

2016 DOUGLAS COUNTY PROPERTY ASSESSMENT STUDY





WILDROSE Appraisal Incorporated Audit Division



September 15, 2016

Mr. Mike Mauer Director of Research Colorado Legislative Council Room 029, State Capitol Building Denver, Colorado 80203

RE: Final Report for the 2016 Colorado Property Assessment Study

Dear Mr. Mauer:

Wildrose Appraisal Inc.-Audit Division is pleased to submit the Final Reports for the 2016 Colorado Property Assessment Study.

These reports are the result of two analyses: A procedural audit and a statistical audit.

The procedural audit examines all classes of property. It specifically looks at how the assessor develops economic areas, confirms and qualifies sales, develops time adjustments and performs periodic physical property inspections. The audit reviews the procedures for determining subdivision absorption and subdivision discounting. Valuation methodology is examined for residential properties and commercial properties. Procedures are reviewed for producing mines, oil and gas leaseholds and lands producing, producing coal mines, producing earth and stone products, severed mineral interests, and non-producing patented mining claims.

Statistical audits are performed on vacant land, residential properties, commercial/industrial properties and agricultural land. A statistical analysis is performed for personal property compliance on the eleven largest counties: Adams, Arapahoe, Boulder, Denver, Douglas, El Paso, Jefferson, Larimer, Mesa, Pueblo and Weld. The remaining counties receive a personal property procedural study.

Wildrose Appraisal Inc. – Audit Division appreciates the opportunity to be of service to the State of Colorado. Please contact us with any questions or concerns.

Harry J. Hullon

Harry J. Fuller Project Manager Wildrose Appraisal Inc. – Audit Division



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The State Board of Equalization (SBOE) reviews assessments for conformance to the Constitution. The SBOE will order revaluations for counties whose valuations do not reflect the proper valuation period level of value.

The statutory basis for the audit is found in C.R.S. 39-1-104(16)(a)(b) and (c).

The legislative council sets forth two criteria that are the focus of the audit group:

To determine whether each county assessor is applying correctly the constitutional and statutory provisions, compliance requirements of the State Board of Equalization, and the manuals published by the State Property Tax Administrator to arrive at the actual value of each class of property.

To determine if each assessor is applying correctly the provisions of law to the actual values when arriving at valuations for assessment of all locally valued properties subject to the property tax.

The property assessment audit conducts a twopart analysis: A procedural analysis and a statistical analysis. The procedural analysis includes all classes of property and specifically looks at how the assessor develops economic areas, confirms and qualifies sales, and develops time adjustments. The audit also examines the procedures for adequately discovering, classifying and valuing agricultural outbuildings, discovering subdivision build-out subdivision and discounting procedures. Valuation methodology for vacant land, improved residential properties commercial and properties is examined. Procedures for producing mines, oil and gas leaseholds and lands producing, producing coal mines, producing earth and stone products, severed mineral interests and non-producing patented mining claims are also reviewed.

Statistical analysis is performed on vacant land, residential properties, commercial/industrial properties, agricultural land, and personal property. The statistical study results are compared with State Board of Equalization compliance requirements and the manuals published by the State Property Tax Administrator.

Wildrose Audit has completed the Property Assessment Study for 2016 and is pleased to report its findings for Douglas County in the following report.



REGIONAL/HISTORICAL SKETCH OF DOUGLAS COUNTY

Regional Information

Douglas County is located in the Front Range region of Colorado. The Colorado Front Range is a colloquial geographic term for the populated areas of the State that are just east of the foothills of the Front Range. It includes Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, El Paso, Jefferson, Larimer, Pueblo, and Weld counties.





Historical Information

Douglas County had an estimated population of approximately 314,638 people with 339.7 people per square mile, according to the U.S. Census Bureau's 2014 estimated census data. This represents a 10.2 percent change from April 1, 2010 to July 1, 2014.

Douglas County was one of the original 17 counties created in the Colorado Territory by Colorado Territorial Legislature the on November 1, 1861. The county was named in honor of U.S. Senator Stephen A. Douglas of Illinois, who died five months before the county was created. The county seat was originally Franktown, but was moved to California Ranch in 1863, and then to Castle Rock in 1874. Although the county's boundaries originally extended eastward to the Kansas state border, in 1874 most of the eastern portion of the county became part of Elbert County.

Douglas County is the eighth most populous of the 64 counties of the State of Colorado. The county, sometimes nicknamed Dougco, is located midway between Colorado's two largest cities: Denver and Colorado Springs. The United States Census Bureau estimates that the county population was 280,621 in 2008, a 59.7% increase since U.S. Census 2000, making Douglas County one of the fastest growing counties in the United States. The county seat is Castle Rock, named after a small butte just north of the town.

Douglas County is lightly wooded, mostly with ponderosa pine, with broken terrain characterized by mesas and small streams. Cherry Creek and Plum Creek rise in Douglas County and flow north toward Denver and into the South Platte River. Both were subject to flash flooding in the past, Plum Creek being partially responsible for the Denver flood of 1965. Cherry Creek is now dammed. (*Wikipedia.org*)



RATIO ANALYSIS

Methodology

All significant classes of properties were analyzed. Sales were collected for each property class over the appropriate sale period, which was typically defined as the 18-month period between January 2013 and June 2014. Counties with less than 30 sales typically extended the sale period back up to 5 years prior to June 30, 2014 in 6-month increments. If there were still fewer than 30 sales, supplemental appraisals were performed and treated as proxy sales. Residential sales for all counties using this method totaled at least 30 per county. For commercial sales, the total number analyzed was allowed, in some cases, to fall below 30. There were no sale quantity issues for counties requiring vacant land analysis or condominium analysis. Although it was required that we examine the median and coefficient of dispersion for all counties, we also calculated the weighted mean and pricerelated differential for each class of property. Counties were not passed or failed by these

latter measures, but were counseled if there were anomalies noted during our analysis. Qualified sales were based on the qualification code used by each county, which were typically coded as either "Q" or "C." The ratio analysis included all sales. The data was trimmed for counties with obvious outliers using IAAO standards for data analysis. In every case, we examined the loss in data from trimming to ensure that only true outliers were excluded. Any county with a significant portion of sales excluded by this trimming method was examined further. No county was allowed to pass the audit if more than 5% of the sales were "lost" because of trimming. For the largest 11 counties, the residential ratio statistics were broken down by economic area as well.

