Using ORMAP Data to Derive and Maintain

Framework Administrative Boundaries

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For the Geospatial Enterprise Office
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Executive Summary

Lane Council of Governments (LCOG), working in collaboration with Oregon Department of Revenue (DOR) and staff from several other State agencies, has advanced work done initially at DOR to derive certain administrative boundary information from data submitted to DOR by Oregon counties under the ORMAP program. This work is intended to leverage Framework cadastral data, and to benefit the broader GIS community in Oregon by improving and streamlining the data development and maintenance processes for administrative boundaries.

LCOG undertook the following tasks during this project:

1. Refined and improved processing scripts and script tools,
2. Used those improved processing tools to derive several kinds of administrative boundaries,
3. Compared those derived boundaries with existing statewide data layers,
4. Summarized findings of that work,
5. Collaborated with DOR staff on a proposal to extend the Cadastral Data Exchange Standard,
6. Compiled information related to Stewardship of these administrative boundaries,
7. Made recommendations for next steps.

Inputs for the extraction process included the following:

1. Tax Code Area (TCA) polygons submitted to DOR by Oregon counties under ORMAP,
2. A statewide match table (lookup table) derived by DOR staff from annual County reports.

Extraction results included four types of "excess" polygons which were found across all counties, and were common to all five types of taxing districts examined:

1. Excess polygons due to incomplete county number attribution on input TCA polygons.
2. Excess polygons representing Joint Districts.
3. Excess polygons due to variants in the District Name attribute which are related to levies and bonds.
4. Excess polygons due to variants in the District Name attribute related to formatting/casing.

In addition, extraction results were negatively impacted by mismatches between the input polygons and the input match (lookup) table. These mismatches appear to be related to inputs not being chronologically in sync.

Most or all these observed issues could be avoided by:

1. Using input polygons which are fully attributed with DOR county numbers, as per standard.
2. Using a lookup table that:
    a) includes only actual districts and does not include various tax levies and bonds,
    b) enforces standardized formats for naming and casing,
    c) is chronologically in sync with the TCA polygons.

A proposal has been placed before the ORMAP participating counties to extend the Cadastral Data Exchange Standard by adding a Taxing District Lookup table which will correspond to the submitted TCA polygons. The processing tools were revised to make use of this kind of lookup table. DOR staff will take the lead on moving that proposal through further discussion, refinement, and possible adoption.

Introduction

Lane Council of Governments (LCOG) received funding through DAS-GEO to build upon preliminary work done at Oregon Dept. of Revenue (DOR) aimed at deriving Taxing District boundaries from digital cadastral information provided to DOR by Oregon Counties through the ORMAP program. The primary goals were to leverage significant secondary Framework benefits from the statewide cadastral data being assembled by DOR, to benefit the broader Oregon GIS community by improving and streamlining the maintenance of existing Framework data layers, and to make it possible to use the existing statewide cadastral base as the foundation upon which to build additional Framework layers. Because these data layers will be built directly from the foundation provided by the ORMAP data, they will be vertically integrated with the statewide cadastral base.

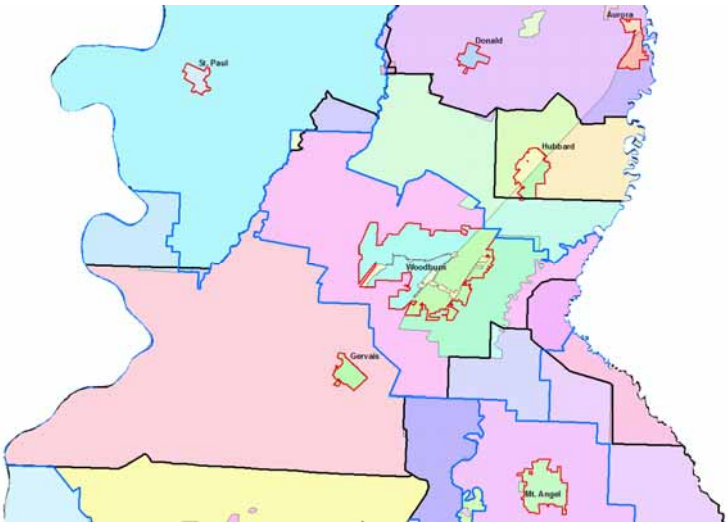
As mentioned above, this project was aimed at building on the results of previous testing carried out at DOR and was also modeled in part on long-standing workflows at Polk County. Preliminary work at DOR had confirmed that several types of administrative boundaries could theoretically be derived (or extracted) from the ORMAP data, and also revealed numerous issues which would need to be resolved to better enable Framework Stewards to derive and maintain boundary information in this way. This project was intended to resolve those issues and to develop statewide extraction and maintenance routines. Further work will be needed over successive cycles of ORMAP data submission to continue to identify and resolve specific issues and further improve and streamline the derivation process. Ultimately, the results of this project should help streamline and automate the derivation and maintenance processes for existing Framework layers, and potentially for other types of administrative boundaries as well.

The geoprocessing models developed, along with improvements in the input data, will enable Framework data aggregators and data stewards to derive a variety of taxing district boundaries from the cadastral information. These derived boundaries can be used as a primary source of boundary data where such information is otherwise unavailable or does not yet exist and can be used to detect changes in existing boundary data. These derived boundaries can also act as a source of quality control information when compared to boundary data that has been developed or acquired from other sources.

Taxing Districts and Tax Code Areas

Taxing Districts include such things as Counties, Cities, School Districts, Rural Fire Protection Districts, Water Districts, Educational Service Districts (ESDs), Community College Districts, and many others. Many of these Taxing District boundaries are among the Framework data elements assigned to the Administrative Boundaries Framework Implementation Team (Admin Boundaries FIT). A more complete discussion of Taxing Districts can be found at the Admin Boundaries FIT page of the DAS-GEO website.

While Taxing Districts of any given type generally do not overlap, Taxing Districts of *different* types do overlap one another, and typically several taxing districts will co-exist at any given location. For example, any given location can fall simultaneously into a county, a school district, an ESD, a community college district, a city or a rural fire protection district, and possibly other kinds of taxing districts. Unique combinations of taxing districts define what are known as Tax Codes and a Tax Code Areas, or TCAs, as depicted in this map of a portion of northern Marion County. Each colored polygon represents a different Tax Code Area. City Limits are shown in red, School Districts in blue, and Fire Districts in black. The relationship between TCAs and their component



taxing districts implies that virtually every tax code in a given county will be related to the county itself (as a taxing district), while the smallest taxing districts in that county, such as a special road district, may be represented by only one or two tax codes and TCAs.

In addition to taxlots, the digital cadastral data submitted to DOR by Oregon counties under the ORMAP program includes these TCA polygons. Each TCA polygon represents a unique combination of overlapping taxing districts. These TCAs polygons do not necessarily follow tax lot lines. In some cases, a given tax lot can be split between different districts or may be partly in and partly out of a given type of district, such as a fire district. Most kinds of taxing districts can extend into more than one county, and when this happens the district is known as a "joint district". (In the case of school districts, joint districts are designated with a "J" appended to the district number.)

Oregon counties are also required by statute to submit "Summary of Assessments and Levies" (SAL) reports to DOR each year. These SAL reports have been used by DOR to compile a statewide cross-reference table (referred to elsewhere in this report as the "match" table or lookup table) which relates each Tax Code Area to its corresponding set of overlapping taxing districts, and also relates each taxing district to its component TCAs. By using such a lookup table, all the TCA polygons which relate to a given Taxing District can be selected and dissolved into a polygon which represents that district. In many counties, however, these SAL reports are not produced by the same work group that maintains the TCA polygons and makes the annual ORMAP submission. The SAL reports and TCA polygons are not submitted to the same work group at DOR, nor are they submitted at the same time. One of the primary findings of this project was that this programmatic distinction creates a kind of systemic separation between these two sources of input information for the extraction process, which negatively impacts the results in multiple ways, as will be detailed in later sections of this report.

Overview of Project Scope

For this project, statewide layers of taxing districts were extracted from TCA polygons submitted to DOR by 35 counties. These extraction results were compared to existing Framework datasets or other statewide data layers. A statewide layer of City Limits was derived from the TCA data and was compared directly to the current Framework City Limits layer maintained by the Oregon Department of Transportation (ODOT). A statewide layer of School Districts was also derived from the TCA data and was compared directly to the current Framework layer that has been maintained in recent years by Oregon Dept. of Human Services/Oregon Health Authority (DHS/OHA). A statewide layer of Fire Districts was also derived from the ORMAP TCA data and was compared with an existing statewide layer of structural fire protection providers developed by the Oregon Dept. of Forestry (ODF) in collaboration with the Office of the State Fire Marshal (OSFM). As a further demonstration of the extraction methodology, a statewide layer of Community College Districts was derived from the ORMAP TCA data and delivered to DHS/OHA, which had indicated a business need for that data layer, and at the time, a willingness to act as Framework Steward for it.

The original proposal for this project was to focus only on City Limits and School Districts, comparing statewide TCA extraction results with those existing statewide Framework layers. Fire Districts were added to the scope at the request of DAS-GEO, even though an official Framework Steward had not been identified at that time. As the project unfolded, it became clear that a statewide layer of Counties would also be a good candidate for extraction and comparison. Counties are just as readily derived from TCA polygons, and perhaps most clearly illustrate the kinds of issues to be encountered, because a) there are fewer of them, and b) counties (like school districts) should form a complete and continuous coverage of the entire State, with no gaps or overlaps. In addition, there is an existing Framework layer for Oregon Counties, under the stewardship of the Bureau of Land Management (BLM), to which the extraction results can be compared.

The extraction and evaluation work described above is detailed in Sections 1 and 2 of this report. Findings are summarized in Section 3 of this report. Based on these findings, LCOG and DOR staff have proposed a new initiative for the ORMAP program, detailed in Section 4 of this report, which would significantly improve the results of the extraction process. A Stewardship element was also added to the scope at the request of DAS-GEO. Information related to Stewardship is provided in Section 5 of this report.

Section 1: Processing ORMAP TCA Polygons: Issues and Solutions

DOR staff provided LCOG with the input data and preliminary results of their work to create taxing district boundaries from county-submitted TCA polygons. Input data included 35 ESRI shapefiles containing the TCA polygons submitted by each county under the ORMAP program (Klamath County was at the time the only county not participating in ORMAP), as well as the statewide "match" table compiled by DOR staff from individual SAL reports submitted by each county. DOR also provided two preliminary Python scripts and corresponding Python Script Tools packaged within an ESRI Toolbox, along with an ESRI map document, and preliminary results contained in an ESRI file geodatabase.

Issue 1.A Structure of the Output Data

In the preliminary testing work done at DOR, taxing districts of all types (counties, cities, school districts, etc.) were extracted onto a single layer of overlapping polygons. The script was designed to run within ArcMap, and it took several hours for the script to run through all the types of districts in all 35 of the counties.

Solution: The processing script was reconfigured in order to process the taxing districts by specific type (which is referred to as "Block" within the DOR match table). The user can choose one specific type of boundary (cities, school districts, etc.) from a drop-down list of Blocks. This makes it much easier to examine and inspect the results as they pertain to any one type of district, and to evaluate them against existing data. It also structures the output in a way that can be more easily handed off to Framework Stewards or other interested parties. If no Block is selected by the user from the drop-down list, all district types are dissolved into a single layer, as before. This may be the most useful output structure for DOR staff, as it most closely models the overlapping condition of all the various taxing districts that make up each Tax Code Area.

Other changes to the processing script eliminated the requirement to first manually create a "template" layer into which the results are extracted and made it possible to run the script either within ArcMap or from ArcCatalog, which allows the script to run in much less time. Another possible enhancement would be the ability to run the process for selected individual counties, rather than for all counties by default.

Issue 1.B Handling of Joint Districts

Examination of the preliminary results revealed that "joint" districts (i.e., taxing districts which span more than a single county) were systematically incomplete. The preliminary results included only those portions of each joint district that are contained within the "primary" or "home" county of that district. Those portions of joint districts which extend into neighboring counties were systematically omitted from the extraction results.

Solution: Discussion with DOR staff revealed that the script needed to rely on a different field in the SAL-derived match table for the extraction to capture all portions of joint districts, including those portions that extend into neighboring counties. With that change, the results appeared to be more complete and to include all portions of joint districts.

Issue 1.C Incomplete TCA Polygons

Once the "joint" districts were fully represented in the output, it was possible to zero in on remaining holes and gaps in the results. Some of the observed holes in the output polygons were due to omissions in the input polygons. Significant widespread omissions in the input TCA polygons were found in just two of the 35 participating counties. In Douglas County, the input TCA polygons were just a scattering of what they should have been, which had not been observed by DOR staff in previous submittals and was likely due to an error in the county's export process. DOR staff requested and received a replacement set of TCA polygons for Douglas County, which completely resolved this problem for Douglas County. The TCA polygons submitted to DOR by Coos County contained some long-standing gaps which remain unresolved at this time. Up to now, the lack of downstream uses for TCA polygons has made detecting and fixing those gaps a low priority. DOR staff should work with GIS staff at Coos County to resolve those omissions in future ORMAP submittals.

Recommended QC:
In order to automatically detect significant gaps in submitted TCAs, the total area of submitted TCA polygons could be checked against a set of "control totals" for each county. To build a set of control totals, existing framework data were downloaded from Oregon Spatial Data Library (OSDL) for Oregon Counties and the Oregon State Boundary, both of which have been compiled by the BLM. The Oregon State Boundary dataset includes a coastline, which was used to trim the offshore area from the Counties layer. The resulting county control total areas were compared to the total area of TCA polygons submitted by each county, as shown in the table below.

Table 1: County Area Comparison to Input Data

County Name	DOR Code	County Control Total Area	Total Area of TCA Polys	Pct of County Area	Difference Pct
Baker County	1	86,134,474,946	86,058,671,066	99.91	-0.09
Benton County	2	18,913,773,382	18,892,513,447	99.89	-0.11
Clackamas County	3	52,548,500,569	52,518,987,055	99.94	-0.06
Clatsop County	4	26,275,962,427	26,471,385,462	100.74	0.74
Columbia County	5	19,252,191,803	19,264,251,302	100.06	0.06
Coos County	6	45,352,364,627	38,821,231,438	85.60	-14.40
Crook County	7	83,281,525,637	83,235,528,136	99.94	-0.06
Curry County	8	45,617,873,368	45,661,220,112	100.10	0.10
Deschutes County	9	85,143,120,101	85,117,724,592	99.97	-0.03
Douglas County	10	141,314,569,146	141,336,483,020	100.02	0.02
Gilliam County	11	34,138,599,966	34,082,240,662	99.83	-0.17
Grant County	12	126,292,285,915	126,190,758,307	99.92	-0.08
Harney County	13	285,099,639,509	285,141,669,698	100.02	0.01
Hood River County	14	14,890,028,957	14,821,200,892	99.54	-0.46
Jackson County	15	78,093,896,018	78,140,277,650	100.06	0.06
Jefferson County	16	49,990,190,705	49,934,029,262	99.89	-0.11
Josephine County	17	45,743,332,186	45,804,972,567	100.14	0.13
Klamath County	18	171,083,583,062	(Not Participating in ORMAP at this time)		
Lake County	19	232,989,369,089	233,062,461,928	100.03	0.03
Lane County	20	128,856,585,681	128,710,977,070	99.89	-0.11
Lincoln County	21	27,699,178,748	27,701,585,837	100.01	0.01
Linn County	22	64,323,017,315	64,333,834,063	100.02	0.02
Malheur County	23	276,805,962,465	276,822,236,865	100.01	0.01
Marion County	24	33,220,414,740	33,196,184,154	99.93	-0.07
Morrow County	25	57,164,015,516	57,088,340,088	99.87	-0.13
Multnomah County	26	12,988,435,937	12,964,269,996	99.81	-0.19
Polk County	27	20,760,852,249	20,738,787,664	99.89	-0.11
Sherman County	28	23,202,217,878	23,162,513,907	99.83	-0.17
Tillamook County	29	31,387,577,417	30,896,862,787	98.44	-1.56
Umatilla County	30	90,234,846,883	89,768,438,418	99.48	-0.52
Union County	31	56,908,735,892	56,833,733,507	99.87	-0.13
Wallowa County	32	88,003,308,938	87,846,348,291	99.82	-0.18
Wasco County	33	66,832,896,891	66,826,020,674	99.99	-0.01
Washington County	34	20,289,279,450	20,258,795,741	99.85	-0.15
Wheeler County	35	47,880,117,313	47,832,839,106	99.90	-0.10
Yamhill County	36	20,049,681,205	20,022,383,378	99.86	-0.14

Coos County was found to be about 14% short of the control total. All other participating counties were found to be within about 1.5%, plus or minus, of their respective control total. The largest variations were found in two coastal counties, due to the way their TCA polygons either do not include bays or extend around the headlands. All other participating counties were within about 0.5% of their control total. Using a variance threshold of 1.6% plus or minus (98.4% to 101.6%) would have flagged only Coos County as having insufficient TCA coverage in their ORMAP submittal.

