



State of Oregon Department of Environmental Quality

# Rule Concept: Recycling Material Acceptance Lists, Part One

Plastic Pollution and Recycling Modernization Act (SB 582, 2021) Rulemaking Advisory Committee Meeting 3 of 5, Rulemaking 1

Oct. 27, 2022

## Background

The current rulemaking will establish Oregon’s first statewide recycling material acceptance lists. This memo provides initial draft rule concepts regarding the placement of many materials on two separate material acceptance lists:

1. The **Local Government Recycling Acceptance List**, containing materials that regulated local governments providing recycling service under the Opportunity to Recycle Act must provide recycling opportunities for (potentially at on-route collection, depots, or both), and
2. The **PRO Recycling Acceptance List**, containing materials that producer responsibility organizations commonly known as/or PROs must provide additional collection and recycling opportunities for, such as at depots.<sup>1</sup>

## Establishing and changing material acceptance lists

The Plastic Pollution and Recycling Modernization Act provides for several methods for establishment of and adjustments to acceptance lists. All of these mechanisms allow for adaptability and changes to collection services over time.

- **Rulemaking:** Both local government and PRO recycling acceptance lists can be changed by rule.
- **PRO choice:** PROs may collect additional materials at depots or support additional recycling opportunities.
- **Local government choice:** Local governments may collect additional materials, such as batteries or textiles, through their local collection programs, so long as materials not on the Uniform Statewide Collection List (a subset of the Local Government Recycling Acceptance List) are not added to commingled collections.
- **PRO Program plan:** ORS 459A.914(4)(b) creates an “on-ramp” for adding materials to the Uniform Statewide Collection List (USCL). A PRO may propose, via its program plan or plan amendment, a change to the USCL. That proposal is subject to all the standards for review of a program plan or plan amendment, including public comment and review by the Oregon Recycling System Advisory Council. DEQ may accept or reject the proposal; acceptance results in the material being added to the USCL.

## Statutory evaluation criteria

Statute (ORS 459A.914(3)) requires the Environmental Quality Commission (“the commission”) to consider the following criteria when adding materials to an acceptance list by rule:

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<sup>1</sup> Depot collection of materials by PROs could take several different forms, including expansion of existing (local government/service provider) recycling depots, return-to-retail collection, stand-alone drop boxes collecting individual materials, and new, multi-material recycling depots.

- (a) The stability, maturity, accessibility and viability of responsible end markets;
- (b) Environmental health and safety considerations;
- (c) The anticipated yield loss for the material during the recycling process;
- (d) The material's compatibility with existing recycling infrastructure;
- (e) The amount of the material available;
- (f) The practicalities of sorting and storing the material;
- (g) Contamination;
- (h) The ability for waste generators to easily identify and properly prepare the material;
- (i) Economic factors;
- (j) Environmental factors from a life cycle perspective; and
- (k) The policy expressed in ORS 459.015(2)(a) to (c).

DEQ's 2022 evaluation of materials against these criteria is summarized in Appendix 1.

### **Consequences of adding any material to an acceptance list**

Establishing material acceptance lists is a cornerstone for implementation of the Act. Many other elements of the Act depend on, or are informed by, the acceptance lists that will first be established by this administrative rule in 2023. The addition of any material to a recycling acceptance list results in a number of consequences. These include but are not limited to the following:

1. Regulated local governments must collect for recycling materials on the Local Government Recycling Acceptance List. If collected commingled, these materials may only be sent to a commingled recycling processing facility that is permitted, certified, or meets similar standards.
2. PROs must collect and recycle materials on the PRO Recycling Acceptance List, and meet convenience standards, collection targets and performance standards for those materials.
3. Commingled recycling processing facilities and PROs will be required to provide DEQ with quarterly material disposition reporting for all materials each entity is responsible for collecting, processing, and marketing to a responsible end market.
4. Properly prepared materials are prohibited from disposal once separated for recycling.
5. Materials not on these acceptance lists are, by definition, "contamination". Such a designation imposes additional requirements on local governments (regarding public outreach), processors and PROs. For example, local governments are required to implement programs to reduce contamination at the point of separation and collection, and processors are required to separate contamination from recyclable materials.
6. PROs are required to develop outreach materials and conduct campaigns encouraging proper recycling of designated materials.
7. Commingled recycling processing facilities are required to effectively sort materials on the USCL and send them to end markets that meet standards for "responsible end markets".
8. Commingled recycling processing facilities will receive funding from the Contamination Management Fee to handle and dispose of contamination (materials not on the USCL), if the facility is treating the material as contamination.
9. PROs are obligated to ensure that materials collected for recycling on their designated list, as well as materials collected for recycling on the USCL are delivered to responsible end markets, managed according to the hierarchy of materials management options under ORS 459.015(2) and managed in an environmentally protective way through to final disposition.
10. PROs are required to design fees charged to members to differentiate between types of covered products and the materials and formats that comprise those covered products. Fees charged for different types, materials and formats of covered products must be proportional to the cost to the PRO for that covered product type, material or format. Additionally, average fees on materials not accepted for recycling must be higher than average fees on materials that are accepted for recycling.

## Concepts for discussion at Nov. 9, 2022 RAC meeting

The two rule concepts contained in this document involve recommendations for the placement of many materials that DEQ has evaluated. Given the large number of materials and the complexity involved in evaluation, DEQ has not yet completed all evaluation, or prepared recommendations for all materials.

Materials have been placed onto the following four lists:

1. Materials currently recommended for placement on the Local Government Recycling Acceptance List. These materials are named in rule concept #1, below.
2. Materials currently recommended for placement on the PRO Recycling Acceptance List. These materials are named in rule concept #2, below.
3. Materials that DEQ is still actively evaluating. DEQ hopes to discuss some of these materials with the Rulemaking Advisory Committee at its November 9 meeting, and after additional evaluation is complete, will then recommend placements for these materials to discuss at the Committee’s subsequent meeting (January 11, 2023).
4. All other materials.

### Rule concept for discussion: Local Government Recycling Acceptance List

DEQ is recommending that the Environmental Quality Commission, as authorized under ORS 459A.914(1)(a), designate the following materials as “materials collected to provide the opportunity to recycle.” Such a designation will require regulated local governments to provide recycling opportunities for them. Figure 1 lists each material and notes whether the material must be collected via on-route collection, at depots, or both, and whether or not the material is suitable for commingled recycling.

Materials designated by the commission as suitable for commingled recycling are automatically placed on the USCL. That designation *allows* local governments to collect them in a commingled manner, although commingled collection is not required. The consequences to local governments of these designations are detailed further in DEQ background paper “[Oregon’s Opportunity to Recycle Requirements Relative to Proposed Materials Acceptance Lists](#)”

**Figure 1. Recommendations for Local Government Recycling Acceptance Lists**

Materials	Required for On-Route Collection	Required for Depot Collection	Suitable for Commingled Collection (USCL)
Corrugated cardboard: uncoated or coated with recycle-compatible coating. Includes pizza boxes.	✓	✓	✓
All kraft paper (such as paper bags, mailers)	✓	✓	✓
Uncoated paperboard packaging (e.g., cereal, cracker, and medicine boxes)	✓	✓	✓
Polycoated cartons (e.g., milk cartons), aseptic cartons, and polycoated paper cups	✓	✓	✓
Molded pulp packaging (but not food serviceware)	✓	✓	✓
Tissue paper (packaging, not sanitary)	✓	✓	✓
Non-metalized gift wrap	✓	✓	✓

