

Oregon Waste Composition Study 2016



Marion County Waste Composition 2016

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**Peter Spendelow
Oregon Department of Environmental Quality
Materials Management**



Oregon Waste Composition Study

- Metro previous studies
 - 1986-87
 - 1989-90
 - 1993-94
- DEQ down-state studies
 - 1992-93
 - 1994-95
- Previous joint statewide studies
 - 1998
 - 2000
 - 2002
 - 2005
 - 2009

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Many Helped with the 2016 Study:

- Collection Service Owners and Dispatchers
- Disposal Site Operators
- Landfill Data Coordinators
- Study Co-sponsors
 - Department of Environmental Quality
 - Metro
 - Marion County
 - Lane County
 - Washington County
 - City of Portland
 - City of Beaverton
 - City of Eugene
- Contractor: Sky Valley Associates

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Sampling Strategy:

- Samples collected at 55 disposal sites statewide
 - Brooks Waste to Energy Facility
 - MRRF
 - Browns Island
 - Transfer stations from transfer trailers
 - A very few self-haul at 3 out-of-county sites
- Samples collected every month of the year
 - Quarterly for Marion County
- Within sub-streams, representative sampling proportional to amount of waste disposed.
 - Route trucks
 - Compacting and loose drop boxes
 - Self-haul: Transfer station and special purpose landfill
 - Mixed waste sorting residuals

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Sampling Strategy:

- Route truck samples pre-selected based on recent disposal records
 - Later classified into residential, commercial, and mixed based on driver interview
- Other samples selected randomly on site
- 975 samples collected and sorted in 2016 statewide
 - 158 from Marion County + 4 from out-of-county at Browns Island

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Separate Composition of 82 Waste Streams

By source:

- Residential Route Trucks
- Commercial Route Trucks
- Mixed Route Trucks
- Compacting Drop Boxes
- Loose Drop Boxes
- Self Haul
- Residue- Mixed Waste Processing
- Special Purpose Landfill

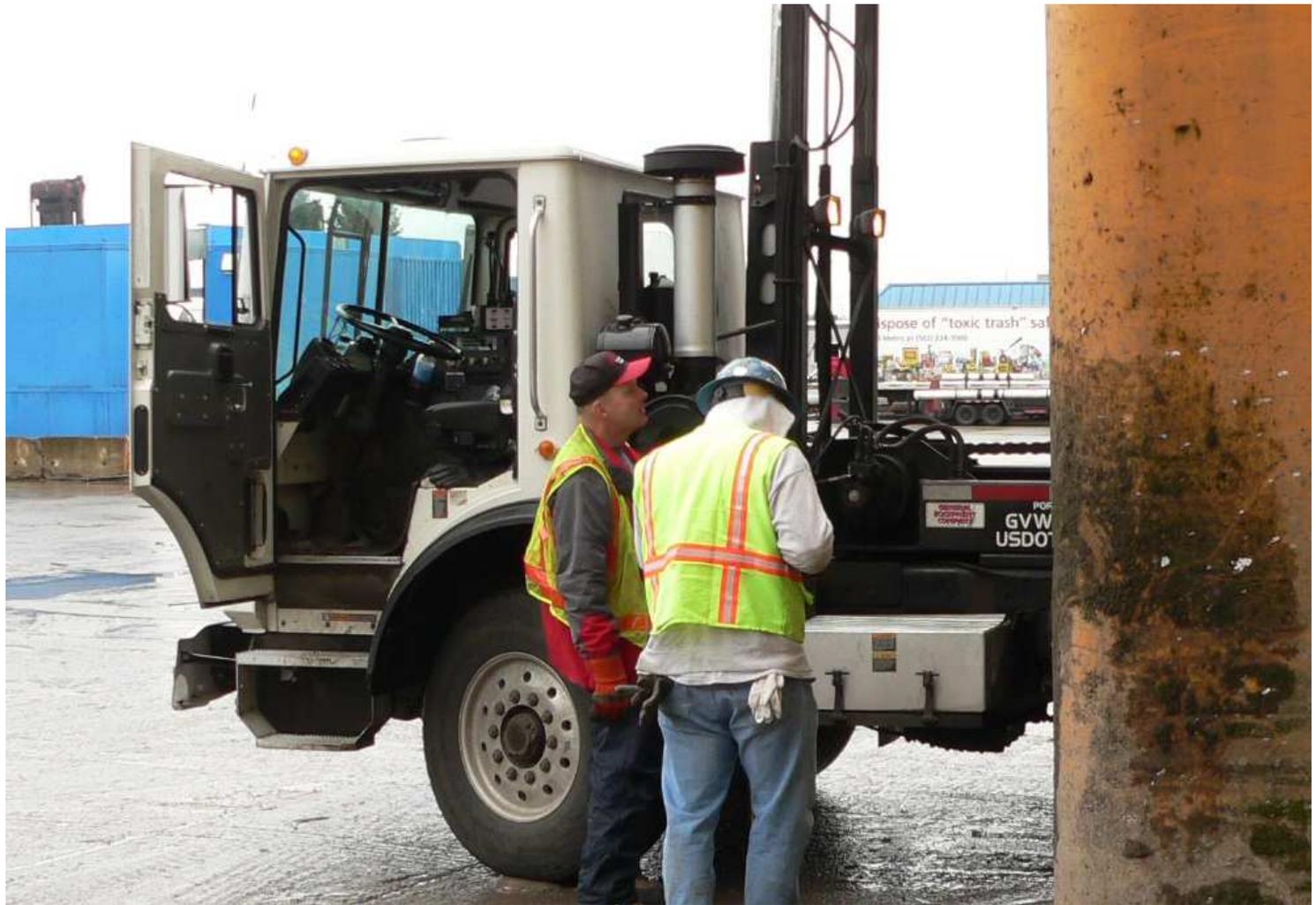
By location:

- Washington County
- City of Portland
- Rest of Metro
- Marion County
- Lane County
- Rest of Oregon

By season:

- Warm (Apr-Sep)
- Cold (Oct-Mar)

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Brad Anderson getting load information from a drop box truck driver.

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Drop box loads are highly variable. Will the ladder and desk end up in the sample?

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A random number table is used to select where in the pile the sample is pulled from (We didn't get the desk or the ladder).

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The load is dumped on a tarp to be held for sorting. Frequently the disposal site operator helps out with equipment as is true here at Metro Central

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Roughly checking the sample weight. Loads must average 200 lbs or more, and minimum weight is 175 lbs.

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A large self-haul load

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Sorting the load. We sorted into 138 categories in 2016

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Marcus Gomez sorting plastic into multiple categories

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A look in the sorted paper bins

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A small scale measuring to 1/100 lbs is used for small items. Beverage containers were also counted.



Contamination Analysis

- Field-sorted material is contaminated. Example - Food waste adheres to or is absorbed into other materials
- Samples randomly selected for contamination analysis
 - 40 full samples
 - 108 rigid plastic container samples
 - 108 other rigid plastics samples
- Samples taken to a facility where each material was cleaned and dried
- Clean weight and weight of contaminating materials were recorded
- Contamination analysis used to adjust field results

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Contamination analysis – Resorting and cleaning selected samples

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Cleaned materials are set aside to air-dry, and then are re-weighed

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Recovering and weighing dirt from a lumber sample

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Nan Hage weighing out the sample.

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Contamination Correction Factor Example - Corrugated Cardboard 2002

	Lbs.	(%)	Waste-stream (%)
Total Corrugated Cardboard from field	303.78	100.00%	3.235 %
Cardboard after cleaning, drying	249.26	82.05%	2.654%
Contaminant Materials	6.26	2.06%	
Water (weight loss on air-drying)	48.26	15.89%	
"Add-backs" (Cardboard from other material loads)	+ 3.44	+1.13%	+.036%
Contamination Correction Factor		-16.82%	2.691%

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Contamination Correction for selected materials 2009/2010