Conclusions

For this final analysis report, the minimum acceptable statistical standards allowed by the State Board of Equalization are:

ALLOWABLE STANDARDS RATIO GRID					
Property Class	Unweighted Median Ratio	Coefficient of Dispersion			
Commercial/Industrial	Between .95-1.05	Less than 20.99			
Condominium	Between .95-1.05	Less than 15.99			
Single Family	Between .95-1.05	Less than 15.99			
Vacant Land	Between .95-1.05	Less than 20.99			



The results for Douglas County are:

Douglas County Ratio Grid								
Number of Unweighted Price Coefficient Qualified Median Related of Time Tree Property Class Sales Ratio Differential Dispersion Analys								
Commercial/Industrial	118	0.962	1.153	19.6	Compliant			
Condominium	N/A	N/A	N/A	N/A	N/A			
Single Family	13,455	0.975	1.009	5.9	Compliant			
Vacant Land	373	1.000	1.161	19	Compliant			

Ratio Statistics for CURRTOT / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion
1	.975	1.007	.056
2	.978	1.008	.056
3	.972	1.014	.068
4	.975	1.010	.060
5	.941	1.013	.078
6	.951	1.014	.103
7	1.003	1.178	.316
Overall	.975	1.009	.059

After applying the above described methodologies, it is concluded from the sales ratios that Douglas County is in compliance with SBOE, DPT, and Colorado State Statute valuation guidelines.

Recommendations



TIME TRENDING VERIFICATION

Methodology

While we recommend that counties use the inverted ratio regression analysis method to account for market (time) trending, some counties have used other IAAO-approved methods, such as the weighted monthly median approach. We are not auditing the methods used, but rather the results of the methods used. Given this range of methodologies used to account for market trending, we concluded that the best validation method was to examine the sale ratios for each class across the appropriate sale period. To be specific, if a county has considered and adjusted correctly for market trending, then the sale ratios should remain stable (i.e. flat) across the sale period. If a residual market trend is detected, then the county may or may not have addressed market

trending adequately, and a further examination is warranted. This validation method also considers the number of sales and the length of the sale period. Counties with few sales across the sale period were carefully examined to determine if the statistical results were valid.

Conclusions

After verification and analysis, it has been determined that Douglas County has complied with the statutory requirements to analyze the effects of time on value in their county. Douglas County has also satisfactorily applied the results of their time trending analysis to arrive at the time adjusted sales price (TASP).

Recommendations



SOLD/UNSOLD ANALYSIS

Methodology

Douglas County was tested for the equal treatment of sold and unsold properties to ensure that "sales chasing" has not occurred. The auditors employed a multi-step process to determine if sold and unsold properties were valued in a consistent manner.

We test the hypothesis that the assessor has valued unsold properties consistent with what is observed with the sold properties based on several units of comparison and tests. The units of comparison include the actual value per square foot and the change in value from the previous base year period to the current base year. The first test compares the actual value per square foot between sold and unsold properties by class. The median and mean value per square foot is compared and tested for any significant difference. This is tested using non-parametric methods, such as the Mann-Whitney test for differences in the distributions or medians between sold and unsold groups. It is also examined graphically and from an appraisal perspective. Data can be stratified based on location and subclass. The second test compares the difference in the median change in value from the previous base year to the current base year between sold and unsold properties by class. The same combination of non-parametric and appraisal testing is used as with the first test. A third test employing a valuation model testing a sold/unsold binary variable while controlling for property attributes such as location, size, age and other attributes. The model determines if the sold/unsold variable is statistically and empirically significant. If all three tests indicate a significant difference between sold and unsold properties for a given class, the Auditor may meet with the county to determine if sale chasing is actually occurring,

or if there are other explanations for the observed difference.

If the unsold properties have a higher median value per square foot than the sold properties, or if the median change in value is greater for the unsold properties than the sold properties, the analysis is stopped and the county is concluded to be in compliance with sold and unsold guidelines. All sold and unsold properties in a given class are first tested, although properties with extreme unit values or percent changes can be trimmed to stabilize the analysis. The median is the primary comparison metric, although the mean can also be used as a comparison metric if the distribution supports that type of measure of central tendency.

The first test (unit value method) is applied to both residential and commercial/industrial sold and unsold properties. The second test is applied to sold and unsold vacant land properties. The second test (change in value method) is also applied to residential or commercial sold and unsold properties if the first test results in a significant difference observed and/or tested between sold and unsold properties. The third test (valuation modeling) is used in instances where the results from the first two tests indicate a significant difference between sold and unsold properties. It can also be used when the number of sold and unsold properties is so large that the nonparametric testing is indicating a false rejection of the hypothesis that there is no difference between the sold and unsold property values.

These tests were supported by both tabular and graphics presentations, along with written documentation explaining the methodology used.



Sold/Unsold Results				
Property Class	Results			
Commercial/Industrial	Compliant			
Condominium	N/A			
Single Family	Compliant			
Vacant Land	Compliant			

Conclusions

Recommendations

After applying the above described methodologies, it is concluded that Douglas County is reasonably treating its sold and unsold properties in the same manner.



AGRICULTURAL LAND STUDY



Agricultural Land

County records were reviewed to determine major land categories such as irrigated farm, dry farm, meadow hay, grazing and other In addition, county records were lands. reviewed in order to determine if: Aerial photographs are available and are being used; soil conservation guidelines have been used to classify lands based on productivity; crop rotations have been documented; typical commodities and yields have been determined; orchard lands have been properly classified and valued; expenses reflect a ten year average and are typical landlord expenses; grazing lands have been properly classified and valued; the number of acres in each class and subclass have been determined; the capitalization rate was properly applied. Also, documentation was required for the valuation methods used and developed any locally yields, carrying capacities, and expenses. Records were also checked to ensure that the commodity prices and expenses, furnished by the Property Tax Administrator (PTA), were applied properly.

