Improving Oregon Recycling Systems Infrastructure Research

FINAL Phase 2 Task 4 Research Plan

December 27, 2019

Phase 2 Task 4 Oregon's Residential, Commercial, and Drop-off Recycling System Model Design and Base-Case Scenario

The goal of this task is to develop an Excel-based model to analyze the cost and performance of Oregon's recycling collection, education, and processing system, and populate this model to analyze the current ("base case") situation. Oregon's programs will be represented in a simplified model and represented in four groupings (see Appendix A). The model will be developed and used in future tasks to compare alternative future scenarios against the base-case scenario. The base case model will represent the current system (2018), scaled in size/capacity to handle projections of material tonnages in 2025. Scaling will inflate tonnages, population/customers, and associated costs but will not change the type or average age of equipment.

The model will include cost and tonnage flow modules for the following stages of the recycling process:

- **Customer engagement** methods to increase quantities of recyclables and reduce contamination, such as education, incentives, and compliance programs.
- **Collection** methods for single-family residential pick-up, multifamily pick-up, commercial pick-up, and drop-off.
- **Consolidation and transport** transfer between collection and sortation.
- **Sortation** methods such as various types and arrangements of MRFs, PRFs, and CRFs
- **Marketing** including transport costs to ports or domestic mills and market price for first sale post-sortation.

The model will focus on recyclables covered in Phase 1 (excluding organics, C&D debris, and HHW). The scope includes recyclables collected through drop-off (not bottle bill) and "on-route" residential and commercial collection, that is, the types of collection services that are largely provided by franchised and licensed waste collectors. For each grouping, DEQ will estimate and provide generation tonnages by sector and desired materials to be analyzed. Current capture rates will be based on either Phase 1 outputs or alternative capture rates provide by DEQ.

Base case model inputs will be developed using a combination of available data (Task 1, 2, and 3 research plus additional research as budget allows), consultant expertise, and input from DEQ and Partners. The model will be designed to balance transparency regarding inputs and assumptions with the

potential need for confidentiality to be able to obtain actual operating data from sortation facilities. The model will also be designed to provide transparency in calculations and ranges for sensitivity analysis.

Model outputs, presented at the grouping level, will be *(as information is available or presented as a scenario input assumption)*:

- Summary scenario total system costs by stage of recycling process
- Tons by type of materials: collected (inbound) and marketed (outbound, by ISRI specification and anticipated end-market)
- Average in-bound contamination rates
- Average processing residue rate (i.e., material disposed from processing facilities)
- Average outbound bale contamination levels
- Summary system costs per ton marketed
- Summary number of FTEs required for the customer engagement, collection, and sortation stages

Model outputs regarding tonnages by material will allow DEQ to assess environmental benefits/costs. The model will simplify collection frequency as either weekly or every-other-week based on the very small number of monthly or bi-monthly collection programs.

Draft Evaluation Criteria (for future alternative scenarios)

DEQ and Partners have identified the following evaluation criteria for analyzing the baseline results against future scenarios. Some of these criteria are modeling outputs while others are modeling inputs or will be evaluated qualitatively:

- **Access to recycling opportunities**: population and/or number of customers by grouping and sector with access to define recycling service levels *(modeling input determined during scenario definition)*
- **Employment**: FTEs associated with customer engagement, recycling collection activities, and sortation by type of job (e.g., permanent versus temporary or by job class; administrative FTEs will be included for sortation and collection stages) *(modeling output)*
- **Environmental outcomes and social costs of those outcomes**: *to be defined and calculated by DEQ using modeling tonnage outputs*
- **Transactional costs**: system recycling costs covering recycling-related customer engagement labor and expenses, collection capital and operations, consolidation and intermediate transport capital and operations, sortation capital and operations, and transport to domestic markets or ports for export and sale of recyclable materials *(market prices will be an input determined during scenario definition; costs will be a modeling output)*
- **Quality of materials to reach markets**: bale contamination levels and whether bales meet ISRI specifications *(modeling input determined during scenario definition)*
- **Quantity of materials to reach markets**: tonnages by commodity type *(modeling output)*
- **Meets the needs of different generators**:

