

# Revisions in State Establishment-based Employment Estimates Effective January 2015

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## Introduction

With the release of the payroll employment estimates for January 2015, nonfarm payroll employment, hours, and earnings data for states and areas were revised to reflect the incorporation of the 2014 benchmarks and the recalculation of seasonal adjustment factors for payroll employment estimates. The revisions affect all not seasonally adjusted data from April 2013 to December 2014, all seasonally adjusted data from January 2010 to December 2014<sup>1</sup>, and select series subject to historical revisions before April 2013. This article provides background information on benchmarking methods, business birth/death modeling, seasonal adjustment of employment data, effects of changes in statistical area delineations, and details of the effects of the 2014 benchmark revisions on state and area payroll employment estimates.

## Benchmark methods

The Current Employment Statistics (CES) program, also known as the payroll survey, is a federal and state cooperative program that provides, on a timely basis, estimates of payroll employment, hours, and earnings for states and areas by sampling the population of employers. Each month the CES program surveys about 143,000 businesses and government agencies, representing approximately 588,000 individual worksites, in order to provide detailed industry level data on employment and the hours and earnings of employees on nonfarm payrolls for all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and about 450 metropolitan areas and divisions.<sup>2</sup>

As with data from other sample surveys, CES payroll employment estimates are subject to both sampling and nonsampling error. Sampling error is an unavoidable byproduct of forming an inference about a population based on a limited sample. The larger the sample is, relative to the population, the smaller the sampling error. The sample-to-population ratio varies across states and industries. Nonsampling error, by contrast, generally refers to errors in reporting and processing.<sup>3</sup>

In order to control both sampling and nonsampling error, CES payroll employment estimates are benchmarked annually to employment counts from a census of the employer population. These counts are derived primarily from employment data provided in unemployment insurance (UI) tax reports that nearly all employers are required to file with state workforce agencies. The UI tax reports are collected, reviewed, and edited by the staff of the BLS Quarterly Census of Employment and Wages (QCEW).<sup>4</sup> As part of the benchmark process for benchmark year 2014, census-derived employment counts replace CES payroll employment estimates for all 50 States and the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and about 450 metropolitan areas and divisions for the period of April 2013 to September 2014.

UI tax reports are not collected on a timely enough basis to allow for replacement of CES payroll estimates for the fourth quarter, October 2014 to December 2014. For this period, estimates based on existing sample information are revised using the new series level from census-derived employment counts and updated business birth/death factors.<sup>5</sup>

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<sup>1</sup> Further information regarding the difference in historical reconstruction between not seasonally adjusted data and seasonally adjusted data is available in the seasonal adjustment section of this article and at <http://www.bls.gov/sae/790over.htm>

<sup>2</sup> Further information on the sample size for each state is available at [www.bls.gov/sae/sample.htm](http://www.bls.gov/sae/sample.htm).

<sup>3</sup> Further information on the reliability of CES estimates is contained in the Technical Note of the latest Regional and State Employment and Unemployment press release and is available at [www.bls.gov/sae/news.htm](http://www.bls.gov/sae/news.htm).

<sup>4</sup> Further information on the BLS Quarterly Census of Employment and Wages program is available at [www.bls.gov/cew/](http://www.bls.gov/cew/).

<sup>5</sup> Further information on the monthly estimation methods of the CES program can be found in Chapter 2 of the *BLS Handbook of Methods* and is available at [www.bls.gov/opub/hom/pdf/homch2.pdf](http://www.bls.gov/opub/hom/pdf/homch2.pdf).

## Special notice regarding changes to statistical area delineations

On February 28, 2013, the Office of Management and Budget (OMB) announced changes to statistical area delineations based on the application of new data standards from the 2010 Census.<sup>6</sup> Prior to the release of 2014 benchmark data, CES area definitions were derived from the 2009 OMB delineations. The 2010 updates from OMB created time series breaks within some areas. For areas not previously covered by BLS, no historical data are available. In order to provide consistent time series to its data users, BLS reconstructed both All Employee (AE) and non-AE time series for all areas affected by the redelineation, including the creation of new time series for newly covered areas. These updates to the 2010 OMB delineations have been released with the 2014 benchmark.

A comprehensive description of areas, area codes, and standards for new delineations that provides a broad perspective of statistical area revisions is available at [www.bls.gov/lau/lausmsa.htm](http://www.bls.gov/lau/lausmsa.htm). Below is a summary of changes by statistical area.<sup>7</sup>

### *Summary of Changes by Statistical Area:*

*Metropolitan Statistical Areas.* Under the revised 2010 OMB statistical area delineations there are a total of 373 MSAs published by CES State and Area. Compared to the 2009 delineations, 82 underwent compositional changes, and five were assigned new names and Federal Information Processing Standards (FIPS) code changes (with no compositional change). A total of 24 entirely new MSAs were added, and 10 MSAs were dropped.

*Metropolitan Divisions.* There are 28 Metropolitan Divisions (MD) under the new area delineations. Compared to the 2009 delineations, eight underwent compositional changes, and three were assigned new names and FIPS code changes. A total of four entirely new MDs were added, and one was dropped.

*New England County and Town Areas.* There are 21 New England City and Town Areas (NECTAs) under the new area delineations. Compared to the 2009 delineations, all 21 areas underwent compositional changes and zero were dropped.

*New England City and Town Divisions.* There are ten New England City and Town Area Divisions (NDs) under the new area delineations. Compared to 2009 delineations, nine underwent compositional changes, with one entirely new ND created and zero dropped.

*Nonstandard areas.* There are 11 nonstandard areas (NSAs) under the new area delineations. Compared to 2009 delineations, three underwent compositional changes, with two entirely new NSAs created and zero dropped.