Alternatively, if each County would neatly nest their TCAs within the existing Framework County boundaries, it would ensure complete coverage and extraction results would edge-match well with neighboring counties.

Issue 1.D Narrow Gaps in the Submitted TCA Polygons

In addition to the more significant omissions described above, narrow gaps exist between and within the TCA polygons submitted by almost all counties. Some of them are actual gaps between TCA polygons, others are small polygons which exist in the submitted TCA shapefile but which do not carry any tax code attribution. Either way, those narrow gaps come through to the derived taxing district results.

It would be difficult to detect the presence of these narrow gaps simply by using the control totals described above. Narrow gaps are widespread throughout much of Wallowa County, for example, but the overall total for Wallowa County is within 0.18% of the control total.

Possible Solution: Polk County uses a similar extraction process and includes an automated "eliminate" step to remove unintended narrow gaps from their results and to create more seamless taxing district layers. However, they can carefully focus that step of the process on unintended gaps only, in order not to eliminate small but legitimate features. Applying that kind of automated cleanup approach to other counties would likewise have to be done very carefully, as it could lead to inaccurate results. With City Limits, what may appear to be narrow gaps could be right-of-way areas that have specifically not been included in the incorporated area. In some cases, narrow gaps in the results may need to be manually cleaned up by data stewards, perhaps in consultation with the local jurisdiction, to be sure they are not legitimate. Future improvements in the continuity of the input TCA polygons, such as enforcing clean planar topology, may also help.

With the implementation of the processing changes described above, the extraction process was run again on the input TCA data provided by DOR. Separate layers were built for Counties, School Districts, City Limits, Fire Districts, and Community College Districts, and were then subjected to the post-processing examination and cleanup described in the next section of this report.

Section 2: Post-Extraction Cleanup and Comparison to Framework

2.A County Boundaries

Issue 2.A.i Edge-Matching Between Counties

The outer edge of each extracted county is determined by the outermost limit of the TCA polygons for that county. By definition, there should not be any "joint" counties, and the extracted county boundaries were not found to have crossed county lines in any significant way, but they do not edge-match well with neighboring counties. There is widespread but minor misalignment between the outermost edges of each county's TCA polygons and the BLM's Framework County boundaries. This misalignment will also negatively impact the extraction results for other types of Taxing Districts.

Recommended Solution: If each County would neatly nest their TCAs within the existing Framework County Boundaries, extraction results would likely edge-match well along county boundaries.

Issue 2.A.ii Multi-Part Counties Caused by Incomplete County Number Attribute

The initial extraction results included several counties that were each represented by two extracted polygons of the same name. The first post-extraction cleanup step, therefore, was to simply dissolve on "district name" in order to merge them back together. In almost every case, the existence of that second same-named polygon was due to the presence of input TCA polygons carrying a County Number attribute of zero or null, rather than an attribute value corresponding to that county's DOR code. This same issue affects results for other types of taxing districts, as well.

Recommended Solution: Check submitted TCA polygons and fill in missing attribution with County number or require complete attribution as condition of accepting ORMAP submissions.

Issue 2.A.iii Multi-Part Counties Caused by Name Variants

After the initial post-extraction dissolve, there were 40 polygons remaining in the extraction results, and there should be only 35 (Klamath County is not currently participating in ORMAP). In other words, there were five additional instances of "extra counties" in the extraction results which were not caused by incomplete county number attribution (Issue 2.A.ii). These were individually identified and resolved as follows:

Washington County was represented in the extraction results by two non-overlapping polygons, including a small outlier which carried the name attribute as "Washington County" (title case) instead of the prevailing standard "WASHINGTON COUNTY" (upper case). These polygons were manually merged together. The casing issue may have originated from the county-submitted SAL report or from the statewide match table compiled by DOR. The casing issue did not arise from the TCA polygons because they do not carry a district name attribute.

Linn County was represented in the extraction results by two overlapping and identical polygons, one called "LINN COUNTY", and the other called "LINN COUNTY NEW LOCAL OPTION". The latter was deleted.

Jefferson County was represented in the extraction results by two overlapping and identical polygons, one called "JEFFERSON COUNTY", and the other called "COUNTY JAIL LEVY". The latter polygon was deleted.

Clackamas County was represented in the extraction results by three overlapping and non-identical polygons, one called "CLACKAMAS COUNTY (CITY)", one called "CLACKAMAS COUNTY (RURAL)", and one called "CLACKAMAS COUNTY PUBLIC SAFETY", which had an area essentially equal to the combined area of the other two. The first two were deleted and the third one renamed to simply "CLACKAMAS COUNTY". (Alternatively, the first two could have been merged together and the third one deleted.)

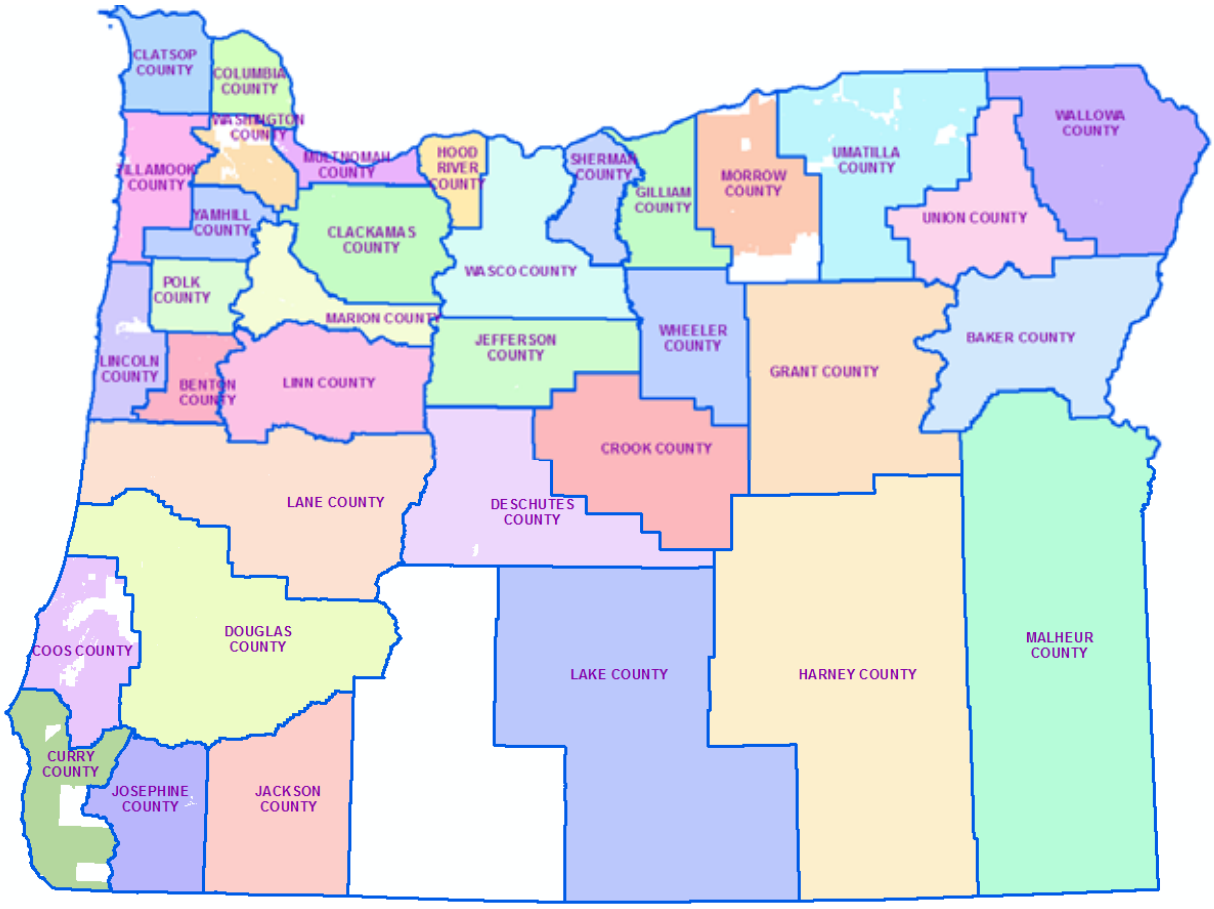
Recommended Solution: Most of the extraneous name variants were found to be related to various tax levies and bonds. This same issue was observed for the other types of taxing district that were examined during this project. Because names are not carried on the TCA polygons submitted by the counties, this issue must arise either from the county-submitted SAL reports or from the statewide match table compiled by DOR. This could be avoided by using a lookup table that includes only actual ("parent") districts and does not include related tax levies and bonds. Ideally, standardized formats for naming and casing would also be enforced by the lookup table.

Comparison of Extracted Counties with Framework Counties

After the post-processing cleanup steps described above, the extraction results contained only the expected 35 polygons, each representing one county (Klamath County was not included in this project). As noted above, there is widespread but minor misalignment between the outermost edges of each county's submitted TCA polygons and the BLM's Framework County boundaries, which can be observed only at relatively large scales. These misalignments negatively impact the extraction results by causing gaps and overlaps along the extracted county boundaries.

Recommended Solution: Going forward, each County should nest their submitted TCA polygons within the Framework county boundaries. Extraction results would be significantly improved.

The map below shows the extraction results for counties (color shaded areas) in comparison to the Framework County Boundaries data layer (blue lines).



In addition to the widespread small misalignments along the edges of neighboring counties, which cannot be observed at this scale, there are other, larger gaps in the extraction results, particularly in a handful of counties. Some of these gaps correspond to the omissions and gaps observed in the input TCA polygons which were noted in Section 1 (Issues 1.C and 1.D). But many other gaps observed in the extraction results do not correspond to gaps in the input polygons. The county extraction results were compared with the county control totals compiled earlier in order to quantify these “processing losses”, as shown in Table 2.

The comparison reveals that 16 of the 35 counties lost none of their input TCA area. Another 12 counties lost less than 0.2% of their input TCA area. The remaining 7 counties suffered more significant losses during the extraction process, ranging from about 2% in Multnomah County to over 20% in both Morrow County and Washington County. Coos County lost about 2.6%, on top of the 14.4% they were already “short” in terms of total TCA area.

In some cases, gaps in the extraction results appear to have been caused by using a set of input TCA polygons which were not from the same year as the corresponding SAL report for that County. For example, gaps in the extraction results for Lincoln County, visible in the map above, add up to about 4% of the total area of the county, and correspond to just a handful of the input TCAs polygons, which are missing from the lookup table. Examination of the four most recent annual SAL reports posted on the County’s website reveals that this same handful of tax codes were not in use a couple of years ago, but are in use now, as depicted in Table 3.

Table 2: Summary of County Extraction Results

County Name	DOR Code	Total Area of TCA Polys	Extraction Results	Process Loss (Pct)
Baker County	1	86,058,671,066	86,058,671,066	
Benton County	2	18,892,513,447	18,892,248,416	
Clackamas County	3	52,518,987,055	52,493,499,377	0.05
Clatsop County	4	26,471,385,462	26,471,385,462	
Columbia County	5	19,264,251,302	19,231,158,949	0.17
Coos County	6	38,821,231,438	37,816,655,768	2.59
Crook County	7	83,235,528,136	83,235,528,136	
Curry County	8	45,661,220,112	39,207,910,356	14.13
Deschutes County	9	85,117,724,592	84,970,545,461	0.17
Douglas County	10	141,336,483,020	141,332,665,976	
Gilliam County	11	34,082,240,662	34,082,240,662	
Grant County	12	126,190,758,307	126,190,758,307	
Harney County	13	285,141,669,698	285,141,669,698	
Hood River County	14	14,821,200,892	14,821,200,892	
Jackson County	15	78,140,277,650	78,140,277,650	
Jefferson County	16	49,934,029,262	49,916,021,003	0.04
Josephine County	17	45,804,972,567	45,746,614,252	0.13
Klamath County	18	Not Participating in ORMAP at this time		
Lake County	19	233,062,461,928	233,062,461,928	
Lane County	20	128,710,977,070	128,698,235,247	0.01
Lincoln County	21	27,701,585,837	26,598,631,621	3.98
Linn County	22	64,333,834,063	64,333,834,063	
Malheur County	23	276,822,236,865	276,821,670,633	0.00
Marion County	24	33,196,184,154	33,152,900,030	0.13
Morrow County	25	57,088,340,088	45,479,145,858	20.34
Multnomah County	26	12,964,269,996	12,705,271,082	2.00
Polk County	27	20,738,787,664	20,711,398,124	0.13
Sherman County	28	23,162,513,907	23,162,513,907	
Tillamook County	29	30,896,862,787	30,896,862,787	
Umatilla County	30	89,768,438,418	85,812,933,849	4.41
Union County	31	56,833,733,507	56,833,733,507	
Wallowa County	32	87,846,348,291	87,846,348,291	
Wasco County	33	66,826,020,674	66,812,072,644	0.02
Washington County	34	20,258,795,741	15,970,629,368	21.17
Wheeler County	35	47,832,839,106	47,832,839,106	
Yamhill County	36	20,022,383,378	20,022,383,378	

Table 3: Examples of Lincoln County Tax Code Changes

Lincoln County Tax Code	Tax Year			
	2014-2015	2015-2016	2016-2017	2017-2018
115	Not in use	Not in use	In use	In use
116	Not in use	Not in use	In use	In use
208	Not in use	Not in use	Not in use	In use
259	Not in use	Not in use	Not in use	In use
281	Not in use	Not in use	Not in use	Not in use
291	Not in use	Not in use	In use	In use

This observed change over time reflects the fact that new tax codes can be introduced from one year to the next, usually because new combinations of taxing districts have been created, through annexations, the formation of new special districts, or for some other reason. Less frequently, through mergers or for other reasons, certain combinations of districts can cease to exist, and tax codes can be dropped from one year to the next. In addition, tax code numbers are sometimes re-used, so it is entirely possible that a given tax code, corresponding to a certain combination of districts one year, might correspond to a slightly different combination of districts the following year. This means that if the match table derived from SAL reports is not in sync, chronologically, with the TCA polygons submitted to DOR through the ORMAP program, the extraction results can be incomplete or unreliable.

Recommended Solution: Use a lookup table that is chronologically in sync with the TCA polygons submitted to DOR through the ORMAP program.

2.B School Districts

Issue 2.B.i Joint School Districts

The Oregon Department of Education (ODE) website indicates there are 197 school districts in the state. The current Framework layer contains 196 districts (more on that minor discrepancy later). Extraction from the TCA polygons submitted by each county initially resulted in a total of 301 polygons, but that raw count included multiple polygons for the joint districts (those which extend into more than one county). The first post-processing step is to dissolve on district name in order to merge the parts of those joint districts together. In addition to the joint districts, this step also resolved some instances of Issue 2.A.i (the county number attribute on the TCA polygons being zero or null). Dissolving on district name reduced the count to 221 polygons, indicating that there remained about 24 “excess” polygons in the school district extraction results.