- Recycling participation rates *(modeling input determined during scenario definition)*

- Qualitative assessment of likely customer acceptance of customer engagement and collection methods *(modeling input consideration determined during scenario definition)*

- Qualitative assessment of equity considerations *(narrative discussion)*

- **Resiliency/adaptability**: qualitative assessment regarding ability of collection and/or sortation infrastructure to handle changes in incoming material quantities and types *(modeling input determined during scenario definition)*

- **Potential for stranded assets**: potential for existing assets to be suitable in alternative scenarios *(narrative discussion)*

- **Worker safety/working conditions**: qualitative assessment based on type of jobs, collection methods, and facility types *(narrative discussion)*

Service Level Groupings

DEQ categorized all areas of the state — cities, county areas within urban growth boundaries and county areas outside urban growth boundaries — into one of four grouping based on factors related to service level, geography (transportation to markets), population density and amounts of commercial activity in order to simplify the scope of work for the sake of efficiency and to reduce the costs of research. Groupings provided by DEQ:

- **Category 1**: all areas within the Metro urban growth boundary

- **Category 2**: Areas with curbside collection in most of the Willamette Valley, The Oregon Coast south to Lincoln County, Deschutes County, Hood River County, and Wasco County.

- **Category 3**: All other areas with curbside collection including some small towns from areas in Category 2 if they are distant from Portland and other population centers, such as the city of Oakridge in Lane County.

- **Category 4**: All areas without curbside collection or minimal curbside collection — served mainly by depots, if at all.

Below is a summary of Oregon's residential population (roughly calculated) in each of these 4 categories, further broken down by the frequency of collection. See Appendix A for all details.

Category	Frequency	Pop2018	Percent
1: Metro area	Weekly	1,283,440	30.6%
1: Metro area	Every other week	345,604	8.3%
2: Willamette Valley, etc.	Weekly	315,383	7.5%
2: Willamette Valley, etc.	Every other week	948,382	22.6%
2: Willamette Valley, etc.	Uncertain	14,744	0.4%
3: Other areas with curbside	Weekly	202,084	4.8%
3: Other areas with curbside	Every other week	294,500	7.0%
3: Other areas with curbside	Bimonthly	2,535	0.1%
3: Other areas with curbside	Monthly	8,045	0.2%
3: Other areas with curbside	Uncertain	455	0.0%
4: Areas without curbside	No or minimal curbside	633,044	15.1%
Areas uncertain about curbside*		140,771	3.4%
Total		**4,188,987**	**100.0%**

*Uncertain areas have not been assigned to a category yet at the time of this draft, but they will be assigned before modeling begins.

Tonnage Flow Modules

Generation Tonnages

For each grouping, DEQ will provide generation tonnages by grouping, sector, and desired materials to be analyzed. Current capture rates will be based on either Phase 1 outputs or alternative capture rates provided by DEQ.

Inputs

Tonnage generation estimated by grouping and sector for the following four sectors:

- Single-family residential (on-route)
- Multifamily residential (on-route)
- Commercial (on-route)
- Self-haul (excluding bottle-bill)

Tonnage generation by grouping, sector, and material type for the following materials:

- Materials to be determined by DEQ

Outputs

Same as inputs: this is a pass-through module organizing tonnage data.

Customer Separation and Collection Tonnages

Inputs and Research Methods

- **Tonnages:** by grouping, sector, and material type from Generation Tonnage Module.
- **Baseline:** Data provided by DEQ for the Generation Tonnage Module and/or DEQ's Oregon Material Recovery and Waste Generation Rates Report.
- **Alternative scenarios:** Data/assumptions regarding capture and contamination rates by sector and material type (based on collection methods and customer engagement programs included in the scenario). Data to be drawn largely from Phase 2, Task 1 and 3 research.