### *AE Reconstructions*

For AE series, data were reconstructed primarily using data available from the Longitudinal Database (LDB) of the Quarterly Census of Employment and Wages (QCEW) program of BLS. The LDB contains establishment-level microdata along with administrative records of state, county, township, ownership (federal, state, or local government or private) and industry (based upon the 2012 North American Industry Classification System, or NAICS). Between 1990 and 2013 there were about 29 million unique establishment identifiers available for use in these reconstructions. These microdata records were mapped by county code (or, in the case of New England states, the New England City and Town Area (NECTA), township code) at the 6-digit NAICS level according to the 2010 OMB delineations. Monthly microdata were collected according to fixed administrative records for state, county (or township), NAICS, and ownership back to 1990 (or the earliest record available) and aggregated to publication levels.

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<sup>6</sup> Office of Management and Budget Bulletin No. 13-01, dated February 28, 2013. Available at [www.bls.gov/lau/lausmsa.htm](http://www.bls.gov/lau/lausmsa.htm).

<sup>7</sup> For a list of areas that experienced compositional changes, areas that were added, and areas that were dropped, see the appendix of this article.

In the cases of redelineated areas where counties or townships were either being added or dropped, data for the added or dropped counties or townships were reconstructed and added or dropped from the area. For areas never before covered by BLS, all series were entirely reconstructed. This methodology allowed for the leverage of previously benchmarked data and any prior adjustments to the series whose records were no longer available.

In addition to the use of LDB data for microdata aggregation, BLS reconstructions accounted for scope differences between the QCEW and CES programs. Employment available from the LDB covers approximately 98 percent of CES employment, with most of the remaining being Non-Covered Employment (NCE). Since NCE data are out of scope for the QCEW program, the LDB data could not be used. Moreover, historical NCE data are not constructed by county but rather by area. Therefore NCE data had to be extrapolated from known relationships to derive county-NAICS level data; this approach has significant limitations. NCE data were reconstructed by proportionally distributing statewide industry NCE's (as a percentage of total LDB industry employment) to the county-NAICS level (or the township-NAICS level in the case of NECTA's). In the case of railroad and religious workers, where no industry-specific LDB data were available, industry-specific statewide NCE's were taken as a percentage of statewide total nonfarm employment and applied to the county's (or township's) total industry employment.

Once these additions and/or deletions were tabulated, every time series was reviewed for consistency. In the cases where breaks were still apparent in the time series analysts reviewed microdata records in order to build more reliable histories.

#### *Non-AE Reconstructions*

Data for non-AE reconstructions were severely limited. Unlike AE data, no microdata records were available for hours and earnings from the LDB; however, sample microdata records were available for use from October 2010. This limitation was due to a major systems change in 2011 during processing of the 2010 benchmark. Because of this limitation, different reconstruction methods were used for new areas and compositionally changing areas.

For new areas, reconstructions were made with the aforementioned microdata in accordance with estimation methods outlined in the [BLS Handbook of Methods Chapter 2](#) back to January 2011. The December 2010 estimate was calculated by taking the mean of the weighted sample from the three months in the fourth quarter of 2010.

For compositionally changing areas, the series structure and start date were preserved. Historical data from January 2011 forward were reconstructed using the same aforementioned methodology for new areas, with the exception of the December 2010 value which was an actual non-AE estimate from the prior area instead of an imputed value. Historical data prior to January 2011 were reconstructed by applying the average monthly ratio of the reconstructed series to the previously published series over the period January 2011 to September 2014. This was also used to ultimately replace the December 2010 value.

### **Business birth/death modeling**

Sample-based estimates are adjusted each month by a statistical model designed to reduce a primary source of nonsampling error: the inability of the sample to capture employment growth generated by new business formations on a timely basis. There is an unavoidable lag between an establishment opening for business and its appearance in the sample frame making it available for sampling. Because new firm births generate a portion of employment growth each month, nonsampling methods must be used to estimate this growth.

Earlier research indicated that, while both the business birth and death portions of total employment are generally significant, the net contribution is relatively small and stable. To account for this net birth/death portion of total employment, BLS uses an estimation procedure with two components. The first component excludes employment losses due to business deaths from sample-based estimation in order to offset the missing employment gains from business births. This is incorporated into the sample-based estimate procedure by simply not reflecting sample units

going out of business, but rather imputing to them the same trend as the other continuing firms in the sample. This step accounts for most of the birth and death changes to employment.<sup>8</sup>

The second component is an autoregressive integrated moving average (ARIMA) time series model designed to estimate the residual birth/death change to employment not accounted for by the imputation. To develop the history for modeling, the same handling of business deaths as described for the CES monthly estimation is applied to the population data. Establishments that go out of business have employment imputed for them based on the rate of change of the continuing units. The employment associated with continuing units and the employment imputed from deaths are aggregated and compared to actual population levels. The differences between the two series reflect the actual residual of births and deaths over the past five years. The historical residuals are converted to month-to-month differences and used as input series to the modeling process. Models for the residual series are then fit and forecasted using X-13 ARIMA-SEATS software.<sup>9</sup> The residuals exhibit a seasonal pattern and may be negative for some months. Finally, differences between forecasts of the nationwide birth/death factors and the sum of the states' birth/death factors are reconciled through a ratio-adjustment procedure, and the factors are used in monthly estimation of payroll employment in 2015. The updated birth/death factors are also used as inputs to produce the revised estimates of payroll employment for October 2014 to December 2014.