Materials	Required for On-Route Collection	Required for Depot Collection	Suitable for Commingled Collection (USCL)
High-grade office paper	✓	✓	✓
Newspaper/newsprint	✓	✓	✓
Magazines, catalogs and similar glossy paper	✓	✓	✓
Telephone directories	✓	✓	✓
Other printing and writing paper (e.g., envelopes, “junk mail”, cards)	✓	✓	✓
Paperback books	✓	✓	✓
Aluminum food and beverage cans	✓	✓	✓
Steel and bi-metal cans, including empty/dry metal paint cans	✓	✓	✓
Scrap metal less than 10 pounds in weight and 18” in length – no sharp items (e.g., knives) or “tangles” (bicycle chains, wire, etc.)	✓	✓	✓
Other scrap metal		✓	
Plastic bottles and jugs, 6 ounces and larger: PET (#1) (clear only); natural and colored HDPE (#2) and LDPE (#4); clear and colored PP (#5). Caps OK if screwed on.	✓	✓	✓
Plastic tubs (e.g., cottage cheese), 6 ounces and larger: PET (#1), HDPE (#2), LDPE (#4) and PP (#5)	✓	✓	✓
Plastic buckets, pails, storage containers and other packaging that fits loosely in the generator’s provided on-route collection container: HDPE (#2) and PP (#5)	✓	✓	✓
Clear plastic cups: PET (#1) and PP (#5)	✓	✓	✓
Motor oil		✓	

Major factors that support inclusion of each material on the Local Government Recycling Acceptance List, and other considerations worth noting, are summarized in Appendix 2.

### Rule concept for discussion: PRO Recycling Acceptance List

DEQ is recommending that the Environmental Quality Commission, as authorized under ORS 459A.914(1)(b), designate the following materials as “covered products of which a producer responsibility organization must provide for the collection through recycling depot or mobile events as provided in ORS 459A.896.”

- Steel and aluminum aerosol packaging
- Aluminum foil and pressed foil products
- Shredded paper
- Polyethylene film
- Plastic buckets, pails and storage containers (HDPE and PP)

Appendix 3 summarizes major factors that DEQ considered in developing this recommendation.

The first three materials listed above are currently accepted in the commingled collection programs of local governments in the Metro region and several other communities. Since these materials are not recommended for inclusion in the uniform statewide collection list, local governments would be prohibited from collecting them as part of their commingled programs starting July 1, 2025.

Plastic buckets, pails and storage containers, or HDPE and PP, are recommended for inclusion on both local government and PRO recycling acceptance lists. While local government collection provides higher convenience, oversized items will not fit into curbside collection carts, and so PRO depots would provide a complementary service for those materials.

ORS 459A.914(7) requires the commission establish rules for collection targets, convenience standards and performance standards for PROs that collect these covered products. A rule concept relating to such targets and standards will be discussed at the Jan. 11, 2023 RAC meeting.

## **Additional topics for discussion at Nov. 9, 2022 RAC meeting**

### **I. Materials still under active consideration**

The following materials are still under evaluation by DEQ. If time allows, DEQ will share some background information on select items at the Nov. 9 meeting of the RAC.

- Glass packaging
- Nursery (plant) packaging (e.g. pots, trays)
- Block white expanded polystyrene
- PET thermoform packaging (e.g., berry clamshells)
- PE and PP lids
- Paper “cans” with metal ends (e.g., coffee, nuts or snacks canisters)
- HDPE package handles (e.g., 6-pack handles)
- Large metal appliances (e.g., refrigerators)
- Single-use propane canisters

DEQ plans to bring recommendations regarding the placement of these materials to the Rulemaking Advisory Committee for discussion at its next meeting (Jan. 11, 2023).

### **II. Other materials**

Materials not listed in any of the prior sections have either not been evaluated by DEQ or have been evaluated and DEQ is recommending against placement of them on either acceptance list at this point in time.

A few particularly noteworthy materials are summarized here:

- **Polyethylene tubes, such as recyclable-compatible toothpaste packaging**  
The three largest toothpaste producers have all committed to switching many of their brands’ packaging to an all-HDPE tube, which would improve recyclability. Once this has occurred, material recovery facilities (MRFs) could target this material for sorting and recycling. Eventually, other types of tubes (e.g., sunscreen) could also be included. However, until the very large majority of tubes are packaged in such a recyclable format, it would be very expensive for MRFs to sort this material.

- **Food serviceware items not listed above (such as molded pulp and plastic clamshells)**  
While technically recyclable, these materials have the potential to bring with them significant amounts of contamination, especially in the form of residual sauces. While a producer organization (Foodservice Packaging Institute) provided DEQ with limited evidence that food serviceware items such as these are no more contaminated than other commingled recyclables, the evidence was dated. DEQ is particularly concerned about potential contamination if these materials are collected for recycling at locations where users cannot adequately wash and prepare them, such as quick service restaurants and food carts.
- **Bulky HDPE and PP products (such as patio and children's furniture)**  
Oregon discards relatively large quantities of HDPE and PP products. Given their bulky size, they are relatively easy to identify and separate. Such products could be collected and recycled with bulky large packaging. However, these materials are not a covered product, only local governments could mandate recycling them at a depot. Given the many other changes at such depots resulting from implementation of the Act, DEQ recommends against mandating acceptance of this material at this time.

## Appendix 1: Material acceptance list evaluation criteria and methods

ORS 459A.914(3) requires the Environmental Quality Commission to consider multiple criteria prior to placing a material on a recycling acceptance list. DEQ, on behalf of the commission, is undertaking a multi-faceted evaluation of materials. While that evaluation is not yet complete, many results are available. This appendix summarizes evaluation criteria, process and current findings.

### Criteria

The commission is required to consider the following criteria:

- a) The stability, maturity, accessibility and viability of responsible end markets;
- b) Environmental health and safety considerations;
- c) The anticipated yield loss for the material during the recycling process;
- d) The material's compatibility with existing recycling infrastructure;
- e) The amount of material available;
- f) The of sorting and storing the material;
- g) Contamination;
- h) The ability for waste generators to easily identify and properly prepare the material;
- i) Economic factors;
- j) Environmental factors from a life cycle perspective; and
- k) The policy expressed in ORS 459.015 (2)(a) to (c).

DEQ has not prioritized the criteria, although some factors are more important than others. For example, a material that lacks *stable, mature or viable end markets* is a poor candidate for inclusion, even if there are large *amounts of material available*. In contrast, a material with stable, mature and viable end markets might be a good candidate for acceptance even if the amount of material available is small, and especially if it can be co-collected with other materials.

DEQ's evaluation of materials against these criteria is largely organized into two major tracks: evaluation at the level of individual materials, and evaluation of materials in the context of larger, whole-system scenarios. These are described in turn below.

### Evaluation at the level of individual materials

DEQ has chosen to evaluate many of the criteria in ORS 459A.914(3) at the level of individual materials. A description of methods used to gather information to conduct that evaluation and preliminary results are provided later in this appendix. Here we summarize the relevant statutory criteria:

- Relating to responsible end markets:
  - "Stability" and "maturity" may consider both historic and anticipated near-term future considerations, and address both presence of the responsible end market (availability to use materials) and stability of prices. Further, a market with a single or limited number of buyers would be considered "less stable".
  - "Accessibility" is largely a measure of location and distance (and by extension, cost to access).
  - "Viability" is a summation of prior sub-criteria and any other relevant considerations.
- "Environmental health and safety" is primarily a qualitative measure that considers safety and health impacts for workers handling the material, and whether the end market(s) is (are) likely to properly manage contaminants that may show up in a materials bale.

