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# Deschutes County Supplement to the 2023 Oregon Waste Composition Studies



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Abbreviations used in this report:

FSW = Food Serviceware

USCL – Uniform Statewide Collection List, defined in Oregon Revised Statues 459A.914

# 2023 Oregon Solid Waste Composition Deschutes County Supplement

March 5, 2026

The Oregon Waste Composition Study for 2023 is a state-wide study of the composition of municipal solid waste generated in Oregon across disposal, inbound commingled recycling, and outbound recycling commodities and waste streams after being sorted at commingled recycling processing facilities. To supplement the statewide emphasis of the study, Deschutes County, Marion County, Lane County, and Metro all participated in and contributed to the study to obtain more detailed information about the wastes within each of their respective jurisdictions. Deschutes County contributed samples to the disposal composition study, but not the recycling studies.

This report is a supplement to the overall 2023 Oregon Waste Composition Study report. Aspects such as study methodology and statewide results will be covered briefly here and will be presented in more detail in the overall 2023 statewide study report. This supplement will concentrate on the results from the Deschutes County samples, as well as present quantity information for the Deschutes County wastes.

The disposal study was conducted by obtaining samples of disposed waste directly from route trucks, drop boxes, self-haul vehicles, and residue from mixed solid waste processing facilities, sorting the waste into different material categories, weighing each component, and then combining these results with disposal tonnage reported by landfills and energy recovery facilities to determine the total amount of each material being disposed that was generated in Oregon. Similar methodology was used for the inbound commingled recycling study, with the large majority of sample coming from recycling route trucks and relatively few from depots or separate loads from individual businesses. The total amount of commingled recycling collected in each jurisdiction was derived from Oregon's annual material recovery survey.

## Disposal study

The statewide disposal composition study includes municipal solid waste and construction and demolition debris disposed at landfills, transfer stations, and incinerators in Oregon or transported out-of-state for disposal. The study excluded whole loads of sewage sludge, industrial waste, inert rock, dirt, asphalt, and similar material specified in Oregon Revised Statutes 459A.010 (3)(d), matching the waste streams that are excluded from counting in Oregon’s annual material recovery survey. The intent of the Deschutes County disposal study was to determine the composition of waste going to Knott Landfill and the county’s transfer stations by sampling the relevant points of disposal in Deschutes County in proportion to the amount of each waste stream directly received at each facility listed in Table 1. Sampling was conducted during the months of March, June, September, and December of 2023.

Deschutes County participated by paying to have 90 additional disposal site samples collected and sorted from within the county. DEQ also contributed samples in addition to those that would have been done for the statewide study, with a goal of obtaining at least 150 samples from Deschutes County. The targeted 150 Deschutes County samples were all collected and sorted, plus one extra, giving a total sample count of 151 (see footnote 1). Table 1 summarizes the number of samples from each facility across the various load types (substreams). The majority of samples were collected from Knott Landfill, representing a mix of substreams. Most samples represented the self-haul substream, predominantly from Knott landfill.

**Table 1: Number of samples collected for each waste substream and waste facility.**

Load Type	Knott Landfill	Negus TS	Northwest TS	Southwest TS	Total
Residential Route Truck	14	8	0	3	25
Mixed Route Truck	3	3	1	0	7
Commercial Route Truck	11	1	0	0	12
Compacting Drop Box	6	0	0	0	6
Loose Drop Box	21	1	0	0	22
Self-Haul	65 <sup>1</sup>	8	2	4	79
<b>Total</b>	<b>120</b>	<b>21</b>	<b>3</b>	<b>7</b>	<b>151</b>

Tables 2 and 3 summarize Deschutes County waste reported quarterly to DEQ throughout 2023 by facility, source, and substream. Although the study includes Deschutes County self-haul waste

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<sup>1</sup> Includes one self-haul sample from Jefferson County and another from Crook County

samples coming from the transfer stations and disposed at Knott Landfill, no samples were collected of Deschutes County waste being delivered to facilities outside of Deschutes County. The amount of Deschutes County self-haul waste disposed out-of-county that the study did not sample included 4,170 tons from Crook County Landfill, 6 tons from Finley Buttes Landfill, and 4 tons from Browns Island Demolition Landfill as reported to DEQ by those facilities. The Crook County landfill also reported 1,376 tons of drop box waste from Deschutes County. Because delivery of these loads to the out-of-county landfills is fairly erratic, it was not practical to gather samples to properly represent disposal of this waste. 98% of the waste from Deschutes County that was landfilled ended in the Knott Landfill, and only 2% was disposed in out-of-county landfills in 2023. Self-haul waste made up 47% of the total disposed waste, and route truck waste made up 40% in 2023. The tonnages for each substream in Table 3 are DEQ’s best estimate based on available data.

