have garbage collection services with the remaining 2.5% (4 of 162) offering garbage and compost collection.

At the state level, an average of 2.3 drop-off locations are available per 100,000 persons, but the amount varies widely in different waste generation regions. The west and central regions have a higher ratio of drop-off services with 7.4 and 6.8 drop-off locations per 100,000 inhabitants, respectively. The Puget Sound area displays the lowest ratio of the service, with less than one drop-off site per 100,000 persons, but the region does have higher levels of curbside service.

Categories of Solid Waste Services Providers

This subsection identifies the categories that solid waste services providers fall under in Washington as well as the prevalence of these provider types across solid waste management jurisdictions statewide. **Figure 12** (below) displays the percentage of jurisdictions that are served by each category of service provider.

Fig.12: Frequency of Service Provisions by Type

Legend:
- UTC
- Contract
- Municipal Only
- Contract & UTC
- Contract & Municipal
- Tribal

Values shown: 61.5%, 28.1%, 5.2%, 2.3%, 1.6%, 1.0%
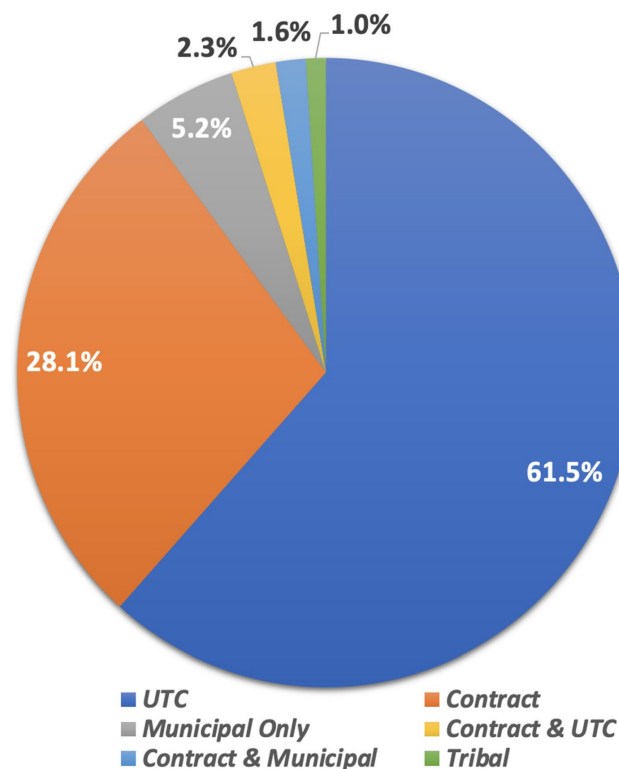
This data shows that most jurisdictions receive services through the UTC. This means that cities themselves do not directly provide these services or contract with a third-party private hauler to provide them. From a logistical point of view, this simplifies the process of providing solid waste services as it is no longer under the city's control but instead the UTC. From a consumer standpoint, this can create challenges as the city government is not responsible for setting fees or the scope of service provisions (this becomes the responsibility of the UTC). This means that instead of contacting city staff to address service issues, consumers must contact UTC customer service to resolve concerns.

The second-largest grouping is for jurisdictions that contract directly with a third party to provide solid waste services. This allows cities to negotiate the services offered and, to a degree, the fees consumers are charged for solid waste services. The third-largest grouping features jurisdictions where the municipality directly provides solid waste services to residents. This means that the city uses internal staff and equipment to collect and process solid waste.

The next two categories are jurisdictions that provide services through a combination of third- party contracting and then either provide municipal services or leverage a UTC franchise hauler. There are only 15 jurisdictions that do this, largely to balance consumer needs with available resources for service provision. This is elaborated further in the analysis of the interview findings in **Section 4.3**.

Finally, there are only four tribes that provide waste hauling services directly like the municipalities that do in 20 other jurisdictions. The final jurisdiction is the only one that provides services through a combination of direct provision from the municipality and the UTC provider.

Figure 13 (below) shows the geographic distribution of these provider types. While the UTC serves over 60% of Washington's solid waste jurisdictions, they are concentrated in rural counties, while the densely populated regions in King, Pierce, Snohomish, Benton, and Spokane counties are predominantly served by third party contracts.

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Fig.13: Solid Waste Management
   Jurisdictions by Hauler Type
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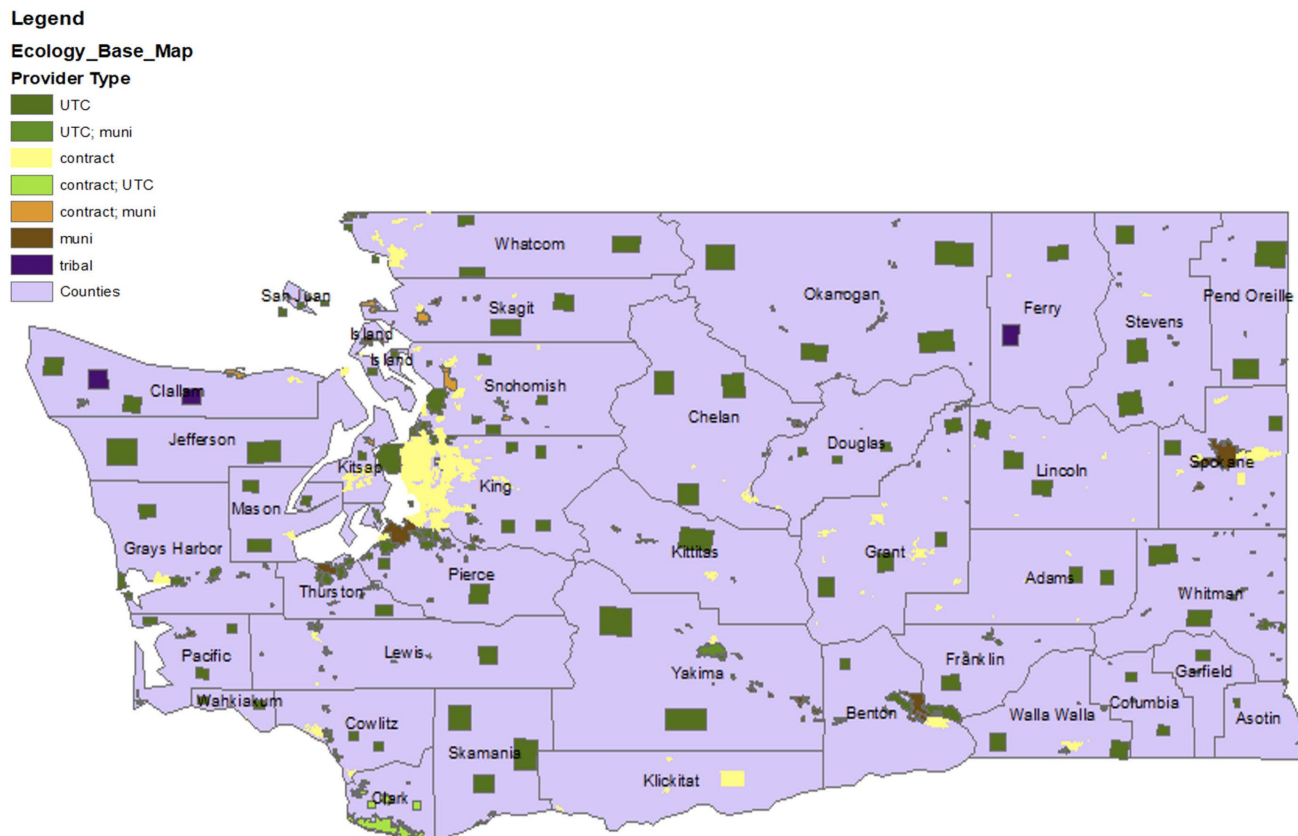
Solid Waste Service Providers (Owners)

This section analyzes the proportion of jurisdictions served by each hauler owner as well as the geographic concentration of the service areas of these owners. Washington's 384 solid waste jurisdictions are served by 14 "large" owners (serving four or more jurisdictions), 22 "small" owners (serving three or fewer jurisdictions), 28 municipalities, and three tribes.

The top five individual hauler owners (by number of jurisdictions served) constitute 64.5% (248 of 384) of solid waste service provision across the state (this includes the seven jurisdictions in which they provide partial services in partnership with the municipality). Small third-party owners account for 10.15% (39 of 384) of jurisdictions. Municipalities account for 5.47% (21 of 384) of jurisdictions and tribes account for 1.04% (4 of 384). **Figure 14** (below) shows the top haulers alongside the number of jurisdictions they serve as well as the proportion served by small third parties and municipalities. **Figure 15** (next page) displays this information in map form.