- “Compatibility with existing recycling infrastructure” is split here into two sub-criteria: compatibility with *commingled* collection and processing, and compatibility with *separate* (non-commingled) material collection and processing. Note that drop-off collection can be either commingled or separated.
- “Amount of material available” considers the quantity of material *generated* as projected for the year 2025 by Cascadia Consulting Group. It considers both the quantity of materials available as individual materials, as well as in potential combination with each other. In some cases, the amount of material is not known; in some of these cases, materials are likely to be aggregated together with similar materials (e.g., polypropylene bottles and polypropylene tubs are likely to be managed in the same way by a processing facility).
- “Practicalities of sorting material” relates primarily to a commingled recycling processing facility’s ability to properly separate the material from other materials if collected in a commingled collection system.
- “Practicalities of storing material” may consider the practicality of storing the material unbaled (e.g., volume requirements relative to weight/value), the ability of the material to be baled or otherwise densified, and the practicality of storing baled material (including how quickly the bales might move and whether they are subject to potential degradation during storage, such as due to moisture).
- “Contamination” includes two considerations:
  - The potential of a material to bring contamination with it (e.g., cardboard often brings tape and/or staples; food containers may bring food into the system; the acceptance of some recyclable plastics may lead generators to include other non-recyclable plastics; etc.).
  - The nature of the contamination, the potential for “look-alike” contamination, its ability to be removed in a commingled recycling processing facility, and potential impacts downstream. For example, food that is included with aluminum foil is not practical for a MRF to remove.
- “Ability for waste generators to easily identify and properly prepare the material” relates to both identification and proper preparation of materials.
- “Policy in ORS 459.015(2)(c)”: For purposes of this evaluation, this relates to the ability of the material to be recycled via responsible end markets that result in the greatest reduction of net negative impacts on human well-being and environmental health, responsible end markets that displace the production of more impactful materials, and processes that best preserve the value and molecular structure of the material being recycled. Where value and molecular structure is preserved (e.g., mechanical recycling), materials are given a high score if displacing high impact materials (e.g., aluminum) or a slightly lower (but still above average) score if displacing lower-impact materials (e.g., corrugated cardboard). Where value and molecular structure is not preserved (e.g., pyrolysis) materials are given a moderate score if displacing higher-impact materials (e.g., styrene resin, diesel fuel) or a slightly lower score if displacing lower-impact materials.

Many of these criteria also factor into a parallel evaluation of whole-system scenarios. For example, scenario-level evaluation considers accessibility of end markets, compatibility with existing recycling infrastructure, amounts of material available, practicalities of sorting material, and contamination.

### **Evaluation at the level of whole-system scenarios**

DEQ is primarily evaluating materials against additional criteria in ORS 459A.914(3) using whole-system scenario modeling. Details of this modeling are provided later in this appendix. Not all materials are



included in this scenario-level evaluation; for example, materials that scored poorly against multiple criteria above were not advanced for further evaluation.

The criteria that are primarily evaluated via scenario modeling are:

- “Anticipated yield loss” considers product loss at all stages of the recycling process (collection, processing/sorting, and end markets). The models used to estimate material flows and disposition account for yield loss in collection and processing/sorting, while the models used to evaluate environmental impacts account for yield loss at end markets.
- “Economic factors” consider both transactional costs (such as fuel, labor, and capital) as well as externalized costs (such as economic damages resulting from pollution).
- “Environmental factors from a life cycle perspective” are evaluated primarily based on quantitative data (where available) concerning life cycle impacts such as greenhouse gas emissions, depletion of nonrenewable resources, air and water toxics, etc. Most of this evaluation occurs at the level of whole scenarios as opposed to individual materials, in parallel with the evaluation of “economic factors”.
- “Policy in ORS 459.015(2)(a) and (b)”: These criteria have limited relevance to recycling acceptance list recommendations, although (a) is considered as part of the quantitative evaluation of “environmental factors from a life cycle perspective” (described above).

### **Information gathering/evaluation activities**

DEQ’s information gathering and evaluation has included multiple elements, summarized below:

In February 2022 DEQ convened a Technical Workgroup that was chartered to help provide information, review draft materials, and provide feedback regarding evaluation methods and results. [Membership of the Workgroup](#) included a cross-section of subject matter experts drawn from across Oregon, the U.S. and Canada. The Workgroup met for 28 hours over [six meetings](#) held between March and September. All meetings were open to the public and included opportunities for public input. Three members of the Rulemaking Advisory Committee (Nicole Willett, Jerry Powell, and Rosalynn Greene) also participated in that Workgroup.

Also in February, DEQ published a [request for information](#) that generated thousands of pages of responses from a wide variety of organizations, including organizations representing producers and material suppliers. Many of the organizations that submitted information were then invited into conversations for clarification and additional questions, including discussions with the Technical Workgroup.

DEQ has also held many conversations with other parties, including producers, their suppliers, processors, end markets, and other subject matter experts.

All of the information gathered through those processes informed an evaluation matrix (provided below). DEQ shared multiple iterations of that matrix with the Technical Workgroup and sought members’ feedback on it over the course of several meetings.

In parallel, DEQ has also undertaken several types of quantitative analysis:

- The Department conducted screening-level life cycle assessments of more than 80 different disposition pathways for three specific materials: glass, expanded polystyrene, and polycoated containers. Results of these assessments are summarized below.
- Working with local partners, DEQ coordinated surveys of more than 800 users of recycling depots across the state to better understand their use and driving behaviors. In parallel, DEQ also

conducted interviews with a panel of recycling partners across the state to gain their insights on how people in their communities might respond to a network of producer responsibility organization (PRO) depots in the future.

- DEQ has contracted with Cascadia Consulting Group to conduct extensive modeling of whole-system scenarios. Scenarios involve projecting the flow and disposition of over 50 discrete types of materials, originating in four geographic groupings across the state, and managed through multiple modes (on-route collection and self-haul; garbage and recycling; single-family, multi-family and non-residential). Material flows are then used to estimate transactional (financial) costs, such as labor, fuel and capital. This modeling, which is being undertaken by Cascadia and subcontractors Bell & Associates and Circular Matters, is being undertaken in two phases. The first phase, which is nearly complete, involves a baseline scenario that represents the state's recycling system as provided by local government services and programs largely as it exists today, along with 17 different possible future scenarios. The second phase, which begins in late October, will evaluate four additional scenarios.
- DEQ uses the material disposition projections from Cascadia to inform the quantitative evaluation of life cycle environmental impacts. This analysis relies heavily on DEQ's peer-reviewed [Waste Impact Calculator](#), which generates estimates of multiple types of environmental impacts such as fossil fuel depletion and the emissions of respiratory pollutants. Damage cost factors are used to convert these impacts to estimates of social costs – for example, estimates of the costs such pollution imposes upon the economy – for a more complete assessment of economic impacts. This expanded view of economic impacts, while more comprehensive than consideration of transactional costs alone, remains incomplete, as several important economic benefits resulting from implementation of the Act are not quantified by DEQ. These include reductions in marine debris and burning of plastics associated with exports, stability in collection services and supply chains for domestic industries, and improved public confidence.