## Seasonal adjustment

CES payroll employment data are seasonally adjusted by a two-step process. BLS uses the X-13 ARIMA-SEATS program to remove the seasonal component of month-to-month employment changes. This process uses the seasonal trends found in census-derived employment counts to adjust historical benchmark employment data while also incorporating sample-based seasonal trends to adjust sample-based employment estimates. By accounting for the differing seasonal patterns found in historical benchmark employment data and the sample-based employment estimates, this technique yields improved seasonally adjusted series with respect to analysis of month-to-month employment change.<sup>10</sup> Seasonally adjusted employment data for the most recent 13 months are published regularly in table D-1.<sup>11</sup>

The aggregation method of seasonally adjusted data is based upon the availability of underlying industry data. For all 50 states, the District of Columbia, and Puerto Rico, the following series are sums of underlying industry data: total private, goods-producing, service-providing, and private service-providing. The same method is applied for the Virgin Islands with the exception of goods-producing, which is independently seasonally adjusted because of data limitations. For all 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands, data for manufacturing, trade, transportation, and utilities, financial activities, education and health services, leisure and hospitality, and government are aggregates wherever exhaustive industry components are available; otherwise these industries' employment data are directly seasonally adjusted. In a very limited number of cases, the not seasonally adjusted data for manufacturing, trade, transportation, and utilities, financial activities, education and health services, leisure and hospitality, and government do not exhibit enough seasonality to be adjusted; in those cases the not seasonally adjusted data are used to sum to higher level industries. The seasonally adjusted total nonfarm data for all metropolitan statistical areas (MSAs) are not an aggregation but are derived directly by applying the seasonal adjustment procedure to the not seasonally adjusted total nonfarm level.<sup>12</sup>

### *Variable survey intervals*

BLS utilizes special model adjustments to control for survey interval variations, sometimes referred to as the 4 vs. 5 week effect, for all nonfarm seasonally adjusted series. Although the CES survey is referenced to a consistent

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<sup>8</sup> Technical information on the estimation methods used to account for employment in business births and deaths is available at <http://www.bls.gov/web/empsit/cesbd.htm>.

<sup>9</sup> Further information on the X-13 ARIMA-SEATS is available on the US Census Bureau website at <https://www.census.gov/srd/www/x13as/>.

<sup>10</sup> A list of all seasonally adjusted employment series are available at [www.bls.gov/sae/saeseries.htm](http://www.bls.gov/sae/saeseries.htm).

<sup>11</sup> Table D-1 can be viewed at [www.bls.gov/sae/tables.htm](http://www.bls.gov/sae/tables.htm).

<sup>12</sup> A list of BLS standard MSAs is available at <http://www.bls.gov/sae/saeseries.htm>.

concept, the pay period including the 12th day of each month, inconsistencies arise because there are sometimes 4 and sometimes 5 weeks between the week including the 12th day in a given pair of months. In highly seasonal industries, these variations can be an important determinant of the magnitude of seasonal hires or layoffs that have occurred at the time the survey is taken.<sup>13</sup>

### *Methodology Changes and Area Updates*

#### *Methodology:*

BLS upgraded to the use of the Census Bureau's X-13 ARIMA-SEATS program from the X-12 ARIMA program with the release of the January 2015 preliminary estimates. Tests conducted on the differences between how series were handled between the two ARIMA programs resulted in only minor differences that were of little to no statistical significance. Moreover, the Census Bureau is in the process of eliminating software support for the X-12 ARIMA program, and as a result it was necessary for BLS to make the upgrade.

#### *Area Updates:*

As a result of (a) the BLS update in the 2014 benchmark to official 2010 area delineations and (b) limitations in data availability associated with the two-step process for seasonal adjustment, it was necessary for BLS to reverse its methodology for seasonally adjusting combined areas from last year.

For the 2014 benchmark, all combined areas have been directly seasonally adjusted and will have independent seasonal factors applied in 2015 as BLS did in each year prior to the 2013 benchmark. Accordingly, with the 2014 benchmark, BLS has replaced the seasonally adjusted total nonfarm data for all combined areas back to 1990.

For new areas, no originally published sample data was available as input to the two-step seasonal adjustment process. Therefore, BLS will not be publishing any seasonally adjusted data for new areas for at least 3 years.<sup>14</sup>

For areas undergoing redelineations, those changes caused breaks in both the benchmarked QCEW data as well as the originally published sample data, both of which are used as input to the seasonal adjustment process. Benchmarking QCEW data were reconstructed (this is the historical data of the series that is now published), but there were no originally published sample data available for input according to the two-step methodology. This is critical since the sample-based estimates are used to forecast factors for the upcoming year. Research was conducted using benchmarked historical QCEW data updated to the new delineations to test for breaks in the seasonality of the new series compared to the previously defined series. This was used as a proxy for what one might expect for breaks in the sample series as well. BLS determined, through a number of statistical tests for series breaks, that most areas that had an absolute compositional change of equal to or more than 4 percent would be more certain of having a break in the seasonality of the sample-based series. Therefore, areas that underwent an absolute percentage change of 4 percent or greater will not be published on a seasonally adjusted basis for 2015; this amounts to 59 compositionally changing areas. Likewise, any area that underwent an absolute percentage change of less than 4 percent (57 compositionally changing areas) are less likely to experience a series break and will be published in 2015 on a seasonally adjusted basis. BLS will be able to publish seasonally adjusted data for the 59 missing areas as more sample-based data become available, which would likely not be longer than 3 years.

## **Benchmark revisions**

### **Revisions by industry**

The magnitude of benchmark revisions is commonly gauged by the percentage difference between the sample-based estimates of payroll employment and the revised benchmark payroll employment levels for March of the benchmark year, presently March 2014. The average absolute percentage revision across all states for total nonfarm payroll employment is 0.5 percent for March 2014. This compares to the average of 0.6 percent for the same

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<sup>13</sup> For more information on the presence and treatment of calendar effects in CES data, see [www.bls.gov/ore/pdf/st960190.pdf](http://www.bls.gov/ore/pdf/st960190.pdf).

<sup>14</sup> The X-13 ARIMA-SEATS software used by BLS requires a minimum of 3 years of data to process a time series.

measure during the five prior benchmark years of 2009 to 2013. For March 2014, the range of the percentage revision for total nonfarm payroll employment across all states is from -1.5 to 2.0 percent. (See table 1a.)

For December 2014, the average absolute percentage revision for state total nonfarm payroll employment is 0.6 percent. The range of the percentage revision for state total nonfarm payroll employment is from -1.8 to 1.6 percent for December 2014. (See table 1a.)