(See Assessor Reference Library Volume 3 Chapter 5.)

Conclusions

An analysis of the agricultural land data indicates an acceptable appraisal of this property type. Directives, commodity prices and expenses provided by the PTA were properly applied. County yields compared favorably to those published by Colorado Agricultural Statistics. Expenses used by the county were allowable expenses and were in an acceptable range. Grazing lands carrying capacities were in an acceptable range. The data analyzed resulted in the following ratios:



	Douglas County Agricultural Land Ratio Grid						
Abstract Code	Land Class	Number Of Acres	County Value Per Acre T	County Assessed Total Value	WRA Total Value	Ratio	
4107	Sprinkler	1,713	58.39	100,025	103,511	0.97	
4117	Flood	1,095	96.10	105,226	108,194	0.97	
4127	Dry Farm	17,777	53.80	956,316	965,849	0.99	
4137	Meadow Hay	1,447	122.63	177,448	177,448	1.00	
4147	Grazing	168,910	11.16	1,884,518	1,884,518	1.00	
4177	Forest	6,983	10.84	75,675	75,675	1.00	
4167	Waste	292	1.99	580	580	1.00	
Total/Avg		198,217	16.65	3,299,788	3,315,775	1.00	

Recommendations

None

Agricultural Outbuildings

Methodology

Data was collected and reviewed to determine if the guidelines found in the Assessor's Reference Library (ARL) Volume 3, pages 5.74 through 5.77 were being followed.

Conclusions

Douglas County has substantially complied with the procedures provided by the Division

of Property Taxation for the valuation of agricultural outbuildings.

Recommendations



Agricultural Land Under Improvements

Methodology

Data was collected and reviewed to determine if the guidelines found in the Assessor's Reference Library (ARL) Volume 3, pages 5.19 and 5.20 were being followed.

Conclusions

Douglas County has used the following methods to discover land under a residential improvement on a farm or ranch that is determined to be not integral under 39-1-102, C.R.S.:

- Questionnaires
- Field Inspections
- Phone Interviews
- In-Person Interviews with Owners/Tenants
- Written Correspondence other than Questionnaire
- Personal Knowledge of Occupants at Assessment Date
- Aerial Photography/Pictometry

- Appeal reviews
- Ag Applications

Douglas County has used the following methods to discover the land area under a residential improvement that is determined to be not integral under 39-1-102, C.R.S.:

- Property Record Card Analysis
- Field Inspections
- Personal Knowledge of Occupants at Assessment Date

Douglas County has substantially complied with the procedures provided by the Division of Property Taxation for the valuation of land under residential improvements that may or may not be integral to an agricultural operation.

Recommendations



SALES VERIFICATION

According to Colorado Revised Statutes:

A representative body of sales is required when considering the market approach to appraisal.

(8) In any case in which sales prices of comparable properties within any class or subclass are utilized when considering the market approach to appraisal in the determination of actual value of any taxable property, the following limitations and conditions shall apply:

(a)(1) Use of the market approach shall require a representative body of sales, including sales by a lender or government, sufficient to set a pattern, and appraisals shall reflect due consideration of the degree of comparability of sales, including the extent of similarities and dissimilarities among properties that are compared for assessment purposes. In order to obtain a reasonable sample and to reduce sudden price changes or fluctuations, all sales shall be included in the sample that reasonably reflect a true or typical sales price during the period specified in section 39-1-104 (10.2). Sales of personal property exempt pursuant to the provisions of sections 39-3-102, 39-3-103, and 39-3-119 to 39-3-122 shall not be included in any such sample.

(b) Each such sale included in the sample shall be coded to indicate a typical, negotiated sale, as screened and verified by the assessor. (39-1-103, C.R.S.)

The assessor is required to use sales of real property only in the valuation process.

(8)(f) Such true and typical sales shall include only those sales which have been determined on an individual basis to reflect the selling price of the real property only or which have been adjusted on an individual basis to reflect the selling price of the real property only. (39-1-103, C.R.S.) Part of the Property Assessment Study is the sales verification analysis. WRA has used the above-cited statutes as a guide in our study of the county's procedures and practices for verifying sales.

WRA reviewed the sales verification procedures in 2016 for Douglas County. This study was conducted by checking selected sales from the master sales list for the current valuation period. Specifically WRA selected 60 sales listed as unqualified.

All of the sales in the unqualified sales sample had reasons that were clear and supportable.

For residential, commercial, and vacant land sales with considerations over \$500, the contractor has examined and reported the ratio of qualified sales to total sales by class and performed the following analyses of unqualified sales:

The contractor has examined the manner in which sales have been classified as qualified or unqualified, including a listing of each step in the sales verification process, any adjustment procedures, and the county official responsible for making the final decision on qualification.

The contractor has reviewed with the assessor any analysis indicating that sales data are inadequate, fail to reflect typical properties, or have been disqualified for insufficient cause. In addition, the contractor has reviewed the disqualified sales by assigned code. If there appears to be any inconsistency in the coding, the contractor has



conducted further analysis to determine if the sales included in that code have been assigned appropriately.

Conclusions

Douglas County appears to be doing a good job of verifying their sales. WRA agreed with the

county's reason for disqualifying each of the sales selected in the sample. There are no recommendations or suggestions.

Recommendations



ECONOMIC AREA REVIEW AND EVALUATION

Methodology

Douglas County has submitted a written narrative describing the economic areas that make up the county's market areas. Douglas County has also submitted a map illustrating these areas. Each of these narratives have been read and analyzed for logic and appraisal sensibility. The maps were also compared to the narrative for consistency between the written description and the map.

Conclusions

After review and analysis, it has been determined that Douglas County has

adequately identified homogeneous economic areas comprised of smaller neighborhoods. Each economic area defined is equally subject to a set of economic forces that impact the value of the properties within that geographic area and this has been adequately addressed. Each economic area defined adequately delineates an area that will give "similar values for similar properties in similar areas."