Approach / Calculations

The customer separation portion of this tonnage module will apply capture rates for each material, by sector, to separate materials into:

- Recycling
- Disposal
- *Organics, C&D debris, HHW and* other waste *(excluded from further modeling)*

Customer separation will also include assumptions around contamination rates.

The collection portion of this tonnage module will assign separated materials into collection container types. Examples include:

- Glass-only tubs

- Commingled carts
- Commingled tubs
- Commingled dumpsters/compactors
- Disposal carts/cans *(excluded from further tonnage flow modeling)*
- Disposal dumpsters/compactors *(excluded from further tonnage flow modeling)*
- Self-haul recycling drop-off containers (commingled)
- Self-haul recycling drop-off containers (source-separated)
- *(Other recycling collection container configurations to be added during scenario modeling)*

Outputs

- Tonnages by grouping, sector, material type, and collection method
- Recycling contamination rate

Recycling Consolidation and Transport Tonnages

Inputs and Research Methods

- **Tonnages:** Data from the Customer Separation and Collection Module
- **Baseline**: Data provided by DEQ and/or Oregon sortation facilities
- **Alternative Scenarios**: Assumptions regarding whether, how, and where materials from each grouping will be consolidated (e.g., transfer stations) and transported (e.g., sortation facilities)

Approach / Calculations

For service level groupings and materials not delivered directly to a sortation facility, this tonnage module will serve as a pass-through to send collected recycling tonnages to consolidation sites and distant sortation facilities.

Outputs

- Tonnages by material type, collection stream (e.g., separated glass, commingled residential, commingled commercial), preparation for transport (e.g., baled, loose), transport method (e.g., truck, rail), and destination (e.g., sortation facility type and general location or average distance).

Recycling Sortation Tonnages

Inputs and Research Methods

- **Tonnages:** Data from the Consolidation and Transport Module, including contamination rates from the Customer Separation and Collection Module.
- **Baseline:** Data provided by Oregon sortation facilities through interviews.

- **Alternative Scenarios:** Data/assumptions regarding sortation success, bale purity and overall contamination rates, and residual rates (based on facility and commodity bale types included in the scenario), drawn from Phase 2 Task 2 research and additional research as into additional sortation facilities as needed using similar methods.

Approach / Calculations

This tonnage module will apply sortation rates to assign collected materials into bales versus residuals, using assumptions around sortation success rates.

Outputs

- Tonnages of recyclable materials correctly sorted into bales.
- Bale purity rates: percentage of bales that contain the specified materials (by weight).
- Residual rates: percentage of inbound materials that are disposed instead of being sorted into bales (by weight).

Commodity Marketing Tonnages

Inputs and Research Methods

- **Tonnages:** Recyclable materials correctly sorted into bales from the Sortation Module.
- **Baseline:** Data provided by Oregon sortation facilities
- **Alternative Scenarios:** Data/assumptions regarding likely markets (based on commodity bale types included in the scenario).

Approach / Calculations

This module will assign commodity outputs from sortation to domestic versus export markets.

Outputs

- Tonnages of recyclables by bale type and market destination (domestic versus export).

Cost Modules

Recycling Customer Engagement Costs

Inputs and Research Methods

- **Baseline:** data/extrapolations from hauler data already collected by Bell and Associates supplemented by a brief online survey of haulers, municipal governments, and DEQ.

- **Alternative scenarios:** data/assumptions regarding customer engagement programs included in the scenario (e.g., average program cost per customer or per campaign applied to number of customers) using research from Phase 2 Task 3 and additional research as needed, including:
  - Engagement labor requirements/costs
  - Non-labor operational costs (e.g., printing/mailing)
  - Estimated administrative cost rates (e.g., as a percentage of engagement costs)

Outputs

- Total system recycling customer engagement cost by grouping and sector (where feasible)
- Customer engagement FTEs

Recycling Collection Costs

Inputs

- **Baseline:** Data/extrapolations from hauler data already collected by Bell and Associates. Supplemental survey of haulers, drop-off facility operators, and municipalities regarding stand-alone drop-off recycling sites.
- **Alternative scenarios:** data/assumptions regarding cost-of-service elements for recycling (based on collection methods included in the scenario) using research from Phase 2 Task 1 and additional research as needed, including:
  - Recycling collection labor requirements/costs
  - Recycling collection equipment and capital requirements/costs
  - Non-labor recycling operational costs (e.g., fuel, maintenance)
  - Estimated administrative cost rates (e.g., as a percentage of collection costs)
- Notes:
  - Processing fees incurred by haulers are not included because they are handled in the sortation cost module.
  - Disposal costs will be included using an average tip fee per grouping, applied to disposed tons.