Absolute level revisions provide further insight on the magnitude of benchmark revisions. Absolute level revisions are measured as the absolute difference between the sample-based estimates of payroll employment and the benchmark levels of payroll employment for March 2014. A relatively large benchmark revision in terms of percentage can correspond to a relatively small benchmark revision in terms of level due to the amount of employment in the industry.

**Table 1a. Percentage differences between state employment estimates and benchmarks by industry, March 2009–March 2014 and December 2014 (all values in percent)**

Industry	Mar 2009	Mar 2010	Mar 2011	Mar 2012 <sup>1</sup>	Mar 2013 <sup>2</sup>	Mar 2014	Dec 2014
Total nonfarm.....	0.9	0.4	0.5	0.7	0.4	0.5	0.6
Mining and logging.....	6	7.5	3.2	4.7	3.7	2.8	4.6
Construction.....	4	3.6	3.2	4.4	3.1	3.0	3.6
Manufacturing.....	2.2	1.8	1.4	1.5	1.4	1.2	2.0
Trade, transportation, and utilities.....	1.6	1.2	0.9	1.1	1.0	0.7	1.0
Information.....	3.3	2.3	2.4	3.2	2.2	2.0	2.7
Financial activities.....	1.6	1.8	1.9	2.2	1.6	2.0	2.1
Professional and business services...	2.2	2.2	1.8	1.9	1.8	1.6	1.8
Education and health services.....	0.8	1	0.9	1.4	1.6	0.9	1.1
Leisure and hospitality.....	1.7	1.8	1.9	2.3	1.4	1.4	1.7
Other services.....	1.9	1.9	2.4	2.7	2.1	2.4	3.1
Government.....	0.6	0.8	0.7	1.0	0.7	0.9	1.0
<b>Total nonfarm:</b>							
Range.....	-3.8 to 1.1	-1.3 to 1.4	-1.8 to 1.4	-1.5 to 2.2	-0.7 to 2.9	-1.5 to 2.0	-1.8 to 1.6
Mean.....	-0.8	-0.1	0.2	0.6	0.3	0.1	0.1
Standard deviation.....	0.8	0.5	0.6	0.7	0.6	0.6	0.7

<sup>1</sup> CES State and Area payroll employment estimates are typically replaced with census derived employment counts through the third quarter of the benchmark year. However, in the 2011 benchmark year, CES estimates were replaced only through the second quarter of 2011 (through June 2011). As a result, the March 2012 benchmark revisions reflect revisions to cumulatively more months of sample-based estimates than is typical, contributing to generally higher rates of revision. For more information, see <http://www.bls.gov/sae/benchmark2013.pdf>.

<sup>2</sup> The CES estimates in this column were subject to large revisions and historical reconstructions due to substantial reclassifications by the QCEW program in the financial activities and education and health services sectors. For more information, see [http://www.bls.gov/news.release/archives/cewqtr\\_09262013.htm](http://www.bls.gov/news.release/archives/cewqtr_09262013.htm).

The following example demonstrates the necessity of considering both percentage revision and level revision when evaluating the magnitude of a benchmark revision in an industry. The average absolute percentage benchmark revision across all states for financial activities and for professional and business services are 2.1 and 1.8 percent for December 2014. However, for December 2014 the absolute level revision across all states for the financial

activities industry is 2,600, while the absolute level revision across all states for the professional and business services industry is 4,100. (See table 1b.) Relying on a single measure to characterize the magnitude of benchmark revisions in an industry can potentially lead to an incomplete interpretation.

**Table 1b. Level differences between state employment estimates and benchmarks by industry, March 2009–March 2014 and December 2014 (all values payroll employment)**

Industry	Mar 2009	Mar 2010	Mar 2011	Mar 2012 <sup>1</sup>	Mar 2013 <sup>2</sup>	Mar 2014	Dec 2014
Total nonfarm.....	20,700	7,600	10,200	14,800	16,900	11,500	18,500
Mining and logging.....	700	600	500	600	600	400	700
Construction.....	3,700	2,900	3,300	4,200	2,700	2,800	3,500
Manufacturing.....	3,200	2,000	2,100	2,200	1,500	1,700	2,500
Trade, transportation, and utilities.....	7,800	4,500	2,800	3,900	3,900	2,600	5,000
Information.....	1,300	1,200	1,300	1,500	800	900	1,200
Financial activities.....	2,300	2,300	2,600	2,500	2,000	2,100	2,600
Professional and business services...	6,500	4,600	4,700	5,500	4,100	3,900	4,100
Education and health services.....	2,800	2,800	3,000	4,600	12,000	3,400	5,000
Leisure and hospitality.....	3,500	3,500	3,100	5,200	2,900	3,500	4,400
Other services.....	1,900	1,600	1,900	2,300	2,000	2,000	2,800
Government.....	2,200	3,800	3,700	4,100	2,500	3,900	4,800
<b>Total nonfarm:</b>							
Range.....	-190,500 to 10,900	-38,700 to 28,900	-15,300 to 57,500	-28,900 to 59,400	-13,700 to 428,200	-40,800 to 103,800	-50,300 to 226,200
Mean.....	-19,600	-1,700	6,100	13,100	13,800	5,500	10,600
Standard deviation.....	31,500	11,300	15,300	16,200	60,800	20,200	38,100

<sup>1</sup> CES State and Area payroll employment estimates are typically replaced with census derived employment counts through the third quarter of the benchmark year. However, in the 2011 benchmark year, CES estimates were replaced only through the second quarter of 2011 (through June 2011). As a result, the March 2012 benchmark revisions reflect revisions to cumulatively more months of sample-based estimates than is typical, contributing to generally higher rates of revision. For more information, see <http://www.bls.gov/sae/benchmark2013.pdf>.

<sup>2</sup> The CES estimates in this column were subject to large revisions and historical reconstructions due to substantial reclassifications by the QCEW program in the financial activities and education and health services sectors. For more information, see [http://www.bls.gov/news.release/archives/cewqtr\\_09262013.htm](http://www.bls.gov/news.release/archives/cewqtr_09262013.htm).