Issue 2.B.ii District Name Variants Including Bond-Related Name Variants

These “excess” school district polygons are caused by variations in district names and a variety of other redundancies, as enumerated individually below. This issue affects results for all other types of taxing districts, as well. Again, because the TCA polygons submitted by each county do not include district names, just tax code numbers, these name variants may arise from individual records in the SAL reports, which carry the district names and which relate each TCA to the various districts which overlap at that location. These extra records may have been carried through, perhaps by design, to the statewide match table, which may have been compiled to meet specific internal DOR needs (which likely require inclusion of those levy-related and bond-related records). For purposes of extracting school district boundaries, only the records for the “parent” taxing district would be required. Redundant polygons and name variants in the school district extraction results were identified and resolved as follows, along with a cumulative count of the resulting reduction in the statewide total:

In Washington County, small polygons named “Beaverton School District 48” had to be dissolved into “BEAVERTON 48J SCHOOL “, and a small polygon named “Forest Grove School District 15” had to be dissolved into “FOREST GROVE 15 SCHOOL”. The extraction results for Washington County revealed similar title-cased variants of district name attributes for other types of taxing districts, which were not observed in any other county, and must arise either from the county-submitted SAL report, or in the match table compiled by DOR. (-2)

These name variants due to title-casing are clearly an outlier in the input data and were observed only in Washington County. The more commonly encountered form of name variant apparently arises from the fact that the SAL reports and/or the match table are used to track not just parent districts, but also bonds and tax levies of one kind or another. In Multnomah County, Corbett School District was represented in the extraction results by three overlapping polygons, one called “CORBETT SCHL DIST 94 BOND”, a second called “CORBETT 39 (CORB/BNVL 1994 BOND)”, and a third called “CORBETT 39 SCHOOL”, which had an area equal to the combined area of the other two. The first two were deleted from the results. (-4) Gresham-Barlow School District was represented in the extraction results by two partially overlapping polygons, one called “GRESHAM-BARLOW 26J SCHOOL” which appears to cover the entire school district, and a smaller one called “GRESHAM 26 (DAMASCUS-UNION BOND)” which only covers the portion of the district which lies in Clackamas County, and was deleted. (-5)

Portland School District was represented in the extraction results by four overlapping polygons, one called "PORTLAND 1J SCHOOL (UR EXCLUDED)", another small polygon in Washington County called "Portland District 1-1J (88) - After" (note the non-standard casing), another small polygon in Clackamas County called "SCH PORTLAND GAP 2010", and one called "PORTLAND 1J SCHOOL" which completely covers those first three, which were deleted from the results. (-8) Philomath School District was also represented in the extraction results by four overlapping polygons, and the one called simply "PHILOMATH 17J SCHOOL" completely covered the other three, all of which had the word "BOND" in the name attribute, and were deleted from the results. (-11)

Hillsboro School District was represented in the extraction results by two overlapping and nearly identical polygons, one called "HILLSBORO 1J SCHOOL (BOND POCKET)" and one called "HILLSBORO 1J SCHOOL". In this case, the one that included "Bond Pocket" in the name was slightly larger and more closely matched the existing Framework data. These two were merged together into "HILLSBORO 1J SCHOOL". (-12) Ione School District was represented in the extraction results by two overlapping and identical polygons, one called "IONE SCHOOL BONDS" and one called "IONE SCHOOL". The first was deleted. (-13)

Madras School District was represented in the extraction results by four overlapping polygons, one called "MADRAS 509J SCHOOL" and an identical polygon called "SD509J MADRAS BONDS" both of which appear to cover the entire school district, plus a smaller polygon called "MADRAS SCHOOL 509J BONDS AFTER", which only covers the portion of the district which lies in Wasco County, and another polygon called "SD509J MADRAS BONDS AFTER", which only covers the portion of the district which lies in Jefferson County. All but the first were deleted. (-16)

Molalla School District was represented in the extraction results by two partially overlapping polygons, one called "MOLALLA RIVER 4 SCHOOL" which appears to cover the entire school district, and a smaller polygon called "MOLALLA 4 (DICKIE PRAIRIE BOND)" which only covers a portion of the district, and was deleted. (-17) Morrow School District was represented in the extraction results by two overlapping polygons, one called "MORROW 1 SCHOOL" and another larger polygon called "MORROW 1 SCHOOL (BONDS)" which appears to cover both the Morrow School District and Ione School District and was deleted. (-18) The remaining polygon covered not just the Morrow School District but also the portion of Ione School District which extends into Gilliam County. That portion was deleted from the results, but why that occurred is not fully understood. In addition, the results for Morrow County have unexplained omissions in the extraction results for School Districts and for the County Boundary, and these gaps may be due to a temporal mis-match between the TCA polygons and the lookup table, similar to the situation discussed previously for Lincoln County results (Issue 2.A.iv).

Scio School District was represented in the extraction results by two partially overlapping polygons, one called "SCIO 95 SCHOOL" which appears to cover the entire school district, and a smaller polygon called "SCIO 95 (SCIO 95 BOND)" which only covers a portion of the district, and was deleted. (-19) Sherwood School District was also represented in the extraction results by two partially overlapping polygons, one called "SHERWOOD 88J SCHOOL" which appears to cover the entire school district, and a much smaller polygon called "SHERWOOD 88J SCHOOL BOND POCKET" which appears to cover a portion of the neighboring Tigard-Tualatin School District, and was deleted. (-20)

Silver Falls School District was represented in the extraction results by two non-overlapping polygons, one called "SILVER FALLS 7J SCHOOL" which only covered the portion of the district in Marion County and the other called "SILVER FALLS 7J SCHOOL (CLACK)" which only covered the portion of the district in Clackamas County. These were merged together. (-21) Tigard School District was represented in the extraction results by three non-overlapping polygons, "TIGARD/TUALATIN 23J SCHOOL", "TIGARD 23J SCHOOL", and "TIGARD-TUALATIN 23J BOND POCKET". All of these had to be merged together. (-23) North Wasco School District was represented in the extraction results by two overlapping polygons, "NORTH WASCO 21 SCHOOL" which appears to cover the entire school district, and a smaller polygon called "THE DALLES 12 SCHOOL", which appears to be unnecessary (possibly historical) and was deleted. (-24)

These post-extraction cleanup actions brought the total polygon count down to approximately where it should be, considering that the extraction results do not include Klamath County.

The situation in southeastern Oregon is complicated by the existence of separate and legitimately overlapping elementary and secondary school districts. Harney County was completely accounted for in the extraction results by nine non-overlapping school districts, as expected, but there was one additional large polygon, called "CRANE UH1J SCHOOL", which completely covered 8 of the 9 districts in Harney County, as follows:

- Crane SD4
- Diamond SD 7
- Double O SD 28
- Drewsey SD 13
- Frenchglen SD 16
- Pine Creek SD 5
- South Harney SD 33
- Suntex SD 10

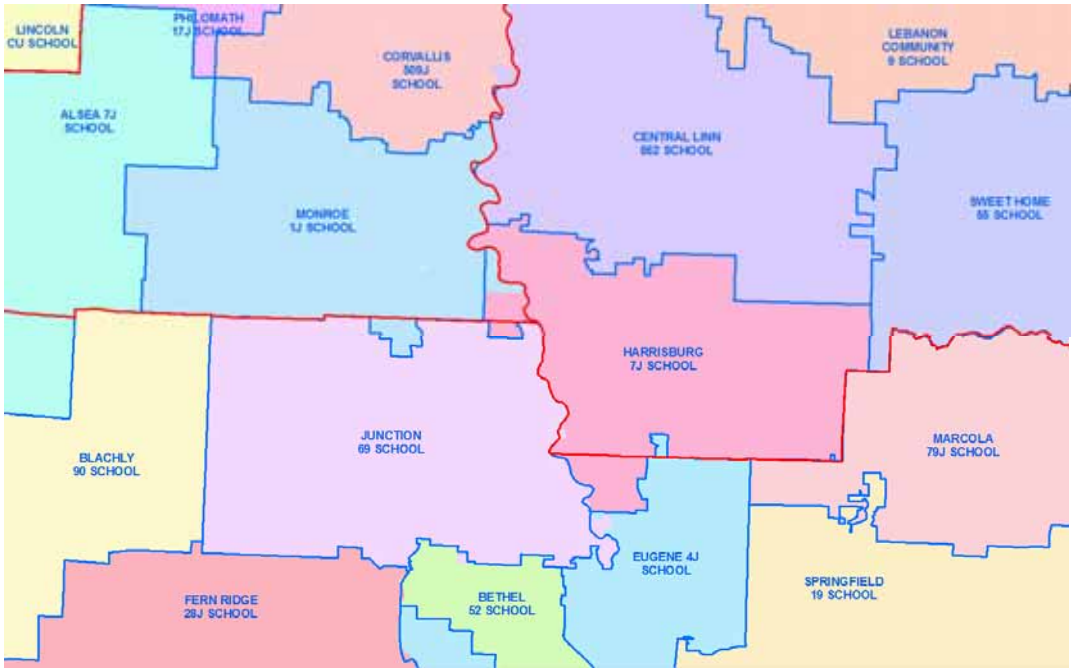
According to its website, Crane Union High School is fed by eight "Rural Elementary Feeder School Districts", which can each be matched up with one of the listed school district polygons. There is no separate "secondary" district polygon in the current Framework layer, which explains why the Framework total district count (196) is one less than what is stated on the ODE website (197). However, the Framework layer does have an attribute field for "Secondary School District", and there appears to be just one - "HARNEY COUNTY UNION HIGH SD" - in the Framework data, which corresponds spatially with the Harney County portion of the "CRANE UH1J SCHOOL", and covers those same 8 elementary districts listed above. However, there were 2 additional districts in Malheur County which are partially covered by the "CRANE UH1J SCHOOL" polygon in the extraction results:

- Harper SD66
- Juntura SD12

That partial coverage by the secondary district created additional tax codes and additional TCAs, so that those two school districts were each represented in the extraction results by two polygons, which were merged together. This brought the total count of school districts in the extraction results down to 195, including the overlapping polygon for the Crane Unified High School District. Allowing for the two school districts in Klamath County, which are not included in the extraction results, this matches the count on the ODE website.

<u>Comparison of Extracted School Districts with Framework School Districts</u>

After the post-extraction cleanup described above, there is overall good agreement between the extracted School Districts and the Framework data layer, as shown in this map of the area where Lane, Linn, and Benton Counties intersect. The color shading represents the extraction results. Framework School District lines are shown in blue, and county lines are shown in red.



Extraction results for school districts were exported to a table and aligned with the existing Framework data in order to provide a quantitative district-by-district comparison of polygon areas. A few school districts go by significantly different names in the two datasets. The results of the district-by-district comparison, sorted by percent difference in area, are presented in their entirety as Appendix A.

Overall, the area comparisons are very close. Of the 194 school districts that are in both the extraction results and the existing Framework data, 162 have an area difference of 2% or less, and 130 have an area difference of less than 0.5%. Only 32 of these 194 school districts have an area difference of more than 2%. This strongly suggests that the extraction methodology works well in most cases, and suggests that the existing Framework data layer is relatively accurate, overall.

Significant differences, however, can be observed, both on the comparison table and in the spatial results. There appears to be significant difference between the boundary between Molalla and Colton School Districts as depicted in extraction results and the same boundary as depicted in the existing Framework layer. It is possible that this difference reflects an error in the extraction results due to the kind of tax code mismatch described above for the extraction results for Lincoln County. Several other school districts have a noticeable although less significant difference in area. There are more "losers" than "gainers", as would be expected because of gaps in the extraction results. Many of the biggest losses in school district area are in Curry County and Washington County, where the most significant output gaps have already been noted. It is probably unreasonable to read too much into these differences until a central issue has been resolved: ensuring that the extraction process is conducted with a set of input TCA polygons which are chronologically in sync with the lookup table.

2.C City Limits

Issue 2.C.i Joint Cities

There are 241 incorporated cities in the state, and there are 241 corresponding polygons in the current Framework layer. Extraction of City Limits from the TCA polygons submitted by each county initially resulted in a total of 266 "city" polygons, but that raw count included multiple polygons for the joint districts (cities which span more than one county). As with school districts, the first step in post-extraction cleanup is to dissolve on "district name" in order to merge together the parts of the cities which span more than one county, such as the City of Salem and the City of Albany. In addition to these joint cities, this step also resolved some instances of Issue 2.A.i (i.e., the county number attribute on some TCA polygons was zero or null).

Issue 2.C.ii City Name Variants Including Bond-Related Name Variants

As with school districts, that initial dissolve reduced the initial count of polygons, but the extraction results included numerous variations in city name and other redundancies which needed to be resolved, as described below.

The extraction results for Washington County included "RIVERGROVE CITY", while the results for Clackamas County have it as "CITY RIVERGROVE". The upper-case format ending in "CITY" is the statewide norm. This mismatch must be resolved in order for the dissolve to successfully join these two parts of that "joint" city, or else the data steward will have to look for these mismatches and dissolve them manually as part of their cleanup. Ideally this could be cleaned up by enforcing a district naming standard for the lookup table.

Name mismatches do not always involve joint districts and multiple counties. The extraction results for Washington County included both "FOREST GROVE CITY" and "City of Forest Grove", as well as both "BEAVERTON CITY" and "City of Beaverton". As noted above, the upper-case format ending in "CITY" is the statewide norm. Those title-case formats appear to be outliers, and the resulting polygons were manually merged into the larger surrounding polygons carrying the standard naming form. In the TCA shapefile submitted by Washington County, those non-standard polygons exactly coincide with the "outlier" results for Counties, as well, where the attribution was title-case "Washington County" instead of the all-caps format (see Issue 2.A.ii). It is not completely clear whether those non-standard TCA polygons are needed to delineate some other taxing-district combination within

Washington County or not. It is possible the problem lies not in the TCA polygons but in the SAL report. Hopefully DOR can reach out to Washington County and get these outliers cleaned up on their end, but the bottom line is that the data stewards will need to be on the lookout for situations such as this.

As with school districts, a common form of "name variant" has to do with the SAL reports and/or the match table being used to track bonds and levies of one kind or another, in addition to tracking actual districts. For example, the results for Lane County include both "EUGENE CITY" and another polygon exactly the same size and shape for "EUGENE CITY BONDS", which needed to be deleted. However, assessment staff at Lane County indicated that they do not use TCAs to track bonds, and "EUGENE CITY BONDS" was not part of the SAL report submitted to DOR by Lane County, so the appearance of this redundant polygon in the results remains unexplained, and may relate to the way SAL reports were compiled by DOR into the statewide match table, which was likely done for internal DOR needs unrelated to extraction of GIS data layers.

Similarly, the combined extraction results for Clackamas, Washington, and Multnomah Counties included polygons for "LAKE OSWEGO CITY (INS SCHOOL)", "LAKE OSWEGO CITY (OUT SCHOOL)", and "LAKE OSWEGO CITY (BONDS)". Merging the first two together yielded a polygon of the same size and shape as the "bonds" version, which was then deleted. Results included two other polygons of the same size and shape, one called "PORTLAND CITY", and the other called "PORTLAND CITY AFTER LOCAL OPTION", which was deleted.

Results for Lincoln County included a polygon for "LINCOLN CITY" and a separate small polygon for "CITY OF LINCOLN CITY PHASE-IN", and those had to be merged together to create a single Lincoln City polygon which matches both the existing Framework information and what can be found on the Lincoln County website. Similarly, results in Douglas County included "ROSEBURG CITY", "ROSEBURG CITY (OUTSIDE DOWNTOWN)", and "ROSEBURG CITY (SERAFIN)". All three needed to be merged together to create a single polygon for Roseburg that closely matches the existing Framework dataset.

At this point, results included polygons with name attributes all ending in "CITY" except for one in Clackamas County called "CITY JOHNSON", which is the City of Johnson City. Ideally, name attributes should all match the statewide normative format, which in this case would be "JOHNSON CITY". Other cities where "City" is part of the name, such as Mill City and Junction City, do conform to that standard.