Outputs

- Total system recycling collection cost by grouping, sector, and cost type
- Per-ton system recycling collection cost by grouping, sector, and cost type
- Total on-route recycling FTEs

Recycling Consolidation and Transport Costs

Inputs

- **Baseline**: data/extrapolations from hauler data already collected by Bell and Associates and additional data provided by Oregon sortation facilities.
- **Alternative Scenarios**: data/assumptions regarding:
  - Recycling consolidation facilities (number/size, transfer labor, transfer equipment/capital).
  - Recycling transport method, per-mile transport costs, and average distance transported.
  - Estimated administrative cost rates (e.g., as a percentage of consolidation and transport costs)

Outputs

- Total system recycling consolidation and transport cost by grouping and cost type

Recycling Sortation Costs

Inputs

- **Baseline:** data provided by Oregon sortation facilities. Bell & Associates will hold a meeting with Oregon MRF operators to agree on acceptable questions regarding costs and effectiveness of sortation that will protect competitive information.
- **Alternative Scenarios:** data/assumptions regarding cost-of-service elements (based on processing methods included in the scenario) using research from Phase 2 Task 2 and additional research as needed, including:
  - Sortation labor requirements/costs
  - Equipment and capital requirements/costs
  - Non-labor operational costs (e.g., utilities, maintenance)
  - Residual disposal costs
  - Estimated administrative cost rates (e.g., as a percentage of sortation costs)

Outputs

- Total system sortation cost by modeled sortation facility *(To protect confidential information from current MRFs, the output will be a modeled "average Oregon MRF" that consolidates costs for each facility to obscure individual facility information)*
- Per-ton system sortation cost by modeled sortation facility
- Total sortation FTEs by type

Commodity Marketing Costs

Inputs

- **Baseline:** data provided by Oregon sortation facilities
- **Alternative Scenarios**: data/assumptions regarding:
  - Market destination (domestic facility location, seaport location for exported materials)
  - Transport method, per-mile transport costs, and average distance transported (per haul cost)
  - Per-ton commodity values

Outputs

- Total system marketing cost
- Per-ton system marketing cost

Environmental Impact and Social Cost Modules

DEQ will provide environmental impacts and social costs using outputs from the model —details to be determined.

Appendix A: Groupings Tables

Key: Collection frequency: W= Weekly, E = Every Other Week, M = Monthly, BM = Bimonthly, N = no curbside collection. Required: "Y" = curbside collection or an alternative method is required in this jurisdiction. UGB = Urban Growth Boundary

Category 1

County	Jurisdiction	Frequency	Required	Pop2018
Clackamas	Gladstone	W	Y	11,880
Clackamas	Happy Valley	W	Y	20,945
Clackamas	Johnson City	W	Y	560
Clackamas	Lake Oswego	W	Y	35,645
Clackamas	Milwaukie	W	Y	20,525
Clackamas	Oregon City	W	Y	34,860
Clackamas	Portland	W	Y	770
Clackamas	Rivergrove	W	Y	470
Clackamas	Tualatin	W	Y	2,925
Clackamas	West Linn	W	Y	25,830
Clackamas	Wilsonville	W	Y	22,345
Multnomah	Fairview	W	Y	8,990