Material	Field	Corrected	Factor	Factor 90% CI
Cardboard	3.26%	2.80%	-14.29%	(-19.54, -9.61%)
Hi grade paper	0.91%	0.88%	-3.47%	(-8.42, 3.78%)
Newspaper	0.86%	0.72%	-16.29%	(-22.91, -10.13%)
Other compostable nonrecyclable paper	5.23%	2.99%	-42.77%	(-45.52, -39.85%)
Rigid Plastic Containers (RPCs)	1.86%	1.47%	-21.07%	(-25.08, -17.59%)
Plastic film - recyclable	1.12%	1.05%	-6.43%	(-11.59, -2.10%)
Plastic film - non-recyclable	3.70%	2.38%	-35.67%	(-39.58, -31.05%)
Leaves and grass	3.63%	3.69%	1.59%	(0.43, 2.33%)
Wood	11.51%	11.10%	-3.51%	(-5.36, -1.96%)
Food	16.99%	17.62%	3.68%	(2.09, 5.01%)
Glass	1.95%	2.01%	2.77%	(-0.46, 6.72%)
Aluminum foil / food trays	0.14%	0.08%	-41.19%	(-46.60, -35.80%)
Water and Residue	0.00%	5.89%		

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Major Categories Disposed 1998-2016 Statewide (field data only)

Material	2016	2009	2005	2002	1998
Paper	15.14%	16.99%	19.64%	20.62%	24.35%
Plastic	11.77%	11.56%	11.24%	10.95%	10.45%
Yard Debris	2.38%	4.61%	4.30%	6.58%	4.92%
Wood/Lumber	15.46%	11.51%	13.60%	8.72%	11.18%
Food	14.71%	16.99%	14.92%	15.60%	14.30%
Glass	2.27%	1.95%	1.57%	2.32%	2.77%
Metals	5.17%	6.98%	7.68%	7.45%	7.31%
Other Inorganics	13.69%	11.09%	11.43%	12.78%	10.32%
Hazardous Materials	0.43%	0.45%	0.48%	0.76%	0.81%

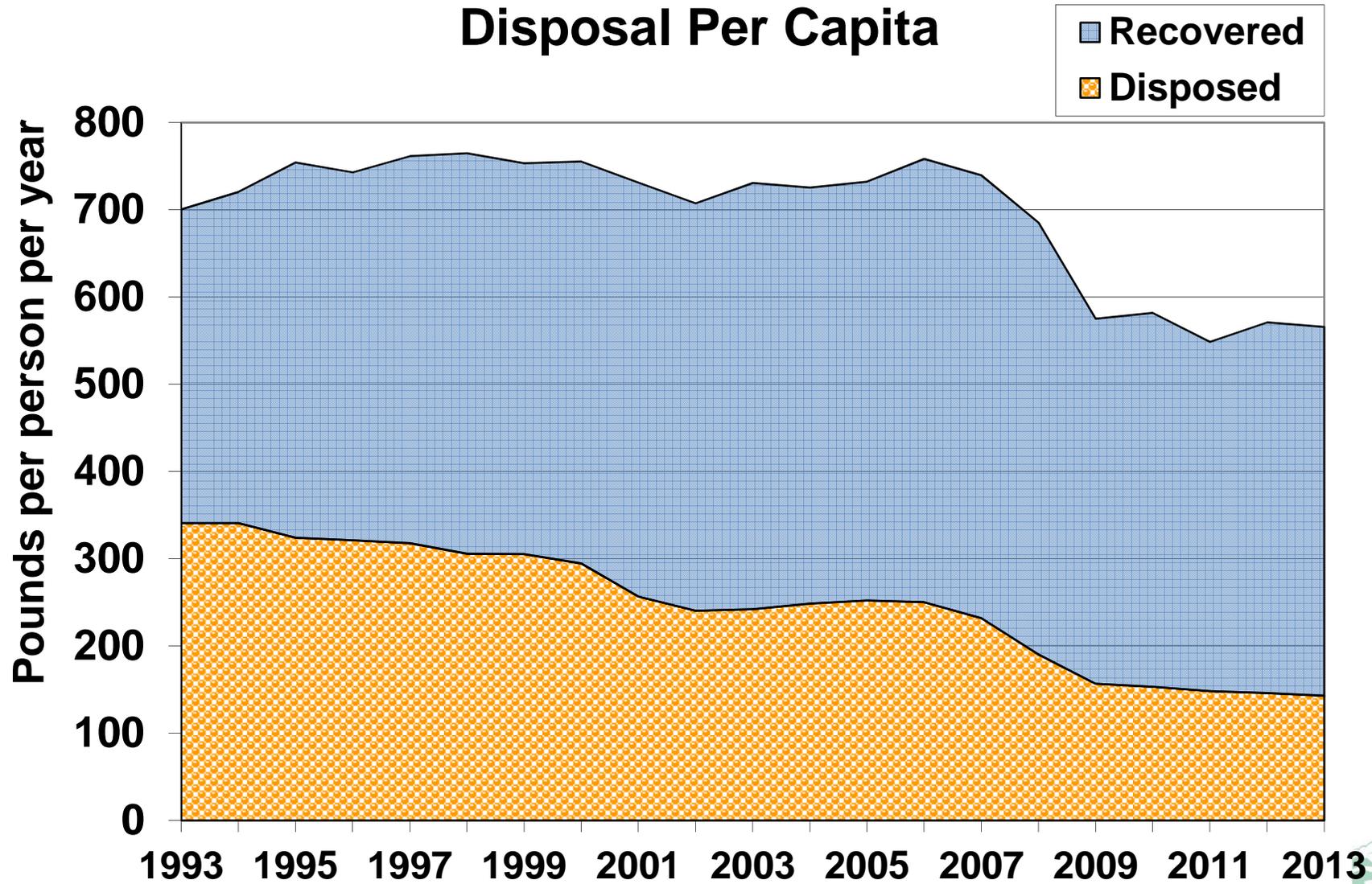
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Major Categories Disposed 2002-2016 Marion County (field data only)