Recommendations



NATURAL RESOURCES

Earth and Stone Products

Methodology

Under the guidelines of the Assessor's Reference Library (ARL), Volume 3, Natural Resource Valuation Procedures, the income approach was applied to determine value for production of earth and stone products. The number of tons was multiplied by an economic royalty rate determined by the Division of Property Taxation to determine income. The income was multiplied by a recommended Hoskold factor to determine the actual value. The Hoskold factor is determined by the life of the reserves or the lease. Value is based on two variables: life and tonnage. The operator determines these since there is no other means to obtain production data through any state or private agency.

Conclusions

The County has applied the correct formulas and state guidelines to earth and stone production.

Recommendations



VACANT LAND

Subdivision Discounting

Subdivisions were reviewed in 2016 in Douglas County. The review showed that subdivisions were discounted pursuant to the Colorado Revised Statutes in Article 39-1-103 (14) and by applying the recommended methodology in ARL Vol 3, Chap 4. Subdivision Discounting in the intervening year was accomplished by reducing the absorption period by one year.

Conclusions

Douglas County has implemented proper procedures to adequately estimate absorption periods, discount rates, and lot values for qualifying subdivisions.

Recommendations



POSSESSORY INTEREST PROPERTIES

Possessory Interest

Possessory interest property discovery and valuation is described in the Assessor's Reference Library (ARL) Volume 3 section 7 in accordance with the requirements of C.R.S. Chapter 39-1-103 (17)(a)(II) Possessory Interest is defined by the Property Tax Administrator's Publication ARL Volume 3, Chapter 7: A private property interest in government-owned property or the right to the occupancy and use of any benefit in government-owned property that has been granted under lease, permit, license, concession, contract, or other agreement.

Douglas County has been reviewed for their procedures and adherence to guidelines when assessing and valuing agricultural and commercial possessory interest properties. The county has also been queried as to their confidence that the possessory interest properties have been discovered and placed on the tax rolls.

Conclusions

Douglas County has implemented a discovery process to place possessory interest properties on the roll. They have also correctly and consistently applied the correct procedures and valuation methods in the valuation of possessory interest properties.

Recommendations



PERSONAL PROPERTY AUDIT

Douglas County was studied for its procedural compliance with the personal property assessment outlined in the Assessor's Reference Library (ARL) Volume 5, and in the State Board of Equalization (SBOE) requirements for the assessment of personal property. The SBOE requires that counties use ARL Volume 5, including current discovery, classification, documentation procedures, current economic lives table, cost factor tables, depreciation table, and level of value adjustment factor table.

The personal property audit standards narrative must be in place and current. A listing of businesses that have been audited by the assessor within the twelve-month period reflected in the plan is given to the auditor. The audited businesses must be in conformity with those described in the plan.

Aggregate ratio will be determined solely from the personal property accounts that have been physically inspected. The minimum assessment sample is one percent or ten schedules, whichever is greater, and the maximum assessment audit sample is 100 schedules.

For the counties having over 100,000 population, WRA selected a sample of all personal property schedules to determine whether the assessor is correctly applying the provisions of law and manuals of the Property Tax Administrator in arriving at the assessment levels of such property. This sample was selected from the personal property schedules audited by the assessor. In no event was the sample selected by the contractor less than 30 schedules. The counties to be included in this study are Adams, Arapahoe, Boulder, Denver, Douglas, El Paso, Jefferson, Larimer, Mesa, Pueblo, and Weld. All other counties received a procedural study.

Douglas County is compliant with the guidelines set forth in ARL Volume 5 regarding discovery procedures, using the following methods to discover personal property accounts in the county:

- Public Record Documents
- MLS Listing and/or Sold Books
- Chamber of Commerce/Economic Development Contacts
- Local Telephone Directories, Newspapers or Other Local Publications
- Personal Observation, Physical Canvassing or Word of Mouth
- Questionnaires, Letters and/or Phone Calls to Buyer, Seller and/or Realtor
- Internet/websites
- Costar
- Loopnet

The county uses the Division of Property Taxation (DPT) recommended classification and documentation procedures. The DPT's recommended cost factor tables, depreciation tables and level of value adjustment factor tables are also used.

Douglas County submitted their personal property written audit plan and was current for the 2016 valuation period. The number and listing of businesses audited was also submitted and was in conformance with the written audit plan. The following audit triggers were used by the county to select accounts to be audited:

- Businesses in a selected area
- Accounts with obvious discrepancies
- New businesses filing for the first time
- Accounts with greater than 10% change



- Incomplete or inconsistent declarations
- Accounts with omitted property
- Same business type or use
- Businesses with no deletions or additions for 2 or more years
- Non-filing Accounts Best Information Available
- Accounts close to the \$7,300 actual value exemption status
- Accounts protested with substantial disagreement

Douglas County's median ratio is .98. This is

in compliance with the State Board of Equalization (SBOE) compliance requirements which range from .90 to 1.10 with no COD requirements.

Conclusions

Douglas County has employed adequate discovery, classification, documentation, valuation, and auditing procedures for their personal property assessment and is in statistical compliance with SBOE requirements.

Recommendations



WILDROSE AUDITOR STAFF

Harry J. Fuller, Audit Project Manager

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A P P E N D I C E S



STATISTICAL COMPLIANCE REPORT FOR DOUGLAS COUNTY 2016

I. OVERVIEW

Douglas County is a metropolitan county located along Colorado's Front Range urban corridor. The county has a total of 135,279 real property parcels, according to data submitted by the county assessor's office in 2016. The following provides a breakdown of property classes for this county:



The vacant land class of properties was dominated by residential land. Residential lots (coded 100 and 1112) accounted for over 90.1% of all vacant land parcels.

For residential improved properties, residential properties coded 1212 and 1213 accounted for 89.6% of all residential properties.

Commercial and industrial properties represented a much smaller proportion of property classes in comparison. Commercial/industrial properties accounted for 1.7% of all such properties in this county.



II. DATA FILES

The following sales analyses were based on the requirements of the 2016 Colorado Property Assessment Study. Information was provided by the Douglas Assessor's Office in May 2016. The data included all 5 property record files as specified by the Auditor.