Fig.14: Hauler Owners by Jurisdictions Served Market Share

Owner	Number of Jurisdictions	Percentage of Jurisdictions
Waste Connections	107/384	27.80%
Waste Management	69/384	17.97%
Republic Services	32/384	8.33%
Darrick Dietrich	21/384	5.47%
Consolidated Disposal	19/384	4.95%
Municipal Haulers	21/384	5.47%
Small Third-Party	37/384	9.64%

Fig.15: Map of Hauler Owners by Jurisdiction

Legend

Ecology_Base_Map

Owner

- Waste Connections
- Waste Management
- Small Third Party
- Republic Services
- Darrick Dietrich
- Municipal
- Consolidated Dispoal Services
- Marc Torre
- Recology Cleanscapes
- Calvin den Hertog
- Mixed
- Sunrise Disposal
- Carroll-Naslund Disposal Service, Inc.
- Peninsula Sanitation Service
- Sanitary Service Company
- Zippy Disposal Service
- Gary's Garbage Services
- Tribal
- Counties
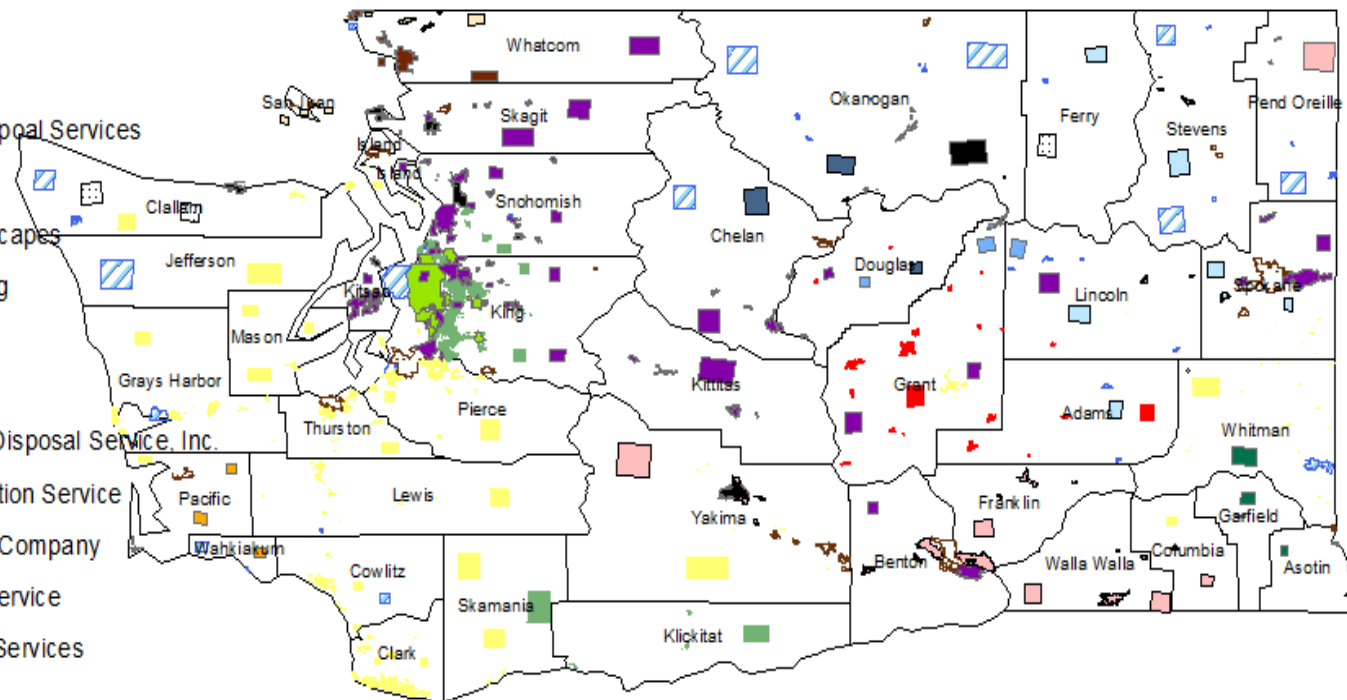
Looking at **Figure 15** on the previous page, one can see that Waste Connections, the most prevalent owner in the state, is primarily concentrated in Washington's Southwest region. Additionally, Waste Management has a significant presence in the Northwest region with ownership in Central and Eastern region urban areas, such as in Spokane and Benton. Finally, Republic Services is concentrated in King County, particularly around Puget Sound.

Distribution of Solid Waste Management Facilities

MRF Location & Service Scope

According to data provided by Ecology, there are seven MRFs that process commingled residential material in Washington. **Figure 16** (below) displays these facilities, their locations, and the counties they serve.

Fig.16: MRF Locations and Service Area

Facility Name	Location	Counties Serving
Cascade Recycling Center	Woodinville (King)	King, San Juan, Skagit, Snohomish, Whatcom
Pioneer Recycling	Tacoma (Pierce)	Benton, Clallam, Cowlitz, Franklin, Grant, Grays Harbor, Island, Jefferson, King, Lewis, Mason, Pacific, Pierce, Thurston, Walla Walla, Yakima
Waste Management MJK Fibers	Tacoma (Pierce)	Clallam, Grays Harbor, King, Kitsap, Pacific, Pierce, Spokane
West Vancouver MRF	Vancouver (Clark)	Clark
Republic Services MRF	Seattle (King)	King, Klickitat, Snohomish, Whitman
Recology Cleanscape	Seattle (King)	King, San Juan
Waste Management SMART Center	Spokane (Spokane)	Benton, Chelan, Douglas, Grant, Kittitas, Okanogan, Spokane

Of Washington's 39 counties, 74.3% (29 of 39) are served by at least one MRF (as shown in the table above). The remaining ten counties—Adams, Asotin, Columbia, Ferry, Garfield, Lincoln, Pend Oreille, Skamania, Stevens, and Wahkiakum—have no access to an MRF and do not provide curbside recycling services in their jurisdictions. Focusing on the counties that lack MRF service, 100% (10 of 10) are classified as rural, with 80% (8 of 10) concentrated in the eastern region of the state. The remaining 20% (2 of 10) of these counties are clustered in the state's southwest region. Regarding the population not served by MRFs, it is a small percentage of Washington residents, only 1.8% (143062/ 7707047)

The MRFs themselves are located exclusively in urban counties, with 5 of 7 (71.4%) clustered in King County (3 of 7) and Pierce County (2 of 7) alone. The remaining two MRFs are situated in Clark County in the southwest and Spokane in the east. The MRF located in Spokane (the Waste Management SMART Center), is the only MRF located in the State's eastern region. **Figure 17** (below) is a map of the distribution of MRFs and the counties they serve.

Fig.17: Map of MRFs and Service Areas

Service Provider

- Cascade
- Cascade/Pioneer/ Waste Mngmnt JMK/Republic/Recology
- Cascade/Recology
- Cascade/Republic
- Pioneer
- Pioneer/Waste Mngmnt JMK
- Pioneer/Waste Mngmnt SMART
- Republic
- W Vancouver
- Waste Mngmnt JMK
- Waste Mngmnt JMK/Waste Mngmnt SMART
- Waste Mngmnt SMART
- None
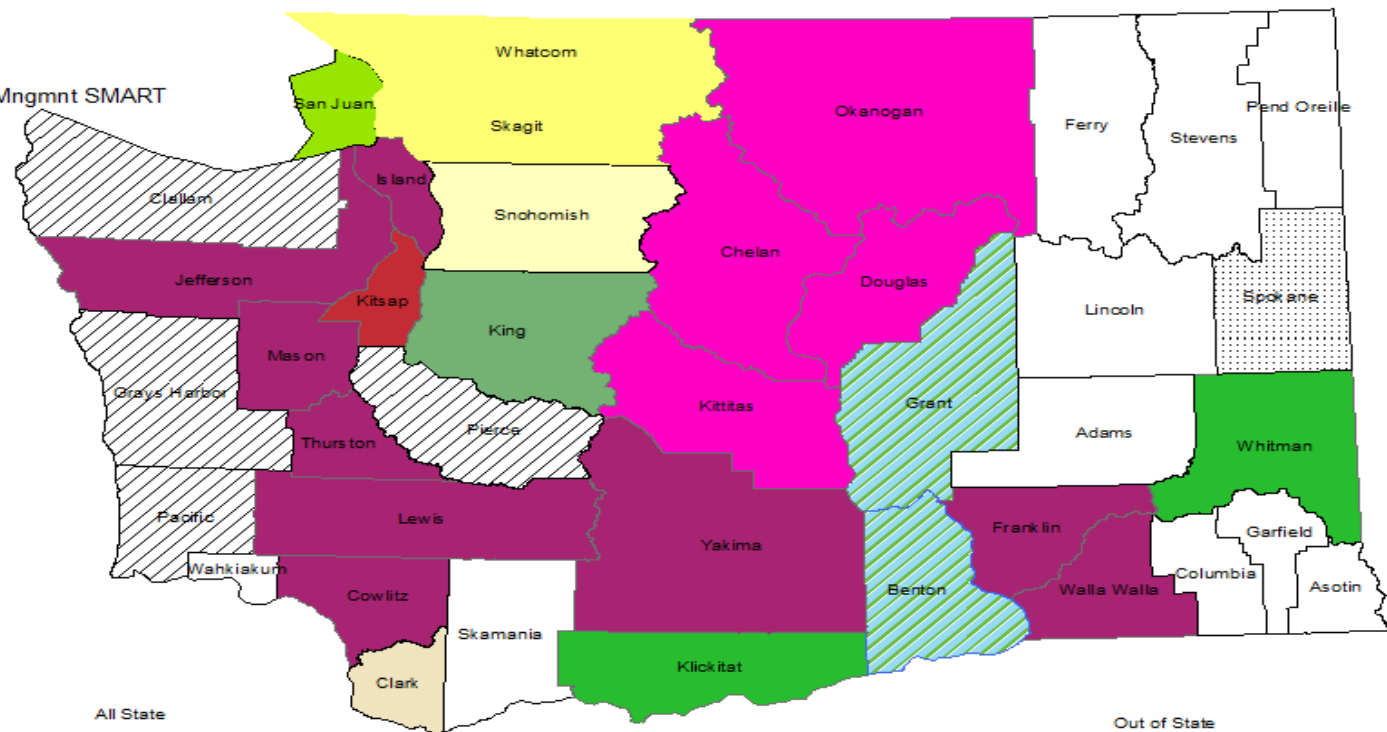
Composting Facilities

According to Ecology's composting database, there are 31 composting facilities located across Washington. These facilities are split relatively evenly between urban and rural counties, with 54.83% (17 of 31) located in rural counties and 45.17% (14 of 31) in urban counties. Despite this broad geographic distribution of facilities, 29.03% (9 of 31) of the facilities are in three counties: King, Pierce, and Snohomish. These counties are all urban and are the most populated counties in the state.