## Summaries of qualitative evaluation results

The following table provides a summary of DEQ’s evaluation of individual materials against many of the criteria contained in ORS 459A.914(3). Criteria were described previously. Most materials are evaluated against criteria using a summary score using a range of 1 – 5, as follows:

- 1 = Material is rated against the stated criteria as generally negative from the perspective of an effective recycling system
- 2 = Material is rated negatively against the stated criteria, but concerns are not as strong as a “1” and/or are counterbalanced by some positive considerations
- 3 = Material is rated neutrally against the stated criteria, potentially due to the presence of both positive and negative considerations
- 4 = Material is rated positively against the stated criteria, but positive features are not as strong as a “5” and/or are counterbalanced by some negative considerations
- 5 = Material is rated against the stated criteria as generally positive from the perspective of an effective recycling system
- “NK” = Not known
- “SV” = Significant variability (for example, may depend on end market)

Material:	Stability and maturity of responsible end markets	Accessibility of responsible end markets	Viability of responsible end markets	Compatibility with existing recycling infrastructure: commingled collection and processing	Compatibility with existing recycling infrastructure: separated material collection	Amount of material available	Practicalities of sorting	Practicalities of storing	Contamination	Ability for waste generators to easily identify and properly prepare material	Environmental health and safety considerations	Policy in ORS 459.015 (2)(c)	Other
<b>Figure 2: Qualitative evaluation results summary</b>													
<b>Paper packaging (uncoated and coated)</b>													
Old corrugated containers (OCC) – uncoated, ex. pizza boxes	5	5	5	5	5	5	5	4	4	4	5	4	
Pizza boxes	5	5	5	5	5		5	4	3	4	5	4	
Old corrugated containers (OCC) – wax coated, not recycle compatible (as paper)	3	2	2	1	2	4	1	3	1	3	4	NE	

<b>Figure 2: Qualitative evaluation results summary</b> Criteria→	Stability and maturity of responsible end markets	Accessibility of responsible end markets	Viability of responsible end markets	Compatibility with existing recycling infrastructure: commingled collection and processing	Compatibility with existing recycling infrastructure: separated material collection	Amount of material available	Practicalities of sorting	Practicalities of storing	Contamination	Ability for waste generators to easily identify and properly prepare material	Environmental health and safety considerations	Policy in ORS 459.015 (2)(c)	Other
<b>Material:</b>													
Old corrugated containers (OCC) – other coated, recycle compatible	5	5	5	5	5	5	5	4	4	4	5	4	
Single-wall kraft packaging (e.g., grocery bags)	5	5	5	5	5	5	5	4	5	5	5	4	
Other multi-layer kraft packaging (e.g., paper padded mailers)	5	5	5	5	5		5	4	5	3	5	4	
Non-poly coated paperboard packaging (e.g., cereal, cracker, cosmetic, medicine boxes)	4	4	5	5	5	5	5	4	4	4	3	4	
Molded pulp packaging (e.g., egg cartons, other protective packaging)	5	5	5	5	5	5	5	4	4	5	3	4	
Molded pulp food serviceware (e.g., take-out “clamshells”)	1	2	1	3	4	NK	5	3	1	2	3	4	
Gable-top and aseptic cartons (in mixed paper bale)	3	3	3	4	5	3	4	4	4	4	2	4	
Gable-top and aseptic cartons (in Grade 52 bale)	3	2	3	3	5	3	2	3	4	4	2	4	
Paper cups, coated and uncoated (in mixed paper bale)	3	3	3	4	5	3	3	4	3	4	2	4	
Paper cups, coated and uncoated (in Grade 52 bale)	3	2	3	3	5	3	2	3	3	4	2	4	

<b>Figure 2: Qualitative evaluation results summary</b> Criteria→	Stability and maturity of responsible end markets	Accessibility of responsible end markets	Viability of responsible end markets	Compatibility with existing recycling infrastructure: commingled collection and processing	Compatibility with existing recycling infrastructure: separated material collection	Amount of material available	Practicalities of sorting	Practicalities of storing	Contamination	Ability for waste generators to easily identify and properly prepare material	Environmental health and safety considerations	Policy in ORS 459.015 (2)(c)	Other
<b>Material:</b>													
Other polycoated packaging (e.g., some freezer and butter boxes, poly-lined deli wrap, animal feed bags) (in mixed paper bale)	2	2	2	4	5	NK	4	4	4	4	2	4	
Other polycoated packaging (e.g., some freezer and butter boxes, poly-lined deli wrap, animal feed bags) (in Grade 52 bale)	2	2	2	3	5	NK	2	3	4	4	2	4	
Other polycoated or clay coated food serviceware (e.g., take-out boxes, food boats, paper plates) (in mixed paper bale)	1	2	1	2	3	NK	2	2	1	3	2	4	
Other polycoated or clay coated food serviceware (e.g., take-out boxes, food boats, paper plates) (in Grade 52 bale)	1	2	1	2	3	NK	1	2	1	3	2	4	
Tissue paper (packaging)	5	5	5	5	5	NK	4	4	4	4	3	4	
Non-metalized gift wrap	5	5	5	5	5	NK	4	4	2	2	3	4	
<b>Printing and writing paper, paper products (non-packaging)</b>													
High-grade office paper (uncoated)	5	5	5	5	5	4	5	4	5	5	4	4	
Newspaper, newsprint	5	5	5	5	5	5	5	4	5	5	4	4	
Magazines and other coated paper (e.g., catalogs)	4	4	5	5	5	5	5	4	4	5	3	4	

<b>Figure 2: Qualitative evaluation results summary</b> Criteria→	Stability and maturity of responsible end markets	Accessibility of responsible end markets	Viability of responsible end markets	Compatibility with existing recycling infrastructure: commingled collection and processing	Compatibility with existing recycling infrastructure: separated material collection	Amount of material available	Practicalities of sorting	Practicalities of storing	Contamination	Ability for waste generators to easily identify and properly prepare material	Environmental health and safety considerations	Policy in ORS 459.015 (2)(c)	Other
<b>Material:</b>													
Telephone directories	4	4	5	4	5	5	4	4	5	5	3	4	
"Low grade" printing and writing paper (e.g., bulk mail, envelopes)	4	4	5	5	5	5	5	4	4	5	3	4	
Shredded paper	5	5	5	2	5	2	2	4	3	5	3	4	
Hardcover books (collected commingled)	4	4	4	2	N/A	2	2	4	4	5	3	4	
Paperback books	4	4	5	5	5	NK	5	4	4	5	3	4	
<b>Plastic packaging and products: bottles, tubs, jars, tubes, bulky and other rigid products (&gt; 6 fluid ounces)</b>													
Clear PET bottles ≥ 6 ounces	5	5	5	5	5	5	4	4	4	4	4	5	
Clear PET other packaging, not thermoform (e.g., jars) ≥ 6 ounces	5	5	5	5	5	4	4	4	3	4	3	5	
Pigmented/opaque PET containers (including black PET) ≥ 6 ounces	2	2	2	2	2	NK	2	3	3	3	2	5	
Clear PET thermoform packaging, not food serviceware (e.g., produce boxes, egg cartons)	3	3	4	3	5	4	3	4	3	3	3	5	
Natural HDPE bottles ≥ 6 ounces	5	5	5	5	5	4	4	4	4	4	4	5	
Colored HDPE bottles ≥ 6 ounces	4	5	4	5	5	4	4	4	4	4	3	5	
Natural HDPE tubs and containers ≥ 6 ounces	5	5	5	5	5	4	4	4	4	4	4	5	
Colored HDPE tubs and containers ≥ 6 ounces	4	5	4	5	5		4	4	4	4	4	3	5

Figure 2: Qualitative evaluation results summary Criteria →	Stability and maturity of responsible end markets	Accessibility of responsible end markets	Viability of responsible end markets	Compatibility with existing recycling infrastructure: commingled collection and processing	Compatibility with existing recycling infrastructure: separated material collection	Amount of material available	Practicalities of sorting	Practicalities of storing	Contamination	Ability for waste generators to easily identify and properly prepare material	Environmental health and safety considerations	Policy in ORS 459.015 (2)(c)	Other
Material:													
HDPE pails and buckets	4	5	4	3	5		3	4	3	4	3	5	
Bulky HDPE products (e.g., laundry baskets, coolers, large toys and children’s furniture) (Note: not a “covered product”)	4	5	4	3	5	3?	3	4	4	3	3	5	
HDPE squeezable tubes (e.g., Colgate toothpaste [new], lotions/sunscreens)	4	5	4	2	5	NK	2	4	2	3	3	5	
LDPE rigid containers (not film) ≥ 6 ounces	4	4	4	2	5	1	2	4	4	4	3	5	
Other LDPE containers (not film) (e.g., squeezable bottles, tubes) ≥ 6 ounces	4	4	4	2	5	NK	2	4	2	3	3	5	
PP bottles ≥ 6 ounces	4	4	5	4	5	1	4	4	5	4	3	5	
PP tubs and other containers ≥ 6 ounces	4	4	5	4	5	4	4	4	4	4	3	5	
PP thermoforms, not food serviceware	4	4	5	4	5	3	4	4	3	3	3	5	
PP paint cans, empty and dry	4	3	4	4	5	NK	4	4	3	3	3	5	
Bulky other PP products (e.g., storage containers, laundry containers, outdoor furniture) (Note: not all “covered products”)	4	4	5	3	5	4	3	4	4	3	3	5	