III. RESIDENTIAL SALES RESULTS

There were 13,455 qualified residential sales in the 18-month sale period ending June 30, 2014. The sales ratio analysis was analyzed as follows:

		Count	Percent
ECONAREA	1	4083	30.3%
	2	4712	35.0%
	3	807	6.0%
	4	3555	26.4%
	5	66	0.5%
	6	210	1.6%
	7	22	0.2%
Overall		13455	100.0%
Excluded		0	
Total		13455	

Case Processing Summary

Ratio Statistics for CURRTOT / TASP

Group	Median	Price Related Differential	Coefficient of Dispersion
1	.975	1.007	.056
2	.978	1.008	.056
3	.972	1.014	.068
4	.975	1.010	.060
5	.941	1.013	.078
6	.951	1.014	.103
7	1.003	1.178	.316
Overall	.975	1.009	.059

The above ratio statistics were in compliance with the standards set forth by the Colorado State Board of Equalization (SBOE) for residential sales with the exception of Economic Area 5, which had a median ratio of 0.941. Due to the relatively small number of sales in this economic area and its less than one



percent difference from the lower median ratio limit, we passed the residential sales analysis overall. Also please note that Economic Area 7 had only 22 sales, so its ratio analysis results were not valid. The following graphs describe further the sales ratio distribution for these properties:



The above graphs indicate that the distribution of the sale ratios was within state mandated limits.



Residential Market Trend Analysis

We next analyzed the residential dataset using the 24-month sale period for any residual market trending and stratified by economic area, as follows:

		Unstandardized Coefficients			Standardized Coefficients		
ECONAREA	Model		В	Std. Error	Beta	t	Sig.
1	1	(Constant)	.982	.002		446.372	.000
		SalePeriod	.000	.000	021	-1.327	.185
2	1	(Constant)	.981	.002		459.368	.000
		SalePeriod	.000	.000	.009	.626	.532
3	1	(Constant)	.987	.007		146.956	.000
		SalePeriod	001	.001	035	-1.007	.314
4	1	(Constant)	.982	.003		331.855	.000
		SalePeriod	5.626E-5	.000	.003	.179	.858
5	1	(Constant)	.976	.022		43.546	.000
		SalePeriod	002	.002	093	749	.457
6	1	(Constant)	.983	.017		59.358	.000
		SalePeriod	001	.002	052	744	.458
7	1	(Constant)	1.297	.251		5.170	.000
		SalePeriod	016	.027	132	597	.557

a. Dependent Variable: salesratio

The above results indicated that there is no significant residual market trending for residential property sales when broken down by economic area, based on either statistical significance or the magnitude of any residual trending that was significant. We therefore concluded that the assessor has adequately considered market trending in their residential valuations overall.

Sold/Unsold Analysis

In terms of the valuation consistency between sold and unsold residential properties, we compared the median and mean actual values per square foot for 2016 between each group. The data was analyzed both as a whole and broken down by economic area, as follows:

Report

ValSF			
sold	N	Median	Mean
UNSOLD	88,104	\$163.04	\$179.33
SOLD	13,455	\$166.75	\$174.27



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Report

Variables ValSF						
ECONAREA	sold	N	Median	Mean		
1		25070	\$153.05	\$173.29		
		4083	\$158.72	\$165.23		
2		33251	\$173.16	\$179.33		
		4712	\$182.03	\$188.63		
3		6633	\$170.66	\$182.55		
		807	\$172.01	\$182.91		
4		17184	\$147.78	\$171.90		
		3555	\$149.47	\$160.92		
5		1920	\$166.82	\$315.57		
		66	\$223.88	\$217.34		
6		3028	\$177.84	\$182.70		
		210	\$200.54	\$209.82		
7		498	\$139.36	\$295.02		
		22	\$149.39	\$150.49		

Given that there was a consistent gap between sold and unsold residential properties by economic area and that there was a statistically significant difference using the non-parametric Mann Whitney U test, we next compared the percent change in value between 2014 and 2016 for sold and unsold residential properties in Douglas County, as follows:

Report					
DIFF					
sold	Ν	Median	Mean		
UNSOLD	84,673	1.193	1.195		
SOLD	12,841	1.210	1.218		



Report

DIFF				
ECONAREA	sold	N	Median	Mean
1	UNSOLD	23,739	1.197	1.202
	SOLD	3,884	1.215	1.228
2	UNSOLD	32,577	1.195	1.196
	SOLD	4,586	1.208	1.216
3	UNSOLD	6,594	1.179	1.176
	SOLD	806	1.208	1.211
4	UNSOLD	15,917	1.210	1.210
	SOLD	3,269	1.209	1.213
5	UNSOLD	1,893	1.158	1.167
	SOLD	66	1.199	1.214
6	UNSOLD	2,956	1.151	1.140
	SOLD	210	1.162	1.173
7	UNSOLD	478	1.100	1.099
	SOLD	20	1.136	1.146

The median and mean change in value between sold and unsold residential properties was very similar. Based on the change in value results, we concluded that sold and unsold residential properties were valued consistently by the assessor.

IV. COMMERCIAL/INDUSTRIAL SALE RESULTS

There were 118 qualified commercial and industrial sales in the 18-month sale period ending June 30, 2014. The sales ratio analysis was analyzed as follows:

Median	0.962
Price Related Differential	1.153
Coefficient of Dispersion	19.6

The above table indicates that the Douglas County commercial/industrial sales ratios were in compliance with the SBOE standards. The following histogram and scatter plot describe the sales ratio distribution further:







Commercial/Industrial Market Trend Analysis

The 118 commercial/industrial sales were next analyzed, examining the sale ratios across the 18-month sale period with the following results:



		Unstandardize	d Coefficients	Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	.910	.060		15.208	.000
	SalePeriod	.006	.007	.083	.893	.374

a. Dependent Variable: salesratio



There was no residual market trending present in the commercial/industrial sale ratios. We concluded that the assessor has adequately considered market trending adjustments as part of the commercial/industrial valuation.

Sold/Unsold Analysis

We compared the median and mean values per square foot between sold and unsold properties, as follows:

Report				
ValSF				
sold	N	Median	Mean	
UNSOLD	2,181	\$119.18	\$139.60	
SOLD	118	\$130.00	\$143.06	



	Null Hypothesis	Test	Sig.	Decision
1	The distribution of VaISF is the same across categories of sold.	Independent- Samples Mann- Whitney U Test	.399	Retain the null hypothesis.

