



# **Composition of Commingled Recyclables Before and After Processing**

**A study of materials at 5 Oregon processing facilities**

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## Study goals:

- Obtain information for the Oregon Commingled Recycling Systems Improvement Workgroup
- Inbound Recycling
  - Determine the mix of materials received
  - Types and quantities of contaminants
- Outbound Recycling (after processing)
  - Evaluate sorting effectiveness for each material entering the facilities
  - Evaluate contamination of different commodities produced by the facilities



## **Great help received from all 5 facility operators:**

- Far West Fibers Hillsboro
- Far West Fibers Portland
- KB Recycling
- Oregon Recycling Systems
- SP Recycling



## **Inbound recycling:**

- 150 samples spread across all facilities
- Samples each of 4 seasons
- Residential, Commercial, Transfer Trailers
- 48 separate material categories



## **Contamination levels of inbound commingled materials:**

- About 9-10% contaminants by weight
- Commercial contamination slightly higher than residential
- Roll cart contamination same as 2004/05 study but more roll carts now meaning more contamination (and more recyclables too)



## Contamination levels of inbound commingled materials:

2.0% Paper not recyclable at the curb

- Paper towel, freezer boxes, cigarette packs, cups, fast food items, mixed paper/materials.

2.9% Plastic not recyclable at the curb

- 1.0% film (includes some intended for recycling)
- 1.9% rigid plastics

1.0% Glass (may be underestimated)

0.3% Large metal items

1.2% Bagged garbage

2.0% Other nonrecyclables



## Film Plastic in Inbound Commingled Recycling:

	Average	90% Conf. Interval
Film: All Samples	1.05%	(0.65-1.45%)
<b>Film: Excluding 3 samples</b>	<b>0.66%</b>	<b>(0.54-0.79%)</b>
Recyclable Polyolefin Film	0.25%	(0.20-0.30%)
Nonrecyclable Plastic Film	0.41%	(0.29-0.53%)



## Outbound recycling:

- Sampled each facility twice, 6 months apart
- 2 separate days of sampling for each period at each facility
- Sampled each outgoing recyclable commodity and disposal stream
- 261 samples total
- Overall, 92-94% of incoming recyclable material ends up properly sorted and marketed
- Some less common materials have poorer sorting accuracy



## Incoming newspaper-compatible paper goes out as:

Material	Percent
Newspaper	94.93%
<b>Cardboard</b>	<b>1.58%</b>
Other Paper	1.85%
<b>Containers and metal</b>	<b>0.15%</b>
<b>Glass / film / garbage</b>	<b>1.49%</b>
<b>Total rigorously sorted:</b>	<b>96.78%</b>

Newspaper-compatible paper is 53% of incoming material



## Incoming corrugated cardboard/brown paper goes out as:

Material	Percent
Cardboard	88.35%
Newspaper	6.96%
Other Paper	3.93%
Containers and metal	0.03%
Glass / film / garbage	0.72%
Total rigorously sorted:	92.29%

Cardboard/brown paper is 23% of incoming material



## Incoming recyclable plastic containers go out as:

Material	Percent
Plastic containers	84.22%
Newspaper	11.60%
Cardboard/Other Paper	2.27%
Metal	0.50%
Glass / film / garbage	1.40%
Total rigorously sorted:	84.22%

Recyclable plastic containers are 4.8% of incoming material



## Incoming tinned/steel cans go out as:

Material	Percent
Tinned/steel cans	84.89%
Scrap Metal	1.00%
Newspaper	9.05%
Cardboard/Other Paper	1.59%
Plastic/aluminum	0.57%
Glass / film / garbage	2.90%
<b>Total rigorously sorted:</b>	<b>85.89%</b>

Tinned/steel cans are 2.6% of incoming material



## Incoming aluminum cans go out as:

Material	Percent
Aluminum	66.95%
Scrap Metal	0.07%
Newspaper	22.27%
Cardboard/Other Paper	4.43%
Plastic/other metals	3.02%
Glass / film / garbage	3.26%
<b>Total rigorously sorted:</b>	<b>67.02%</b>

Aluminum cans are 0.3% of incoming material



## Incoming aluminum foil goes out as:

Material	Percent
Aluminum	24.88%
Scrap Metal	9.10%
Newspaper	40.27%
Cardboard/Other Paper	3.89%
Plastic/other metals	4.89%
Glass / film / garbage	16.97%
Total rigorously sorted:	33.98%

Aluminum foil is 0.1% of incoming material



## Incoming gable-top cartons go out as:

Material	Percent
<b>Newspaper</b>	<b>39.12%</b>
<b>Cardboard</b>	<b>29.99%</b>
<b>Other Paper</b>	<b>25.64%</b>
<b>Plastic/Metals</b>	<b>0.46%</b>
<b>Glass / film / garbage</b>	<b>4.80%</b>
<b>Total rigorously sorted:</b>	<b>25.64%</b>

Gable-top cartons are 0.24% of incoming material



## Incoming film plastic goes out as:

<b>Material</b>	<b>Percent</b>
<b>Newspaper</b>	<b>19.12%</b>
<b>Cardboard</b>	<b>3.35%</b>
<b>Other Paper</b>	<b>0.42%</b>
<b>Plastic/Metals</b>	<b>1.24%</b>
<b>Glass / film / garbage</b>	<b>75.86%</b>
<b>Total rigorously sorted:</b>	<b>75.86%</b>

Film plastic is roughly 0.7% of incoming material



## Incoming other rigid plastic goes out as:

Material	Percent
<b>Newspaper</b>	<b>23.46%</b>
<b>Cardboard/other paper</b>	<b>5.53%</b>
<b>Recyclable plastic containers</b>	<b>38.20%</b>
<b>Metals</b>	<b>2.03%</b>
<b>Glass / film / garbage</b>	<b>30.78%</b>
<b>Total rigorously sorted:</b>	<b>30.78%</b>

Other rigid plastic is roughly 1.5% of incoming material



## Summary

- About 9-10% of the commingled material collected for recycling are materials that should not have been set out.
- This is higher contamination than was true for curbside programs in 2005.
- This is due to the increased use of roll carts since 2005, but newer roll cart programs have less contamination than was true in 2005.
- 92-94% of all recyclable material ended up being properly sorted and recycled.
- Less common materials had poorer sorting rates.
- 84% of recyclable plastic containers were properly sorted. 16% went mostly to paper mills where they were disposed of.
- Aluminum cans, aluminum foil, and beverage cartons were poorly sorted, but were only a small amount of the total material.
- Over 75% of the film plastic was removed by sorting.

Contact information

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