More broadly, when looking at the four geographic regions of Washington, 35.48% (11 of 31) of facilities are in the northwest, 29.03% (9 of 31) are in the southwest, 19.35% (6 of 31) are in the eastern region, and 16.13% (5 of 31) are in the central region.

Fig.18: Distribution of Compost Facilities by Geographic Region
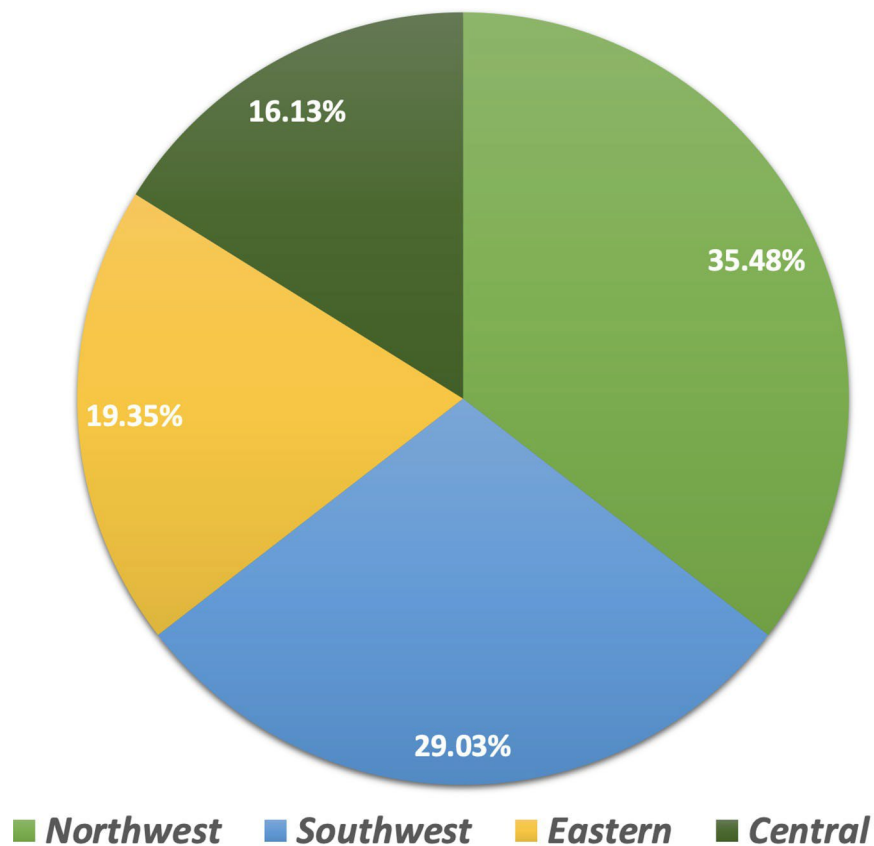
Equity Policies

This section provides an analysis of contracts and service data to identify how jurisdictions conceive of and implement policies to improve the equitability of service access. In this analysis, equity falls under three main categories: (1) community outreach and engagement, (2) pricing mechanisms, and (3) curbside recycling access. These categories represent the primary ways in which jurisdictions address equity and implement equitable policies. Additionally, this analysis draws on this project's focus on King County to identify ways in which the county is pursuing equitable solid waste services. The interview analysis in **Section 4.5** also identifies equitable service provisions as one of the top-five goals of solid waste jurisdictions.

Community Outreach and Engagement

In the narrowest sense, outreach in solid waste contracts includes the contractor providing an annual update to current service offerings such as billing information, customer service contact, collection days, and hazardous waste disposal. Every sampled contract required haulers to provide customer and billing services. Cities receive data regarding customer inquiries, call volume, and web traffic volume. In all contracts, the hauler is required to have access to translation services for all ratepayers and specific translation requirements for outreach. Cities can also stipulate coordinated development for outreach and educational materials.

Contract language stipulating the translation of outreach materials varies. Some cities identify specific languages as necessary while others leave language selection up to the private hauler. Under Section 3.3.2.2.6 of the City of Bellevue's contract with Republic, Inc., outreach materials must be translated "into a minimum of seven languages other than English, including Spanish, Chinese, Russian, and four other languages to be identified by the city."

In contrast, in Section 4.3.2.6 of Federal Way's contract with Waste Management, "the website shall also provide statements on its city-specific homepage in other commonly used non-English languages within the city referring customers to the contractor's translation helpline or a separate webpage with an appropriate translation function." With many contracts leaving the final number of available languages undetermined, **Figure 19** identifies available languages for accepted material lists by city contract.

Fig.19: Available Languages for Accepted Material Lists by City

	Amharic	Chinese	Farsi	Hindi	Japan.	Korean	Oromo	Punjabi	Russian	Somali	Spanish	Tagalog	Tigrinya	Ukrain.	Viet.
Auburn	✓	✓		✓		✓			✓	✓	✓				✓
Bellevue		✓		✓	✓	✓			✓	✓	✓				✓
Covington											✓				
Federal Way						✓			✓		✓			✓	
Kirkland	✓	✓		✓		✓			✓	✓	✓				✓
Maple Valley											✓				
North Bend						✓			✓		✓				
Seattle	✓	✓					✓			✓	✓		✓		✓
Shoreline	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓			✓
Snoqualmie		✓		✓		✓			✓	✓	✓				✓

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Of the sampled cities, 15 unique languages are available, offering an average of five languages other than English. Covington and Maple Valley have the lowest number of available languages (2) with only English and Spanish.

Shifting to hauler-specific outreach, Waste Management has a recycle corps program, hiring interns to conduct regional door-to-door outreach. More details on reporting can be found in **Section 4.5**, which covers insights from key informant interviews.

> "Waste Management's **Recycle Corps Internship Program**, now in its sixth year, continues to be a valuable resource for our communities. Throughout the summer, 14 WM Recycle Corps interns engaged with residents across King and Snohomish counties to improve recycling habits and reduce waste. With team members fluent in Spanish, Mandarin, Cantonese, Taishanese, and Japanese, our interns helped bridge language gaps so more community members understand and participate in waste-reduction programs."
>
> *—Waste Management Puget Sound RSA Report (2017)*

Data Reporting

Hauler data is most commonly reported in monthly and annual reports, with some cities receiving weekly and quarterly reporting. In addition to scheduled reports, cities can typically request up to 12 ad hoc reports per year. These reports can be provided through a proprietary data portal such as Waste Management's *Enspire* platform, but cities can stipulate the format in which data is received. Data reporting varies in frequency and themes. Monthly reports between haulers and service areas commonly include the following data:

- Billing summaries, organized by service sector
- Disposal locations and fees
- Commodity values of specific recycled materials
- Contamination rate of specific recycled materials
- Summaries of collected waste, organized by service sector and service type
- Outreach and educational material samples

In addition to these scheduled reports, cities may request monthly or bi-monthly reports, using a maximum of 100-300 contractor staff hours (depending on the contract). Shoreline had further language outlining compensation to the contractor in the event an ad hoc report took more than 200 hours to compile. These reports normally come at no cost to the city and can cover daily operations, customer information such as billing and collection, route information, and other compliance-related requests.

Key

A. Summary of garbage and organics volumes and quantities by service sector
B. Contamination levels and processing residues disposed of as garbage
C. Commodity prices
D. Outreach material samples
E. Tipping and disposal Fees
F. Billing summaries
G. Customer interactions
H. Summaries of service participation
I. Summaries of vehicle accidents or infractions

	A	B	C	D	E	F	G	H	I
Auburn	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bellevue	✓			✓	✓	✓	✓	✓	✓
Federal Way		✓		✓	✓	✓	✓	✓	✓
Kirkland	✓	✓	✓	✓	✓			✓	
Maple Valley		✓		✓	✓	✓	✓	✓	✓
North Bend	✓	✓	✓	✓	✓		✓	✓	✓
Snoqualmie	✓	✓	✓	✓	✓	✓		✓	
Shoreline	✓	✓		✓	✓	✓	✓		✓
Covington	✓		✓	✓	✓	✓	✓	✓	✓

Descriptions of data reporting provisions can be found on the following page.

Description of Data Reporting Provisions

Provision		Description
A.	Summary of garbage, recycling, and organics collection volumes	*Provides the city with the tonnage of waste generated by waste type in single-family and multi-family residential, and commercial sectors*
B.	Contamination levels and processing residues disposed as garbage	*Identifies the amount tonnage of recyclables disposed of as garbage due to contamination*
C.	Commodity prices	*Reports revenue received from the sale of recycled materials by material type.*
D.	Outreach material samples	*Provides the city with draft copies of upcoming outreach materials*
E.	Tipping and disposal fees	*Reports expenditures associated with depositing waste at processing facilities*
F.	Billing summaries	*Provides the number of customers billed broken down by service sector single-family, residential, and commercial services as well as the type of service such as landfill, recycling, and organics*
G.	Customer interactions	*lists all forms of customer contact from call service interactions to site visits. Identifies how customer requests were resolved. May include logs of call volume and website usage*
H.	Summaries of service participation	*Indicates the number of single-family and multi-family residential, and commercial sectors signed up for garbage, recycling*
I.	Summaries of vehicle accidents or infractions	*Infractions may include reporting spillage from hauler vehicles, overweight trucks, and other data related to specific performance fees used in the contract.*

Performance Fees

Hauler-reported data, alongside other metrics, is used by local governments to determine hauler performance. In cases where haulers have fallen short of their contractual obligations, cities can leverage the use of performance fees as an enforcement mechanism. Performance fees are present in every contract and often share identical language. Below are examples of such fees found in Kirkland's solid waste contract with Waste Management.