Hypothesis Test Summary

Asymptotic significances are displayed. The significance level is .05.

ValSF				
ABSTRIMP	sold	N	Median	Mean
2212	UNSOLD	451	\$150.00	\$163.14
	SOLD	28	\$130.00	\$150.34
2220	UNSOLD	197	\$128.00	\$135.57
	SOLD	16	\$125.83	\$122.81
2230	UNSOLD	426	\$179.47	\$188.20
	SOLD	20	\$188.79	\$194.96
2235	UNSOLD	117	\$74.00	\$79.20
	SOLD	6	\$81.00	\$86.80
2245	UNSOLD	179	\$195.00	\$181.02
	SOLD	8	\$317.64	\$283.78
3212	UNSOLD	165	\$80.00	\$89.03
	SOLD	7	\$74.00	\$75.33
3230	UNSOLD	235	\$80.00	\$103.20
	SOLD	22	\$102.50	\$114.67

Report

The above overall results indicated that sold and unsold commercial properties were valued consistently. The results by subclass were more varied, but there was not consistent pattern of sold properties being valued more than unsold properties.

V. VACANT LAND SALE RESULTS

There were 373 qualified vacant land sales in the 18-month sale period ending June 30, 2014. The sales ratio analysis was analyzed as follows:

Median	1.000
Price Related Differential	1.161
Coefficient of Dispersion	19.0



The above ratio statistics were in compliance overall with the standards set forth by the Colorado State Board of Equalization (SBOE) for the overall vacant land sales. The following graphs describe further the sales ratio distribution for all of these properties:







The above histogram indicates that the distribution of the vacant land sale ratios was within state mandated limits.

Vacant Land Market Trend Analysis

We next analyzed the vacant land dataset using the 18-month sale period, with the following results:

		Unstandardize	d Coefficients	Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	.983	.019		53.036	.000
	VSalePeriod	.004	.002	.110	2.061	.040

Coefficients^a

a. Dependent Variable: salesratio



The above analysis indicated that no significant market trending was present in the vacant land sale data. We concluded that the assessor has adequately dealt with market trending for vacant land properties.

Sold/Unsold Analysis

In terms of the valuation consistency between sold and unsold vacant land properties, we compared the median change in value for 2014 and 2016 between each group for subdivisions with at least 5 sales, as follows:



		Report		
DIFF				
SUBDIVNO	sold	N	Median	Mean
0000051		616	1.000	5.927
		17	1.138	3.648
00026875		26	1.333	1.408
		8	1.333	1.367
00044700		21	2.432	2.423
		6	2.438	2.524
01046841		12	1.430	1.440
		5	1.408	1.426
0134957		363	1.200	1.027
		13	1.000	.883
0141307		19	.833	.862
		8	.833	.857
0164775		36	1.390	1.319
		13	1.390	1.635
02067849		7	1.650	1.691
		7	1.650	1.711
2004021991		28	1.830	2.057
		6	1.835	1.800
2004034855		20	1.130	1.212
		11	1.667	1.748
2005066378		12	1.241	1.221
		7	1.241	1.241
2005122094		93	1.320	1.304
		5	1.320	1.320
2006078510		116	1.440	1.404
		6	1.235	1.131
2007037986		8	.996	.996
		17	1.109	1.120
2007095994		5	.950	.952
		5	.950	.966
2009080764		22	1.874	1.770
		11	2.252	2.332

Overall, we concluded that the county assessor valued sold and unsold vacant properties consistently.


V. AGRICULTURAL IMPROVEMENTS ANALYSIS

Based on the parameters of the state audit analysis, this county was exempt from this analysis for 2016.

VI. CONCLUSIONS

Based on this 2016 audit statistical analysis, residential and vacant land properties were found to be in compliance with state guidelines.



STATISTICAL ABSTRACT

Residential

		95% Confiden Me	ice Interval for an		95% Cor	nfidence Interval fo	or Median		95% Confiden Weighte				Coefficient of Variation
ECONAREA	Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage	Weighted Mean	Lower Bound	Upper Bound	Price Related Differential	Coefficient of Dispersion	Mean Centered
1	.979	.977	.982	.975	.972	.977	95.1%	.973	.970	.977	1.007	.056	7.6%
2	.982	.980	.984	.978	.975	.980	95.1%	.974	.971	.977	1.008	.056	7.7%
3	.981	.974	.988	.972	.966	.977	95.1%	.967	.953	.982	1.014	.068	10.6%
4	.982	.979	.985	.975	.973	.979	95.2%	.973	.969	.977	1.010	.060	9.8%
5	.962	.937	.987	.941	.916	.976	96.4%	.950	.930	.969	1.013	.078	10.5%
6	.972	.955	.990	.951	.921	.978	95.5%	.959	.941	.977	1.014	.103	13.2%
7	1.176	.874	1.479	1.003	.898	1.167	98.3%	.998	.873	1.123	1.178	.316	58.0%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Commercial

	95% Confiden Me	ce Interval for an		95% Cor	fidence Interval fo	or Median		95% Confiden Weighte	ce Interval for d Mean			Coefficient of Variation
Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage	Weighted Mean	Lower Bound	Upper Bound	Price Related Differential	Coefficient of Dispersion	Mean Centered
.954	.889	1.020	.962	.920	.984	96.6%	.828	.767	.889	1.153	.196	37.6%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.

Vacant Land

	95% Confiden Me			95% Cor	fidence Interval fo	or Median		95% Confiden Weighte	ce Interval for d Mean			Coefficient of Variation
Mean	Lower Bound	Upper Bound	Median	Lower Bound	Upper Bound	Actual Coverage	Weighted Mean	Lower Bound	Upper Bound	Price Related Differential	Coefficient of Dispersion	Mean Centered
1.064	1.032	1.097	1.000	.994	1.016	95.1%	.917	.832	1.002	1.161	.190	29.7%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level. Other confidence intervals are constructed by assuming a Normal distribution for the ratios.