Issue 2.C.iii Missing Cities

With the resolution of the issues described in the previous section, the extraction results included polygons for 231 Cities. As mentioned previously, however, there are 241 incorporated cities in Oregon, and all of them are represented in the current Framework dataset. This means that 10 cities are missing from the extraction results. Five of those are in Klamath County, which was not included in this project. The other five missing cities include Dunes City in Lane County, Irrigon in Morrow County, Granite in Grant County, Unity in Baker County, and Greenhorn, which despite its small size, manages to straddle the Grant County and Baker County lines.

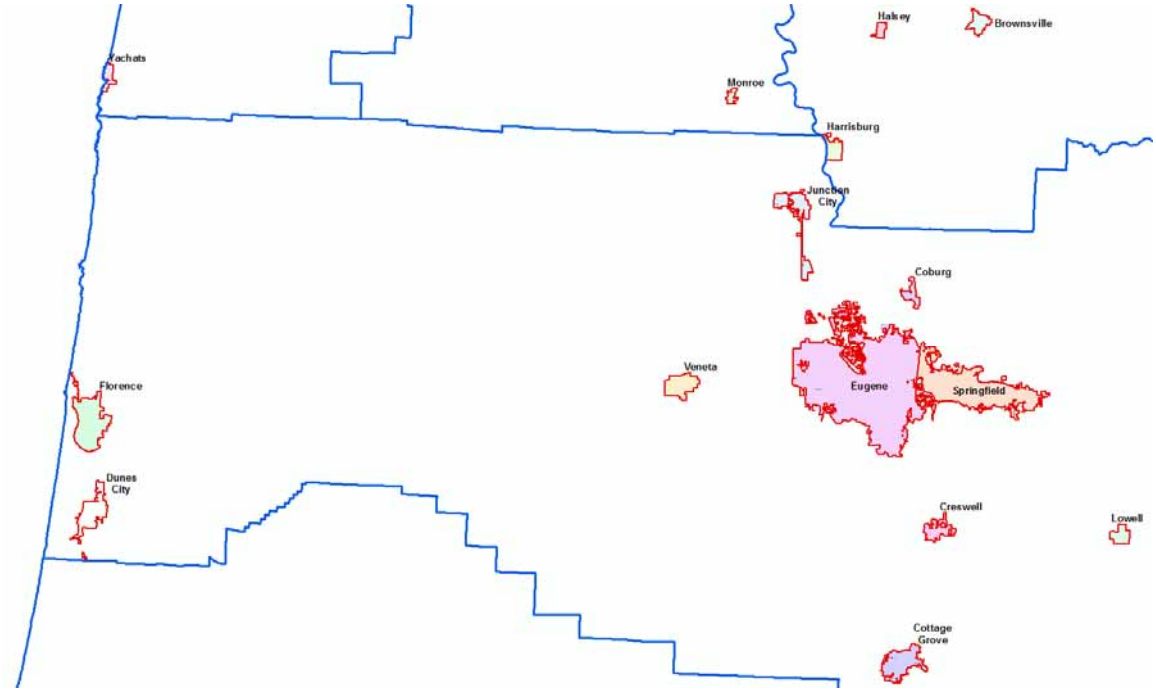
These are all very small cities, and their omission from the extraction results may indicate that some of them, at least, do not levy any property tax, and therefore do not appear in the SAL reports from which the match table was derived. The City of Dunes City, for example, although incorporated, does not levy any property tax, and the same may be true of some of those other missing cities. The TCA polygons submitted by the counties do appear, in most cases, to include linework that accurately reflects the extents of most of these cities, but if a city does not levy any property tax, they may be omitted from the SAL reports from which the match table was derived. (In a sense, this is the converse of the match table including "extraneous" information about bonds and levies and is a reflection of the fact that the TCA polygons and the SAL reports are produced for different reasons.) At least one of these cities, Irrigon, is missing from the extraction results due to apparent mismatches between the polygons and the lookup table, which also affected the extraction results for the nearby City of Boardman.

Recommended Solution: Use a lookup table that is chronologically in sync with the TCA polygons, and which does not omit these "zero-rate" taxing districts.

Comparison of Extracted City Limits with Framework City Limits

After the post-processing cleanup described above, the extraction results for City Limits were exported to a table and brought together with the existing Framework data for quantitative comparison of polygon areas. The complete quantitative results were sorted by percent difference in area, and are presented as Appendix B.

As with school districts, there are more "losers" than "gainers", as would be expected because of gaps in the extraction results. Overall, however, the results are encouraging. Of the 229 cities which appear in both the extraction results and in the Framework layer, 123 are within less than a one percent difference in area (plus or minus) from the Framework City Limits. (Note that in the larger cities, even a one percent difference could represent a fairly large area that is missing from, or erroneously included in, one dataset or the other.) Several cities are missing from the extraction results, as noted above. Some of those are in Klamath County. Others are very small cities and it is possible they do not appear in the results because they do not levy any property tax, and therefore were omitted from the County's TCAs or from the SAL reports and match table. In Lane County, this has been a recurring issue with the City of Dunes City. The map below shows the extraction results as color shading, the Framework City Limits in red, and county lines in blue. The City of Dunes City is missing from the results.



As mentioned above, some of the missing cities may be due to reasons other than having a zero tax rate. At least one missing city, Irrigon, does not appear in the extraction results due to apparent mismatch between TCA polygons and the lookup table, which also affected the extraction results for nearby City of Boardman. Most of the City of Boardman is missing from the results, although its entire extent can be seen in the TCA polygons submitted by Morrow County. That would suggest a mismatch between the tax code attribution of those polygons and the match table derived from the SAL reports. Conversely, results for the City of Stanfield included an extraneous piece of ground about 9 miles to the NE. This may also have been caused by a mismatch between the tax code attributes of the TCA polygons and the statewide lookup table that was used.

In the case of two coastal cities in Tillamook County, City of Bay City and City of Garibaldi, significant "shortfall" in the extraction results appears to be because water areas were not included in the TCA polygons, although they may lie within those cities. In other instances, water areas were included in the TCAs but not in the Framework layer. Similar mismatches in water areas can also be observed along the Columbia River, for example in both Hood River and Mosier. Because these water areas would contain little or no population or taxable value, it is perhaps not surprising that mismatches like this would occur.

In some cases, the extraction results seem more current than the Framework layer, and in some cases less current than the Framework layer. City Limits tend to change at a faster pace than any other type of Taxing District boundary, and annexations can result in new tax codes being created from one year to the next, so it is possible that at least some of these differences have to do with the issue described previously regarding tax code changes, and the critical requirement that the lookup information be in sync with the TCA polygons. A temporal mismatch in the input information would likely be more damaging to the extraction results for City Limits than to other types of taxing districts, where the pace of change is considerably slower.

2.D Fire Districts

Issue 2.D.i Joint Fire Districts

Again, the first post-processing step is to dissolve on district name in order to merge the parts of the "joint" fire districts which extend into more than one county. In addition to the joint districts, this step also resolved some instances of Issue 2.A.i (the county attribute on the TCA polygons was zero or null). The raw results from the extraction process yielded 304 polygons and dissolving on name brought that total down to 252 polygons.

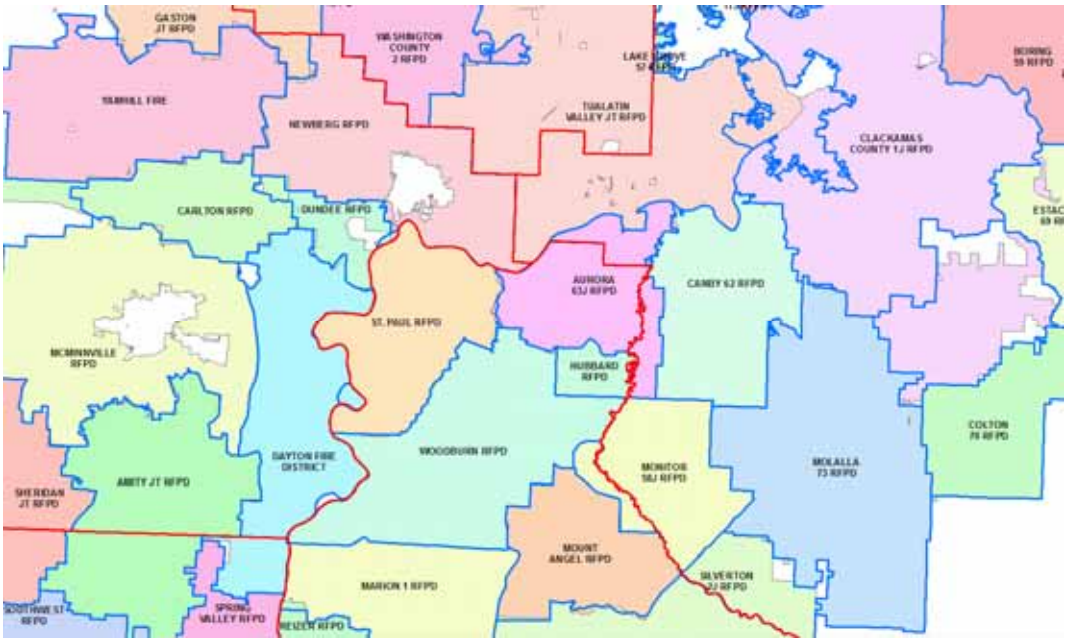
Issue 2.D.ii Fire District Name Variants Including Bond-Related Name Variants

Compared to other types of taxing districts, the initial dissolve appeared to leave behind a smaller number of "excess" fire district polygons caused by variations in district names. In Washington County, non-standard title casing of the district name attribute was again encountered. Small areas attributed as "Tualatin Valley Fire & Rescue" exist alongside a much larger area attributed as "TUALATIN VALLEY JT RFPD", as well as a small area in Multnomah County attributed as "TV FIRE/RESCUE DIST #1 - LOC OPT". These were all merged together as "TUALATIN VALLEY JT RFPD". Dayton Fire District was represented in the extraction results by two non-overlapping polygons, one in Polk County called "DAYTON FIRE DISTRICT" and a larger polygon in Yamhill County called "DAYTON JT RFPD". These were merged together into "DAYTON FIRE DISTRICT".

Merging of like names must be done with caution, as sometimes similar names mean very different areas. For example, "JEFFERSON CO RFPD" is located in Jefferson County in Central Oregon, whereas "JEFFERSON 8J RFPD" is located around the town of Jefferson in Marion County. And "JOHN DAY-FERNHILL RFPD" is located in Clatsop County, nowhere near "JOHN DAY RFPD". Similarly, "LAKE CREEK RFPD (JACKSON)" is distinct from "LAKE CREEK RFPD (LANE)". Presumably, "MULTNOMAH 10 RFPD", "MULTNOMAH 11J RFPD", and "MULTNOMAH 14 RFPD" are all distinct from one another, or perhaps they could be merged together. "PILOT ROCK 7-401 RFPD" and "PILOT ROCK RFPD" were considered to be the same and were merged together as "PILOT ROCK RFPD". Likewise, "SWEET HOME FIRE/AMBULANCE Z1" and "SWEET HOME FIRE/AMBULANCE Z2" were considered to be the same and were merged together as "SWEET HOME FIRE/AMBULANCE". The fact they are divided into two separate taxing districts in the eyes of Linn County implies that different tax rates are involved, and from that perspective, they could be thought of as two distinct taxing districts, but more likely they are the same district with different rates applied in different areas.

Comparison of Extracted Fire Districts with Existing Statewide Compilation

As stated previously, a statewide layer of structural fire protection providers has been compiled by the Oregon Dept. of Forestry (ODF) in collaboration with the Office of the State Fire Marshal (OSFM). While not officially considered to be a Framework dataset, that layer does represent the best available data at this time and was used as the basis for comparison. The map on the following page depicts the extraction results (color shaded areas) with that statewide compilation (blue lines) in the northern Willamette Valley. County lines are shown in red.



During the post-extraction cleanup described above, a small number of polygons were merged together based on name similarity, bringing the total count down to 247 polygons. However, the statewide layer compiled by ODF contains over 1440 polygons, so a major simplification of the ODF dataset would be needed before a direct comparison would be possible. In addition, the statewide layer compiled by ODF is intended to include not just rural fire protection districts but also cities that provide their own structural fire protection, i.e., a compilation of all areas in the state with structural fire protection, regardless of whether that provider is a city or a rural fire protection district. As the map above shows, the RFPD extraction results do not include these cities. This is an additional complication which would have to be addressed by any future Framework Steward of a Fire Protection Provider dataset.

2.E Community College Districts

As stated previously in this report, DHS/OHA volunteered to participate in this project and indicated a business need for Community College Districts, so those boundaries were also included in the project. This was done as a further demonstration of the extraction methodology, without comparison to an existing dataset (as none exists).

According to the online Oregon Blue Book, there are 17 Community Colleges in Oregon:

- Blue Mountain Community College (Pendleton)
- Central Oregon Community College (Bend)
- Chemeketa Community College (Salem)
- Clackamas Community College (Oregon City)
- Clatsop Community College (Astoria)
- Columbia Gorge Community College (The Dalles)
- Klamath Community College (Klamath Falls)
- Lane Community College (Eugene)
- Linn-Benton Community College (Albany)
- Mt. Hood Community College (Gresham)
- Oregon Coast Community College (Newport)
- Portland Community College (Portland)
- Rogue Community College (Grants Pass)
- Southwestern Ore. Community College (Coos Bay)
- Tillamook Bay Community College (Tillamook)
- Treasure Valley Community College (Ontario)
- Umpqua Community College (Roseburg)

Issue 2.E.i Joint Community College Districts

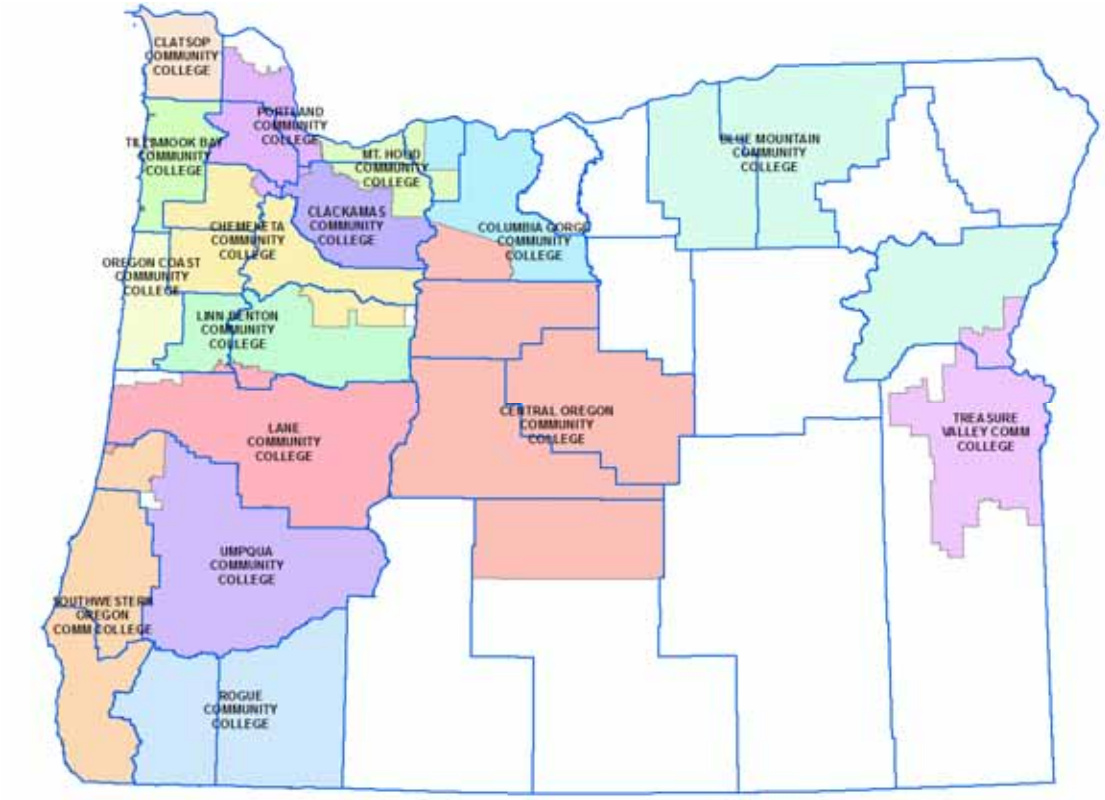
As before, the first step in post-extraction cleanup is to dissolve on district name in order to merge the parts of the "joint" community college districts which span more than one county, which is very common among Community College Districts. In addition to the joint districts, this step also resolved some instances of Issue 2.A.i (the county number attribute on the TCA polygons was zero or null). While the raw results from the extraction process yielded 65 polygons, dissolving on name brought that total down to just 24 polygons.