Fig.20: Overview of Performance Fees, City of Kirkland

Action or Omission	Associated Fees
Failure to deliver garbage, recyclables, or compostable containers within seven (7) days of a request to single-family residences requesting service after the date of commencement of service.	*$25 per incident*
Negligent or international misrepresentation by contractors in records or reporting.	*$5,000 per incident*
Failure to provide the required monthly and annual report on time. Failure to provide an adequate or timely response to a request for an ad hoc report.	*$500 per day past deadline*
Failure to maintain clean, sanitary, and properly painted containers. Failure to replace or repair broken lids on containers.	*$50 per incident (maximum $1,000 per inspection)*
Failure to maintain contract-compliant vehicles.	*$50 per incident (maximum $1,000 per inspection)*

Pricing Mechanisms

Of the cities sampled in this report, Auburn, Kirkland, North Bend, and Seattle all offered rate reductions to their residents. Rates were not always outlined directly in solid waste hauler contracts, with some programs being operated by the city independently from the hauler. These rate reduction programs are typically offered to low-income, disabled, or senior residents, but specific requirements vary by jurisdiction.

Figure 21 (below) compares services and rates across 10 cities with solid waste contracts as well as Enumclaw, which operates a municipal solid waste hauling program. These rates are based on single-family residential data (using 96-gallon collection bins) from the most recent pricing guidelines. All rate data was updated between 2021 and 2022. Notably, all featured cities offer recycling services at no additional cost to their residents. Bellevue and Kirkland charge a single fee for providing garbage, recycling, and organics collection as a bundled service.

Fig.21: Comparison of Services, Rates, and Revenues by Contract

City	Garbage	Recycling	Organics	Total Monthly
Bellevue	37.08	Embedded	Embedded	37.08
Maple Valley	31.75	Embedded	8.86	40.61
Covington	41.82	Embedded	9.61	51.43
North Bend	48.56	Embedded	9.71	58.27
Shoreline	55.88	Embedded	3.19	59.07
Federal Way	49.25	(1.84)*	12.58	59.99
Enumclaw	48.10	Embedded	13.73	61.83
Snoqualmie	58.09	Embedded	4.68	62.77
Auburn	57.14	Embedded	11.81	68.95
Kirkland	78.02	Embedded	Embedded	78.02
Seattle	126.40	Embedded	13.40	139.8

*Federal Way refunds revenue generated from the sale of recyclable materials to its residents. For the year 2022, this amount averaged $1.84 per month for households.

Tipping Fees and Fee Reduction Programs

Tipping fees present a potential barrier to recycling accessibility. Of the 47 transfer stations across Washington State, 29 out of 47 (62%) have a tipping fee of over $100 per ton. Clark County and King County are examples of localities offering rate reduction programs to assist disabled or low-income customers. In Clark County, the Helico (handicapped, elderly, and low-income) service is available to residents who are physically unable to move their trash, recycling, and yard debris containers to the curb and who meet low-income guideline requirements. Those who seek to use this service must contact their service provider for the appropriate form. King County offers the Cleanup LIFT Discount, which gives eligible customers $14 off the cost to dispose of each type of waste per visit. Residential customers currently enrolled in ProviderOne, EBT, or ORCA LIFT who haul their garbage and recyclables to a King County recycling and transfer facility are eligible for the discount.

Curbside Recycling Access

Based on data from Zero Waste Washington, 71.7% (28 of 39) counties have access to curbside recycling services while the remaining 28.3% (11 of 39) counties do not have access. Of the 28 counties providing access to curbside recycling services, 25% (7 of 28) do not provide access to more than half of their population. Scaling down a level, 56.5% (217 of 384) of jurisdictions offer curbside recycling services while the remaining 43.5 (167 of 384) do not. **Figure 22** (below) is a map of those jurisdictions with access to curbside recycling services. 88.4% of the state's population currently has access to curbside recycling services.

According to the State Department of Health, Washington has nine urban counties and 30 that are classified as rural. The nine urban counties—Benton, Clark, King, Kitsap, Pierce, Snohomish, Spokane, and Thurston—are home to 78.7% (6,065,536 of 7,705,281) of the state's total population. In these urban counties, 97.2% of the population has access to curbside recycling services, and no county serves less than 50% population on its own. In rural counties, which account for 21.3% (1,639,745 of 7,705,281) (US Census, 2020) of the state population, only 56.07% of the population has access to curbside recycling. 17 rural counties do not provide access to curbside recycling for more than 50% of their population.

At this time in King County, equity is being addressed across several avenues, including culturally competent educational and outreach materials and the fair distribution of transfer station locations, services, and resources. Equity is also addressed in the King County plan by way of climate change mitigation, adaptation, and sequestration. All three of these branches, when approached effectively, have been acknowledged as county priorities in part because the effects of climate change are projected to exacerbate existing inequities.

Fig.22: Map of Curbside Recycling Access
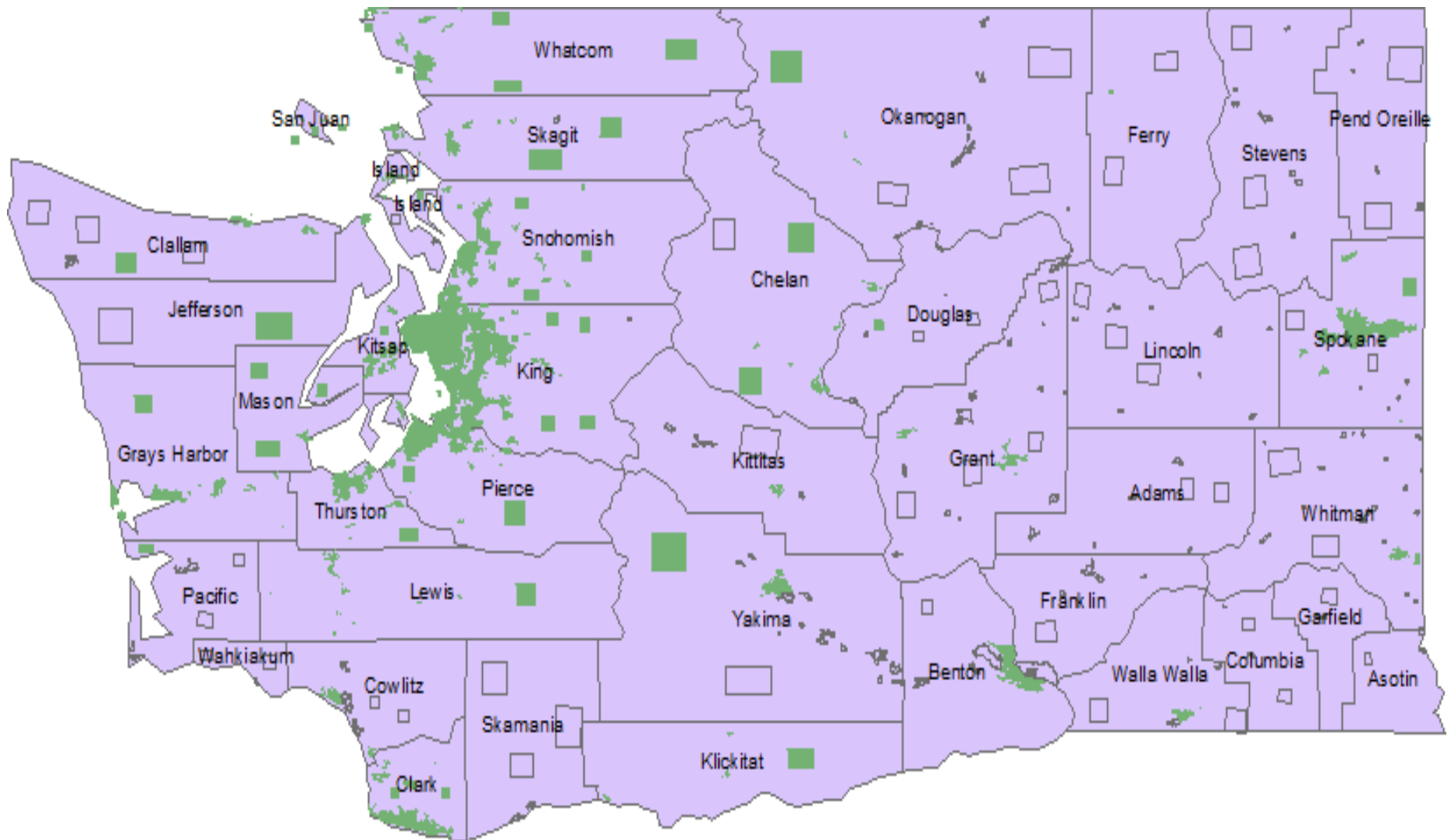
Contamination Reduction

This section provides an analysis of contracts to identify effective contamination policies. This includes policies such as cart tagging and charging haulers performance fees based on how well they are meeting their contractual obligations.

Problem Overview

Although many of the contracts reviewed by this project were signed prior to the establishment of jurisdictional CROPs in 2019, most feature provisions related to contamination reduction. It should be noted that many cities may have contamination reduction-specific outreach that are not contractually enshrined.

To identify contaminated containers, most cities rely on drivers to inspect contents as they are collected into the truck, but some contracts require a limited number of routes to be inspected prior to collection. Kirkland has contract language requiring the hauler to inspect contamination on specified routes one to two times per month. Seattle gets more specific in its contract language, requiring that between 1-2% of routes be inspected prior to collection. For customers who continue to place items in the incorrect bin, six existing contracts outline explicit fees for frequent contamination, and seven outline parameters for suspension of service.

Following service suspension, customers can reinstate their residence by signing an online form acknowledging correct disposable practices (an educational measure) or by directly contacting the solid waste hauler.

Cart Tagging

Contamination tags prevent contamination from entering the waste stream while also serving as a point of contact with customers to prevent problematic behavior. Communication about proper recycling techniques is important to reducing contamination, and cities have deployed contract language related to customer outreach and education to encourage proper recycling techniques.