Residential Median Ratio Stratification

Sale Price

	Case Processing Summary						
		Count	Percent				
SPRec	LT \$25K	1	0.0%				
	\$25K to \$50K	1	0.0%				
	\$50K to \$100K	37	0.3%				
	\$100K to \$150K	193	1.4%				
	\$150K to \$200K	507	3.8%				
	\$200K to \$300K	3474	25.8%				
	\$300K to \$500K	6758	50.2%				
	\$500K to \$750K	1805	13.4%				
	\$750K to \$1,000K	434	3.2%				
	Over \$1,000K	245	1.8%				
Overall		13455	100.0%				
Excluded	k	0					
Total		13455					

				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
LT \$25K	3.962	1.000	.000	
\$25K to \$50K	2.197	1.000	.000	
\$50K to \$100K	1.029	1.026	.156	49.7%
\$100K to \$150K	.997	.999	.082	11.4%
\$150K to \$200K	.995	1.000	.066	10.2%
\$200K to \$300K	.984	1.001	.055	8.0%
\$300K to \$500K	.973	1.001	.053	7.1%
\$500K to \$750K	.963	1.000	.066	8.8%
\$750K to \$1,000K	.949	1.000	.087	11.4%
Over \$1,000K	.921	1.010	.109	14.0%
Overall	.975	1.009	.059	9.1%



Subclass

Case Processing Summary

		Count	Percent
ABSTRIMP	1212	11495	85.4%
	1213	904	6.7%
	1215	1	0.0%
	1220	1	0.0%
	1225	3	0.0%
	1230	1051	7.8%
Overall		13455	100.0%
Excluded		0	
Total		13455	

				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
1212	.973	1.008	.060	8.9%
1213	.993	1.003	.051	6.9%
1215	1.044	1.000	.000	
1220	1.030	1.000	.000	
1225	.921	.978	.012	2.6%
1230	.989	1.007	.059	11.9%
Overall	.975	1.009	.059	9.1%



Improvement Age

Case Processing Summary

		Count	Percent
AgeRec	Over 100	9	0.1%
	75 to 100	5	0.0%
	50 to 75	43	0.3%
	25 to 50	1667	12.4%
	5 to 25	8761	65.1%
	5 or Newer	2970	22.1%
Overall		13455	100.0%
Excluded		0	
Total		13455	

				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
Over 100	.904	1.166	.254	52.3%
75 to 100	.904	1.009	.064	8.9%
50 to 75	1.012	1.090	.199	49.2%
25 to 50	.975	1.006	.072	12.8%
5 to 25	.973	1.008	.056	7.8%
5 or Newer	.983	1.011	.057	7.6%
Overall	.975	1.009	.059	9.1%



Improved Area

Case Processing Summary

		Count	Percent
ImpSFRec	500 to 1,000 sf	257	1.9%
	1,000 to 1,500 sf	2224	16.5%
	1,500 to 2,000 sf	3496	26.0%
	2,000 to 3,000 sf	5274	39.2%
	3,000 sf or Higher	2204	16.4%
Overall		13455	100.0%
Excluded		0	
Total		13455	

				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
500 to 1,000 sf	.980	1.020	.089	22.3%
1,000 to 1,500 sf	.972	1.005	.056	8.0%
1,500 to 2,000 sf	.977	1.006	.054	9.1%
2,000 to 3,000 sf	.974	1.007	.057	7.9%
3,000 sf or Higher	.980	1.015	.072	10.0%
Overall	.975	1.009	.059	9.1%



Improvement Quality

Case Processing Summary

		Count	Percent
QUALITY		1	0.0%
	Average	9362	69.6%
	Excellent	134	1.0%
	Fair	20	0.1%
	Good	3152	23.4%
	Low	1	0.0%
	Very Good	785	5.8%
Overall		13455	100.0%
Excluded		0	
Total		13455	

				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
	1.325	1.000	.000	
Average	.974	1.005	.054	8.2%
Excellent	.994	1.044	.118	16.5%
Fair	.984	1.035	.115	19.4%
Good	.979	1.010	.064	10.2%
Low	2.197	1.000	.000	
Very Good	.979	1.015	.084	11.0%
Overall	.975	1.009	.059	9.1%



Improvement Condition

Case Processing Summary

		Count	Percent
CONDITION		1	0.0%
	Average	1475	11.0%
	Badly Worn	5	0.0%
	Good	11970	89.0%
	Very Good	4	0.0%
Overall		13455	100.0%
Excluded		0	
Total		13455	

				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
	1.325	1.000	.000	
Average	.975	1.007	.072	13.2%
Badly Worn	1.044	1.138	.408	66.5%
Good	.975	1.009	.057	8.3%
Very Good	.998	.996	.105	12.5%
Overall	.975	1.009	.059	9.1%



Commercial Median Ratio Stratification

Sale Price

Case Processing Summary

		Count	Percent
SPRec	\$50K to \$100K	7	5.9%
	\$100K to \$150K	7	5.9%
	\$150K to \$200K	6	5.1%
	\$200K to \$300K	7	5.9%
	\$300K to \$500K	7	5.9%
	\$500K to \$750K	11	9.3%
	\$750K to \$1,000K	7	5.9%
	Over \$1,000K	66	55.9%
Overall		118	100.0%
Excluded	1	0	
Total		118	

				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
\$50K to \$100K	1.027	1.012	.088	12.4%
\$100K to \$150K	.990	1.001	.050	7.0%
\$150K to \$200K	1.012	1.003	.040	5.2%
\$200K to \$300K	.991	.994	.067	10.3%
\$300K to \$500K	.991	.980	.182	31.8%
\$500K to \$750K	1.025	1.010	.233	44.2%
\$750K to \$1,000K	1.075	.962	.467	98.0%
Over \$1,000K	.886	1.042	.195	27.7%
Overall	.962	1.153	.196	37.3%