Issue 2.E.ii District Name Variants Including Bond-Related Name Variants

As with other types of taxing districts, the remaining "excess" community college district polygons are caused by variations in district names, nearly all of which are related to bond levies. Of the 24 polygons, 7 had the word "Bond" in the name attribute, and in every case, they overlapped entirely or partially with a corresponding "non-bond" district polygon (the "parent" district). Deleting all of them left just 17 polygons. Portland Community College was represented in the extraction results by two non-overlapping polygons with slightly different names, which were merged together. This left 16 polygons, which correspond exactly to the list above (except for Klamath Community College, because Klamath County was not included in this project).

Summary of Community College Districts

Statewide results of the extraction process are shown in the map below. There is no Framework dataset for Community College Districts, so it was not possible to compare these extraction results with anything else. As mentioned previously, at the outset of this project, GIS staff at DAS/OHA had expressed a business need for Community College Districts, and at that time, a willingness to take on stewardship. In order to give them a reasonable start, some effort was made to clean up the raw extraction results.



As with other types of taxing districts, the extraction process leaves gaps in the extraction results. Most Community College District boundaries follow county boundaries, and in cases where data gaps were large and widespread, it proved easier and more successful to manually construct some of the Community College Districts by using whole counties, relying on the extraction results as a guide for merging and splitting counties when appropriate. Most of the splits which occur within a county follow school district boundaries, but not always. For example, the Monroe School District is apparently split between Lane Community College and Linn-Benton Community College. It also appears from the extraction results that Community College districts do not form a complete wall-to-wall coverage of the state, and many areas are not inside any Community College district. For example, extraction results show that a small portion of northwestern Lane County is not part of the Lane Community College District, which is confirmed by tax code information obtained directly from Lane County. Extraction results, as well as tax code information obtained directly from Lane County, also indicate that area is not inside any other Community College district. The same may be true of small portions of Douglas County and Linn County, as well. Further work is needed to confirm some of these apparent gaps.

Section 3: Summary of Findings

Post-processing examination and cleanup of extraction results encountered four types of "excess" polygons which were found across all counties, and which were common to all five types of taxing districts examined:

1. Excess polygons due to incomplete county number attribution on input TCA polygons. This can be easily resolved by the addition of a pre-extraction processing step to correct the missing county number attributes on the input TCA polygons, or by ensuring that attribution is complete prior to submittal.

2. Excess polygons representing Joint Districts. This can be resolved by dissolving on District Name and relies on agreement between the spelling and formatting of the district name attributes.

3. Excess polygons due to variants in the "Name" attribute due to formatting/casing. Variations in the spelling or formatting of the district name cannot be automatically resolved. Keep in mind that the name attribute is not carried on the input TCA polygons. The District Name attribution comes from the lookup table. In the case of Washington County, district names were sometimes provided in title case instead of the otherwise-universal upper case. This "outlier format" caused some fragmentation of extraction results, and should be resolved at the input, whether that is from the SAL information submitted by Washington County, or from the match table compiled by DOR staff. Standardization of district names and name format will be key to successful implementation of this extraction methodology.

4. Excess polygons due to variants in the "Name" attribute which are related to levies and bonds. In the case of these excess polygons, the name often included the words "bond" or "levy", but this was not always the case. Many of these extraneous polygons could be automatically excluded from the extraction results if the name used for the "parent" district (i.e., the NON-bond/NON-levy district, the actual physical district) always ended with the keyword corresponding to the Block (the type of taxing district), for example:

- Counties: "… COUNTY" (Only a single outlier was encountered.)
- School Districts: "… SCHOOL" (About 88% currently conform to this standard.)
- City Limits: "… CITY" (Over 90% currently conform to this standard.)
- Fire Districts: "… RFPD" (About 90% currently conform to this standard.)
- Community College Districts: "… COLLEGE". (All are in conformance.)

If these naming standards were enforced for the parent districts, then the extraction process could be modified to automatically exclude all the bond-related and levy-related polygons, which appeared to be unneeded in virtually every instance. As it stands now, that modification in processing would also exclude about 10% of the legitimate taxing districts, so the naming standards would need to be enforced at the source of the lookup table. Another possible solution is to use lookup information that does not include records for these bonds and levies, but includes records only for the parent districts. However, there may be business needs for some or perhaps all these bond-related and levy-related geographies, for example, Urban Renewal Districts, which make up their own Block in the statewide match table compiled by DOR.

In addition, in the case of City Limits, some were observed to be completely missing from the extraction results. Most or all these observed issues could be avoided by using TCA polygons which are fully attributed with county numbers, and by using a lookup table that:

a) includes only parent districts and does not include various tax levies and bonds,

b) includes non-taxing or zero-rate taxing districts,

c) enforces standardized formats for naming and casing,

d) is chronologically in sync with the TCA polygons.

Section 4: Proposal to Extend the ORMAP Data Exchange Standard

As this work progressed and the findings summarized above became increasingly apparent, discussions between LCOG staff and DOR staff began to focus on the implications of the programmatic separation between the TCA polygons and the SAL reports at both the county and state levels as well as the impact this appeared to be having on the extraction results. Essentially, the TCA polygons and the SAL reports are produced by the Counties at different times and by different work groups in order to meet different business needs and different DOR requirements. This creates two systemically distinct sources of input information for the extraction process, which negatively impacts the extraction results in multiple ways, as summarized in the previous section of this report.

In October 2018, LCOG staff attended a meeting of the ORMAP Technical Group in order to describe what was being learned from this project, and to put forward the concept of extending the ORMAP Cadastral Data Exchange Standard to include a Taxing District Lookup table as a companion to the TCA polygons. Adding that lookup table to the annual ORMAP submission and using that in place of the statewide match table derived from annual SAL reports, would greatly alleviate the issues described in the previous sections of this report.

In January 2019, LCOG and DOR staff made a presentation on this topic to the Cartography break-out session of the annual winter meeting of the Oregon State Association of County Assessors (OSACA), followed by a discussion of the proposal. Questions that were discussed include the following:

- Can the cadastral GIS staff at each County compile and provide this lookup information?
- Can a “Block” attribute (or ”district type” attribute of some kind) be included?
- What annual timing would best keep data in sync?
- Can zero-tax-rate taxing districts be included in the lookup tables?
- Can a feedback loop be developed aimed at further improvement of extraction results?

In April 2019, LCOG staff attended a second meeting of the ORMAP Technical Group to engage the group in additional discussion, to gather comments on the proposal, and to circulate a draft prototype lookup table for each County, using information synthesized from the statewide match table compiled previously by DOR staff. A sample of the prototype lookup table format is shown below. (This is only a small sample, not the full table.)

Table 4: Sample of Prototype Lookup Table Format

County	CountyName	TaxCode	DistName	Block	BlockName
1	Baker	16-6	BAKER COUNTY	1	COUNTY
1	Baker	25-2	BAKER COUNTY	1	COUNTY
1	Baker	61-13	BAKER VECTOR CONTROL	15	VECTOR CONTROL
1	Baker	61-14	BAKER VECTOR CONTROL	15	VECTOR CONTROL
1	Baker	61-4	PINE VALLEY CEMETERY	6	CEMETERY
1	Baker	61-6	PINE VALLEY CEMETERY	6	CEMETERY
2	Benton	2520	BENTON COUNTY	1	COUNTY
2	Benton	2521	BENTON COUNTY	1	COUNTY
2	Benton	914	VINEYARD MOUNTAIN PARK & REC	9	PARK
2	Benton	917	VINEYARD MOUNTAIN PARK & REC	9	PARK
2	Benton	915	COUNTRY ESTATES ROAD	11	ROAD
2	Benton	948	COUNTRY ESTATES ROAD	11	ROAD
2	Benton	937	BROWNLEY MARSHAL ROAD	11	ROAD
2	Benton	938	BROWNLEY MARSHAL ROAD	11	ROAD
3	Clackamas	000-002	LAKE GROVE PARK & REC	9	PARK
3	Clackamas	007-017	LAKE GROVE PARK & REC	9	PARK
9	Deschutes	06-052	DESCHUTES COUNTY	1	COUNTY
9	Deschutes	06-048	DESCHUTES COUNTY	1	COUNTY
9	Deschutes	01-001	BEND METRO PARK & REC	9	PARK
9	Deschutes	01-075	BEND METRO PARK & REC	9	PARK

Several details of this prototype table structure remain to be resolved, including the following:

- It is not absolutely necessary to have both Block and Block Name, one or the other could suffice.
- The Block attribution could be replaced with some other kind of district type attribution.
- District type attribution may not be necessary if District Names are fully standardized (see Sect. 3, item 3).
- Tax Code format can vary from county to county, but needs to match format used on the TCA polygons.

An alternative approach was suggested by Polk County: instead of having each county provide a companion lookup table with the TCA polygons as part of the ORMAP submittal, have the counties run the extraction process themselves, and provide the extraction results as part of the ORMAP submittal. This is a valid alternative, and it may be possible to frame the extension of the Data Exchange Standard to allow either approach, depending on each county's preference. This could, however, create additional work for DOR staff, and would impact the stewardship arrangements for individual statewide datasets. This issue needs to be resolved by the ORMAP group.

Revision of Extraction Scripts and Tools

LCOG staff have reconfigured the extraction scripts and script tools to utilize 34 county-level prototype lookup tables which were synthesized from the statewide match table compiled previously by DOR staff. The revised tools were re-run to test the new process, but because these prototype lookup tables were derived from the same statewide match table that was used previously, the extraction results are essentially unchanged. If the ORMAP Data Exchange Standard is successfully extended, however, and Counties begin to provide companion lookup tables with their TCA polygons, as part of their annual ORMAP submittal, it is expected that the extraction process will be streamlined and the results will be significantly improved.

Current Status and Next Steps

This proposal to extend the ORMAP Cadastral Data Exchange Standard is now in the hands of DOR staff and the ORMAP Technical Group, which is part of Cadastral FIT. The next step is to resolve the questions raised in this section of this report, and to agree upon a finalized structure for the lookup table, including naming and formatting standards and attribution of district type.

In addition, if each county were to "nest" their submitted TCA polygons within the Framework County Boundaries, it would significantly reduce the edge-match issues observed in the extraction results. This should also be further discussed, as part of the proposed change in the ORMAP Data Exchange Standard.

Section 5: Stewardship

5.A County Boundaries

As far as is known at this time, BLM will continue to be the Framework Steward of a statewide layer of Counties. Because county boundaries change very rarely, and because significant effort has gone into developing and refining the existing Framework layer, BLM is not expected to adopt this extraction methodology for ongoing maintenance of that Framework layer. In fact, the Framework County Boundaries could play an important role in improving the extraction methodology, as suggested in the previous sections of this report.

5.B School Districts

School District Boundaries are among several statewide K-12-related datasets that were compiled - and have been maintained over the past ten years - by GIS staff at DHS/OHA. This layer has been considered a Framework layer, available through OSDL. The initial effort at DHS/OHA to compile statewide GIS data for school districts and school attendance areas began in the fall of 2008 as part of a request to map childrens' foster home locations to their school attendance areas throughout the state. At that time, it was determined that no such data layer had been compiled by Oregon Department of Education (ODE). Over the next year, DHS/OHA staff contacted the 197

individual school districts to assess how many of them had attendance boundary data and in what format. Attendance boundaries for some of the larger districts were available in digital format, but for most districts, attendance boundary information consisted of paper maps or written descriptions. As more was learned about the hierarchical (nested) educational structure in place throughout the state, DHS/OHA staff decided to compile Educational Service District (ESD) and School District Boundaries, as they represent the basic framework for the school attendance boundaries.

School Districts are required to maintain legal descriptions of the school district boundaries, but when these were compared to the school district boundaries available in GIS at the time, significant differences were found. Some were errors in the descriptions, but most were related to scale issues: most districts were mapped at scales on the order of 1:250,000 (if at all). In 2009, ODE requested that DHS/OHA staff submit school district updates to the US Census Bureau in preparation for the 2010 Census, given that DHS/OHA staff had the most accurate data available. DHS/OHA staff submitted only a handful of changes, as the Census required changes be submitted through a very complicated process.

That same year, DHS/OHA staff received Framework funding to complete and expand the education-related data layers. Over the following year DHS/OHA staff manually digitized all attendance area boundaries and started to collect the legal descriptions for the school district boundaries. In 2012 DHS/OHA staff collected the best available source data (roads, rivers, township/range lines, etc.) referenced by most of the descriptions, and rebuilt all of the school district boundaries from the legal descriptions. At the present time, DHS/OHA staff have been able to collect only about a third of the legal descriptions. All the agencies involved (ODE, school districts, county assessors, and DOR) have referred DHS/OHA staff to the state archives for the remaining legal descriptions, but multiple attempts over the years have failed to produce any results. The derivation methodology described in this report may prove to be a better solution for maintaining school district boundaries, although it will not yield school attendance boundaries within the districts.

Unfortunately, DHS/OHA has recently pulled back from their role as the de-facto Framework Steward for these statewide education-related datasets, including School District Boundaries. No edits are planned after July 1, 2019. No other Steward has stepped forward, and no Stewardship Plan exists, as far as is known.

Ideally, the Framework Steward for any administrative boundary would be the authoritative source of the boundary information, would be the adjudicator of changes in the boundaries, and would accept custodial responsibility over the statewide data layer. Among State agencies, ODE would appear to be the most logical choice to act as Steward for school district boundaries. It was a business need at DAS/OHA, however, which drove the initial compilation and which has provided maintenance for the past decade. In theory, it should be possible for ODE to act as Framework Steward, but continue to have the actual maintenance work carried out by DAS/OHA or some other agency, under contract or MOU or some other arrangement.

5.C City Limits

At the time the GIS Framework Implementation Teams were being put together, circa 2000, ODOT was already maintaining, in CAD, a city limits layer for internal use. An informal agreement was reached between ODOT and DOR recognizing that ODOT, due to available needs and resources, would be the horizontal integrator, and DOR would remain as the data Steward. The city limits layer continued to be maintained in CAD until around 2003, when it was converted to an SQL table and has been maintained from then on as a GIS layer.

Data sources used to compile and maintain City Limits have included:

- approved annexations from the DOR with legal description and map
- Aerial photography
- ORMAP taxlots.

The current maintenance process is as follows:

- DOR receives and approves the annexation submitted by the appropriate jurisdiction. Legal description and matching map must be submitted for approval. All annexations must be submitted by September 1 in order to be placed on following year's Tax Rolls.
- DOR sends the approved annexations to ODOT GIS Unit.
- Approved annexations are added to working city annexation feature class.
- Annexations are merged by city and status and exported into city limits feature class.
- Edits are done throughout the year, and a snapshot is posted to the OSDL annually, usually in October.

As far as is known at this time, ODOT will continue to maintain a statewide data layer of City Limits, although DOR reportedly remains the data Steward. No formal Stewardship Plan exists, as far as is known at this time. The maintenance process described above seems relatively robust, but the layer could suffer from horizontal inaccuracies inherited from its earliest incarnation as a CAD dataset. One of the advantages of the TCA-based extraction process described in this report is better vertical integration between the cadastral data and the derived boundaries.