Material	2016	2009	2005	2002
Paper	15.49%	16.11%	18.43%	21.95%
Plastic	12.21%	11.50%	12.00%	14.17%
Yard Debris	1.49%	3.20%	3.56%	2.82%
Wood/Lumber	9.86%	8.15%	7.36%	5.57%
Food	15.47%	18.55%	20.52%	17.66%
Glass	1.49%	1.94%	1.63%	2.15%
Metals	4.80%	7.05%	7.02%	8.34%
Other Inorganics	15.67%	14.20%	12.97%	10.93%
Hazardous Materials	0.24%	0.77%	0.61%	1.21%

Common Recyclable Materials Recovery and Disposal Per Capita



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Marion County vs All Oregon (field data only)

Material	Marion County	All Oregon
Paper	15.49%	15.14%
Plastic	12.21%	11.77%
Yard Debris	1.49%	2.38%
Wood/Lumber	9.86%	15.46%
Food	15.47%	14.71%
Glass	1.49%	2.27%
Metals	4.80%	5.17%
Other Inorganics	15.67%	13.69%
Hazardous Materials	0.24%	0.43%

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Waste by Substream – Marion County (field data only)

Material	RES Routes	Mixed Routes	COM Routes	Compact. Dropbox	Loose Dropbox	Self-Haul Trans. St.
Paper	13.68%	14.98%	14.59%	15.19%	18.61%	4.08%
Plastic	10.55%	11.07%	10.56%	23.09%	9.92%	4.50%
Yard Debris	0.60%	2.92%	1.46%	0.70%	0.63%	3.40%
Wood/Lumber	1.82%	8.16%	5.05%	11.21%	7.63%	24.36%
Food	24.24%	23.35%	30.39%	21.65%	31.35%*	3.06%
Glass	2.38%	1.20%	4.36%	0.83%	0.68%	0.61%
Metals	4.50%	6.80%	5.35%	1.98%	3.27%	5.29%
Other Inorganics	14.29%	2.94%	1.81%	1.60%	8.07%	28.12%
Haz. Materials	0.49%	0.04%	.058%	0.06%	0.06%	0.27%
All curbside recyclables	12.01%	12.11%	12.25%	10.46%	13.17%	4.86%

* 3 of 19 loose drop box loads came from a meat-packing plant and had 90%+ inedible food waste

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Top 12 Items Residential Statewide 2016