County	Jurisdiction	Frequency	Required	Pop2018
Multnomah	Gresham	W	Y	110,505
Multnomah	Lake Oswego	W	Y	2,560
Multnomah	Maywood Park	W	Y	750
Multnomah	Portland	W	Y	646,370
Multnomah	Troutdale	W	Y	16,185
Multnomah	Wood Village	W	Y	3,920
Washington	Beaverton	W	Y	97,000
Washington	Cornelius	W	Y	11,935
Washington	Durham	E	Y	1,880
Washington	Forest Grove	W	Y	24,125
Washington	Hillsboro	E	Y	101,920
Washington	King City	E	Y	3,700
Washington	Lake Oswego	W	Y	10
Washington	Portland	W	Y	1,600
Washington	Rivergrove	W	Y	35
Washington	Sherwood	E	Y	19,505
Washington	Tigard	W	Y	52,785
Washington	Tualatin	W	Y	24,130
Washington	Wilsonville	W	Y	2,905
Clackamas	Clackamas Metro UGB	W	Y	102,640
Multnomah	Multnomah Metro UGB	W	Y	240
Washington	Washington Metro UGB	E	Y	218,599

Category 2

County	Jurisdiction	Frequency	Required	Pop2018
Benton	Adair Village	W		860
Benton	Corvallis	W	Y	59,280
Benton	Corvallis UGB	W	Y	2,886
Benton	Philomath	W	Y	4,715
Benton	Philomath UGB	W	Y	385
Clatsop	Astoria	E	Y	9,695
Clatsop	Astoria UGB	E	Y	9
Clatsop	Cannon Beach	E		1,710
Clatsop	Gearhart	E		1,505
Clatsop	Seaside	E	Y	6,660
Clatsop	Seaside UGB	E	Y	9
Clatsop	Warrenton	E	Y	5,310
Clatsop	Warrenton UGB	E	Y	9
Columbia	Clatskanie	E		1,765
Columbia	Rainier	E		1,925

County	Jurisdiction	Frequency	Required	Pop2018
Columbia	Scappoose	E	Y	7,200
Columbia	Scappoose UGB	W	Y	9
Columbia	St. Helens	W	Y	13,240
Columbia	St. Helens UGB	E	Y	9
Deschutes	Bend	E	Y	89,505
Deschutes	Bend UGB	E	Y	9
Deschutes	Redmond	E	Y	29,190
Deschutes	Redmond UGB	E	Y	9
Deschutes	Sisters	E		2,725
Hood River	Cascade Locks	E		1,375
Hood River	Hood River	W	Y	7,990
Hood River	Hood River UGB	W	Y	9
Lane	Coburg	W		1,195
Lane	Eugene	E	Y	169,695
Lane	Eugene UGB	E	Y	19,088
Lane	Springfield	E	Y	60,865
Lane	Springfield UGB	E	Y	8,038
Lane	Veneta	E	Y	4,790
Lane	Veneta UGB	E	Y	0
Benton	Albany	W	Y	7,945
Linn	Albany	W	Y	45,200
Linn	Albany UGB	W	Y	1,025
Linn	Lebanon	W	Y	16,920
Linn	Lebanon UGB	W	Y	2,500
Linn	Lyons	E		1,195
Linn	Millersburg	W		2,315
Linn	Sodaville	E		345
Linn	Sweet Home	E	Y	9,225
Linn	Sweet Home UGB	E	Y	1,000
Linn	Tangent	W		1,250
Lincoln	Depoe Bay	E		1,440
Lincoln	Lincoln City	E	Y	8,730
Lincoln	Lincoln City UGB	E	Y	1,303
Lincoln	Newport	E	Y	10,125
Lincoln	Newport UGB	E	Y	600
Lincoln	Siletz	W		1,235
Lincoln	Toledo	W		3,490
Lincoln	Waldport	W		2,105
Lincoln	Yachats	W		745
Marion	Aumsville	E		3,975
Marion	Aurora	E		985