<b>Figure 2: Qualitative evaluation results summary</b> Criteria→	Stability and maturity of responsible end markets	Accessibility of responsible end markets	Viability of responsible end markets	Compatibility with existing recycling infrastructure: commingled collection and processing	Compatibility with existing recycling infrastructure: separated material collection	Amount of material available	Practicalities of sorting	Practicalities of storing	Contamination	Ability for waste generators to easily identify and properly prepare material	Environmental health and safety considerations	Policy in ORS 459.015 (2)(c)	Other
<b>Material:</b>													
Non-bulky other PP products (e.g., DVD cases, kitchenware) (Note: not all “covered products”)	4	4	5	1	5		1	4	3	3	3	5	
Natural and colored PS packaging, excluding food serviceware, EPS (e.g., CD cases)	3	3	3	2	5	NK	2	4	4	4	3	SV	
<b>Plastic horticultural/nursery packaging</b>													
HDPE colored nursery containers (e.g., pots, trays, etc.)	3	4	3	3	5	NK	3	4	4	4	3	5	
LDPE colored nursery containers (e.g., pots, trays, etc.)	3	2	3	3	5	NK	3	4	4	4	3	5	
PP colored nursery containers (e.g., pots, trays, etc.)	3	4	3	3	5	NK	3	4	4	4	3	5	
PS colored nursery containers (e.g., pots, trays, etc.)	2	2	2	2	5	NK	2	4	4	4	2	SV	
<b>Small plastic packaging, lids, caps, and similar materials</b>													
Tub and container lids, e.g. yogurt container lids (multiple resins)	4	4	4	1	5	2	2	4	5	5	3	5	
Tub and container lids, e.g. yogurt container lids <u>co-collected with bottle caps</u> (multiple resins)	4	4	4	1	5	NK	2	3	4	5	3	5	



<b>Figure 2: Qualitative evaluation results summary</b> Criteria→	Stability and maturity of responsible end markets	Accessibility of responsible end markets	Viability of responsible end markets	Compatibility with existing recycling infrastructure: commingled collection and processing	Compatibility with existing recycling infrastructure: separated material collection	Amount of material available	Practicalities of sorting	Practicalities of storing	Contamination	Ability for waste generators to easily identify and properly prepare material	Environmental health and safety considerations	Policy in ORS 459.015 (2)(c)	Other
<b>Material:</b>													
HDPE 6-pack carriers (e.g., PakTech) (not LDPE ring carriers)	4	5	4	2	5	1	2	4	4	4	3	5	
Mixed resins small containers < 6 ounces	3	3	3	2	4	NK	1	2	3	3	3	5	
<b>Foamed packaging (excluding food serviceware)</b>													
Expanded PS: block and sheet foam	2	2	2	1	3	3	1	2	3	4	3	SV	
Expanded PS: packing peanuts	1	1	1	1	3		1	2	2	2	3	SV	
Expanded PS: other packaging and products, excluding food serviceware (e.g., coolers) (some not a covered product)	2	2	2	1	3		1	2	2	3	2	SV	
PE block or sheet foam	2	2	2	1	3	NK	1	3	4	3	3	5	
<b>Films, bags and wraps</b>													
PE film and wrap (post-industrial, post-commercial, post-consumer)	4	4	4	1	5	5	1	3	3	3	3	SV	
PP film and wrap	2	2	2	1	4	NK	1	4	3	3	2	5	
Woven PP bags (e.g., rice bags)	3	3	3	1	4	NK	1	4	4	5	3	5	
Multimaterial films, pouches, other flexible packaging	1	1	1	1	4	3	2	3	2	2	2	3	
<b>Plastic food serviceware (FSW)</b>													
Clear cups: PET thermoforms	3	3	4	3	5	2	3	4	3	3	3	5	

<b>Figure 2: Qualitative evaluation results summary</b> Criteria→	Stability and maturity of responsible end markets	Accessibility of responsible end markets	Viability of responsible end markets	Compatibility with existing recycling infrastructure: commingled collection and processing	Compatibility with existing recycling infrastructure: separated material collection	Amount of material available	Practicalities of sorting	Practicalities of storing	Contamination	Ability for waste generators to easily identify and properly prepare material	Environmental health and safety considerations	Policy in ORS 459.015 (2)(c)	Other
<b>Material:</b>													
Clear cups: PP thermoforms	5	4	5	4	5	3	4	4	3	3	3	5	
Clear cups: clear PS	3	3	3	2	5	NK	2	4	3	3	3	SV	
Cups: rigid PS (not clear)	3	3	3	2	5	NK	2	4	3	3	3	SV	
Other FSW: PET thermoforms	3	3	4	3	4	4	3	3	2	2	3	5	
Other FSW: PP thermoforms	5	4	5	4	4	3	4	3	2	2	3	5	
Other FSW: expanded polystyrene	2	2	2	1	4	NK	1	3	2	2	3	SV	
<b>Metal - packaging and other</b>													
Aluminum beverage cans	5	4	5	5	5	4	5	5	4	5	4	5	
Aluminum foil and pressed foil products (e.g., roasting pans)	5	4	5	3	5	4	3	4	3	2	4	5	
Steel (tin) and bi-metal cans	5	5	5	5	5	5	5	5	4	5	4	4	
Metal aerosol cans (should be empty)	5	5	5	3	5	4	4	4	2	4	2	4	
Steel paint cans (non-aerosol), empty	5	4	5	5	5	NK	5	5	3	4	4	4	
Large appliances/"white goods" with refrigerants (e.g., refrigerators, air conditioners)	4	4	4	1	4	5	1	5	1	4	2	4	5
Large appliances/"white goods" without refrigerants (e.g., stoves, hot water heaters, clothes washers and dryers)	4	4	4	1	5	5	1	5	1	4	3	4	

<b>Figure 2: Qualitative evaluation results summary</b> Criteria →	Stability and maturity of responsible end markets	Accessibility of responsible end markets	Viability of responsible end markets	Compatibility with existing recycling infrastructure: commingled collection and processing	Compatibility with existing recycling infrastructure: separated material collection	Amount of material available	Practicalities of sorting	Practicalities of storing	Contamination	Ability for waste generators to easily identify and properly prepare material	Environmental health and safety considerations	Policy in ORS 459.015 (2)(c)	Other
<b>Material:</b>													
Scrap metal (smaller than 30 inches and less than 30 pounds), including small metal pieces (e.g., lids, screws and nails – to be collected inside a metal can which has been crimped tightly closed)	4	4	4	2	4	5	2	5	3	2	2	5	
Other scrap metal larger than 30 inches or more than 30 pounds	4	4	4	1	4		2	5	3	2	2	5	
Single-use propane cylinders (should be empty)	3	3	3	1	3	NK	1	4	2	2	2	4	
<b>Other materials</b>													
Glass bottles and jars	5	5	5	2	5	5	2	4	3	5	5	4	
Motor oil	4	4	4	1	5	5	1	2	2	4	2	2	5
Paper “cans” with steel ends (to steel mill)	3	3	3	4	4	2	4	4	4	4	4	4	
Paper “cans” with steel ends (to paper mill)	3	3	2	2	4		2	4	4	4	4	4	

## Evaluation of environmental and economic impacts (whole scenarios)

### Phase One

Phase One of the evaluation of environmental and economic impacts of whole system scenarios was initiated in the spring of 2022 and is expected to be completed by December. DEQ will share results with Rulemaking Advisory Committee members and other interested parties once analysis is complete.