**Table 2: Tons of Deschutes County waste disposed by facility as reported to DEQ**

Facility	Source	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Total
Finley Buttes Landfill	Self-haul	0	0	2	3	6
Browns Island Demo LF	Self-haul	0	0	4	0	4
Crook County Landfill	Hauler uncompacted	316	414	376	270	1,376
Crook County Landfill	Self-haul	1,271	981	1,125	793	4,170
Knott Landfill	Hauler compacted	15,689	16,276	16,382	15,493	63,840
Knott Landfill	Hauler uncompacted	4,534	5,111	5,619	4,869	20,133
Knott Landfill	Self-haul	15,208	29,205	21,079	18,972	84,464
Knott Landfill	Transfer stations	10,829	13,611	13,146	11,797	49,384
<b>Total</b>		<b>47,847</b>	<b>65,598</b>	<b>57,734</b>	<b>52,198</b>	<b>223,377</b>

**Table 3: Tons of Deschutes County waste disposed by substream and quarter**

Substream	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Total
Route	21,684	22,936	22,874	21,808	89,302
<i>Residential Route</i>	<i>12,320</i>	<i>13,032</i>	<i>12,997</i>	<i>12,391</i>	<i>50,740</i>
<i>Commercial Route</i>	<i>5,914</i>	<i>6,255</i>	<i>6,238</i>	<i>5,948</i>	<i>24,355</i>
<i>Mixed Route</i>	<i>3,450</i>	<i>3,649</i>	<i>3,639</i>	<i>3,470</i>	<i>14,207</i>
Compacting drop box	1,876	1,904	1,894	1,869	7,543
Loose drop box	5,054	5,792	6,282	5,355	22,483
Self-haul	19,234	34,965	26,685	23,165	104,049
<b>Total</b>	<b>47,847</b>	<b>65,598</b>	<b>57,734</b>	<b>52,198</b>	<b>223,377</b>

## Disposed waste results

The [Oregon Waste Composition Studies page](#) on the DEQ website includes a link to the file [A05-Deschutes-2023Semifinal-WC2023.xlsx](#), which contains the disposed waste composition results for Deschutes County, as well as results for the different substreams of waste listed in Table 3 above for the County. Table 4 below gives a summary of those results for the county as a whole. Table 4 does not include tires from Deschutes County that go to tire processors and are chipped and landfilled en masse.

The results shown here are the results of composition as measured in the field, but that means that absorbent materials such as paper or light thin materials such as film plastic and aluminum foil include not only the material itself, but also water absorbed into the material and sticky materials such as food waste contaminating the material. In the past, DEQ has done studies to produce contamination correction factors to determine the “clean, dry” weight of materials as opposed to the “dirty, wet” weight of materials as measured in the field. DEQ did not do this contamination correction work in this study except for work on rigid plastics. The Excel file on the website is labelled “Semifinal” because DEQ intends to do additional work applying contamination correction factors from the past studies to come up with a better estimate of the clean, dry weight of materials disposed. Although the file is labelled “semifinal” the field results themselves are final.