	Material	Field%	Conf. Int.	Tons
1	All edible food	13.96%	(12.75 - 15.25%)	90205.33
2	Pet litter, animal feces	10.37%	(8.92 - 12.10%)	67007.83
3	Non-recyclable paper combined	10.33%	(9.66 - 10.99%)	66749.36
4	All non-edible food	9.49%	(8.55 - 10.49%)	61321.53
5	Disposable diapers	9.03%	(7.97 - 10.13%)	58349.15
6	All recyclable paper	8.27%	(7.36 - 9.18%)	53438.26
7	Plastic Packaging	6.96%	(6.49 - 7.42%)	44973.43
8	Plastic film - combined	6.28%	(5.87 - 6.69%)	40579.48
9	Plastic Products	5.64%	(4.91 - 6.51%)	36443.99
10	Textiles & mixed	5.56%	(4.51 - 6.92%)	35927.05
11	Yard Debris	3.83%	(2.62 - 5.04%)	24748.31
12	Leaves and grass	2.95%	(1.95 - 3.97%)	19062.02

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Top 12 Items All Sub-streams 2016 Statewide

	Material	Field%	Conf. Int.	Tons
1	All edible food	9.06%	(8.41 - 9.74%)	274387.57
2	All recyclable paper	7.98%	(7.44 - 8.57%)	241679.12
3	Non-recyclable paper combined	7.16%	(6.80 - 7.52%)	216844.93
4	Clean lumber & hogged fuel	5.73%	(5.15 - 6.39%)	173536.51
5	All non-edible food	5.65%	(5.18 - 6.12%)	171113.66
6	Plastic Packaging	5.42%	(5.12 - 5.71%)	164147.97
7	Plastic film - combined	5.26%	(4.95 - 5.56%)	159302.28
8	Disposable diapers	3.91%	(3.46 - 4.31%)	118416.71
9	Asphalt roofing - recyclable	3.72%	(3.11 - 4.40%)	112662.45
10	Rigid plastic products	3.62%	(3.18 - 4.01%)	109633.89
11	Pet litter, animal feces	3.60%	(3.15 - 4.10%)	109028.17
12	Cardboard incl. wine boxes	3.51%	(3.24 - 3.81%)	106302.47

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Waste Composition and Recovery Reports

If you are interested in looking at the data presented in this slideshow more closely 2016 reports will soon be available:

Waste Composition Study

<http://www.oregon.gov/deq/mm/Pages/Waste-Composition-Study.aspx>

Material Recovery Survey

<http://www.oregon.gov/deq/mm/Pages/survey.aspx>

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Waste Composition Reports

Oregon 2016 Waste Composition Study: Excel results files

This is one of a series of files giving detailed results of the waste composition study

Results are given in a series of sheets or tabs. This file contains the following tabs:

P16TOT	Oregon - All Substreams
P16RES	Oregon Residential Route Trucks
P16COM	Oregon Commercial Route Trucks
P16MIX	Oregon Mixed Route Trucks
P16ROC	Oregon Compacting Drop Boxes
P16ROD	Oregon Loose Drop Boxes
P16SH	Oregon Self Haul
P16MRF	Oregon Mixed Waste Processing Residue
P16SPS	Oregon Special Purpose Landfill
P16C	Oregon Cold Seasons (October - March)
P16W	Oregon Warm Seasons (April - September)

Each of these separate tabs contains the following columns:

A: Material	Material name (or group of materials)
B: Field Results	Composition percent for this material as measured in the field
D: Contam. Corrected	Composition based on "clean/dry" correction for each material
F: Clean Tons	Total tons disposed (Contam.-Corrected percent multiplied by total substream tons)
H: # Present/#Samples	Number of samples where the material was present/Total samples
I: % Present	Percent of samples where the material was present

Subsequent columns give the confidence interval information from columns C, E, and G, formatted as numbers rather than text

For comparisons to waste composition studies outside of Oregon, use the field results, as few other studies measure contamination levels of their sorted wastes.

Explanation of material name formatting

Material group names in bold are sums of some of the individual materials below

Material group names in italics are recombination of some of the individual materials above.

Materials that are neither bold nor italics are the individual materials sorted and measured in the field.