Preliminary results were made available to DEQ in August and September, and were also made available to members of the Technical Workgroup. DEQ and Workgroup members identified a number of additional revisions needed to improve the model, which is why final results are not yet available.

Figure 3 presents a summary of the 18 scenarios under evaluation in this phase, which are numbered 00-17. In summary:

- Scenario 00 represents the “baseline” – Oregon’s existing system of diverse material acceptance lists and collection infrastructure, MRFs as currently configured and operated, and current levels of contamination both at the point of collection and at the point of transfer to end markets.
- Scenario 01 – 17 all represent a future case where collection opportunities are expanded, acceptance lists are more uniform, generator-facing contamination reduction programming (by local governments and service providers) reduces contamination at the point of collection, and capital investments and other improvements to MRF operations result in more effective sortation of accepted recyclables and better removal of contamination. The 17 scenarios differ from each other largely in regard to which materials are included on which acceptance lists (local government vs. PRO depots).

**Figure 3. 18 Whole-System Scenarios Currently Under Evaluation (Phase One)**

	S00	S01	S02	S03	S04	S05	S06	S07	S08	S09	S10	S11	S12	S13	S14	S15	S16	S17
Core USCL	Varies	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL
Glass	OTS	OTS	OTS	OTS	OTS /PRO	PRO	OTS	OTS	OTS	OTS /PRO	OTS /PRO	OTS /PRO	OTS	OTS	OTS	OTS	OTS	OTS
PET, HDPE, PP packaging	Varies	Not	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	PRO	PRO	PRO	PRO	USCL	USCL
Polycoat cartons & cups	Varies	Not	Not	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	USCL	PRO	PRO	Not	PRO	USCL	USCL
HDPE, PP, PET pails/cups	Varies	Not	Not	Not	Not	Not	PRO	PRO Low	PRO High	PRO	PRO Low	PRO High	PRO	PRO	PRO	PRO	USCL	USCL
Aerosols, rigid PS, FSW	Varies	Not	Not	Not	Not	Not	PRO	PRO Low	PRO High	PRO	PRO Low	PRO High	PRO	PRO	PRO	Not	USCL	USCL
Bulky HDPE, PP products	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	Not	USCL	USCL
Lids, film, foil, shred paper	Varies	Not	Not	Not	Not	Not	PRO	PRO Low	PRO High	PRO	PRO Low	PRO High	PRO	PRO	PRO	PRO	Not	PRO
Block EPS	Not	Not	Not	Not	Not	Not	PRO	PRO Low	PRO High	PRO	PRO Low	PRO High	PRO	Not	PRO	PRO	Not	PRO

USCL = Uniform Statewide Collection List; OTS = collection on the side; PRO = collection at PRO depots, medium density (number) of depots across the state; OTS/PRO = collection on the side in the Metro region, and at PRO depots elsewhere; PRO Low = collection at PRO depots, lower site density; PRO High = collection at PRO depots, higher site density; FSW = food serviceware; EPS = expanded polystyrene

### Phase Two

Phase two modeling is currently being scoped and will be undertaken during November 2022 – February 2023. Phase one modeling focused on scenarios that were defined earlier in 2022, while much of the research involving individual materials was just getting started. Those scenarios were defined in part to isolate and evaluate specific variables (such as depot density). In contrast, phase two scenarios will be defined to more closely approximate likely outcomes of this current rulemaking. While the exact outcomes (acceptance lists) will not be known until 2023, DEQ has, as part of this rule concept, prepared preliminary recommendations for the placement of many items. While the final placement of materials will likely deviate somewhat from these initial recommendations, and several important materials are not yet recommended for placement, enough evaluation has been completed at this point in time to justify a more refined and narrowly focused examination of options. Phase two will examine four more scenarios and continue to allow for additional refinements and improvements in modeling assumptions. DEQ hopes to share preliminary results with the Rulemaking Advisory Committee at its January 2023 meeting.

### **Additional environmental evaluation (screening-level assessments)**

As mentioned previously, DEQ also conducted in-house screening-level life cycle assessments of three materials that were of particular interest to the Department. Each of these assessments is summarized briefly here:

**Expanded polystyrene:** DEQ shared draft results of a screening-level environmental assessment of 16 potential scenarios for management of expanded polystyrene (commonly called by the trade name “Styrofoam”) at the Technical Workgroup’s May meeting, and then revised and expanded the assessment to address a total of 20 scenarios that were [shared](#) at the Workgroup’s July meeting. Scenarios compared mechanical recycling (out-of-state), pyrolysis (in-Oregon), and landfilling (local vs. distant); domestic vs. international mechanical recycling; impacts of generator vehicle use for drop-off, if depot locations were more vs. less conveniently located; and the impacts of densification of collected expanded polystyrene.

Key findings of this screening level analysis included:

- Convenience of drop-off sites may significantly impact overall environmental results (relative to other stages of the life cycle)
- The added impacts of densification are justified when transport distances are large
- Location of densification (at the point of collection vs. nearby) is of less importance
- Domestic end markets do not necessarily result in lower impacts when compared to international end markets (for mechanical recycling)
- Disposition results are mixed, with the best disposition varying by impact category.
- For many impact categories, mechanical recycling delivers better environmental results (lower impacts) than pyrolysis, even if the mechanical recycling occurs out-of-state and the pyrolysis is local
- The relative benefits/impacts of mechanical recycling and pyrolysis, compared to landfilling, vary depending on whether the landfill is nearby or distant.

**Polycoated and aseptic cartons:** DEQ [shared results](#) of a screening-level environmental assessment comparing eight different dispositions for polycoated and aseptic cartons at the Technical Workgroup’s August meeting (presentation starts on slide 94). This evaluation was limited to impacts post-collection and processing, and considered options including use of baled materials by a tissue mill in Mexico, a deinked pulp mill in Wisconsin, a packaging/paper mill in Washington, and local landfill/incineration. Also evaluated was an emerging market that uses polycoated and aseptic cartons as the primary feedstock in the manufacture of a roofing cover board product. Unlike the paper mill options, which recover 65 – 87.5 percent of fiber and none of the plastic, the cover board manufacturer recovers 100 percent of incoming material.

Key findings of this screening level analysis included:

- Across almost all impact categories evaluated, recycling into tissue/toweling was most preferential, followed by pulp and packaging.
- Recycling to tissue or de-inked pulp leads to net emissions reductions at end of life when compared to landfilling.
- In contrast, recycling into roofing cover board appears to result in net emissions increases when compared to landfilling.
- Domestic end markets do not necessarily lead to better environmental outcomes.
- Increased fiber yield also does not necessarily correlate with better environmental outcomes.
- DEQ was unable to evaluate the fate or impact of any plastic in polycoated and aseptic cartons that might be released to the environment from paper mills (in wastewater or sludge) in the form of microplastics.

**Glass packaging:** DEQ shared preliminary results of a screening-level life cycle assessment of glass disposition at the Technical Workgroup's July meeting. In response to feedback, an expanded assessment is currently in process. Evaluation of more than sixty scenarios provides for evaluation of several variables including end market (local glass packaging vs. distant glass packaging, distant fiberglass manufacturing, local cement additive (pozzolan), and aggregate displacement), recycling vs. disposal, mode of collection (on-route in a dedicated truck vs. on-route in a dual-compartment truck vs. depots), depot convenience, and Metro vs. rest-of-state collection.