### Revisions by State

For March 2014, 25 states and the District of Columbia revised nonfarm payroll employment upward, while 22 states revised payroll employment downward. (See table 2 or map 1.)

For December 2014, 29 states and the District of Columbia revised nonfarm payroll employment upward, while 20 states revised payroll employment downward. (See table 2 or map 2). The percentiles of percent revisions for March 2014 and December 2014 can be found below (See Exhibit 1).

**Table 2. Percent differences between nonfarm payroll employment benchmarks and estimates by state, March 2009–March 2014 and December 2014 (all values in percent)**

State	Mar 2009	Mar 2010	Mar 2011	Mar 2012	Mar 2013	Mar 2014	Dec 2014
Alabama.....	-1.1	0.3	-0.1	0.6	0.4	-0.1	-0.2
Alaska.....	-0.5	-1.3	-0.2	0.8	0.1	-0.2	0.6
Arizona.....	-0.1	-0.3	0.6	0.3	0.3	0.1	0.1
Arkansas.....	-0.3	-0.3	-1.1	1.2	-0.5	-0.7	-0.1
California.....	-1.3	-0.1	(1)	0.3	2.9	0.7	1.4
Colorado.....	-0.3	0.5	0.7	0.2	0.5	0.5	0.9
Connecticut.....	-0.5	-1.3	(1)	0.6	0.2	-0.1	-0.5
Delaware.....	0.7	-0.4	0.7	0.1	0.2	0.3	-0.3
District of Columbia.....	-0.6	-0.4	1.4	-0.8	1.1	0.3	0.1
Florida.....	-1.4	-0.2	0.5	0.5	0.3	-0.1	0.6
Georgia.....	-0.9	0.2	1.4	0.7	(1)	0.7	1.3
Hawaii.....	-1.2	-0.5	(1)	0.5	1.0	0.6	-1.0
Idaho.....	-1.2	-0.2	-0.4	0.3	0.2	2	1.6
Illinois.....	-0.3	0.1	(1)	0.7	0.1	0.5	0.6
Indiana.....	-1.3	-0.2	0.7	0.7	-0.2	-0.1	-0.2
Iowa.....	-0.3	-0.5	-0.2	0.8	-0.1	(1)	(1)
Kansas.....	-0.8	-0.3	1.2	0.9	-0.2	0.5	0.5
Kentucky.....	-1.3	-0.4	-0.3	-0.1	-0.3	0.3	0.2
Louisiana.....	-1.4	-0.6	0.9	-1.5	-0.1	0.5	0.3
Maine.....	-0.7	0.3	-0.4	0.3	(1)	-0.7	-1.0
Maryland.....	-0.6	-0.1	1.1	-0.2	-0.4	-0.3	0.5
Massachusetts.....	0.1	0.9	0.3	1.3	1.2	0.1	0.1
Michigan.....	-0.5	0.2	0.2	1.1	0.9	1.1	1.2
Minnesota.....	-0.1	-0.4	0.8	0.8	(1)	-0.6	-0.5
Mississippi.....	-1.2	-0.1	-0.4	1.1	-0.7	(1)	0.4
Missouri.....	-1.1	-0.5	-0.4	0.4	1.1	-1.5	-1.8
Montana.....	-2.4	0.2	-0.7	2.1	0.6	0.2	-0.8
Nebraska.....	0.1	-0.2	-0.6	1.5	1.3	0.7	0.7
Nevada.....	-3.8	-0.6	-0.1	0.4	0.5	-0.6	0.8
New Hampshire.....	-1.5	-0.7	(1)	0.8	(1)	-0.3	0.1
New Jersey.....	-1.2	-0.1	-0.2	0.3	-0.1	0.5	0.6
New Mexico.....	-1.6	-0.1	(1)	-0.2	0.2	0.5	0.6
New York.....	-0.4	0.3	0.7	(1)	(1)	0.6	1.0
North Carolina.....	-0.1	(1)	0.8	0.3	-0.3	-0.1	-0.1
North Dakota.....	-0.9	0.8	0.3	2	-0.2	-1.4	-1.4
Ohio.....	-0.5	(1)	-0.3	0.6	0.9	0.4	0.7
Oklahoma.....	-1.2	0.1	(1)	1.5	0.4	-0.3	-0.7
Oregon.....	-1.3	0.1	-0.3	0.7	0.2	-0.4	-0.1
Pennsylvania.....	-0.4	0.3	0.3	0.4	(1)	0.2	0.3
Rhode Island.....	-0.3	1.4	(1)	1.7	0.4	-0.2	-0.1
South Carolina.....	-1.4	-1.2	0.3	0.3	0.2	0.5	0.3
South Dakota.....	-0.4	-0.1	0.5	1.4	-0.1	0.8	0.7
Tennessee.....	-1.3	(1)	0.7	0.8	-0.2	0.4	0.5
Texas.....	-0.7	(1)	-0.1	0.5	(1)	0.1	-0.3
Utah.....	-1.9	-0.5	0.2	0.9	-0.2	-0.1	-0.1
Vermont.....	1.1	0.1	-1.8	0.5	0.1	(1)	0.5
Virginia.....	-0.4	(1)	0.5	0.1	0.3	-0.3	0.1
Washington.....	-0.6	-0.7	0.1	0.1	1.9	0.6	0.9
West Virginia.....	0.8	0.8	0.4	1	-0.7	-0.9	-1.4
Wisconsin.....	0.4	0.7	0.1	2.2	0.6	-0.3	-0.8
Wyoming.....	-1.5	-0.1	0.1	1	0.4	-0.7	-0.7

(1) Less than +/- 0.05 percent

**Exhibit 1. Percentiles of Percent Revisions March 2014 and December 2014 (all values in percent)**

Percentiles of Absolute Percent Revisions	March	December
	2014	2014
20th percentile.....	-0.3	-0.5
40th percentile.....	-0.1	0
60th percentile.....	0.3	0.4
80th percentile.....	0.5	0.7
100th percentile.....	2.0	1.6

**Revisions by metropolitan statistical areas (MSAs)**

A summary of benchmark revisions for nonfarm employment in MSAs that did not have compositional changes, or had simple name change, is provided in tables 3a and 3b. These tables do not include areas that had compositional changes, newly defined areas or areas that are no longer classified as Metropolitan Statistical Areas. CES will resume benchmark revision analysis for all MSAs with the 2015 benchmark scheduled to be introduced in March 2016 with the release of the January 2016 estimates.