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Waste Composition Reports

Oregon - All Substreams		Total Tons ==>	3,028,560
Material	Field Results	90% Conf. Interval	Field Tons
TOTAL PAPER	15.14%	(14.45 - 15.90%)	458524.05
Packaging Paper	7.53%	(7.14 - 7.95%)	228050.60
Cardboard incl. wine boxes	3.51%	(3.24 - 3.81%)	106302.47
Wine boxes	0.00%	(0.00 - 0.01%)	0.00
Cardboard/brown bags	3.50%	(3.23 - 3.80%)	105999.61
Low grade Not OK With ONP	1.24%	(1.13 - 1.36%)	37554.15
Polycoats +bleached drink boxes	1.15%	(1.08 - 1.23%)	34828.44
Milk cartons/Drink boxes	0.09%	(0.08 - 0.10%)	2725.70
Gable top (milk) cartons	0.05%	(0.04 - 0.06%)	1514.28
Aseptic drink boxes	0.04%	(0.03 - 0.05%)	1211.42
Other Polycoated paper	1.06%	(0.99 - 1.14%)	32102.74
Nonrecyclable (packaging) paper	1.63%	(1.43 - 1.85%)	49365.53
Waxed corrugated cardboard	0.28%	(0.17 - 0.42%)	8479.97
Non-compost., non-recycl. paper	1.34%	(1.19 - 1.51%)	40582.71
Other (Non-packaging) Paper	7.61%	(7.12 - 8.12%)	230473.45
Hi grade paper	0.90%	(0.61 - 1.28%)	27257.04
Newspaper	0.53%	(0.46 - 0.61%)	16051.37
Magazines	0.51%	(0.39 - 0.64%)	15445.66
Low grade OK With ONP	1.14%	(1.04 - 1.24%)	34525.59
Hardcover books	0.07%	(0.04 - 0.10%)	2119.99
Other compostable nonrecycl. paper	4.47%	(4.21 - 4.72%)	135376.65
<i>Low-grade paper combined</i>	<i>2.54%</i>	<i>(2.35 - 2.72%)</i>	<i>76925.43</i>
<i>Non-recyclable paper combined</i>	<i>7.16%</i>	<i>(6.80 - 7.52%)</i>	<i>216844.93</i>
<i>Paper drink cartons</i>	<i>0.09%</i>	<i>(0.08 - 0.11%)</i>	<i>2725.70</i>
All recyclable paper	7.98%	(7.44 - 8.57%)	241679.12
TOTAL PLASTIC	11.77%	(11.22 - 12.30%)	356461.56
Plastic Packaging	5.42%	(5.12 - 5.71%)	164147.97
Rigid Plastic Containers (RPCs)	1.85%	(1.73 - 1.96%)	56028.37
Deposit plastic soft drink/beer bottles	0.06%	(0.05 - 0.06%)	1817.14
Plastic deposit water	0.07%	(0.06 - 0.08%)	2119.99
Plastic deposit in 2018 (juice, etc)	0.12%	(0.10 - 0.14%)	3634.27
No-deposit plastic beverage bots.	0.15%	(0.13 - 0.17%)	4542.84
Other plastic bottles	0.43%	(0.40 - 0.47%)	13022.81
5 Gallon buckets/ Flower Pots	0.18%	(0.13 - 0.23%)	5451.41

Why recycle?



The direct environmental damage from waste in landfills...

- Potential for groundwater contamination if landfill liners leak, or if landfill is unlined
- Some methane and hydrogen sulfide released from landfills
- Some limitations on uses of old landfills



Riverbend Landfill –
McMinnville, Oregon.

Photo – Jamie Francis, The Oregonian, 2008

Croton Point Landfill



The environmental damage from wasting materials and harvesting/mining new virgin resources...



- cutting down more trees
- mining more minerals and fossil fuels
- more greenhouse gasses



What Does Recycling Save?