Key findings to date of this screening level analysis include:

- The choice of end market can have significant impacts on environmental outcomes. Closed loop recycling (glass bottle to glass bottle) is not necessarily better than open loop; in particular, glass to pozzolan (a cement substitute) appears to have significantly larger environmental benefits (especially climate) than recycling bottles back into bottles.
- The convenient accessibility of drop-off sites also matters.
- On-route collection in a dedicated truck leads to higher impacts and lower net benefits than co-collection in a two-compartment truck.
- Given the heavy weight of glass, relatively high transportation impacts, the location of the Owens-Illinois bottle plant in Portland, and relatively low benefits (compared to many other recyclables) when recycled back into packaging, collection of glass in the Portland Metro region results in better outcomes than collection elsewhere in Oregon.

## Appendix 2: Local Government Recycling Acceptance List details

Major factors that support inclusion of each material on the Local Government Recycling Acceptance List, and special considerations worth noting follow.

- **Corrugated cardboard:** uncoated corrugated cardboard is ubiquitous in all sectors of the economy and one of the highest-volume materials currently collected for recycling. The material is relatively easy to collect. Yet despite widespread recycling access, opportunities exist to increase capture further. The material is effectively sorted if collected commingled. While market prices are volatile, market demand is reliable, long-standing, and diversified; multiple mills in Oregon and Washington recycle corrugated. Like all fiber products, there is some loss of material (yield) in the repulping process; yield loss varies by fiber type and source. There is a marked shift away from wax-coated boxes (not readily recyclable) to containers treated with recycle-compatible coatings. Recent MRF testing also demonstrates that empty pizza boxes are also compatible with existing infrastructure.
- **All kraft paper (paper bags, mailers):** This high-volume, uncoated material can be included in several different fiber-based bales such as a grade 15 (Used Brown Kraft), grade 54 (Mixed Paper) or grade 56 (Sorted Residential Papers & News) bale. Kraft bags may also end up in cardboard bales. There are long-standing, stable and reliable end-markets for this commodity inside and outside of the Pacific Northwest. This material is compatible with the state's existing collection and processing infrastructure.
- **Uncoated paperboard packaging (e.g., cereal, cracker, and medicine boxes):** Like kraft paper and cardboard, there are long-standing, stable and reliable end-markets for this commodity inside and outside of the Pacific Northwest. This high-volume material typically ends up in a Mixed Paper bale, mixed with other fiber products/packaging that are being recommended for the Uniform Statewide Collection List. This material is compatible with the state's existing collection and processing infrastructure.
- **Polycoated cartons (e.g., milk cartons) and aseptic cartons (e.g., shelf stable soup and non-dairy beverage cartons):** Presently, there is only one Pacific Northwest paper mill willing to handle this material (and able to recover fiber) when polycoated cartons are included in a grade 54 Mixed Paper bale, and that mill is a long-standing, stable and reliable end market. Another option for MRFs is to separate the materials and produce a grade 52 Aseptic Packaging and Gable-Top Cartons (Cartons) bale. Separation at a MRF is feasible using an automated process, such as robotics; some lower-volume or lower-tech MRFs may not want to separate this material, thus would rely on secondary processing at another MRF for recovery of this material. Oregon MRFs have generally struggled to accumulate sufficient volume to fill a truckload, and this problem would be reduced if the material were accepted statewide. PROs could also help to facilitate consolidation of materials from multiple MRFs prior to shipment to an end market. Markets for grade 52 Carton bales include packaging mills in the Midwest and tissue mills in Mexico and Korea. Despite high transportation distances, recycling still reduces multiple types of environmental impacts. Fiber quality in these cartons is excellent and mills can recover significant fractions of fiber. Polyethylene (and aluminum) layers are typically discarded, with overall yield at the mills sourcing grade 52 cartons estimated at 67-70 percent. DEQ was unable to secure any data to evaluate outstanding questions regarding the potential for microplastic formation in pulpers and emissions via wastewater.

- **Polycoated paper cups:** Polycoated paper cups can be collected, processed and marketed in a manner identical to polycoated cartons. There is growing mill demand for solid bleached sulfate, the white paperboard fibers found in the cups. Last year, a coalition of 31 paper mills that account for 75 percent of consumption of mixed paper in the US and Canada signed a “declaration of acceptance,” announcing their commitment to increasing the recycling of paper cups. Some Oregon MRFs may not want to separate this material, and like other low-volume items, may rely on secondary processing at another MRF for recovery of this material.
- **Molded pulp packaging (but not food serviceware), tissue paper (packaging, not sanitary) and non-metalized gift wrap:** These items will most likely end up in a Mixed Paper bale, mixed with other fiber products/packaging included on the Uniform Statewide Collection List. There are long-standing, stable and reliable end-markets for Mixed Paper bales inside and outside of the Pacific Northwest. This material is compatible with the state’s existing collection and processing infrastructure. The inclusion of tissue paper refers to gift-based/packaging-based tissue paper only. Sanitary tissue, like napkins, paper towels, Kleenex, etc., are not included under this “Tissue paper” category.
- **High-grade office paper:** The volume of high-grade office paper has declined over the years, especially since the global pandemic moved many workforces from an office to teleworking setting. Regardless, there are long-standing, stable and reliable end-markets for this material inside and outside of the Pacific Northwest. This material is compatible with the state’s existing collection and processing infrastructure.
- **Newspaper/newsprint and magazines, catalogs and similar glossy paper:** While volumes of newsprint have declined sharply in recent years, there are long-standing, stable and reliable end-markets for these materials inside and outside of the Pacific Northwest. This material is compatible with the state’s existing collection and processing infrastructure.
- **Telephone directories, other printing and writing paper (e.g., envelopes, “junk mail”, cards) and paperback books:** All of these materials are compatible with the state’s existing collection and processing infrastructure. They could be marketed in several different grades of paper, all of which have long-standing, stable and reliable end markets.
- **Aluminum food and beverage cans:** Though most of the aluminum beverage cans generated in Oregon end up in the state’s Bottle Bill system, there is still a certain volume of material processed at Oregon’s MRFs, including aluminum food cans. The aluminum material is easy to collect commingled and is very compatible with Oregon’s existing MRF infrastructure. Contamination with such products is low and the domestic markets for aluminum cans are long-standing and reliable. On a per-ton basis, aluminum provides some of the largest climate benefits of all materials when recycled.
- **Steel and bi-metal cans, including empty/dry paint cans:** Steel and bi-metal cans are a high-volume material generated in Oregon. Domestic (including in-state) demand for recovered steel material is strong and reliable, as the material is in demand for packaging, appliances, utility poles, construction materials, among other items. The steel material is easy to collect commingled and is very compatible with Oregon’s existing MRF infrastructure.
- **Scrap metal less than 10 pounds in weight and 18” in length – no sharp items (e.g., knives) or “tanglers” (bicycle chains, wire, etc.):** Examples of these items include pots and pans, muffin tins, and similar items. Whether it’s ferrous or non-ferrous material, scrap metal is a high-volume



material in Oregon that can be very environmentally-beneficial to recycle. There is wide variability across Oregon's collection programs and MRFs regarding acceptance of scrap metal – ranging from no acceptance to all scrap metal less than 30 pounds and 30 inches in length. Sharp items can harm MRF workers and equipment, as can heavy or large items. Most of the metal handled by Oregon's existing MRF infrastructure currently ends up at local scrap metal recyclers. From there, the material can end up at a number of long-standing, reliable domestic (including regional) and international markets. With the smaller size and weight limits proposed here, the scrap material should be easier to collect, safer for MRF workers to handle, and be less problematic for existing MRF equipment. Potential contamination with non-accepted items remains a risk and will need to be a priority for communication and generator feedback.