For all unchanged metropolitan statistical areas (MSAs) published by the CES program, the percentage revisions ranged from -7.0 to 6.1 percent, with an average absolute percentage revision of 1.1 percent across all unchanged MSAs for March 2014. (See table 3a.) Comparatively, at the statewide level the range was -1.5 to 2.0 percent, with an average absolute percentage revision of 0.5 percent for March 2014. (See table 1a.) As MSA size decreases so does the sample size, resulting in larger relative standard errors and therefore increasing both the range of percent revisions and the average absolute percent revision. Metropolitan areas with 1 million or more employees during March 2014 had an average absolute revision of 0.7 percent, while metropolitan areas with fewer than 100,000 employees had an average absolute revision of 1.4 percent. (See table 3a.)

For December 2014, the percentage revisions ranged from -4.1 to 6.1 percent, with an average absolute percentage revision of 1.4 percent across all unchanged MSAs. (See table 3b.) Comparatively, at the statewide level the range was -1.8 to 1.6 percent, with an average absolute percentage revision of 0.6 percent for December 2014. (See table 1a.) As noted previously, both the range of percentage revisions and the average absolute percentage revision generally increase as the amount of employment in an MSA decreases. Metropolitan areas with 1 million or more employees during December 2014 had an average absolute revision of 0.8 percent, while metropolitan areas with fewer than 100,000 employees had an average absolute revision of 1.7 percent. (See table 3b.)

**Table 3a. Benchmark revisions for nonfarm employment in unchanged metropolitan areas, March 2014<sup>1</sup>**

Measure	All MSAs	MSAs grouped by level of total nonfarm employment			
		Less than 100,000	100,000 to 499,999	500,000 to 999,999	1 million or more
Number of MSAs.....	258	132	100	11	15
Average absolute percentage revision.....	1.1	1.4	0.9	0.9	0.7
Range.....	-7.0 to 6.1	-7.0 to 6.1	-3.2 to 2.6	-0.9 to 2.4	-0.9 to 1.9
Mean.....	0.3	0.3	0.4	0.3	0.5
Standard deviation.....	1.5	1.8	1.0	1.2	0.7

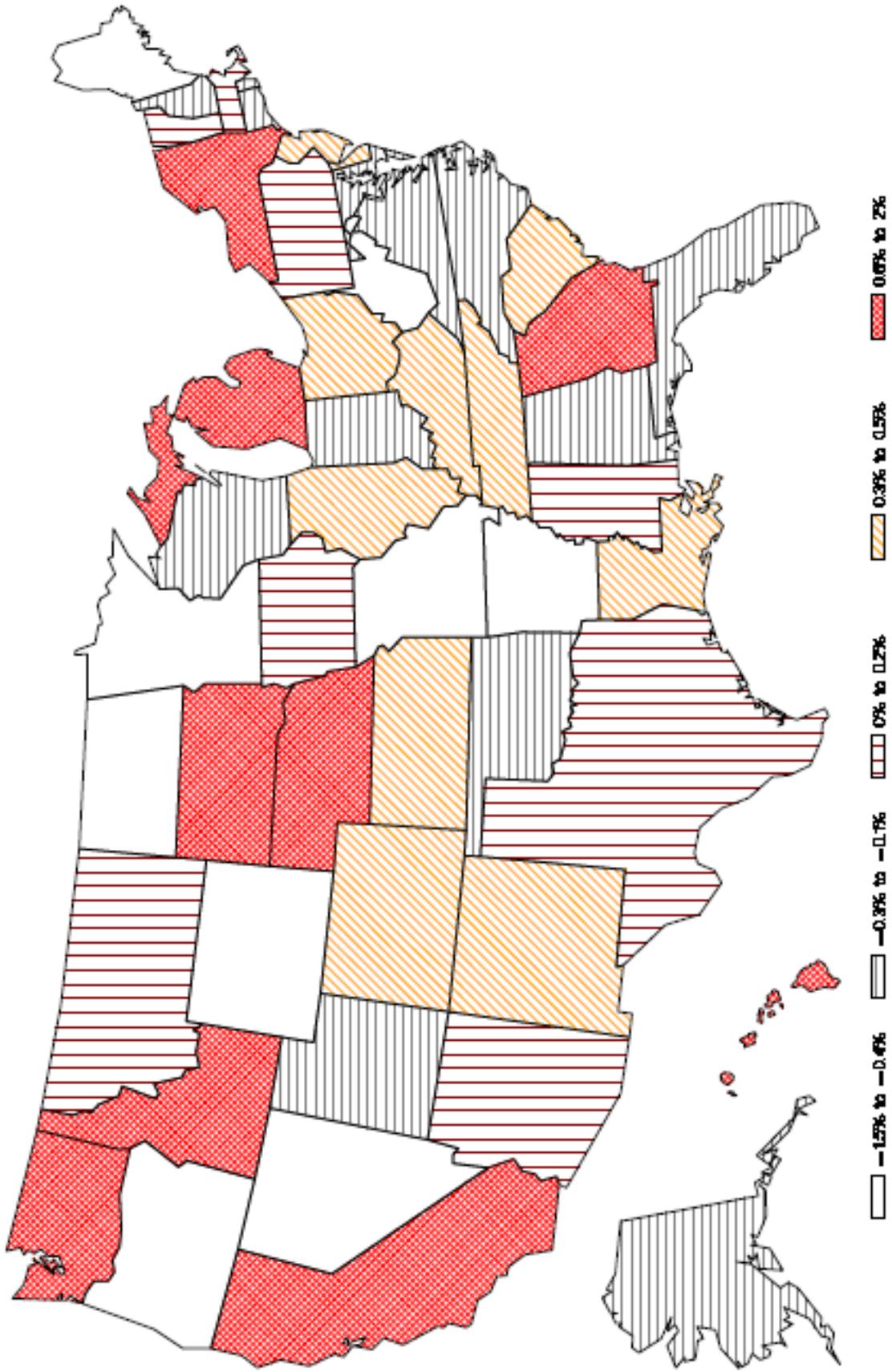
<sup>1</sup>The areas included in this table are only unchanged MSAs and NECTAs. MSAs that experienced compositional changes, areas that are new in the 2010 delineations, areas that have been dropped from the 2010 delineations, areas that experienced FIPS code changes (and no compositional change), NECTAs that experienced compositional changed, NECTAs that are new in the 2010 delineations, NECTAs that have been dropped from the 2010 delineations, Metropolitan Divisions, and NECTA Divisions have been excluded.