Like the situation described above for school districts, it was a business need at ODOT which drove the initial compilation and which has provided maintenance for the past two decades, under the Stewardship of DOR, and this arrangement could remain in place. In general, DOR conforms with the concept that the data Steward should be the authoritative source of the boundary information, would approve changes in the boundaries, and would have custodial responsibility over the statewide data layer. It could also be argued that the Secretary of State's Office also meets those criteria. In theory, either of these agencies could act as the official Steward, but continue to have the actual work carried out by ODOT or by some other agency, under contract or MOU or some other arrangement.

5.D Fire Districts

At the outset of this project, a Framework Steward for statewide Fire District Boundaries had yet to be identified. While ODF had been a primary collaborator in the compilation of a statewide layer of structural fire protection providers, which was used as a basis for evaluating the extraction results described in this report, ODF declined to act as Framework Steward. OSFM would appear to be more logical choice to be the state agency to take on stewardship of this dataset, given the criteria expressed above, but at that time, OSFM had no GIS capacity. Since that time, however, OSFM has brought on a GIS staff-person, who has reportedly taken on at least de-facto stewardship for the following statewide data layers:

- Structural Fire Protection – municipal & rural (transferred from ODF)
- Fire Station Locations (transferred from OR-IRIS/DEQ)
- Hazmat Team Boundaries and Base Locations (transferred from OR-IRIS/DEQ)
- Community Right-to-Know Facilities (transferred from DAS GEO)

OSFM staff are currently planning to update the Structural Fire Protection Provider layer, and to fill in data gaps by utilizing City Limits and/or by cross-walking to an OSFM list of fire protection agencies. The updated layer will be posted to the spatial data library.

5.E Community College Districts

At the outset of this project, DHS/OHA had volunteered to participate and had indicated a business need for Community College Districts. A layer of Community College Districts boundaries was therefore included in this project, as a demonstration of the methodology, but without comparison to an existing dataset (because there is none). Unfortunately, as described above, DHS/OHA has recently pulled back from the role of Framework Steward for education-related boundaries, and currently the new statewide Framework layer of Community College Districts has no identified Steward.

5.F Cadastral Data

DOR will continue to be Framework Steward for statewide cadastral data under the ORMAP program and will continue to work with the participating Counties to maintain and improve the integrity and quality of the ORMAP data. Depending on how DOR and the ORMAP participants resolve some of the issues raised in the previous sections of this report, the most feasible approach might be to also make DOR the "keeper" of the extraction scripts and tools that have been developed through this project. While it would be possible to provide the Stewards of individual statewide datasets with the tools to run the extraction process themselves, they would also have to be provided with the input data, and it may be more practical to continue to have DOR staff conduct at least the initial extraction. The extraction results could then be provided to the steward of each individual statewide data layer for post-extraction editing and verification, as needed. This is an issue that needs additional discussion among the statewide GIS community.

As noted above, regardless of which state agency is considered the Framework Steward for any type of taxing district (or other administrative boundary), the actual development and/or maintenance work could be carried out by some other state agency, under contract, MOU, or some other arrangement.

5.G Integration of Extraction Methodology with Stewardship and Maintenance

Efforts to integrate the extraction methodology described in this report with an actual Stewardship Plan should wait until the current proposal to extend the ORMAP Cadastral Data Exchange Standard is taken through the adoption process. At that time, the data Steward (or the agency to which they have delegated the work) can work with DOR to decide whether it makes more sense for DOR to conduct the raw extraction process and provide those results, or for DOR to provide the input TCA polygons, the lookup table, and the extraction tools to the Steward (or designee), so that they can run the extraction process themselves. The former would probably be easier to manage, if DOR is willing to be the "keeper" of the input TCA polygons, the lookup table, and the extraction tools.

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- Chad Crockett, ODOT, for providing data and background information about City Limits, and for all of his work to aggregate and maintain that statewide layer for many years.
- Arron Heriford, DHS/OHA, for providing data and background information about School District Boundaries, and for all of his work to aggregate and maintain that statewide layer for many years.
- Emmor Nile, ODF, for providing data and background information about Fire District Boundaries, and for his work in the creation and improvement of that statewide layer.
- Melanie Wadsworth, OSFM, for taking on the stewardship and maintenance of that ODF data layer.
- Dean Anderson, Polk County, for helping recruit and facilitate county-level participation, and for all of his work over the years as a key participant in the ORMAP Technical Group.

Appendix A: Quantitative Comparison of Extraction Results for School Districts

Extracted Name	Extract_Area	FRAMEWORK NAME	Framework sq feet	Diff Pct
GRANTS PASS 7 SCHOOL	1,350,425,599	GRANTS PASS SD	668,494,000	50.50%
MOLALLA RIVER 4 SCHOOL	5,939,331,832	MOLALLA RIVER SD	3,996,270,000	32.72%
NORTH BEND 13 SCHOOL	5,218,047,792	NORTH BEND SD	4,414,430,000	15.40%
WALLOWA 12 SCHOOL	28,244,034,614	WALLOWA SD	25,404,700,000	10.05%
TROY 54 SCHOOL	2,160,184,993	TROY SD	2,044,800,000	5.34%
CLATSKANIE 6J SCHOOL	3,479,471,590	CLATSKANIE SD	3,357,090,000	3.52%
ONTARIO 8 SCHOOL	3,458,961,894	ONTARIO SD	3,360,770,000	2.84%
SEASIDE 10 SCHOOL	5,702,559,135	SEASIDE SD	5,553,600,000	2.61%
HUNTINGTON 16J SCHOOL	9,472,198,565	HUNTINGTON SD	9,275,980,000	2.07%
ANNEX 29 SCHOOL	4,738,661,041	ANNEX SD	4,657,870,000	1.70%
TILLAMOOK 9 SCHOOL	9,556,138,546	TILLAMOOK SD	9,419,530,000	1.43%
MONROE 1J SCHOOL	3,705,223,548	MONROE SD	3,656,480,000	1.32%
LAKE OSWEGO 7J SCHOOL	387,167,042	LAKE OSWEGO SD	382,905,000	1.10%
ECHO 5 SCHOOL	5,965,466,278	ECHO SD	5,903,760,000	1.03%
NESTUCCA VALLEY 101J SCHOOL	10,417,140,160	NESTUCCA VALLEY SD	10,313,500,000	0.99%
SHERIDAN 48J SCHOOL	1,766,976,671	SHERIDAN SD	1,753,120,000	0.78%
JUNCTION 69 SCHOOL	4,611,612,265	JUNCTION CITY SD	4,580,020,000	0.69%
BLACK BUTTE 41 SCHOOL	5,412,044,289	BLACK BUTTE SD	5,375,800,000	0.67%
FALLS CITY 57 SCHOOL	3,833,470,123	FALLS CITY SD	3,808,580,000	0.65%
PINE-EAGLE 61 SCHOOL	17,972,259,310	PINE-EAGLE SD	17,855,900,000	0.65%
RIVERDALE 51J SCHOOL	54,454,566	RIVERDALE SD	54,114,800	0.62%
RAINIER 13 SCHOOL	3,430,034,127	RAINIER SD	3,410,350,000	0.57%
SISTERS 6J SCHOOL	7,600,682,098	SISTERS SD	7,560,500,000	0.53%
CENTRAL LINN 552 SCHOOL	5,267,443,592	CENTRAL LINN SD	5,241,810,000	0.49%
MADRAS 509J SCHOOL	43,170,689,689	JEFFERSON COUNTY SD	42,973,900,000	0.46%
PHILOMATH 17J SCHOOL	5,736,715,655	PHILOMATH SD	5,710,900,000	0.45%
UNION 5 SCHOOL	9,579,495,605	UNION SD	9,537,830,000	0.43%
NEAH-KAH-NIE 56 SCHOOL	11,069,401,961	NEAH-KAH-NIE SD	11,023,300,000	0.42%
GLENDALE 77 SCHOOL	8,493,196,351	GLENDALE SD	8,459,600,000	0.40%
BEAVERTON 48J SCHOOL	1,554,603,720	BEAVERTON SD	1,549,010,000	0.36%
CAMAS VALLEY 21 SCHOOL	3,702,401,888	CAMAS VALLEY SD	3,689,590,000	0.35%
ARLINGTON 3 SCHOOL	10,414,700,305	ARLINGTON SD	10,379,200,000	0.34%
JOHN DAY 3 SCHOOL	40,900,554,925	JOHN DAY SD	40,786,200,000	0.28%
STANFIELD 61 SCHOOL	1,692,109,384	STANFIELD SD	1,687,520,000	0.27%
NYSSA 26 SCHOOL	10,367,369,526	NYSSA SD	10,344,100,000	0.22%
DUFUR 29 SCHOOL	13,999,857,135	DUFUR SD	13,971,800,000	0.20%
LOWELL 71 SCHOOL	8,956,239,682	LOWELL SD	8,941,100,000	0.17%
DAYTON 8 SCHOOL	1,579,552,870	DAYTON SD	1,577,000,000	0.16%
FERN RIDGE 28J SCHOOL	6,049,968,427	FERN RIDGE SD	6,040,780,000	0.15%

MARCOLA 79J SCHOOL	3,231,924,349	MARCOLA SD	3,227,460,000	0.14%
CANBY 86 SCHOOL	2,465,062,807	CANBY SD	2,461,880,000	0.13%
YAMHILL-CARLTON 1 SCHOOL	5,185,728,223	YAMHILL-CARLTON SD	5,179,370,000	0.12%
CORBETT 39 SCHOOL	5,229,834,740	CORBETT SD	5,223,590,000	0.12%
OAKLAND 1 SCHOOL	8,032,411,655	OAKLAND SD	8,023,200,000	0.11%
PINE CREEK 5 SCHOOL	8,187,193,607	PINE CREEK SD	8,177,920,000	0.11%
MCKENZIE 68 SCHOOL	21,745,626,668	MCKENZIE SD	21,722,100,000	0.11%
ROSEBURG 4 SCHOOL	8,806,387,650	ROSEBURG SD	8,797,380,000	0.10%
IONE SCHOOL	11,796,404,788	IONE SD	11,785,400,000	0.09%
ALSEA 7J SCHOOL	4,516,334,153	ALSEA SD	4,512,490,000	0.09%
NORTH MARION 15 SCHOOL	1,228,766,213	NORTH MARION SD	1,227,850,000	0.07%
CONDON 25J SCHOOL	22,853,900,400	CONDON SD	22,838,500,000	0.07%
MEDFORD SCHOOL DIST 549C	10,240,637,939	MEDFORD SD	10,234,100,000	0.06%
EAGLE POINT SD 9	17,943,226,077	EAGLE POINT SD	17,932,100,000	0.06%
CULVER 4 SCHOOL	9,148,015,174	CULVER SD	9,142,530,000	0.06%
PLUSH 18 SCHOOL	38,945,303,490	PLUSH SD	38,922,900,000	0.06%
POWERS 31 SCHOOL	5,724,809,460	POWERS SD	5,721,850,000	0.05%
SUNTEX 10 SCHOOL	35,820,290,128	SUNTEX SD	35,802,100,000	0.05%
SPRAY 1 SCHOOL	12,392,263,168	SPRAY SD	12,386,000,000	0.05%
ROGUE RIVER SD 35	7,097,745,377	ROGUE RIVER SD	7,094,230,000	0.05%
ELGIN 23 SCHOOL	10,211,419,817	ELGIN SD	10,206,600,000	0.05%
MONUMENT 8 SCHOOL	14,903,537,083	MONUMENT SD	14,896,700,000	0.05%
OREGON CITY 62 SCHOOL	2,224,883,704	OREGON CITY SD	2,223,900,000	0.04%
SIUSLAW 97J SCHOOL	6,557,427,122	SIUSLAW SD	6,554,530,000	0.04%
PERRYDALE 21 SCHOOL	1,411,580,636	PERRYDALE SD	1,411,010,000	0.04%
ADRIAN 61 SCHOOL	8,188,229,403	ADRIAN SD	8,184,940,000	0.04%
PROSPECT SD 59	7,095,612,313	PROSPECT SD	7,092,850,000	0.04%
FOSSIL 21J SCHOOL	17,467,301,485	FOSSIL SD	17,460,900,000	0.04%
PHOENIX/TALENT SD 4	3,791,016,527	PHOENIX-TALENT SD	3,789,850,000	0.03%
MCDERMITT 51 SCHOOL	77,609,983,951	MCDERMITT SD	77,586,600,000	0.03%
AMITY 4J SCHOOL	2,155,480,494	AMITY SD	2,154,880,000	0.03%
DAVID DOUGLAS 40 SCHOOL	302,528,153	DAVID DOUGLAS SD	302,445,000	0.03%
SOUTH HARNEY 33 SCHOOL	47,876,606,464	SOUTH HARNEY SD	47,866,100,000	0.02%
CRANE 4 SCHOOL	58,817,529,776	CRANE SD	58,804,800,000	0.02%
ESTACADA 108 SCHOOL	19,932,031,638	ESTACADA SD	19,927,900,000	0.02%
NORTH LAKE 14 SCHOOL	85,803,491,876	NORTH LAKE SD	85,787,500,000	0.02%
SWEET HOME 55 SCHOOL	28,611,344,658	SWEET HOME SD	28,606,100,000	0.02%
DALLAS 2 SCHOOL	6,702,110,079	DALLAS SD	6,701,220,000	0.01%
GERVAIS 1 SCHOOL	1,926,743,902	GERVAIS SD	1,926,530,000	0.01%
LA GRANDE 1 SCHOOL	22,380,263,531	LA GRANDE SD	22,378,400,000	0.01%
AROCK 81 SCHOOL	48,722,635,032	AROCK SD	48,719,000,000	0.01%

HARPER 66 SCHOOL	33,078,843,498	HARPER SD	33,076,800,000	0.01%
UKIAH 80 SCHOOL	13,544,019,772	UKIAH SD	13,543,200,000	0.01%
ELKTON 34 SCHOOL	8,551,610,541	ELKTON SD	8,551,100,000	0.01%
JORDAN VALLEY 3 SCHOOL	41,485,579,755	JORDAN VALLEY SD	41,483,900,000	0.00%
LEBANON COMMUNITY 9 SCHOOL	6,820,284,351	LEBANON SD	6,820,160,000	0.00%
SCIO 95 SCHOOL	3,048,494,353	SCIO SD	3,048,450,000	0.00%
BURNT RIVER 30J SCHOOL	32,207,595,396	BURNT RIVER SD	32,207,200,000	0.00%
WARRENTON-HAMMOND 30 SCHOOL	1,813,411,527	WARRENTON-HAMMOND SD	1,813,400,000	0.00%
ASTORIA 1 SCHOOL	8,482,126,535	ASTORIA SD	8,482,080,000	0.00%
KNAPPA SCHOOL	2,762,289,652	KNAPPA SD	2,762,280,000	0.00%
CENTENNIAL 28J SCHOOL	408,301,351	CENTENNIAL SD	408,315,000	0.00%
MCMINNVILLE 40 SCHOOL	3,292,207,458	MCMINNVILLE SD	3,292,340,000	0.00%
SPRINGFIELD 19 SCHOOL	5,169,112,814	SPRINGFIELD SD	5,169,350,000	0.00%
LAKEVIEW 7 SCHOOL	52,558,234,412	LAKE COUNTY SD	52,562,800,000	-0.01%
DAYS CREEK 15 SCHOOL	22,396,475,998	DAYS CREEK SD	22,398,500,000	-0.01%
ASHLAND SD 5	10,394,934,812	ASHLAND SD	10,396,600,000	-0.02%
CROOK COUNTY SCHOOL	102,240,189,604	CROOK COUNTY SD	102,258,000,000	-0.02%
BURNS 3 SCHOOL	36,680,030,864	HARNEY COUNTY SD	36,686,900,000	-0.02%
DIAMOND 7 SCHOOL	16,954,569,838	DIAMOND SD	16,958,000,000	-0.02%
FRENCHGLEN 16 SCHOOL	64,205,120,985	FRENCHGLEN SCH DIST SD	64,218,600,000	-0.02%
CRESWELL 40 SCHOOL	1,939,941,925	CRESWELL SD	1,940,410,000	-0.02%
LONG CREEK 17 SCHOOL	23,236,523,736	LONG CREEK SD	23,243,200,000	-0.03%
SHERMAN 1J SCHOOL	23,411,705,217	SHERMAN COUNTY SD	23,418,600,000	-0.03%
NORTH SANTIAM 27J SCHOOL	4,152,844,055	NORTH SANTIAM SD	4,154,180,000	-0.03%
BUTTE FALLS SD 91	9,525,991,318	BUTTE FALLS SD	9,529,070,000	-0.03%
VALE 84 SCHOOL	18,342,321,764	VALE SD	18,348,300,000	-0.03%
NORTH DOUGLAS 22 SCHOOL	5,454,997,424	NORTH DOUGLAS SD	5,456,800,000	-0.03%
PINEHURST SCHOOL DIST 94	2,974,667,025	PINEHURST SD	2,975,650,000	-0.03%
REEDSPORT 105 SCHOOL	13,248,126,919	REEDSPORT SD	13,252,700,000	-0.03%
SUTHERLIN 130 SCHOOL	3,766,157,295	SUTHERLIN SD	3,767,500,000	-0.04%
GRESHAM-BARLOW 26J SCHOOL	1,408,503,162	GRESHAM-BARLOW SD	1,409,020,000	-0.04%
MITCHELL 55 SCHOOL	17,671,816,440	MITCHELL SD	17,678,700,000	-0.04%
ADEL 21 SCHOOL	15,841,741,125	ADEL SD	15,849,300,000	-0.05%
OAKRIDGE 76 SCHOOL	23,550,957,203	OAKRIDGE SD	23,562,300,000	-0.05%
BAKER 5J SCHOOL	36,317,720,354	BAKER SD	36,338,600,000	-0.06%
CROW-APPLEGATE-LORANE 66 SCHOOL	7,071,947,021	CROW-APPLEGATE-LORANE SD	7,076,070,000	-0.06%
MAPLETON 32 SCHOOL	7,083,418,760	MAPLETON SD	7,087,760,000	-0.06%
WINSTON-DILLARD 116 SCHOOL	6,763,087,732	WINSTON-DILLARD SD	6,767,310,000	-0.06%
YONCALLA 32 SCHOOL	4,424,234,833	YONCALLA SD	4,427,030,000	-0.06%
SALEM 24J SCHOOL	4,775,178,440	SALEM/KEIZER SD	4,778,480,000	-0.07%
OREGON TRAIL SCHOOL	11,820,309,281	OREGON TRAIL SD	11,828,500,000	-0.07%