Example: Paper Pulp Production



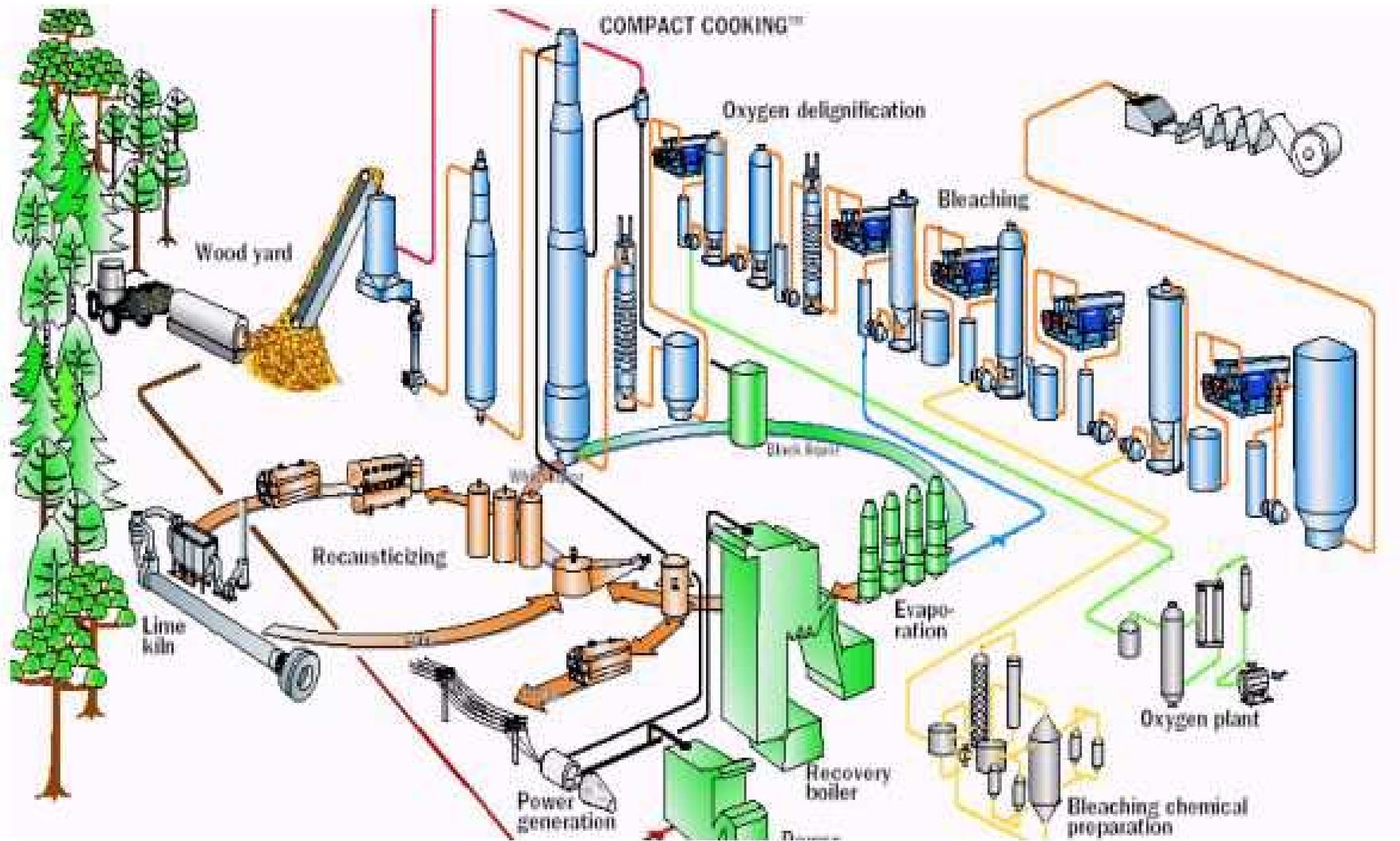
Image: GreenPeace Finland

VS



Image: Valley Community Recycling, Alaska

Producing Kraft Paper Pulp from logs



Courtesy of Kvaerner Pulping

Making paper from pulp

Same for virgin pulp and recycled pulp





Discussion items

- Impact of National Sword
- Mixed waste processing facility
- Plastics Collection Changes
- Shredded Paper



Contact Information

Peter Spendelow

Spendelow.Peter@deq.state.or.us

503-229-5253