**Table 3b. Benchmark revisions for nonfarm employment in unchanged metropolitan areas, December 2014<sup>1</sup>**

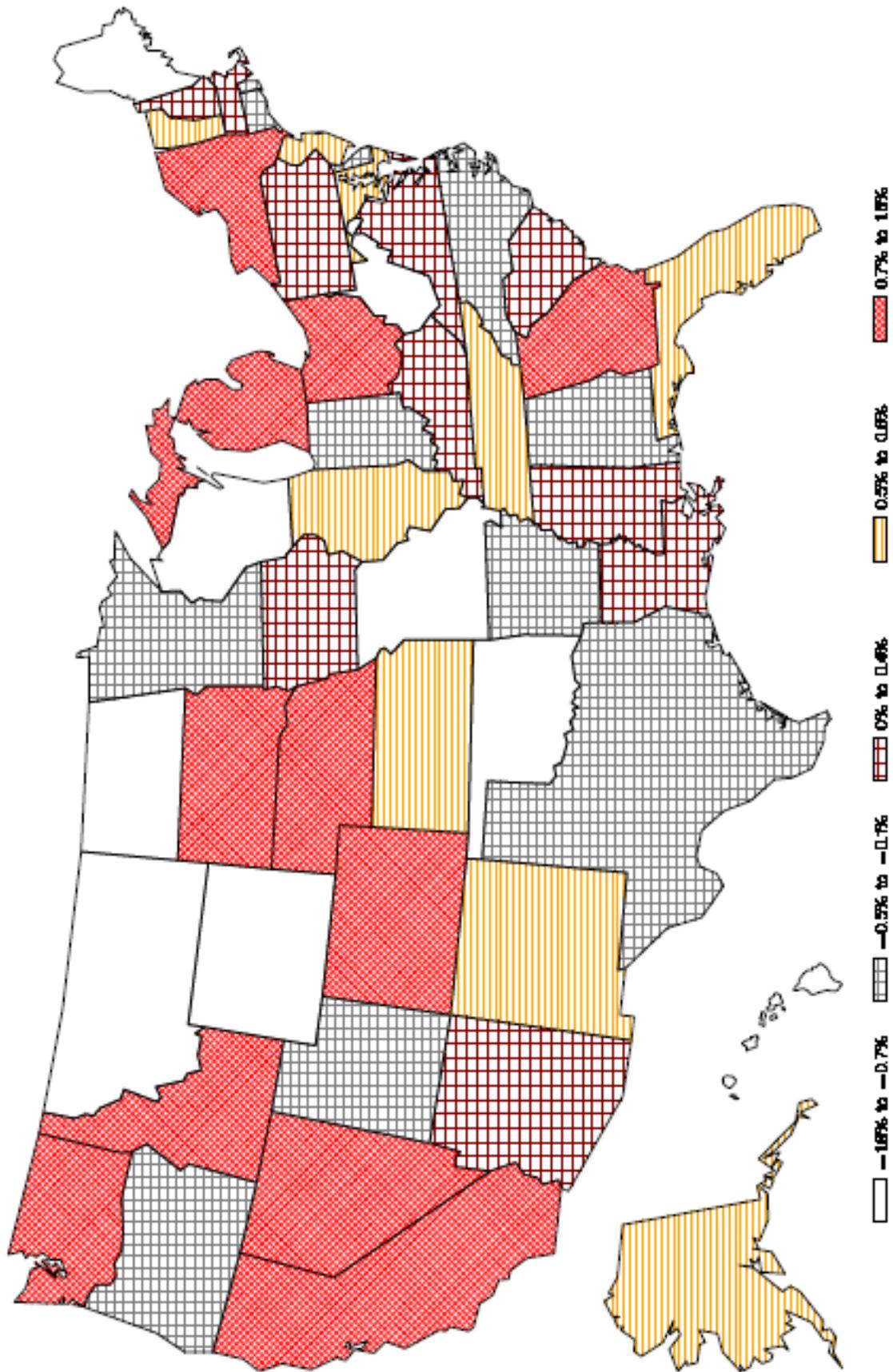
Measure	All MSAs	MSAs grouped by level of total nonfarm employment			
		Less than 100,000	100,000 to 499,999	500,000 to 999,999	1 million or more
Number of MSAs.....	258	132	100	11	15
Average absolute percentage revision.....	1.4	1.7	1.2	1.0	0.8
Range.....	-4.1 to 6.1	-4.1 to 6.1	-3.1 to 4.9	-1.4 to 2.0	-0.5 to 2.6
Mean.....	0.8	0.8	0.8	0.5	0.7
Standard deviation.....	1.7	2.1	1.3	1.2	0.8

<sup>1</sup>The areas included in this table are only unchanged MSAs and NECTAs. MSAs that experienced compositional changes, areas that are new in the 2010 delineations, areas that have been dropped from the 2010 delineations, areas that experienced FIPS code changes (and no compositional change), NECTAs that experienced compositional changed, NECTAs that are new in the 2010 delineations, NECTAs that have been dropped from the 2010 delineations, Metropolitan Divisions, and NECTA Divisions have been excluded.