County	Jurisdiction	Frequency	Required	Pop2018
Marion	Donald	E		985
Marion	Gervais	E		2,585
Marion	Hubbard	E		3,305
Marion	Jefferson	E		3,245
Marion	Keizer	E	Y	38,505
Marion	Keizer UGB	E	Y	300
Marion	Mt. Angel	E		3,415
Marion	Salem	E	Y	138,825
Marion	Salem UGB Marion Co	E	Y	34,500
Marion	Scotts Mills	E		375
Marion	Silverton	E	Y	10,325
Marion	Silverton UGB	E	Y	1,400
Marion	St. Paul	E		435
Marion	Stayton	E	Y	7,810
Marion	Stayton UGB	E	Y	1,100
Marion	Sublimity	E		2,890
Marion	Turner	E		2,085
Marion	Woodburn	E	Y	24,760
Marion	Woodburn UGB	E	Y	1,000
Marion	Marion Rest	E		60,197
Washington	Banks	E		1,785
Clackamas	Barlow	W		135
Clackamas	Canby	W	Y	16,800
Clackamas	Canby UGB	W	Y	9
Clackamas	Estacada	W		3,400
Washington	Gaston	E		655
Clackamas	Molalla	W	Y	9,625
Clackamas	Molalla UGB	W	Y	9
Washington	North Plains	E		3,095
Clackamas	Sandy	W	Y	10,990
Clackamas	Sandy UGB	W	Y	9
Clackamas	Clackamas Rest	W		99,107
Polk	Dallas	E	Y	15,830
Polk	Dallas UGB	E	Y	750
Polk	Falls City	E		955
Polk	Independence	E	Y	9,370
Polk	Independence UGB	E	Y	150
Polk	Monmouth	E	Y	9,890
Polk	Monmouth UGB	E	Y	150
Polk	Salem	E	Y	26,440
Polk	Salem UGB Polk Co	E	Y	200

County	Jurisdiction	Frequency	Required	Pop2018
Wasco	The Dalles	U	Y	14,735
Wasco	The Dalles UGB	U	Y	9
Yamhill	Amity	E		1,655
Yamhill	Carlton	E		2,270
Yamhill	Dayton	E		2,720
Yamhill	Dundee	E		3,230
Yamhill	Lafayette	E		4,105
Yamhill	McMinnville	E	Y	33,810
Yamhill	McMinnville UGB	E	Y	9
Yamhill	Newberg	E	Y	23,795
Yamhill	Newberg UGB	E	Y	9
Yamhill	Sheridan	E	Y	6,190
Yamhill	Sheridan UGB	E	Y	9
Polk	Willamina	E		885
Yamhill	Willamina	E		1,275
Yamhill	Yamhill	E		1,090

Category 3

County	Jurisdiction	Frequency	Required	Pop2018
Benton	Monroe	M		625
Coos	Bandon	W		3,155
Coos	Coos Bay	W	Y	16,680
Coos	Coos Bay UGB	W	Y	9
Coos	Coquille	W		3,915
Coos	Coquille UGB	W		9
Coos	Lakeside	E		1,735
Coos	Myrtle Point	BM		2,535
Coos	North Bend	W	Y	9,815
Coos	North Bend UGB	W	Y	9
Crook	Prineville	E	Y	10,010
Crook	Prineville UGB	E	Y	9
Curry	Brookings	E	Y	6,630
Curry	Brookings UGB	E	Y	9
Curry	Gold Beach	E		2,265
Curry	Harbor CCD	W		4,805
Curry	Port Orford	E		1,145
Douglas	Canyonville	E		1,920
Douglas	Myrtle Creek	E		3,490
Douglas	Oakland	W		955
Douglas	Reedsport	W	Y	4,175
Douglas	Reedsport UGB	W	Y	79
Douglas	Riddle	E		1,190