Only two cities (North Bend and Snoqualmie) do not have cart tagging contractually stipulated but have since implemented the practice. Tagged containers are collected at landfills to prevent contamination of additional material further down the waste recovery stream.

Key Informant Interview Analysis

The following section expands on findings from this project's key informant interviews, based on key themes identified through the codebook (**Section 3.2**). These findings represent the overarching themes used to inform recommendations for Ecology to better optimize the recycling system statewide.
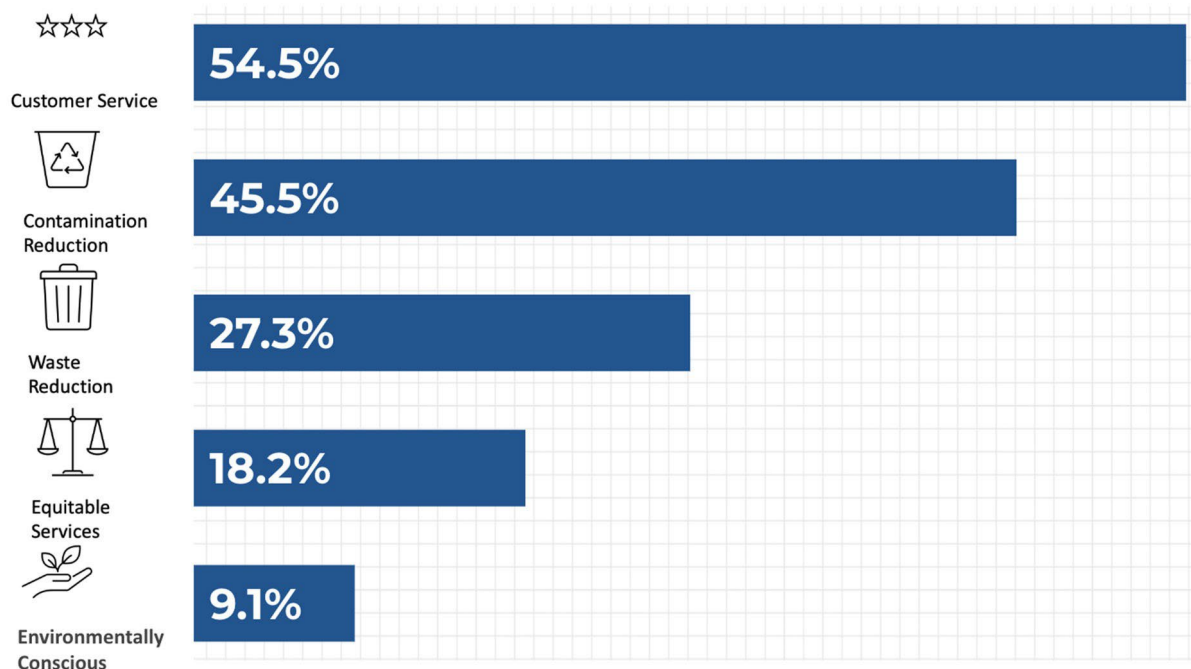
Common Solid Waste Goals

Of the three service provisions available to jurisdictional governments (UTC, private hauler contracts, and franchising), one is typically selected according to two factors: (1) familiarity with the system in place and (2) efficiency and consistency in terms of service, as solid waste services are difficult to provide directly from city resources either due to lack of resources or a vast geographical area.

Interviewees were asked about their top three goals for solid waste management in their respective jurisdictions. The following list shows the most common goals identified (listed from most to least common).

1. Customer Service—This goal refers to providing the best customer service to residents and customers of the solid waste program. Customer service encompasses providing efficient services at affordable and competitive rates (including discounted rates and the cheapest rate negotiated with the hauler), cited by 55% of respondents.

2. Contamination Reduction—45% of respondents frequently listed contamination reduction and prevention as a primary goal for solid waste management. Outreach efforts, including educational literature and events, are set up for customers to help educate about contamination reduction.

3. Waste Prevention—The reduction of overall solid waste tonnage was an essential goal for 27% of respondents included in the interview process.

4. Equitable Services—Providing equitable services to marginalized populations and low-income households was cited as a goal for 18% of respondents. Discounted rates for elderly and low-income households were one way listed to reach this goal.

5. Environmental Consciousness—The least frequently mentioned goal to be addressed through the jurisdiction's solid waste programs was safeguarding the environment at approximately 9% of all respondents.

Fig.23: Top Themes Coded with Primary Theme: Goals

☆☆☆
Customer Service — **54.5%**

Contamination Reduction — **45.5%**

Waste Reduction — **27.3%**

Equitable Services — **18.2%**

Environmentally Conscious — **9.1%**

Key Obstacles to Optimal Service Provision

Optimization of Washington's complex solid waste management system faces an array of obstacles. The most frequently cited challenges per interviewees are outlined below:

- *Cost Efficiency*—While jurisdictions aim to provide affordable and efficient services to customers, solid waste management can become costly. 27% of jurisdictions responded that maintaining cost efficiency tends to be a hurdle to providing efficient services to its customers. Service infrastructure (e.g., trucks) is expensive to procure and has an average life cycle of seven years before being deemed unfit for use.

> "We can do liquidated damages for overweight trucks, which increases our costs compared to privately-owned companies"
>
> —Kent

- Lack of Personnel—45% of jurisdictions reported that there was a lack of full-time personnel dedicated to solid waste management, especially those trained in contract management. Personnel currently trained for solid waste management typically also have other management duties and their capacity is frequently compromised. This is especially prevalent in jurisdictions providing services through contracting. Those

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jurisdictions providing services through their own municipalities have better-staffed programs.

> "City staff are often overworked and do not have the time to understand the contract and how to use it. This is a huge gap, haulers often know city staff is overworked."
>
> –Private Contract Consultant

- Data—Service provision contracts with haulers provide city management with recycling data. However, there are problems with data accessibility. 36% of jurisdictions reported that most data provided to them is of poor quality. There is an expressed need for more granular data and more data sharing between jurisdictions.

> "Would like better data on bin tagging, more granular information of types of material collected and quantities, also would like to see complaint data with locations (to identify hotspots), and more information on service performance in cities with contracts."
>
> –King County

Fig.24: Top Themes Coded with Primary Theme: Obstacles

Lack of Personnel — 45.5%

Data — 36.4%

Cost Efficiency — 27.3%
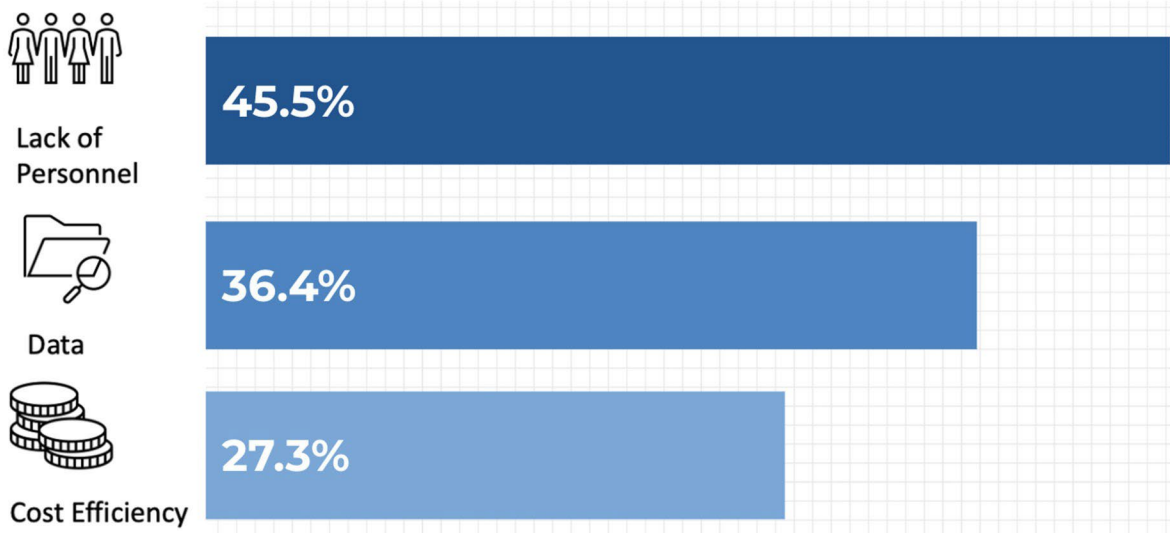
Opportunities for Improving System Performance

Interviewees also provided insight into how Ecology and other stakeholders can help optimize the statewide recycling system. The following list shows the most frequently cited tactics Ecology can leverage to help optimize local recycling programs:

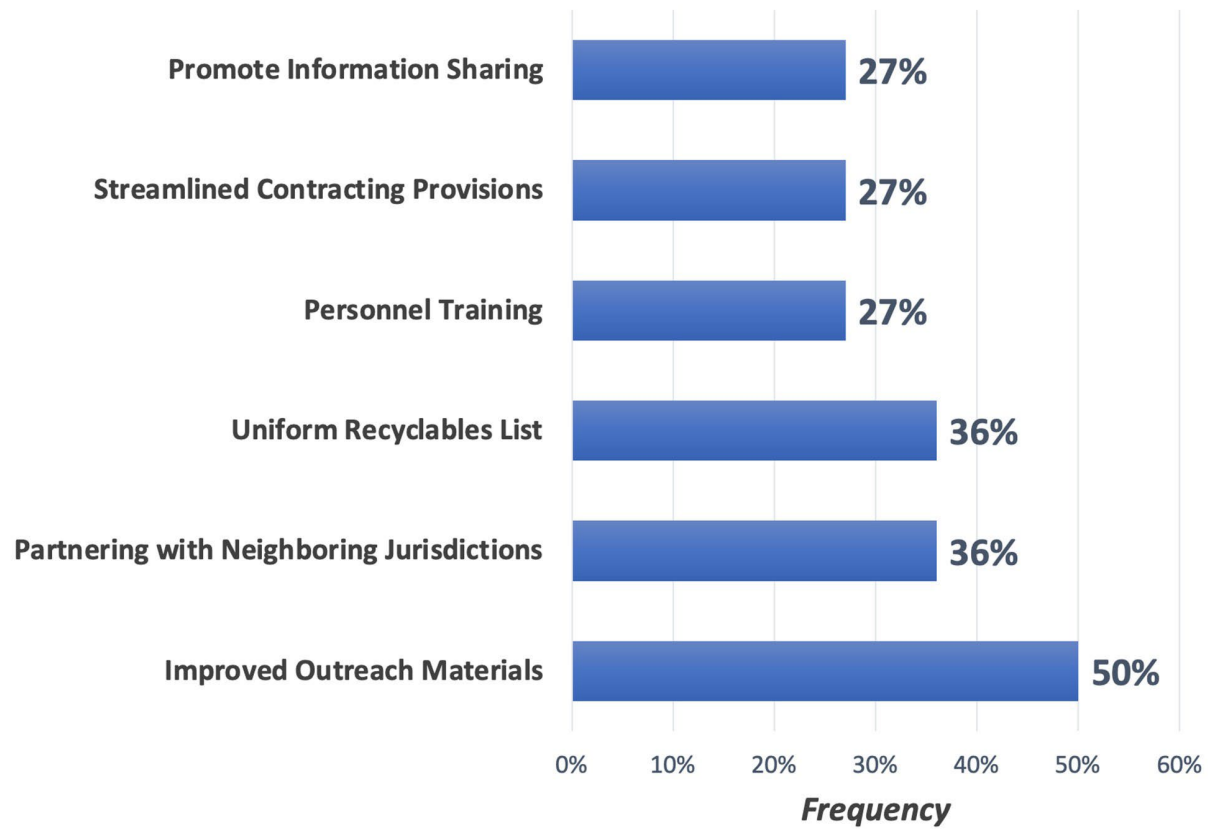- Personnel Training—As mentioned above, there is a lack of personnel dedicated specifically to solid waste management efforts. Consequently, many contract managers lack sufficient experience and training. Opportunities exist to hire more full-time contract management staff and provide sufficient and relevant training. 27% of respondents suggested that it would be beneficial to provide personnel training to solid waste management staff for better service provision and contract management.

- Standardized Recyclable Materials Lists—36% of respondents identified the need for a standardized and uniform list of acceptable recyclable materials. This includes providing a list that is standardized in terms of how it is numbered or labeled, since every jurisdiction has its acceptable recyclable items listed or numbered differently.

- Streamlined Contracting Provisions—27% of respondents suggested that Ecology should work toward providing jurisdictions with a set of general guidelines for contract provisions, while 18% also suggested streamlining the RFP process to help local governments negotiate contracts better to provide more effective and efficient services.

> "Entering the RFP process, it is difficult to know what contract provisions should be pursued, and how to cut costs."
>
> –Snoqualmie

- Improved Outreach Materials and Initiatives—Approximately 50% of respondents believed that jurisdictions could use better outreach materials to help educate customers and reduce overall contamination rates.

- Promote Information Sharing—There is significant overlap in how jurisdictions provide services, creating an opportunity to provide an information-sharing platform. This platform would enable jurisdictions to cross-collaborate and model best practices. 27% of jurisdictions claimed they would be open to information sharing, while 36% claimed they would be open to partnering with neighboring jurisdictions.

Fig.25: Interview Insights: Opportunities

Promote Information Sharing — 27%
Streamlined Contracting Provisions — 27%
Personnel Training — 27%
Uniform Recyclables List — 36%
Partnering with Neighboring Jurisdictions — 36%
Improved Outreach Materials — 50%

Frequency

Chapter 5: Recommendations

This chapter outlines the consulting team's primary recommendations for Ecology based on the analysis presented in **Chapter 2** and **Chapter 4**. These recommendations provide various options for Ecology to support more efficient and equitable services statewide and for local jurisdictions to address their unique goals and barriers. Maintaining focus on the individual needs of local governments is an important consideration as most contracting and enforcement authority concentrates at the local level.

This project was designed to increase transparency into how the state's solid waste system functions. This includes a clear definition of the regulatory, policy, and contracting options available to local jurisdictions, the identification of service types and their costs, as well as where materials are taken for disposal, recycling, or composting. By expanding Ecology's understanding of the current system, this project intends to foster regional and cross-jurisdictional planning to lower costs, reduce contamination, improve service, and promote responsible and sustainable collection and management practices.

Contracting Data & Best Practices

This section expands on how efforts by Ecology can concentrate on information sharing and the dissemination of best practices during the contract negotiation process. These recommendations are designed to foster both **efficiency** and **transparency** within the recyclable collection and processing system.

Contract Information Sharing Platforms

As identified in **Sections 4.4** and **4.5**, cities in Washington State already share contract information between themselves, but only to a limited degree. This report's research analysis identified numerous beneficial contract provisions that were found across various cities and haulers, indicating an opportunity to standardize many of these options across several jurisdictions. This was confirmed when key informants revealed how local governments seek advice from neighboring cities and private consultants in efforts to optimize aspects of their recycling services and outline best practices for solid waste contracting.

When asked what external support city staff would like to see, four interviewees requested training sessions. The scope of these training sessions included best practices for outreach and education and how to use hauler reported waste data, along with information on what contract provisions other cities are using.

This information sharing is being supported by Ecology through the *Planning and Waste Reduction Resource Library*. This database contains information useful to city solid waste management staff such as a database of hauler contracts, contracting guides, and waste management reports. While this information is useful, it takes time to navigate, which may present a barrier to time-constrained city staff.

In order to present this information in a more quickly accessible way, Ecology can work with recycling partners such as the Washington State Recycling Association to facilitate solid waste procurement forums for city waste management staff. These forums would provide a space for city staff to highlight provisions in their contracts, receive condensed information on what provisions to pursue, and other relevant information to contract management.

Information and findings from these forums could then be condensed into a contracting procurement guidebook and other resources to serve as a useful reference for city staff. An example of such a resource can be found in the *Planning and Waste Reduction Resource Library* in a handout created for the 2015 Houston-Galveston Area Council's *Solid Waste and Recycling Procurement Workshop*. This handout covers several aspects of contract management—from scope of services, data to include in hauler reports, and outreach services.

Standardization of Practices & Provisions

This section expands on how standardization of practices and provisions can be put into place to help streamline the solid waste management process. As evaluated by the project team (see **Figure 27** on page 80), these recommendations are designed to facilitate greater **transparency** and **efficiency** in the statewide recycling system.

Standardized Acceptable Materials

Each city and local government faces its own challenges and needs, but significant overlaps remain between many localities regarding necessary service provisions. Because commercial recycling is an open market, lists may vary by hauler within a jurisdiction. Acceptable materials lists are also somewhat iterative—as haulers and their affiliated MRFs are upgraded, or as end-markets and commodity values shift, these lists are subject to adjustments. Because these lists can change and because there are significant differences in acceptable materials between different haulers and jurisdictions, a standardized list of acceptable materials for recycling could help mitigate inefficiencies and confusion and benefit the recycling system statewide.

Ecology has already laid the foundation for this work through local program surveys and the

Recycle Right initiative. *Extended Producer Responsibility* programs (like Oregon's) can also be implemented here in Washington, and again, steps have already been taken toward this through the RENEW Act. Ecology can facilitate a multi-step process of acceptable materials analysis (i.e., which materials are accepted by which haulers and in which localities) and drafting of a standardized list of acceptable recycling materials for all state jurisdictions. This list does not need to be binding in its initial form as it would primarily serve as a public education too. Thus, it could be posted to the *Educational Resources Dashboard* (see below) for public accessibility and distribution.

Educational Resources Dashboard

As evidenced by this project's research, a key contributor to excessive contamination is confusion among residents as to what materials are recyclable and how they should be collected and processed. The most direct solution to this issue is through education and outreach. By expanding its existing online repository—or developing it as an *Educational Resources Dashboard*—Ecology can build out an easily accessible tool that provides clear instructions for residential recyclers. For residents, this resource could allow users to enter their home address and find clear and important information on the types of materials accepted by their local solid waste hauler. Waste management professionals would be able to access Solid Waste Management Plans, CROPs, and statewide survey data. Because this platform already exists, expanding its scope and advertising or sharing access to statewide partners will be an essential step toward streamlining the wider system and achieving benefits like reduced contamination rates and more efficient processing.

Detailed information can be accompanied by references to local hauler data, MRF locations, upcoming recycling events, and essential contact information. Key informants also highlighted the potential for educational resources to improve end-market awareness among solid waste management staff and recycling residents. By providing more clarity on why recyclable materials are valued and how they are processed by private haulers, residents and staff would benefit from a more holistic understanding of the recycling process and their role in its function and impacts.

Interviewees cited the need to educate full-time staff on best practices, a need that is especially important in smaller jurisdictions. For example, cities like Bellevue have multiple personnel dedicated to outreach and public education, but smaller cities like Auburn lack the resources for multiple full-time employees in this realm.

One way a dashboard could benefit smaller management divisions is by providing assistance in the development of culturally competent educational and outreach materials. Diversity, equity,

and inclusion (DEI) is a priority for many local governments at this time, but common messages need to be translated into digital toolkits and printed materials like postcards, something many smaller divisions are not equipped to do.

It should also be noted that cities and local SWM divisions may look to educational materials developed by Ecology to help foster standardization. A standard template for recyclable materials and a guidebook for potential contract provisions could be used as an initial reference point for local solid waste managers. This could provide benefits to local governments by providing guidance on how to solicit and process better data from contracted haulers.