Subclass

Case Processing Summary

		Count	Percent
ABSTRIMP	1315	1	0.8%
	1894	1	0.8%
	2107	2	1.7%
	2212	28	23.7%
	2215	2	1.7%
	2220	16	13.6%
	2224	1	0.8%
	2225	1	0.8%
	2230	20	16.9%
	2235	6	5.1%
	2245	8	6.8%
	2545	1	0.8%
	3212	7	5.9%
	3215	2	1.7%
	3230	22	18.6%
Overall		118	100.0%
Excluded		0	
Total		118	



				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
1315	.887	1.000	.000	
1894	1.066	1.000	.000	
2107	.674	1.019	.092	13.0%
2212	.942	1.111	.239	34.2%
2215	.661	1.005	.032	4.6%
2220	.930	1.250	.277	48.8%
2224	.883	1.000	.000	
2225	1.140	1.000	.000	
2230	.862	1.188	.355	77.9%
2235	.956	1.077	.112	15.4%
2245	1.002	.971	.079	10.9%
2545	.710	1.000	.000	
3212	.976	1.024	.039	5.6%
3215	.963	1.062	.103	14.5%
3230	.991	1.063	.058	8.9%
Overall	.962	1.153	.196	37.3%



Improvement Age

Case Processing Summary

		Count	Percent
AgeRec	Over 100	1	0.8%
	50 to 75	1	0.8%
	25 to 50	21	17.8%
	5 to 25	85	72.0%
	5 or Newer	10	8.5%
Overall		118	100.0%
Excluded		0	
Total		118	

				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
Over 100	.793	1.000	.000	
50 to 75	1.011	1.000	.000	
25 to 50	.969	1.123	.191	30.7%
5 to 25	.946	1.128	.173	27.3%
5 or Newer	1.002	1.286	.420	90.4%
Overall	.962	1.153	.196	37.3%



Improved Area

Case Processing Summary

		Count	Percent
ImpSFRec	500 to 1,000 sf	6	5.1%
	1,000 to 1,500 sf	14	11.9%
	1,500 to 2,000 sf	3	2.5%
	2,000 to 3,000 sf	5	4.2%
	3,000 sf or Higher	90	76.3%
Overall		118	100.0%
Excluded		0	
Total		118	

				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
500 to 1,000 sf	.987	.996	.058	8.3%
1,000 to 1,500 sf	1.027	1.018	.059	8.7%
1,500 to 2,000 sf	1.011	1.021	.100	15.6%
2,000 to 3,000 sf	.978	1.009	.013	1.8%
3,000 sf or Higher	.915	1.134	.241	44.6%
Overall	.962	1.153	.196	37.3%



Improvement Quality

Case Processing Summary

		Count	Percent
QUALITY	Average	53	44.9%
	Excellent	1	0.8%
	Fair	2	1.7%
	Good	61	51.7%
	Low	1	0.8%
Overall		118	100.0%
Excluded		0	
Total		118	

				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
Average	.958	1.107	.200	31.7%
Excellent	.680	1.000	.000	
Fair	.886	1.107	.199	28.1%
Good	.963	1.174	.193	42.7%
Low	1.066	1.000	.000	
Overall	.962	1.153	.196	37.3%



Improvement Condition

Case Processing Summary

		Count	Percent
CONDITION	Average	29	24.6%
	Badly Worn	3	2.5%
	Good	86	72.9%
Overall		118	100.0%
Excluded		0	
Total		118	

				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
Average	.963	1.243	.189	29.5%
Badly Worn	1.066	1.179	.303	46.9%
Good	.953	1.122	.194	39.9%
Overall	.962	1.153	.196	37.3%



Vacant Land Median Ratio Stratification

Sale Price

		Count	Percent
SPRec	LT \$25K	22	5.9%
	\$25K to \$50K	30	8.0%
	\$50K to \$100K	83	22.3%
	\$100K to \$150K	50	13.4%
	\$150K to \$200K	57	15.3%
	\$200K to \$300K	68	18.2%
	\$300K to \$500K	33	8.8%
	\$500K to \$750K	15	4.0%
	\$750K to \$1,000K	8	2.1%
	Over \$1,000K	7	1.9%
Overall		373	100.0%
Excluded		0	
Total		373	

Case Processing Summary

				Coefficient of Variation
Group	Median	Price Related Differential	Coefficient of Dispersion	Median Centered
LT \$25K	1.174	.992	.238	36.5%
\$25K to \$50K	1.036	.962	.387	55.7%
\$50K to \$100K	1.074	1.011	.200	36.9%
\$100K to \$150K	.999	1.004	.177	25.3%
\$150K to \$200K	1.000	1.000	.109	15.5%
\$200K to \$300K	.982	1.005	.136	17.4%
\$300K to \$500K	.952	1.003	.137	23.9%
\$500K to \$750K	.910	1.000	.088	12.4%
\$750K to \$1,000K	.952	1.003	.101	15.7%
Over \$1,000K	.715	1.077	.095	15.8%
Overall	1.000	1.161	.190	32.3%



Subclass

Case Processing Summary

		Count	Percent
ABSTRLND	100	145	38.9%
	200	7	1.9%
	300	2	0.5%
	520	1	0.3%
	530	3	0.8%
	540	4	1.1%
	550	1	0.3%
	1112	197	52.8%
	1125	1	0.3%
	2112	4	1.1%
	2115	1	0.3%
	2125	1	0.3%
	2130	2	0.5%
	2135	1	0.3%
	3112	3	0.8%
Overall		373	100.0%
Excluded		0	
Total		373	



		Drive Deleted	On efficient of	Coefficient of Variation Median
Group	Median	Price Related Differential	Coefficient of Dispersion	Centered
100	1.026	1.068	.190	30.3%
200	.888.	1.438	.551	142.5%
300	.827	.923	.124	17.5%
520	.927	1.000	.000	
530	.994	1.018	.025	5.0%
540	.818	.998	.164	22.3%
550	.983	1.000	.000	
1112	1.000	1.076	.179	27.1%
1125	.655	1.000	.000	
2112	.786	1.047	.131	16.7%
2115	.886	1.000	.000	
2125	.950	1.000	.000	
2130	.991	.998	.009	1.3%
2135	1.271	1.000	.000	
3112	.966	1.102	.116	24.0%
Overall	1.000	1.161	.190	32.3%