County	Jurisdiction	Frequency	Required	Pop2018
Douglas	Roseburg	W	Y	24,820
Douglas	Roseburg UGB	W	Y	8,261
Douglas	Sutherlin	W	Y	8,140
Douglas	Sutherlin UGB	W	Y	366
Douglas	Winston	W	Y	5,480
Douglas	Winston UGB	W	Y	308
Jackson	Ashland	E	Y	20,815
Jackson	Ashland UGB	E	Y	487
Jackson	Butte Falls	E		440
Jackson	Central Point	E	Y	17,895
Jackson	Central Point UGB	E	Y	627
Jackson	Eagle Point	E	Y	9,105
Jackson	Eagle Point UGB	E	Y	137
Jackson	Gold Hill	E		1,220
Jackson	Jacksonville	E		2,980
Jackson	Medford	E	Y	80,375
Jackson	Medford UGB	E	Y	1643
Jackson	Phoenix	E	Y	4,620
Jackson	Phoenix UGB	E	Y	494
Jackson	Rogue River	E		2,245
Jackson	Shady Cove	E		3,105
Jackson	Talent	E	Y	6,380
Jackson	Talent UGB	E	Y	36
Jackson	Jackson Rest	E		66,596
Jefferson	Madras	M	Y	6,345
Josephine	Cave Junction	E		1,940
Josephine	Grants Pass	W	Y	37,285
Josephine	Grants Pass UGB	W	Y	3,395
Josephine	Josephine Rest	N		39,485
Klamath	Klamath Falls	W	Y	21,890
Klamath	Klamath Falls UGB	W	Y	18,009
Lane	Cottage Grove	W	Y	10,005
Lane	Cottage Grove UGB	W	Y	514
Lane	Creswell	E	Y	5,455
Lane	Creswell UGB	E	Y	277
Lane	Dunes City	W		1,335
Lane	Florence	E	Y	8,795
Lane	Florence UGB	E	Y	2,861
Lane	Junction City	E	Y	6,125
Lane	Junction City UGB	E	Y	705
Lane	Lowell	M		1,075
Lane	Oakridge	W		3,280
Lane	Westfir	W		260
Linn	Brownsville	E		1,705
Linn	Halsey	E		935
Linn	Harrisburg	W		3,660

County	Jurisdiction	Frequency	Required	Pop2018
Linn	Mill City	E		1,560
Linn	Scio	E		920
Marion	Mill City	E		305
Malheur	Ontario	W	Y	11,470
Linn	Gates	E		45
Linn	Idanha	E		62
Marion	Detroit	E		210
Marion	Gates	E		440
Marion	Idanha	E		78
Union	Island City	E		1,130
Union	La Grande	E	Y	13,340
Union	La Grande UGB	E	Y	9
Wasco	Mosier	U		455

Category 4

County	Jurisdiction	Frequency	Required	Pop2018
Baker	Baker City	N	Y	9,890
Baker	Baker City UGB	N	Y	9
Baker	Greenhorn	N		2
Baker	Haines	N		415
Baker	Halfway	N		295
Baker	Huntington	N		445
Baker	Richland	N		175
Baker	Sumpter	N		205
Baker	Unity	N		75
Baker	Baker Rest	N		5,254
Columbia	Columbia City	N		1,985
Columbia	Prescott	N		55
Columbia	Vernonia	N		2,065
Columbia	Columbia Rest	N		23,647
Coos	Powers	N		695
Coos	Coos Rest	N		24,718
Crook	Crook Rest	N		12,691
Curry	Agness CCD	N		96
Deschutes	La Pine	N		1,840
Douglas	Drain	N		1,165
Douglas	Elkton	N		215
Douglas	Glendale	N		865
Douglas	Yoncalla	N		1,070
Douglas	Douglas Rest	N		49,236
Gilliam	Arlington	N		610
Gilliam	Condon	N		690
Gilliam	Lonerock	N		20
Gilliam	Gilliam Rest	N		665