**Table 4: Summary of Deschutes County disposed waste composition**

<b>Material</b>	<b>Field Results Percent (90% conf. interval)</b>	<b>Field Results Tons (90% conf. interval)</b>	<b># present / # samples</b>
<b>Total paper</b>	<b>8.74% (7.84 - 9.66%)</b>	<b>19,533 (17,518 - 21,585)</b>	<b>124/ 151</b>
Printing, packaging, and FSW Paper*	6.55% (5.77 - 7.36%)	14,628 (12,897 - 16,449)	121/ 151
Printing and writing paper	1.43% (1.17 - 1.71%)	3,203 (2,623 - 3,822)	77/ 151
Cardboard/Brown bags	2.82% (2.32 - 3.36%)	6,295 (5,187 - 7,514)	114/ 151
Other paper packaging, FSW*	2.30% (2.01 - 2.59%)	5,130 (4,499 - 5,776)	98/ 151
Paper products	2.20% (1.84 - 2.57%)	4,904 (4,105 - 5,741)	84/ 151
<i>All recyclable paper</i>	<i>5.48% (4.75 - 6.25%)</i>	<i>12,242 (10,621 - 13,967)</i>	<i>120/ 151</i>
<i>All nonrecyclable paper</i>	<i>3.26% (2.93 - 3.63%)</i>	<i>7,290 (6,542 - 8,108)</i>	<i>91/ 151</i>
<b>Total plastic</b>	<b>10.43% (8.91 - 11.89%)</b>	<b>23,293 (19,896 - 26,568)</b>	<b>128/ 151</b>
Rigid plastic containers (RPCs)	1.36% (1.16 - 1.56%)	3,039 (2,594 - 3,492)	93/ 151
Other Rigid Plastic Packaging, FSW*	0.71% (0.60 - 0.85%)	1,589 (1,330 - 1,890)	84/ 151
Rigid Plastic Products Excluding FSW	5.27% (3.87 - 6.67%)	11,775 (8,639 - 14,888)	107/ 151
Recyclable polyethylene film	0.86% (0.68 - 1.06%)	1,926 (1,530 - 2,362)	96/ 151
Nonrecyclable plastic film	2.22% (1.88 - 2.60%)	4,963 (4,208 - 5,808)	97/ 151
<b>Yard Debris</b>	<b>5.78% (4.11 - 7.60%)</b>	<b>12,908 (9,170 - 16,980)</b>	<b>61/ 151</b>
Leaves and grass	1.14% (0.60 - 1.75%)	2,547 (1,330 - 3,917)	23/ 151
All Prunings and Stumps	4.64% (3.09 - 6.31%)	10,362 (6,904 - 14,104)	52/ 151
<b>All Wood</b>	<b>23.30% (19.87 - 26.56%)</b>	<b>52,038 (44,393 - 59,330)</b>	<b>126/ 151</b>