- **All scrap metal:** all scrap metal including larger and heavier items, sharp items and tangles can be effectively collected at recycling depots provided under the Opportunity to Recycle law (scrap metal is not a covered product, so PROs cannot be obligated to collect at their depots). Segregated collection allows these materials to bypass commingled processing facilities.
- **Plastic bottles and jugs, 6 ounces and larger: clear PET (#1), natural and colored HDPE (#2) and LDPE (#4) and clear and colored PP (#5). Caps OK if screwed on:** Market demand for clear PET and HDPE rigid material (natural and colored) is reliable and long-standing, and there are numerous domestic markets (local, regional, national, as well as in Canada) seeking this high-volume material. For PP (clear and colored), there is a growing demand for this material (including caps) by domestic and Canadian markets. DEQ expects that new domestic reclamation capacity will come online in 2023 to handle these very resins. Much of the material can be processed and marketed separately (e.g. PET bottle bale, colored HDPE bottles bale, PP rigids bale, etc.) or it can be sold as a mixed material (e.g., 1-7 or 3-7 bottles and mixed rigids bale). Bottles and jugs are already being handled successfully by Oregon's existing MRF infrastructure and are excellent candidates for optical sortation. Some Oregon MRFs may not want to process this material, but could transfer it to another MRF for secondary processing.
- **Plastic tubs (e.g., cottage cheese), 6 ounces and larger: PET (#1), HDPE (#2), LDPE (#4) and PP (#5):** See above, as these materials would be handled by Oregon's MRFs in a manner similar to "Plastic bottles and jugs, 6 ounces and larger."
- **Plastic buckets, pails, storage containers and other packaging that fits loosely in the generator's on-route collection container:** HDPE (#2) and PP (#5): There are long-standing and reliable domestic markets (local, regional, national, as well as in Canada) willing to purchase mixed bales of this material, though the material is more valuable kept separate (e.g., HDPE Injection Bulky Rigids bale, PP All Rigid Plastics bale, etc.) than combined (e.g., Mixed Bulky Rigids bale), at least according to recent regional commodity prices. To ensure proper collection at the curb, and knowing that recycling rollcars vary in size, residents will be asked to only recycle what they can fit in their cart, recycling bigger, bulkier covered products via depot collection. MRFs will likely capture and bunker larger buckets and containers at the pre-sort line, with bunkered material then being baled. Smaller items may be recovered alongside bottles and tubs. Plastic buckets, pails and containers up to 5 gallons in size have been accepted by jurisdictional programs in the Portland and Bend areas for some time.
- **Clear plastic cups: PET (#1) and PP (#5):** These materials can be sorted and marketed in a manner similar to PET and PP bottles; optical sortation in particular can be very effective. Most clear plastic cups are made of polypropylene; markets are acceptable and expected to strengthen, as discussed above. Clear PET cups are typically thermoformed. While thermoformed PET poses some special challenges to PET reclaimers, cups are less of a challenge than packaging (e.g.,

clamshells) due to a lack of labels. As with other plastics, some Oregon MRFs may not want to process these materials, and will rely on another MRF for secondary processing.

- **Motor oil:** The vast majority of motor oil collected for recycling is collected at depots – including solid waste transfer stations and similar sites, as well as automobile service and supply shops. While DEQ encourages on-route collection (source segregated) for its convenience, its recommendation is to only require collection at depots used to satisfy Opportunity to Recycle requirements.

## Appendix 3. PRO Recycling Acceptance List details

Following is a description of major factors that DEQ considered in developing the recommended PRO acceptance list, to date.

- **Steel and aluminum aerosol packaging**

Steel and aluminum are used in the manufacture of aerosol cans. While highly recyclable, the challenge with this packaging involves the contents of the cans themselves. Some are inherently hazardous (e.g., bear spray, pesticides, paint) while all aerosols contain propellants, some of which are flammable. Accidental puncturing of this packaging can cause injury and damage, including fires. If processed properly at the MRF, cans may go to a metal recycler, who will shred the material prior to shipment to a mill; this shredding can also result in releases to the environment. Evidence of harm is limited and anecdotal, but potentially concerning, especially to MRF operators and steel mills.

If all containers were empty, they could be safely recycled at MRFs, but generator behavior is not well understood or necessarily consistent. The Household and Commercial Products Association has a limited research project underway to better characterize the contents of aerosol containers sent to MRFs; results are expected in 2023.

In the meantime, DEQ recommends collecting these materials segregated from other materials: instructing households to treat non-empty aerosols as household hazardous waste, and recycling empty aerosols at PRO depots. If collected at depots, packaging would be consolidated, potentially hand-sorted (based on contents), punctured and drained, with contents managed as a hazardous waste if not characterized. Punctured packaging would then be recycled as scrap metal.

- **Aluminum foil and pressed foil products**

Aluminum foil and pressed foil products, such as single-use roasting pans, pose three special challenges to the recycling system. First, they are frequently contaminated with food residue. Second, loss rates in MRFs are relatively high. Third, nearly all MRFs co-market foil with aluminum cans, directing bales of mixed aluminum to smelters which, according to the Aluminum Association, rely on furnace technologies that result in relatively little of the aluminum foil actually being recycled back into aluminum. In a typical smelter, much of these products simply vaporize in the furnace. There are a handful of smelters in the US using furnace technologies that can recover higher yield from foil. In order to obtain actual environmental benefits from recycling this material, it needs to be sent to a furnace that will recover the aluminum. This would require either additional sortation by MRFs (which could be very expensive), or separation at the source. Source segregation and recycling at PRO depots might also encourage better preparation (less contamination) by generators.

- **Shredded paper**

Like aluminum foil, shredded paper does not harm the processing infrastructure, but its small size results in high levels of loss (50 percent or higher) in most MRFs, and it can contaminate other materials. Encouraging households and businesses to “recycle” their shredded paper via the commingled processing system, where more than half of this material is lost to residue, is of questionable veracity. Fiber quality of this material is high. While depot collection will result in lower participation than on-route collection, this is compensated by higher yield of the source separated material, and is responsive to the need to be honest with system users while providing fact-based assurances that materials they separate for recycling will actually be recycled.

- **Polyethylene film**

Polyethylene film is used in many commercial applications, including pallet wrap, plastic bags, and product overwrap (e.g., paper towels). It is a high volume material with reasonable domestic end markets. Film can be recycled into a composite lumber product (e.g., Trex) or, if clean and uncolored, back into other uses of polyethylene. Oregon is already served by a network of return-to-retail locations. U.S. and Canadian reclamation capacity has expanded in recent years, significantly reducing (but not eliminating) exports. Management of contamination can be a concern. Designating this material as a PRO depot obligation builds on existing collection infrastructure while increasing transparency and helping to ensure that collected materials are being managed in a responsible manner.

- **Plastic buckets, pails and storage containers (HDPE and PP)**

While also designated as a material for the uniform statewide collection list, on-route collection of these materials will be constrained by the size of collection containers (carts). Additional depot collection will provide the public with opportunities to recycle oversized large plastic buckets, pails and storage containers.

## Alternative formats

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email [deqinfo@deq.oregon.gov](mailto:deqinfo@deq.oregon.gov).

El DEQ puede proporcionar los documentos en un formato alternativo o en un idioma distinto al inglés si así lo solicita. Llame al DEQ al 800-452-4011 o envíe un correo electrónico a [deqinfo@deq.oregon.gov](mailto:deqinfo@deq.oregon.gov).

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