Expansion of Access & Financial Assistance

This section discusses how an adjusting of grant funding and the increased encouragement of rate relief provisions can expand the equitability of access to curbside recycling and other solid waste services. These final recommendations are designed to foster greater **equity** in terms of access to services within the statewide recycling system.

Equitable Grant Funding

Ecology can address inequities by adjusting the funding formula for *Local Solid Waste Financial Assistance* (LSWFA) grants. Currently, LSWFA provides an equal base amount for every county and additional funding based on county populations. We recommend that the funding mechanism be changed so that the base amount distributed to each county factors in the population's respective access to curbside recycling and other solid waste services. The mechanism providing funding based on county populations should be left in place.

Data analysis in **Chapter 4** identified that while 88.4% of Washington's population has access to curbside recycling services, access is disproportionately distributed between rural and urban populations. 97.2% of urban county residents have access to curbside recycling services while only 56.07% of residents in rural counties have access (see **Figure 26** below).

Changing the LSWFA funding distribution would improve equity by providing extra resources to counties that lack access to curbside recycling services. These resources can help counties create and implement more robust waste management plans that include curbside recycling services. Greater access to curbside recycling collection allows more communities to recycle, which increases efficiency by reducing overall waste in the processing system.

Ultimately, local governments explained that state financial assistance is important to their

solid waste management plans. Several interviewees explained that grant funding from Ecology for recycling events and public outreach programs has proved to be helpful, effective, and important to achieving local solid waste goals.

Rate Relief Expansion

Interview findings and contract analysis presented in **Chapter 4** revealed a lack of consistency across county plans regarding rate-relief programs. This project's contract analysis showed that only three out of the eleven sampled contracts featured rate relief provisions. Additionally, providing equitable access to services was one of the top five goals identified by interviewees. A large piece in achieving this is through offering rate relief options for those in need so that all state residents can receive curbside recycling services.

Currently, Ecology provides guidance on options for including rate relief and contracts and encourages the inclusion of a provision in county plans allowing private haulers to set discounted rates in unincorporated areas. The inconsistency in rate relief programs identified in interviews and contracts shows there is a tremendous opportunity for expanding these programs statewide. As a reviewer of solid waste plans and through contracting support, Ecology can encourage and facilitate a significant expansion of these provisions.

Fig.26: Curbside Recycling Access, Rural v. Urban
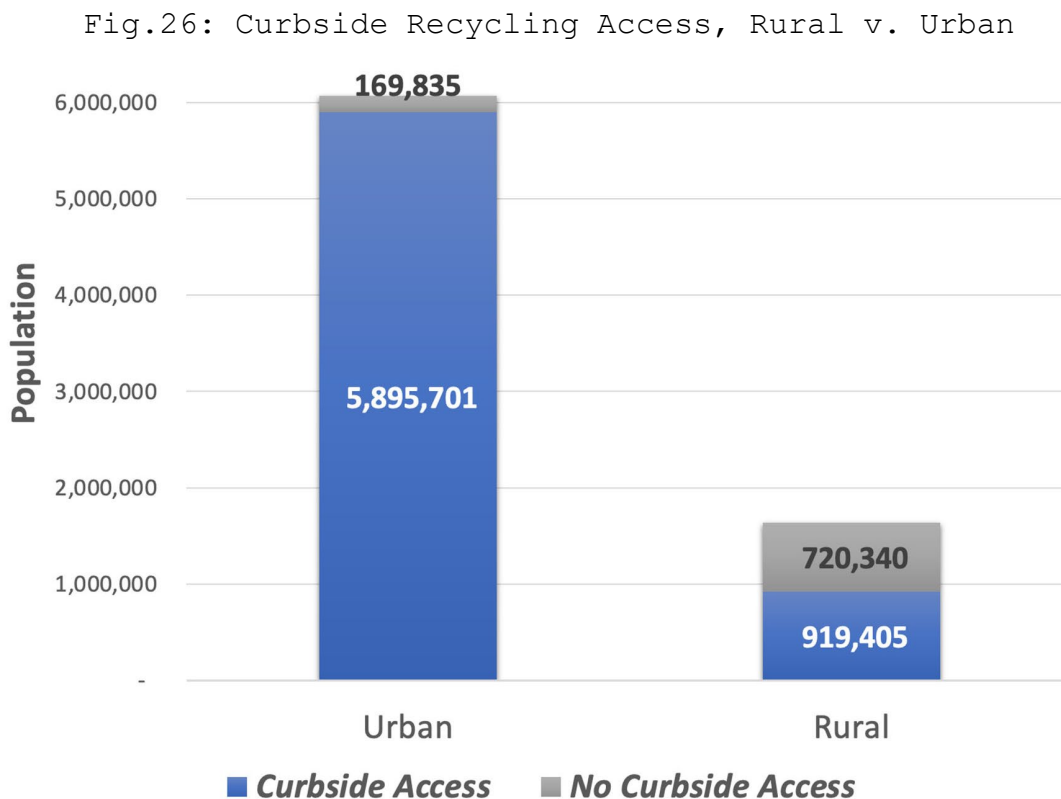
The following table (**Figure 27**) provides a breakdown of how this project values the recommendations made above. The chart shows how items in certain buckets may offer more benefits under specific criteria and less in others. For example, contracting-focused concepts like information sharing and alignment offer strong benefits regarding transparency but may not foster equity as strongly as recommendations listed in the accessibility column.

Project consultants would also like to note that these recommendations are not offered as mutually exclusive options. Ecology and some local governments have already taken steps to begin implementing many of these actions, and the research presented in this report was designed to help identify where they can be expanded or enhanced. There are also several opportunities for continued research into these opportunities and barriers which are listed in the report's final section.

Fig.27: Criteria Analysis of Recommendations

Evaluation by Criteria	Contracting		Standardization		Accessibility	
	Informational Forum	Contracting Guidance	Acceptable Materials Lists	Educational Database	Rate Relief Expansion	Equitable Grantmaking
Transparency	High	High	High	Moderate	Low	Moderate
Efficiency	Moderate	Moderate	High	Moderate	Low	Low
Equity	Low	Low	Low	Moderate	High	High

Additional Research & Considerations

Service Rate Analysis

Rates for collection services vary dramatically across jurisdictions, even in the same county or region. This report recommends that Ecology and its partners lead a study comparing rates statewide, why they differ, and their impact on overburdened communities. This will be key data for the development of *Extended Producer Responsibility* (EPR) programs.

Quantitative Modeling

This research can be furthered with quantitative modeling of waste disposal trends among Washington's various counties and local jurisdictions. This modeling would provide additional context for the creation of a streamlined contracting RFP process and a better understanding of waste disposal trends across rural localities.

Furthermore, quantitative modeling of these trends would give solid waste programs an opportunity to further refine their solid waste management programs. Issues with respect to contamination reduction, waste prevention, and environmental consciousness can be addressed with data-backed evidence for better decision-making.

Intersection of SWM & Environmental Policies

Additional research into the intersection of solid waste management practices and forward-thinking environmental policies could contribute to a continued reduction in emissions from solid waste while also providing consumers with more climate-resilient and sustainable collection services. Currently (as mentioned in **Section 4.2**) only 9.1% of solid waste programs prioritized environmentally conscious practices. Facing constant changes in climate conditions, more environmentally conscious practices can help reduce the system's carbon footprint.

Transforming Static Maps to Dynamic

A final area for further research and development is GIS map generation. As mentioned in **Section 3.5**, the consulting team only had access to ArcGIS Desktop Pro software rather than ArcGIS Online (which is used by Ecology). Although the two software platforms are related, ArcGIS Pro produces highly detailed but static maps, while ArcGIS Online produces dynamic maps that are less detailed. Based on the timeline of this project and the differing software access, the consulting team curated the necessary data and produced initial maps through ArcGIS Pro. These maps serve as a strong basis for future dynamic mapping through ArcGIS Online.

To continue this mapping work, Ecology can work with their internal GIS team to upload maps and data to ArcGIS online and transform them into dynamic versions of themselves. This would allow Ecology to produce a compost-shed map showing the location of compost facilities, the counties that send them materials, and the types and quantities of those materials.

Additionally, using the **Map of Hauler Owners by Jurisdiction,** Ecology can develop a dynamic map outlining unincorporated jurisdictions with greater geographic fidelity than what is represented in this project's static basemaps. Before the final publication of any map, Ecology can continue to conduct quality assurance assessments of underlying data to ensure that it is as up to date as possible. Ecology can also develop a process to ensure that data is maintained to be as current as possible moving forward.

Appendix A: Interview Summaries

To maintain the confidentiality of our interviews, the summaries below have omitted identifying information deemed irrelevant to the project's research. Along with this, several interviews that did not include city-based solid waste staff were omitted entirely as the information discussed would have made the participant easy to identify. These summaries were drafted by project consultants immediately following the conclusion of each interview and work to identify key themes and areas for further research.

Interview 1

Performance fees are common in King County hauler contracts, but city staff has difficulty finding the time to learn them. Using fees can also feel like a waste of time as fee amounts are relatively small. Haulers are aware of this gap in enforcement and may use it to their advantage. Having dedicated staff for contract management would help with contract compliance, but hiring it is hard to justify because many are unaware of the issues with enforcement.

Much of the data provided by the hauler is self-reported, making it possible to misrepresent. Due to the pandemic, haulers generally reported a decrease in commercial waste and an increase in residential reflecting remote work. In this case, hauler data did not reflect this trend. When asked why this was, hauler reports began to reflect that trend without explanation for the reversal.

Generally, data reports are sufficiently accurate, but it is unclear how haulers are collecting that data or their underlying calculations. Additional tensions with haulers came from disagreements about contract interpretation that have resulted in lengthy legal battles.