County	Jurisdiction	Frequency	Required	Pop2018
Grant	Canyon City	N		705
Grant	Dayville	N		155
Grant	Granite	N		40
Grant	John Day	N		1,735
Grant	Long Creek	N		195
Grant	Monument	N		130
Grant	Mt. Vernon	N		525
Grant	Prairie City	N		915
Grant	Seneca	N		200
Grant	Grant Rest	N		2,800
Harney	Burns	N		2,830
Harney	Hines	N		1,560
Harney	Harney Rest	N		2,990
Hood River	Hood River Rest	N		15,936
Jefferson	Culver	N		1,480
Jefferson	Madras UGB	N	Y	9
Jefferson	Metolius	N		740
Jefferson	Jefferson Rest	N		14,986
Klamath	Bonanza	N		455
Klamath	Chiloquin	N		740
Klamath	Malin	N		815
Klamath	Merrill	N		840
Klamath	Klamath Rest	N		25,211
Lake	Lakeview	N		2,300
Lake	Paisley	N		270
Lake	Lake Rest	N		5,545
Lane	Lane Rest	N		70,762
Linn	Waterloo	N		235
Linn	Linn Rest	N		35,478
Malheur	Adrian	N		180
Malheur	Jordan Valley	N		175
Malheur	Nyssa	N		3,310
Malheur	Vale	N		1,950
Malheur	Ontario UGB	N	Y	9
Malheur	Malheur Rest	N		14,831
Multnomah	Multnomah Rest	N		23,780
Washington	Washington Rest	N		40,616
Umatilla	Milton-Freewater	N	Y	7,105
Umatilla	Milton-Freewater UGB	N	Y	9
Morrow	Boardman	N		3,690
Morrow	Heppner	N		1,295
Morrow	Ione	N		330
Morrow	Irrigon	N		1,990
Morrow	Lexington	N		265
Morrow	Morrow Rest	N		4,315
Sherman	Grass Valley	N		165

County	Jurisdiction	Frequency	Required	Pop2018
Sherman	Moro	N		330
Sherman	Rufus	N		280
Sherman	Wasco	N		425
Sherman	Sherman Rest	N		585
Tillamook	Bay City	N		1,350
Tillamook	Garibaldi	N		830
Tillamook	Manzanita	N		640
Tillamook	Nehalem	N		280
Tillamook	Rockaway Beach	N		1,350
Tillamook	Tillamook	N	Y	4,920
Tillamook	Wheeler	N		400
Tillamook	Tillamook UGB	N	Y	9
Tillamook	Tillamook Rest	N		16,616
Umatilla	Adams	N		375
Umatilla	Athena	N		1,170
Umatilla	Echo	N		710
Umatilla	Helix	N		195
Umatilla	Hermiston	N	Y	18,200
Umatilla	Pendleton	N	Y	16,810
Umatilla	Pilot Rock	N		1,505
Umatilla	Stanfield	N		2,185
Umatilla	Ukiah	N		240
Umatilla	Umatilla	N	Y	7,320
Umatilla	Weston	N		685
Umatilla	Hermiston UGB	N	Y	9
Umatilla	Pendleton UGB	N	Y	9
Umatilla	Umatilla UGB	N	Y	9
Umatilla	Umatilla Rest	N		22,152
Union	Cove	N		550
Union	Elgin	N		1,730
Union	Imbler	N		305
Union	North Powder	N		445
Union	Summerville	N		135
Union	Union	N		2,160
Union	Union Rest	N		7,081
Wallowa	Enterprise	N		1,985
Wallowa	Joseph	N		1,120
Wallowa	Lostine	N		215
Wallowa	Wallowa	N		805
Wallowa	Wallowa Rest	N		3,050
Wasco	Antelope	N		50
Wasco	Dufur	N		615
Wasco	Maupin	N		430
Wasco	Shaniko	N		35
Wasco	Wasco Rest	N		10,871
Wheeler	Fossil	N		475

County	Jurisdiction	Frequency	Required	Pop2018
Wheeler	Mitchell	N		140
Wheeler	Spray	N		160
Wheeler	Wheeler Rest	N		675
Yamhill	Yamhill Rest	N		27,248

Areas yet to be categorized

County	Jurisdiction	Frequency	Required	Pop2018
Benton	Benton Rest			16,894
Clatsop	Clatsop Rest			14,293
Curry	Curry Rest			7,965
Deschutes	Deschutes Rest			65,702
Lincoln	Lincoln Rest			18,437
Polk	Polk Rest			17,480