<b>Material</b>	<b>Field Results Percent (90% conf. interval)</b>	<b>Field Results Tons (90% conf. interval)</b>	<b># present / # samples</b>
Clean Lumber & Hogged Fuel	12.26% (9.91 - 14.54%)	27,384 (22,146 - 32,486)	93/ 151
Painted & Treated Lumber	7.46% (5.33 - 9.91%)	16,674 (11,910 - 22,132)	65/ 151
Wood pallets, crates	2.30% (1.41 - 3.25%)	5,132 (3,148 - 7,257)	50/ 151
Wood furniture + other products	2.45% (1.61 - 3.33%)	5,469 (3,592 - 7,443)	50/ 151
Mixed wood/materials	1.08% (0.59 - 1.59%)	2,402 (1,321 - 3,559)	26/ 151
<b>All Food</b>	<b>8.48% (7.17 - 9.99%)</b>	<b>18,948 (16,022 - 22,319)</b>	<b>77/ 151</b>
All edible food	5.84% (4.81 - 7.10%)	13,043 (10,743 - 15,849)	73/ 151
All non-edible food	2.64% (2.12 - 3.30%)	5,905 (4,736 - 7,380)	54/ 151
<b>Tires</b>	<b>0.15% (0.02 - 0.35%)</b>	<b>343 (53 - 787)</b>	<b>5/ 151</b>
<b>Other rubber products</b>	<b>1.21% (0.40 - 2.20%)</b>	<b>2,692 (900 - 4,903)</b>	<b>46/ 151</b>
<b>Disposable diapers</b>	<b>0.91% (0.63 - 1.19%)</b>	<b>2,039 (1,418 - 2,657)</b>	<b>31/ 151</b>
<b>Carpet, Rugs, Carpet Pads</b>	<b>2.09% (1.05 - 3.24%)</b>	<b>4,666 (2,349 - 7,246)</b>	<b>26/ 151</b>
<b>Textiles and mixed materials</b>	<b>3.65% (2.91 - 4.42%)</b>	<b>8,143 (6,501 - 9,869)</b>	<b>91/ 151</b>
<b>Asphalt roofing &amp; tarpaper</b>	<b>5.91% (3.60 - 8.98%)</b>	<b>13,208 (8,036 - 20,056)</b>	<b>20/ 151</b>
<b>Furniture + mattresses</b>	<b>2.42% (1.27 - 3.82%)</b>	<b>5,405 (2,831 - 8,528)</b>	<b>22/ 151</b>
<b>Other carbon-containing materials</b>	<b>2.21% (1.28 - 3.30%)</b>	<b>4,939 (2,860 - 7,375)</b>	<b>68/ 151</b>
<b>Glass</b>	<b>2.26% (1.32 - 3.39%)</b>	<b>5,054 (2,942 - 7,566)</b>	<b>65/ 151</b>
Glass containers	0.84% (0.67 - 1.05%)	1,878 (1,487 - 2,334)	53/ 151
Nonrecyclable glass	1.42% (0.47 - 2.52%)	3,176 (1,043 - 5,629)	32/ 151
<b>Metal</b>	<b>6.18% (5.02 - 7.33%)</b>	<b>13,796 (11,211 - 16,367)</b>	<b>122/ 151</b>
Aluminum	0.29% (0.22 - 0.38%)	651 (485 - 849)	79/ 151
Other nonferrous metal	0.42% (0.23 - 0.66%)	935 (509 - 1,467)	40/ 151
Steel (tinned) cans	0.27% (0.21 - 0.33%)	604 (468 - 741)	50/ 151
Other ferrous metal	2.65% (1.96 - 3.37%)	5,926 (4,368 - 7,538)	91/ 151
Mixed ferrous/non-ferrous	0.39% (0.12 - 0.79%)	868 (264 - 1,765)	12/ 151
Mixed metal/materials	2.15% (1.46 - 2.84%)	4,811 (3,258 - 6,350)	58/ 151
<b>Electronics + small appliances</b>	<b>1.16% (0.80 - 1.57%)</b>	<b>2,581 (1,781 - 3,508)</b>	<b>40/ 151</b>
<b>Rock, dirt, litter</b>	<b>8.30% (5.95 - 10.83%)</b>	<b>18,539 (13,282 - 24,195)</b>	<b>73/ 151</b>
<b>Gypsum wallboard</b>	<b>3.58% (1.81 - 5.37%)</b>	<b>7,995 (4,040 - 11,998)</b>	<b>24/ 151</b>
<b>Other miscellaneous inorganics</b>	<b>2.20% (1.07 - 3.38%)</b>	<b>4,906 (2,396 - 7,546)</b>	<b>45/ 151</b>
<b>Total medical waste</b>	<b>0.66% (0.21 - 1.25%)</b>	<b>1,470 (463 - 2,793)</b>	<b>17/ 151</b>
<b>Hazardous materials</b>	<b>0.39% (0.24 - 0.57%)</b>	<b>880 (542 - 1,270)</b>	<b>45/ 151</b>

\* "FSW" is an abbreviation for "Food Serviceware"

## Inbound recycling study

The Oregon Waste Composition Studies for 2023 also includes a statewide study of the composition of inbound commingled recyclable material going to recycling facilities. Deschutes County did not participate in this study, but DEQ collected 20 samples in Deschutes County as part of statewide sampling. Because only 20 samples were collected, the results have fairly broad confidence intervals and are less precise than the statewide results or results from jurisdictions that participated in the study by purchasing extra samples. The study included commingled recycling received at recycling reload facilities in proportion to the amount of commingled recycling unloaded from collection vehicles at each facility. Table 5 summarizes the number of samples from each facility across the various load types (substreams).

**Table 5: Number of Deschutes County inbound recycling samples collected for each different waste substream and waste facility**

Location	Residential Route Truck	Mixed Route Truck	Commercial Route Truck	Total
Republic Services Reload	15	0	2	<b>17</b>
Negus Transfer Station	3	0	0	<b>3</b>
<b>Total</b>	<b>18</b>	<b>0</b>	<b>2</b>	<b>20</b>

Sampling for the inbound recycling study was conducted at the facilities listed in Table 5, during the months of March, June, September, and December of 2023. Deschutes County reported a total of 13,126 tons of inbound recycling in 2023.