NORTH POWDER 8J SCHOOL	6,520,504,830	NORTH POWDER SD	6,525,030,000	-0.07%
DOUBLE O 28 SCHOOL	5,985,648,005	DOUBLE O SD	5,989,950,000	-0.07%
NORTH WASCO 21 SCHOOL	5,076,289,813	NORTH WASCO COUNTY	5,080,290,000	-0.08%
SOUTH UMPQUA 19 SCHOOL	6,783,883,338	SOUTH UMPQUA SD	6,789,240,000	-0.08%
JEWELL 8 SCHOOL	7,460,023,590	JEWELL SD	7,466,010,000	-0.08%
SOUTH LANE 45J SCHOOL	18,797,370,402	SOUTH LANE SD	18,812,700,000	-0.08%
PLEASANT HILL 1 SCHOOL	3,054,481,647	PLEASANT HILL SD	3,057,180,000	-0.09%
WOODBURN 103 SCHOOL	863,334,910	WOODBURN SD	864,117,000	-0.09%
COVE 15 SCHOOL	5,624,123,087	COVE SD	5,629,300,000	-0.09%
BLACHLY 90 SCHOOL	3,125,018,277	BLACHLY SD	3,128,130,000	-0.10%
SOUTH WASCO COUNTY 1 SCHOOL	26,107,486,032	SOUTH WASCO COUNTY SD	26,134,100,000	-0.10%
PAINSLEY 11 SCHOOL	39,913,691,032	PAISLEY SD	39,960,100,000	-0.12%
GLIDE 12 SCHOOL	35,989,270,588	GLIDE SD	36,034,200,000	-0.12%
CASCADE 5 SCHOOL	2,290,746,750	CASCADE SD	2,293,840,000	-0.14%
DREWSEY 13 SCHOOL	10,614,680,031	DREWSEY SD	10,629,300,000	-0.14%
RIDDLE 70 SCHOOL	3,767,709,575	RIDDLE SD	3,772,900,000	-0.14%
JEFFERSON 14J SCHOOL	1,561,380,321	JEFFERSON SD	1,563,640,000	-0.14%
DAYVILLE 16J SCHOOL	12,226,905,630	DAYVILLE SD	12,244,700,000	-0.15%
CENTRAL POINT SD 6	6,495,425,910	CENTRAL POINT SD	6,508,780,000	-0.21%
BANDON 54 SCHOOL	2,897,064,658	BANDON SD	2,903,090,000	-0.21%
ST. PAUL 45 SCHOOL	1,185,432,877	SAINT PAUL SD	1,188,190,000	-0.23%
MT. ANGEL 91 SCHOOL	380,793,724	MT ANGEL SD	381,769,000	-0.26%
PRAIRIE CITY 4 SCHOOL	35,539,443,037	PRAIRIE CITY SD	35,641,400,000	-0.29%
NEWBERG 29J SCHOOL	2,261,863,636	NEWBERG SD	2,268,640,000	-0.30%
WEST LINN 3J SCHOOL	1,215,376,264	WEST LINN SD	1,219,130,000	-0.31%
IMBLER 11 SCHOOL	3,371,405,303	IMBLER SD	3,381,920,000	-0.31%
BEND 1 SCHOOL	44,267,536,780	BEND-LAPINE ADMIN SD	44,418,500,000	-0.34%
GREATER ALBANY 8J SCHOOL	4,314,253,961	GREATER ALBANY SD	4,329,180,000	-0.35%
HOOD RIVER 1 SCHOOL	14,821,200,892	HOOD RIVER COUNTY SD	14,874,100,000	-0.36%
GLADSTONE 115 SCHOOL	66,084,675	GLADSTONE SD	66,352,000	-0.40%
WILLAMINA 30J SCHOOL	7,194,299,040	WILLAMINA SD	7,224,950,000	-0.43%
EUGENE 4J SCHOOL	4,353,353,727	EUGENE SD	4,372,680,000	-0.44%
ENTERPRISE 21 SCHOOL	22,827,424,597	ENTERPRISE SD	22,932,600,000	-0.46%
TIGARD/TUALATIN 23J SCHOOL	694,476,287	TIGARD-TUALATIN SD	697,821,000	-0.48%
JUNTURA 12 SCHOOL	19,909,952,065	JUNTURA SD	20,017,900,000	-0.54%
REDMOND 2J SCHOOL	15,308,871,163	REDMOND SD	15,398,000,000	-0.58%
ST. HELENS 502 SCHOOL	2,957,958,179	SAINT HELENS SD	2,979,360,000	-0.72%
CENTRAL 13J SCHOOL	4,293,574,870	CENTRAL SD	4,325,210,000	-0.74%
REYNOLDS 7 SCHOOL	915,744,157	REYNOLDS SD	923,878,000	-0.89%
ASHWOOD 8 SCHOOL	11,841,744,414	ASHWOOD SD	11,954,400,000	-0.95%
CORVALLIS 509J SCHOOL	5,361,657,185	CORVALLIS SD	5,414,080,000	-0.98%

SILVER FALLS 7J SCHOOL	7,201,317,339	SILVER FALLS SD	7,271,760,000	-0.98%
SCAPPOOSE 1J SCHOOL	4,005,391,918	SCAPPOOSE SD	4,046,610,000	-1.03%
SHERWOOD 88J SCHOOL	1,020,319,400	SHERWOOD SD	1,031,870,000	-1.13%
BETHEL 52 SCHOOL	870,483,824	BETHEL SD	881,407,000	-1.25%
MILTON-FREEWATER 7 SCHOOL	9,865,684,287	MILTON-FREEWATER SD	9,997,170,000	-1.33%
HARRISBURG 7J SCHOOL	3,576,120,982	HARRISBURG SD	3,627,100,000	-1.43%
PENDLETON 16 SCHOOL	20,874,484,725	PENDLETON SD	21,200,500,000	-1.56%
THREE RIVERS SD 40J	46,976,100,420	THREE RIVERS SD	47,732,800,000	-1.61%
NORTH CLACKAMAS 12 SCHOOL	1,110,856,176	NORTH CLACKAMAS SD	1,129,540,000	-1.68%
COQUILLE 8 SCHOOL	4,639,077,890	COQUILLE SD	4,795,420,000	-3.37%
GASTON 511J SCHOOL	1,670,331,331	GASTON SD	1,732,080,000	-3.70%
LINCOLN CU SCHOOL	29,321,834,306	LINCOLN COUNTY SD	30,538,000,000	-4.15%
SANTIAM CANYON J SCHOOL	21,886,987,569	SANTIAM CANYON SD	22,865,600,000	-4.47%
VERNONIA 47J SCHOOL	6,955,088,081	VERNONIA SD	7,273,240,000	-4.57%
PORTLAND 1J SCHOOL	3,850,539,331	PORTLAND SD	4,063,380,000	-5.53%
PORT ORFORD-LANGLOIS 2J SCHOOL	9,235,990,687	PORT ORFORD-LANGLOIS SD	9,746,640,000	-5.53%
PARKROSE 3 SCHOOL	343,693,797	PARKROSE SD	363,099,000	-5.65%
PILOT ROCK 2 SCHOOL	16,078,512,810	PILOT ROCK SD	17,056,200,000	-6.08%
JOSEPH 6 SCHOOL	34,616,293,113	JOSEPH SD	37,490,000,000	-8.30%
MYRTLE POINT 41 SCHOOL	13,047,729,432	MYRTLE POINT SD	14,273,800,000	-9.40%
UMATILLA 6 SCHOOL	644,562,239	UMATILLA SD	720,394,000	-11.76%
ATHENA-WESTON 29J SCHOOL	8,132,680,447	ATHENA-WESTON SD	9,117,410,000	-12.11%
HILLSBORO 1J SCHOOL	4,956,281,630	HILLSBORO SD	5,704,110,000	-15.09%
BROOKINGS-HARBOR 17 SCHOOL	10,958,478,255	BROOKINGS-HARBOR SD	12,859,800,000	-17.35%
HERMISTON 8 SCHOOL	3,917,179,081	HERMISTON SD	4,640,170,000	-18.46%
CENTRAL CURRY 1 SCHOOL	20,095,996,432	CENTRAL CURRY SD	24,069,100,000	-19.77%
HELIX 1 SCHOOL	5,142,207,214	HELIX SD	6,293,110,000	-22.38%
FOREST GROVE 15 SCHOOL	4,351,789,468	FOREST GROVE SD	5,329,300,000	-22.46%
MORROW 1 SCHOOL	34,692,067,164	MORROW COUNTY SD	46,262,800,000	-33.35%
COLTON 53 SCHOOL	5,216,971,105	COLTON SD	7,146,540,000	-36.99%
COOS BAY 9 SCHOOL	5,479,472,976	COOS BAY SD	12,146,000,000	-121.66%
BANKS 13 SCHOOL	1,536,232,855	BANKS SD	3,687,830,000	-140.06%

Totals	2,499,678,336,589		2,535,234,800,800	-1.42%

In Extract, not in Framework		In Framework, not in ORMAP	
CRANE UH1J SCHOOL	261,518,929,039		
		KLAMATH COUNTY SD	169,076,000,000
		KLAMATH FALLS CITY SCHOOLS	2,068,050,000

Appendix B: Quantitative Comparison of Extraction Results for City Limits

Extracted Name	Extract_Area	FRAMEWORK NAME	Framework sq feet	Diff Pct	Notes
		Klamath Falls	574,328,196		Klamath County not included in this project
		Dunes City	96,073,829		Missing due to Zero Tax Rate?
		Irrigon	44,986,436		Missing due to gaps in Morrow Co table?
		Lonerock	28,612,280		Missing due to Zero Tax Rate?
		Bonanza	22,829,212		Klamath County
		Chiloquin	21,209,898		Klamath County
		Unity	17,894,072		Missing due to Zero Tax Rate?
		Malin	13,940,914		Klamath County
		Merrill	12,240,901		Klamath County
		Granite	10,569,031		Missing due to Zero Tax Rate?
		Greenhorn	2,409,967		Missing due to Zero Tax Rate?
DAMASCUS CITY	416,190,413				No longer a City, but now a City again?
NEWBERG CITY	201,687,450	Newberg	163,032,214	19.17%	Extraction results included Dundee as part of Newberg
MOSIER CITY	21,665,011	Mosier	17,514,577	19.16%	
RUFUS CITY	47,837,779	Rufus	38,877,095	18.73%	
STANFIELD CITY	50,426,538	Stanfield	43,331,482	14.07%	
CASCADE LOCKS CITY	94,128,158	Cascade Locks	82,944,979	11.88%	
GEARHART CITY	57,335,638	Gearhart	51,090,640	10.89%	
MANZANITA CITY	25,715,765	Manzanita	22,954,190	10.74%	
ELKTON CITY	6,153,796	Elkton	5,644,119	8.28%	
YACHATS CITY	27,707,927	Yachats	25,746,901	7.08%	
FAIRVIEW CITY	104,462,635	Fairview	98,365,837	5.84%	
PORT ORFORD CITY	47,401,882	Port Orford	44,865,242	5.35%	
YONCALLA CITY	19,205,014	Yoncalla	18,183,525	5.32%	
OAKRIDGE CITY	61,112,847	Oakridge	58,047,570	5.02%	Area outside UGB but in City Limits
MONUMENT CITY	15,348,111	Monument	14,615,914	4.77%	
SEASIDE CITY	116,825,350	Seaside	111,482,149	4.57%	
LONG CREEK CITY	29,468,107	Long Creek	28,142,078	4.50%	
NYSSA CITY	44,975,934	Nyssa	43,166,862	4.02%	
CANNON BEACH CITY	43,561,765	Cannon Beach	42,179,343	3.17%	
MOUNT ANGEL CITY	30,368,513	Mt. Angel	29,475,238	2.94%	
NORTH PLAINS CITY	30,373,258	North Plains	29,549,836	2.71%	
HELIX CITY	3,647,528	Helix	3,549,992	2.67%	
MOLALLA CITY	67,253,843	Molalla	65,654,130	2.38%	
CLATSKANIE CITY	35,467,613	Clatskanie	34,647,348	2.31%	
LEXINGTON CITY	12,769,853	Lexington	12,484,087	2.24%	
DUNDEE CITY	39,319,207	Dundee	38,500,771	2.08%	
LOWELL CITY	32,344,271	Lowell	31,685,029	2.04%	