Interview 2

In this city, there is no dedicated full-time staff managing solid waste contracting. Management responsibilities have been divided up among many city employees. High turnover in public works has led contract management in this city to fall behind. The hauler is contractually obligated to provide the city with a monthly report on the tonnage of residential waste collected, but the hauler frequently falls behind on reporting, in some instances reporting three months late. Reports may come in late, but in the end, each month is accounted for.

One possible solution to save resources on contract enforcement is to jointly contract with nearby cities, but contracts expire years away from each other making the option difficult to

implement. It is difficult to know what contract provisions should be pursued, how to cut costs, or what other cities are paying. Information sharing, specifically about what other cities are doing in their contracts, would be helpful for cities entering negotiations. Along with this, solid waste training for city staff would be helpful for managing data from the hauler.

Interview 3

This city's relationship with its hauler operates more from a partnership perspective. From this relationship, the hauler is more cooperative with outreach campaigns not directly stipulated in the contract. The city has dedicated solid waste staff to use performance fees but exercises discretion on when they are applied based on the circumstances. The hauler also reports the frequency of missed pickups, with fines being applied when the rate is above a threshold.

On some routes, customer bins are checked for contamination prior to solid waste trucks being dispatched. Drivers also use cameras on vehicles to check for contamination. This city is largely supportive of greater coordination between solid waste contracts. Cities contract with haulers for their unique needs, but there is a large overlap in what cities are contracting for.

Interview 4

After being incorporated, this city began to contract with the solid waste hauler that had previously serviced it under its UTC franchise area. Contract management responsibilities are parsed out to many employees with no full-time staff in solid waste management. Contract enforcement has also been made more difficult to use due to the relationship between a high-ranking city official and the hauler. Such a relationship has made the use of performance fees and other enforcement mechanisms uncomfortable due to the conflict of interest. Another enforcement barrier comes from data reporting.

City officials will often ask for data from the hauler and receive an acknowledgment of the request, but data will not be supplied unless frequent follow-up attempts are made. Community outreach is considered a key to reducing contamination, but lack of outreach has left customers ill-informed about what is recyclable. Customer service offered by the hauler has also fallen short of city expectations. Customer service staff have given inaccurate information to customers and in some cases have charged customers for mandatory services that are optional by contract. Training sessions on effective outreach techniques and coordinating outreach would be useful resources from the state.

Interview 5

Interviewees oversee the city's solid waste contract with Waste Management, which took over billing and hauling responsibilities in recent years. Compared to the UTC, this contract allows the city to negotiate better rates and facilitate higher levels of customer service (due in large part to a strong relationship with the hauler). Primary goals include consistent high-level customer service, promotion of waste reduction and recycling (including public education), and reduction of contamination. Rate reductions are provided by the city for age, disability, and income.

Waste Management uses the *Enspire* data management system (internally developed) to track service levels, tonnage hauled, and billing models. This system provides the city with monthly data on customer levels and commodity values. The city understands that Waste Management is a large corporation and that other jurisdictions interested in the contracting process should include more than they anticipate needing in their contracts during the RFP process. The city faces challenges regarding changes to services and how they are communicated with customers by the haulers. Large call centers can present a barrier to responsive customer service. The city believes there is a need for more qualitative data and more standardized outreach and material processing. Educational outreach needs to be *transcreated*—or informed directly by communities with specific linguistic and cultural needs.

Interview 6

The interviewee emphasizes that no single contract between a jurisdiction and a hauler can address every possible eventuality. Risks from this can be mitigated by maintaining a good relationship with the hauler. An example of the benefits was given when the extreme heat wave last year forced drivers to make collections earlier in the day. Goals for recyclables collection included equity and consistency, value and customer service for ratepayers, and maintaining a good relationship with the hauler. The city's hauler was selected through competitive procurement, which they claim allows for more services than would be offered through the UTC.

The interviewee considers the contract option better at setting competitive rates and avoiding political complications. The hauler provides data on contamination, diversion, participation, tonnage, and revenue, allowing the city to make monthly and yearly comparisons. They consider this data self-reported yet reliable, but they would like more data on dropbox and compactor locations. They emphasize the importance and effectiveness of contract provisions addressing contamination, customer service, and educational outreach. One barrier to reaching their solid waste goals is the economics of multifamily housing, where residents might be

indirectly aware of their waste management and collection rates.

Interview 7

This interviewee was from a relatively large city but was the only staff member working in solid waste management. Other city staff lack experience managing solid waste, making it difficult to draw attention to niche issues. The city can assess performance fees on the hauler, but in practice the city has not used this tactic. This practice is being reconsidered as service quality from the hauler has declined, resulting in poor customer service and high amounts of missed pick-ups.

Hauler-reported data has been used to revise accepted materials lists in an effort to reduce material contamination, but the interviewee highlighted the problem of misaligned interests between city staff and solid waste haulers. Solid waste haulers are willing to include non-recyclable materials in their contracts in order to build leverage during the negotiation process, leading to non-recyclable materials being included in recyclable material lists. To reduce contamination, the city holds free outreach events and hires an outreach consultant for multi-family complexes.

Source References

Works Cited

2019 Comprehensive Solid Waste Management Plan (King County, p. 334). (2019). King County Solid Waste Division. https://kingcounty.gov/depts/dnrp/solid-waste/about/planning/comp-plan.aspx

Note: This document provides our team with an in-depth description of King County's existing solid waste processing system along with forecasting, data, sustainable materials management policies, transfer and processing policies, and an overview of system finances. This report includes a spreadsheet that summarizes single-family collection services in the incorporated cities of King County and the unincorporated county land. This includes information on the type of collection (collection company, contract or UTC, etc), recycling and organics car size, collection frequency, fee structure, and disposal and recycling rates. Primarily, this resource will be used to help the team identify questions for interview candidates in King and other counties. It will also help us develop recommendations for Ecology regarding opportunities for system improvements and best practices.

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Nidhi Upadhyaya. (2019, August 28). Recycling is going to waste! *Atlantic Council*.
https://www.atlanticcouncil.org/blogs/energysource/recycling-is-going-to-waste/

Peter Guttchen, Heather Church, Gimpel, S., Shannon Jones, & Amber Smith. (2021). *Recycling Contamination Reduction Best Management Practices & Resources Companion Guide* (p. 139). Department of Ecology. https://ecology.wa.gov/Waste-Toxics/Reducing-recycling-waste/Strategic-policy-and-planning/Contamination-reduction#:~:text=In%202019%2C%20the%20Washington%20Legislature,state%20to%20reduce%20recycling%20contamination.

Note: This report identifies best management practices and resources to help with the reduction in solid waste contamination. These resources add to Washington State's Recycling Contamination Reduction and Outreach Plan (CROP).

Responsible Recycling Task Force Recommendations to Achieve a Responsible Recycling System. (2019). King County Solid Waste Division. https://doh.wa.gov/community-and-environment/health-equity/environmental-justice

Note: This report is an example of educational material geared to contract managers. It outlines current contract provisions being used and provides sample contract language to implement in future contracts. The report emphasizes using contract provisions to ensure waste material is sent to MRFS that has the real-time capacity to recycle delivered materials, as often materials are rejected at MRFS due to misaligned capacity. Provides examples of contracts being used.

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Additional Resources

[UTC Solid Waste Service Maps - By County](#)
This is a map that shows which companies hold solid waste authority to operate in specific counties across Washington State.

[UTC GIS Portal](#)
This portal contains a map of Washington that shows the geographic area served by each WUTC Solid Waste certified solid waste franchise.

[UTC Franchise Areas](#)
This spreadsheet shows the data displayed in the above map on the name of each WUTC certified franchise, the types of material collected, and regions served.

[King County Draft Contract-Shed Map](#)
This map details the residential municipal solid waste haulers of the incorporated cities of king county and the areas that they serve. This map serves as an example of the level of detail that may be extracted for county case studies.

[Washington Solid Waste Facilities](#)
This spreadsheet identifies all of Washington's solid waste recovery and disposal facilities. This information includes facility type, location, operational status, permit status, ownership type, and contact information.

[Washington County 2021 Tipping Fee Data](#)
This slide includes the 2021 Municipal Solid Waste Tipping Fee data for each Washington county on a per ton basis.

[Access to Curbside Service Map – 2016](#)
This map identifies counties with curbside recycling services, Materials Recovery Facilities, drop-off recycling locations, and cities with curbside recycling. The map shows that the counties with curbside recycling are concentrated around Puget Sound and Spokane.

[Municipal Solid Waste Flow Map](#)
This document includes a map of the source counties for municipal solid waste (MSW) and a map of the landfills the waste flows to. Additionally, the information is presented graphically, with bar graphs displaying the amount of MSW produced by each county and the corresponding landfill(s) it was deposited in.

[Presentation: Flow of Recyclables to Material Recovery Facilities in WA State by County (arcgis.com)](arcgis.com)

This map displays the location of the Material Recovery Facilities in Washington and which counties each of them serves.

[Flow Control Ordinances]

This spreadsheet identifies which Washington counties have Flow Control Ordinances, a URL link to the ordinance, and contact information for a municipal point of contact. This document is somewhat incomplete and should be used with caution.

[Local collection, processing, and planning contracts and contracting resources]

This resource includes a multitude of items. It contains contracts present in different cities and counties within the state- their associated costs and planning, along with the zero Washington reports which provide an overview of garbage and recycle collection services in different jurisdictions within the state.

[2021 Approved Solid and Hazardous Waste Plans]

This folder contains copies of every county's Solid and Hazardous Waste Plans. Additionally, this folder includes the State's Solid and Hazardous Waste Plan. These plans will be reviewed by the team and used to develop a holistic understanding of management plans across the state.