Table 6 gives a summary of the composition of commingled recycling collected in Deschutes County. Full results for Deschutes County samples are located in the tab labelled "06DeschutesCounty" of the [Inbound Commingled Recycling Study data file](#), available on the [DEQ waste composition study webpage](#).

**Table 6: Average composition of 20 samples of commingled recycling collected from Deschutes County recycling route trucks**

Material	Percent	95% conf. interval	Tons	95% conf. interval
Cardboard	56.66%	(50.02-64.11%)	7,438	(6,566-8,415)
Other cart-acceptable paper	23.77%	(19.27-27.81%)	3,120	(2,529-3,650)
Plastic Bottles 6 oz to 5 gallons	3.63%	(2.77-4.54%)	476	(363-595)
Plastic tubs, pails: cart-acceptable	0.48%	(0.32-0.65%)	63	(42-85)
Aluminum beverage cans	0.79%	(0.52-1.12%)	104	(68-147)
Aluminum foil, pet food cans *	0.17%	(0.10-0.25%)	22	(13-33)

<b>Material</b>	<b>Percent</b>	<b>95% conf. interval</b>	<b>Tons</b>	<b>95% conf. interval</b>
Other aluminum: cart-acceptable	0.01%	(0.00-0.02%)	1	(0-3)
Tinned cans excluding aerosols	1.73%	(1.27-2.24%)	226	(167-294)
Other scrap metal cart-acceptable	0.53%	(0.13-1.08%)	70	(17-142)
Paper not cart-acceptable	2.12%	(1.65-2.59%)	278	(217-340)
Rigid plastic not cart-acceptable	2.90%	(2.35-3.42%)	381	(309-448)
Film plastic	1.17%	(0.77-1.62%)	154	(101-213)
Empty aerosol cans	0.04%	(0.02-0.07%)	5	(2-9)
Other scrap metal not cart-acceptable	0.11%	(0.02-0.24%)	14	(3-31)
All glass	1.66%	(0.84-2.60%)	218	(110-342)
Food, yard debris, and wood	1.25%	(0.62-2.08%)	164	(81-272)
Disposable diapers	0.02%	(0.00-0.07%)	3	(0-9)
Cloth textiles	0.47%	(0.08-1.17%)	62	(11-154)
Other non-hazardous nonrecyclables	0.60%	(0.27-0.95%)	78	(36-124)
Medical waste	0.00%		0	
Sharps	0.00%		0	
All batteries	0.01%	(0.00-0.01%)	1	(0-2)
All other hazardous materials	0.35%	(0.00-0.94%)	46	(0-123)
Bagged garbage	1.53%	(0.65-2.65%)	201	(86-347)
All acceptable in cart (USCL)	87.68%	(85.43-90.10%)	11,509	(11,214-11,827)
All acceptable in cart (2023 list)	87.88%	(85.63-90.29%)	11,534	(11,240-11,852)
All not acceptable in cart (USCL)	12.32%	(9.89-14.57%)	1,617	(1,298-1,912)
All not acceptable in cart (2023 list)	12.12%	(9.71-14.37%)	1,591	(1,274-1,886)

Contaminant rows are shaded gray

\* Aluminum foil-form containers were considered acceptable in commingled recycling in 2023 but are not included in the Uniform Statewide Collection List. Aluminum pet food containers are considered acceptable in both the 2023 and the USCL lists.

## **What is acceptable in commingled recycling**

During field work for the commingled recycling study, the crew used the Metro definition of what materials are acceptable in commingled recycling when sorting each load, with one exception – scrap metal was considered acceptable only if items weighed less than 10 pounds and were less than 18 inches long. The standard Metro had used for years was that scrap metal up to 30 pounds or 30 inches long would be acceptable. DEQ used the Metro list as we believed it would be very close in definition to the Uniform Statewide Collection List which at the time had not been defined under Oregon’s Recycling Modernization Act. The Metro 2023 list is very close to the definitions that Deschutes County was using for what is recyclable in commingled recycling.