VERNONIA CITY	47,268,593	Vernonia	46,378,253	1.88%	Area outside UGB but in City Limits
COLUMBIA CITY	35,056,767	Columbia City	34,414,381	1.83%	
RIDDLE CITY	17,465,038	Riddle	17,156,913	1.76%	
SHERIDAN CITY	55,832,869	Sheridan	54,895,830	1.68%	
PHOENIX CITY	38,817,159	Phoenix	38,169,321	1.67%	
GATES CITY	17,964,309	Gates	17,668,428	1.65%	
RIVERGROVE CITY	5,146,838	Rivergrove	5,068,962	1.51%	
MORO CITY	13,931,761	Moro	13,725,421	1.48%	
REEDSPORT CITY	63,297,765	Reedsport	62,386,423	1.44%	
HERMISTON CITY	226,979,391	Hermiston	223,786,456	1.41%	
BUTTE FALLS CITY	10,874,919	Butte Falls	10,731,336	1.32%	
WALLOWA CITY	17,405,113	Wallowa	17,186,843	1.25%	
ISLAND CITY	28,799,165	Island City	28,454,757	1.20%	
GOLD HILL CITY	20,402,011	Gold Hill	20,160,155	1.19%	
ASHLAND CITY	184,945,886	Ashland	182,845,045	1.14%	
RAINIER CITY	142,974,537	Rainier	141,364,816	1.13%	
LAKEVIEW CITY	69,039,995	Lakeview	68,314,502	1.05%	
CORVALLIS CITY	402,382,623	Corvallis	398,196,905	1.04%	
DURHAM CITY	11,475,246	Durham	11,356,803	1.03%	
LEBANON CITY	194,381,308	Lebanon	192,676,570	0.88%	
ROCKAWAY CITY	43,645,766	Rockaway Beach	43,280,904	0.84%	
DUFUR CITY	16,403,432	Dufur	16,277,793	0.77%	
FOSSIL CITY	22,005,297	Fossil	21,838,084	0.76%	
ECHO CITY	16,160,460	Echo	16,038,158	0.76%	
COQUILLE CITY	76,534,760	Coquille	75,981,396	0.72%	
CAVE JUNCTION CITY	49,736,635	Cave Junction	49,385,864	0.71%	
ONTARIO CITY	161,997,202	Ontario	160,919,147	0.67%	
NORTH POWDER CITY	17,521,893	North Powder	17,427,472	0.54%	
ST. PAUL CITY	8,199,227	St. Paul	8,155,126	0.54%	
MYRTLE POINT CITY	44,689,340	Myrtle Point	44,450,533	0.53%	
SCIO CITY	11,532,591	Scio	11,472,008	0.53%	
WINSTON CITY	76,082,106	Winston	75,694,211	0.51%	
LAKE OSWEGO CITY	319,850,071	Lake Oswego	318,344,449	0.47%	
PHILOMATH CITY	58,564,007	Philomath	58,322,252	0.41%	
COBURG CITY	28,302,806	Coburg	28,188,497	0.40%	
MAUPIN CITY	40,362,086	Maupin	40,209,345	0.38%	
SPRAY CITY	7,641,643	Spray	7,613,595	0.37%	
REDMOND CITY	458,812,843	Redmond	457,247,190	0.34%	
EUGENE CITY	1,232,772,577	Eugene	1,228,570,324	0.34%	
OAKLAND CITY	20,632,757	Oakland	20,565,685	0.33%	
DRAIN CITY	17,374,041	Drain	17,318,908	0.32%	

YAMHILL CITY	13,626,609	Yamhill	13,585,243	0.30%	
CONDON CITY	22,396,312	Condon	22,331,018	0.29%	
PILOT ROCK CITY	41,358,039	Pilot Rock	41,243,515	0.28%	
AURORA CITY	13,611,019	Aurora	13,574,813	0.27%	
LINCOLN CITY	167,274,136	Lincoln City	166,883,441	0.23%	
KEIZER CITY	202,843,166	Keizer	202,393,228	0.22%	
TILLAMOOK CITY	51,893,802	Tillamook	51,781,366	0.22%	
CITY JOHNSON	1,892,581	Johnson City	1,888,590	0.21%	
METOLIUS CITY	13,337,029	Metolius	13,310,348	0.20%	
ADAIR VILLAGE CITY	12,032,590	Adair Village	12,008,665	0.20%	
GERVAIS CITY	10,914,462	Gervais	10,893,778	0.19%	
SISTERS CITY	53,451,110	Sisters	53,351,764	0.19%	
BARLOW CITY	1,444,058	Barlow	1,441,575	0.17%	
MONMOUTH CITY	62,441,465	Monmouth	62,352,308	0.14%	
CULVER CITY	19,247,236	Culver	19,220,723	0.14%	
BAKER CITY	201,245,189	Baker City	201,005,709	0.12%	
UKIAH CITY	6,177,024	Ukiah	6,169,730	0.12%	
CANYONVILLE CITY	29,031,278	Canyonville	29,001,366	0.10%	
MEDFORD CITY	718,439,173	Medford	717,721,705	0.10%	
WOODBURN CITY	149,115,932	Woodburn	148,972,668	0.10%	
NEHALEM CITY	8,248,933	Nehalem	8,241,457	0.09%	
PORTLAND CITY	4,048,682,939	Portland	4,045,119,905	0.09%	
ALBANY CITY	494,150,832	Albany	493,730,826	0.08%	
CRESWELL CITY	48,117,147	Creswell	48,081,260	0.07%	
PRAIRIE CITY	26,804,193	Prairie City	26,784,826	0.07%	
BEND CITY	930,091,331	Bend	929,767,084	0.03%	
MILTON-FREEWATER CITY	54,500,693	Milton-Freewater	54,481,824	0.03%	
SODAVILLE CITY	8,459,900	Sodaville	8,457,382	0.03%	
ADAMS CITY	10,047,086	Adams	10,044,558	0.03%	
SALEM CITY	1,369,321,736	Salem	1,369,005,699	0.02%	
HALFWAY CITY	10,414,974	Halfway	10,412,659	0.02%	
SCAPPOOSE CITY	91,603,197	Scappoose	91,584,546	0.02%	
HALSEY CITY	15,746,551	Halsey	15,744,721	0.01%	
HARRISBURG CITY	40,183,674	Harrisburg	40,179,808	0.01%	
LA GRANDE CITY	128,323,832	La Grande	128,312,096	0.01%	
VENETA CITY	71,420,631	Veneta	71,414,663	0.01%	
POWERS CITY	18,245,078	Powers	18,243,652	0.01%	
SHANIKO CITY	13,861,890	Shaniko	13,861,320	0.00%	
HUNTINGTON CITY	20,476,675	Huntington	20,476,239	0.00%	
WATERLOO CITY	3,424,464	Waterloo	3,424,439	0.00%	
ADRIAN CITY	6,791,043	Adrian	6,791,043	0.00%	

SENECA CITY	22,717,254	Seneca	22,717,798	0.00%	
CANYON CITY	38,822,773	Canyon City	38,825,665	-0.01%	
JACKSONVILLE CITY	52,734,466	Jacksonville	52,740,157	-0.01%	
HUBBARD CITY	19,701,555	Hubbard	19,703,980	-0.01%	
TANGENT CITY	104,939,283	Tangent	104,961,050	-0.02%	
CENTRAL POINT CITY	107,036,371	Central Point	107,071,293	-0.03%	
SWEET HOME CITY	161,582,100	Sweet Home	161,643,774	-0.04%	
SUBLIMITY CITY	25,706,648	Sublimity	25,722,804	-0.06%	
FALLS CITY	33,453,333	Falls City	33,481,057	-0.08%	
HAINES CITY	21,051,886	Haines	21,070,995	-0.09%	
SUMPTER CITY	60,735,771	Sumpter	60,792,715	-0.09%	
ANTELOPE CITY	12,842,583	Antelope	12,854,692	-0.09%	
TOLEDO CITY	64,179,933	Toledo	64,240,710	-0.09%	
UNION CITY	69,606,541	Union	69,674,548	-0.10%	
LAFAYETTE CITY	24,322,145	Lafayette	24,346,295	-0.10%	
FOREST GROVE CITY	166,589,521	Forest Grove	166,764,546	-0.11%	
ROGUE RIVER CITY	26,592,765	Rogue River	26,622,910	-0.11%	
TROUTDALE CITY	167,838,968	Troutdale	168,034,978	-0.12%	
BEAVERTON CITY	546,903,809	Beaverton	547,547,698	-0.12%	
SUTHERLIN CITY	176,659,579	Sutherlin	176,869,448	-0.12%	
SHADY COVE CITY	56,471,186	Shady Cove	56,539,227	-0.12%	
DALLAS CITY	135,387,990	Dallas	135,561,360	-0.13%	
JORDAN VALLEY CITY	57,736,989	Jordan Valley	57,813,142	-0.13%	
GRESHAM CITY	655,270,518	Gresham	656,168,743	-0.14%	
WHEELER CITY	14,280,763	Wheeler	14,300,537	-0.14%	
TUALATIN CITY	226,993,161	Tualatin	227,333,401	-0.15%	
SILETZ CITY	17,569,235	Siletz	17,595,742	-0.15%	
FLORENCE CITY	164,207,177	Florence	164,540,546	-0.20%	
BURNS CITY	99,015,020	Burns	99,217,313	-0.20%	
ROSEBURG CITY	303,798,185	Roseburg	304,519,678	-0.24%	
HEPPNER CITY	34,159,925	Heppner	34,249,383	-0.26%	
MONROE CITY	13,217,454	Monroe	13,254,570	-0.28%	
CANBY CITY	124,504,721	Canby	124,865,612	-0.29%	
HINES CITY	58,804,725	Hines	58,982,880	-0.30%	
STAYTON CITY	84,167,370	Stayton	84,436,138	-0.32%	
INDEPENDENCE CITY	82,586,689	Independence	82,862,071	-0.33%	
COVE CITY	22,299,912	Cove	22,377,224	-0.35%	
TURNER CITY	40,478,526	Turner	40,627,816	-0.37%	
GLADSTONE CITY	69,115,209	Gladstone	69,380,002	-0.38%	
TALENT CITY	36,297,369	Talent	36,440,551	-0.39%	
GLENDALE CITY	10,919,870	Glendale	10,963,229	-0.40%	

AUMSVILLE CITY	30,540,955	Aumsville	30,677,047	-0.45%	
SPRINGFIELD CITY	441,444,635	Springfield	443,488,423	-0.46%	
LYONS CITY	24,298,304	Lyons	24,411,717	-0.47%	
JEFFERSON CITY	22,178,353	Jefferson	22,291,713	-0.51%	
ESTACADA CITY	62,539,718	Estacada	62,887,781	-0.56%	
WARRENTON CITY	492,115,566	Warrenton	495,000,319	-0.59%	
MAYWOOD PARK CITY	4,653,227	Maywood Park	4,681,635	-0.61%	
DONALD CITY	7,791,922	Donald	7,840,425	-0.62%	
WEST LINN CITY	224,487,038	West Linn	225,942,574	-0.65%	
VALE CITY	31,527,856	Vale	31,736,557	-0.66%	
EAGLE POINT CITY	81,426,566	Eagle Point	82,024,114	-0.73%	
IONE CITY	18,774,449	Ione	18,916,010	-0.75%	
WASCO CITY	28,005,456	Wasco	28,223,080	-0.78%	
TIGARD CITY	351,400,015	Tigard	354,363,812	-0.84%	
DEPOE BAY CITY	49,035,016	Depoe Bay	49,457,123	-0.86%	
THE DALLES CITY	191,753,550	The Dalles	193,470,548	-0.90%	
MYRTLE CREEK CITY	68,539,586	Myrtle Creek	69,170,570	-0.92%	
ELGIN CITY	26,813,521	Elgin	27,061,550	-0.93%	
SANDY CITY	93,114,945	Sandy	93,977,890	-0.93%	
ENTERPRISE CITY	41,197,996	Enterprise	41,604,802	-0.99%	
WEST FIR CITY	8,636,840	Westfir	8,733,352	-1.12%	
MCMINNVILLE CITY	290,573,949	McMinnville	293,827,529	-1.12%	
JUNCTION CITY	91,605,317	Junction City	92,702,069	-1.20%	
PENDLETON CITY	318,658,137	Pendleton	322,659,364	-1.26%	
JOSEPH CITY	24,700,470	Joseph	25,011,780	-1.26%	
GASTON CITY	9,509,710	Gaston	9,634,432	-1.31%	
SILVERTON CITY	96,618,507	Silverton	97,885,898	-1.31%	
SUMMERVILLE CITY	7,165,816	Summerville	7,261,520	-1.34%	
WOOD VILLAGE CITY	26,190,463	Wood Village	26,544,039	-1.35%	
MILLERSBURG CITY	124,281,042	Millersburg	126,183,608	-1.53%	
IMBLER CITY	5,922,712	Imbler	6,013,420	-1.53%	
RICHLAND CITY	2,736,332	Richland	2,778,940	-1.56%	
ATHENA CITY	14,768,192	Athena	15,000,456	-1.57%	
MITCHELL CITY	35,047,312	Mitchell	35,606,852	-1.60%	
DETROIT CITY	26,196,108	Detroit	26,660,018	-1.77%	
LAKESIDE CITY	61,133,492	Lakeside	62,397,230	-2.07%	
COTTAGE GROVE CITY	104,474,495	Cottage Grove	106,649,738	-2.08%	
PAISLEY CITY	11,688,020	Paisley	11,939,097	-2.15%	
OREGON CITY	275,623,623	Oregon City	281,731,088	-2.22%	
PRESCOTT CITY	2,044,999	Prescott	2,095,752	-2.48%	
ASTORIA CITY	277,202,050	Astoria	284,243,880	-2.54%	

SCOTTS MILLS CITY	9,968,933	Scotts Mills	10,225,809	-2.58%	
GRASS VALLEY CITY	13,824,545	Grass Valley	14,217,559	-2.84%	
DAYVILLE CITY	13,006,455	Dayville	13,395,203	-2.99%	
HOOD RIVER CITY	91,701,833	Hood River	94,607,078	-3.17%	
CARLTON CITY	23,905,504	Carlton	24,685,255	-3.26%	
UMATILLA CITY	139,850,561	Umatilla	144,416,876	-3.27%	
PRINEVILLE CITY	325,657,341	Prineville	336,696,040	-3.39%	
SHERWOOD CITY	120,848,670	Sherwood	124,994,084	-3.43%	
HILLSBORO CITY	681,679,572	Hillsboro	706,493,843	-3.64%	
WILSONVILLE CITY	203,972,882	Wilsonville	211,427,855	-3.65%	
COOS BAY CITY	431,866,647	Coos Bay	449,002,677	-3.97%	
WESTON CITY	14,875,630	Weston	15,551,502	-4.54%	
BROWNSVILLE CITY	35,696,502	Brownsville	37,329,839	-4.58%	
MT. VERNON CITY	18,396,233	Mt. Vernon	19,248,051	-4.63%	
MILL CITY	22,923,102	Mill City	24,011,089	-4.75%	
WILLAMINA CITY	25,205,292	Willamina	26,406,262	-4.76%	
AMITY CITY	16,728,591	Amity	17,545,797	-4.89%	
NEWPORT CITY	291,100,612	Newport	305,347,549	-4.89%	
BANDON CITY	84,567,099	Bandon	88,960,027	-5.19%	
BROOKINGS CITY	110,936,601	Brookings	116,939,923	-5.41%	
CORNELIUS CITY	59,937,517	Cornelius	63,287,724	-5.59%	
GOLD BEACH CITY	69,385,913	Gold Beach	74,046,805	-6.72%	
BANKS CITY	19,430,610	Banks	20,818,723	-7.14%	
HAPPY VALLEY CITY	282,813,595	Happy Valley	307,076,407	-8.58%	
MILWAUKIE CITY	129,757,485	Milwaukie	141,457,624	-9.02%	
IDANHA CITY	21,315,576	Idanha	23,479,765	-10.15%	
LOSTINE CITY	7,226,714	Lostine	7,979,979	-10.42%	
WALDPORT CITY	77,502,562	Waldport	85,619,764	-10.47%	
DAYTON CITY	20,951,640	Dayton	23,174,249	-10.61%	
KING CITY	19,561,662	King City	21,849,510	-11.70%	
MADRAS CITY	147,539,378	Madras	166,895,014	-13.12%	
JOHN DAY CITY	60,271,992	John Day	69,043,857	-14.55%	
ARLINGTON CITY	79,269,667	Arlington	92,906,475	-17.20%	
ST. HELENS CITY	135,177,376	St. Helens	162,441,137	-20.17%	
NORTH BEND CITY	117,574,420	North Bend	141,780,912	-20.59%	
GRANTS PASS CITY	267,483,536	Grants Pass	325,849,547	-21.82%	
GARIBALDI CITY	27,411,168	Garibaldi	38,140,455	-39.14%	Water area not included in TCAs
BAY CITY	37,543,139	Bay City	54,647,782	-45.56%	Water area not included in TCAs
LA PINE CITY	41,264,753	La Pine	194,669,670	-371.76%	
BOARDMAN CITY	14,749,505	Boardman	112,562,441	-663.16%	Missing area due to gaps in Morrow Co table?