After field work was completed, Oregon finalized what materials are on the uniform statewide collection list and thus would be acceptable in commingled recycling. Generally, the USCL is very similar to the lists already used in the Metro area and in Deschutes County, but there were some differences, and DEQ made the following adjustments as an approximation to what are contaminants under the USCL:

- All shredded paper and all empty aerosol cans were reclassified as contaminants
- For the category of aluminum pet cans and aluminum foil and foil-formed containers, we did not have data on what percentage was cans vs. foil, but estimated that each made up a substantial share, assigning 50% as acceptable (the pet food cans) and 50% contamination (the foil).
- There were differences in the smallest size of rigid plastic containers that would be acceptable in commingled recycling.

In Table 6, DEQ estimates the contamination rate using the USCL definition of acceptable material as well as the original definition (referred to as the 2023 list)

## **Underrepresentation of commercial recycling in Deschutes County**

The methodology used to select route trucks for sampling involves randomly picking trucks to sample that are chosen in such a way that any pound of garbage or recycling arriving in a route truck on the sample collection day should be equally likely to be selected. However, with only 20 samples being collected of commingled recycling, just random chance alone could result in over or under sampling a particular recycling stream. Based on data submitted by Deschutes County collection service providers as part of Oregon’s annual material recovery survey, nearly a third of the commingled recyclables collected are reported as coming from commercial sources. Thus, with 20 samples, we would have expected 6 or 7 of the samples to be from commercial sources. However, only two of the twenty route trucks from which we obtained samples were

commercial route trucks. Thus, commercial recycling may be underrepresented in Table 6 and in the full results on the DEQ website. With only 20 samples, sampling errors can be fairly substantial.

## Methodology

The general methodology for the Oregon Waste Composition Study involves the following steps:

1. **Select samples:** The selection protocol is designed to accurately represent all of the municipal solid waste being disposed and recycled from Oregon, or in this case, from Deschutes County. The definition for solid waste that is included in this study is the same as is used in [Oregon's material recovery survey and calculation of Oregon and watershed material recovery rates](#). In the disposal study, DEQ selects loads being directly disposed at landfills, transfer stations, and solid waste incinerators. In the inbound recycling study, DEQ selects loads inbound to recycling facilities.
2. **Sort and weigh materials:** Sort the selected load into categories of materials specified in the document [Material Categories for the 2023 Waste Composition Study](#) and then weigh each material category. The disposal study includes 152 categories, and the inbound commingled recycling study includes 88 categories.
3. **Determine substream compositions:** Use the sorted sample weight data to determine the composition of different substreams of wastes, such as residential and commercial route truck garbage, loose drop box garbage, and self-haul garbage. For the Deschutes County inbound recycling samples, we analyzed them all as a single substream as we did not have reliable independent information as to the quantity of commingled recycling collected in residential vs. commercial route trucks.
4. **Compile composition:** Combine the different substream compositions to produce the overall composition for Oregon or for the specific jurisdiction.

The goal of the study was to provide the most precise estimate of waste composition for Deschutes County as a whole, as well as the composition of the different substreams, given the total budget of the study. To achieve this, the study oversampled self-haul and drop box substreams relative their total portion of Deschutes County's solid waste, for two reasons.

- Self-haul and drop box samples are far more variable than samples from route trucks, since they represent waste from only a single family or business, whereas route trucks mix wastes from many different generators.
- Self-haul and drop box truck samples are usually much easier and cheaper to sort than route truck samples, and so more samples could be collected and sorted for the same amount of money.

When combining the substreams to produce the overall Deschutes County waste composition, each substream was weighted by the total tons in that substream.

The methodology for the inbound commingled recycling study was very similar to that used in the disposed waste composition study and is described in more detail in Appendix A of the report [2023 Oregon Inbound Commingled Recycling Composition Study](#).

## Acknowledgements

All field work for the 2023 Oregon Waste Composition Study was conducted by Sky Valley Associates ("the contractor") under contract to the Oregon Department of Environmental Quality (DEQ). Cascadia Consulting also provided assistance with the aspects of field work for both disposal and inbound recycling sampling.

This study would not have been possible without substantial assistance from the recycling facilities and collection service providers who provided space in their facilities for the sort crews, assistance in capturing samples, data on their recycling routes or the recycling trucks unloading at their facilities, and much more in in-kind support for the study.

Deschutes County (Tim Brownell, Sue Monette) provided extensive information on disposal at Deschutes County facilities including copies of the entire Deschutes County disposal transaction database for 2023. Deschutes County also provided support with sampling at the Knott Landfill and at the transfer stations.

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