**Map 1. Percent differences between nonfarm payroll employment benchmarks and estimates by State, March 2014**



Map 2. Percent differences between nonfarm payroll employment benchmarks and estimates by State, December 2014



## Appendix

**Table A1. Areas with compositional changes**

Area Code	Area Title	Area Code	Area Title
10380	Aguadilla-Isabela, PR	37964	Philadelphia, PA
11100	Amarillo, TX	38540	Pocatello, ID
12060	Atlanta-Sandy Springs-Roswell, GA	38660	Ponce, PR
12260	Augusta-Richmond County, GA-SC	39660	Rapid City, SD
13140	Beaumont-Port Arthur, TX	40060	Richmond, VA
13740	Billings, MT	40340	Rochester, MN
13900	Bismarck, ND	40380	Rochester, NY
13980	Blacksburg-Christiansburg-Radford, VA	41180	St. Louis, MO-IL
14010	Bloomington, IL	41540	Salisbury, MD-DE
14020	Bloomington, IN	41620	Salt Lake City, UT
14540	Bowling Green, KY	41884	San Francisco-Redwood City-South San Francisco, CA
16620	Charleston, WV	41980	San Juan-Carolina-Caguas, PR
16740	Charlotte-Concord-Gastonia, NC-SC	43340	Shreveport-Bossier City, LA
16820	Charlottesville, VA	43580	Sioux City, IA-NE-SD
16980	Chicago-Naperville-Arlington Heights, IL	43900	Spartanburg, SC
17140	Cincinnati, OH-KY-IN	44060	Spokane-Spokane Valley, WA
17300	Clarksville, TN-KY	45500	Texarkana, TX-AR
17860	Columbia, MO	45780	Toledo, OH
18140	Columbus, OH	46220	Tuscaloosa, AL
18880	Crestview-Fort Walton Beach-Destin, FL	47020	Victoria, TX
19100	Dallas-Fort Worth-Arlington, TX	47260	Virginia Beach-Norfolk-Newport News, VA-NC
19124	Dallas-Plano-Irving, TX	47380	Waco, TX
19380	Dayton, OH	47580	Warner Robins, GA
19660	Deltona-Daytona Beach-Ormond Beach, FL	47894	Washington-Arlington-Alexandria, DC-VA-MD-WV
21060	Elizabethtown-Fort Knox, KY	47900	Washington-Arlington-Alexandria, DC-VA-MD-WV
21340	El Paso, TX	48620	Wichita, KS
21780	Evansville, IN-KY	48900	Wilmington, NC
22900	Fort Smith, AR-OK	49180	Winston-Salem, NC
23104	Fort Worth-Arlington, TX	70750	Bangor, ME
24340	Grand Rapids-Wyoming, MI	70900	Barnstable Town, MA
24780	Greenville, NC	71650	Boston-Cambridge-Nashua, MA-NH
24860	Greenville-Anderson-Mauldin, SC	71654	Boston-Cambridge-Newton, MA
25060	Gulfport-Biloxi-Pascagoula, MS	71950	Bridgeport-Stamford-Norwalk, CT
25180	Hagerstown-Martinsburg, MD-WV	72104	Brockton-Bridgewater-Easton, MA
26420	Houston-The Woodlands-Sugar Land, TX	72400	Burlington-South Burlington, VT
26580	Huntington-Ashland, WV-KY-OH	72850	Danbury, CT
26820	Idaho Falls, ID	73050	Dover-Durham, NH-ME
26900	Indianapolis-Carmel-Anderson, IN	73104	Framingham, MA
27140	Jackson, MS	73450	Hartford-West Hartford-East Hartford, CT

27180	Jackson, TN	73604	Haverhill-Newburyport-Amesbury Town, MA-NH
28140	Kansas City, MO-KS	74204	Lawrence-Methuen Town-Salem, MA-NH
28940	Knoxville, TN	74500	Leominster-Gardner, MA
29020	Kokomo, IN	74650	Lewiston-Auburn, ME
29180	Lafayette, LA	74804	Lowell-Billerica-Chelmsford, MA-NH
30020	Lawton, OK	74950	Manchester, NH
31140	Louisville/Jefferson County, KY-IN	75404	Nashua, NH-MA
31180	Lubbock, TX	75550	New Bedford, MA
31540	Madison, WI	75700	New Haven, CT
31740	Manhattan, KS	76450	Norwich-New London-Westerly, CT-RI
32820	Memphis, TN-MS-AR	76524	Peabody-Salem-Beverly, MA
33260	Midland, TX	76600	Pittsfield, MA
33460	Minneapolis-St. Paul-Bloomington, MN-WI	76750	Portland-South Portland, ME
34100	Morristown, TN	76900	Portsmouth, NH-ME
34820	Myrtle Beach-Conway-North Myrtle Beach, SC-NC	77200	Providence-Warwick, RI-MA
34980	Nashville-Davidson--Murfreesboro--Franklin, TN	78100	Springfield, MA-CT
35084	Newark, NJ-PA	78254	Taunton-Middleborough-Norton, MA
35380	New Orleans-Metairie, LA	78700	Waterbury, CT
35614	New York-Jersey City-White Plains, NY-NJ	79600	Worcester, MA-CT
35620	New York-Newark-Jersey City, NY-NJ-PA	92812	Kansas City, KS
36260	Ogden-Clearfield, UT	93562	Orange-Rockland-Westchester, NY
37460	Panama City, FL	94783	Northern Virginia, VA
37620	Parkersburg-Vienna, WV		

**Table A2. Areas dropped from CES Publications**

Area Code	Area Title	Area Code	Area Title
11300	Anderson, IN	37380	Palm Coast, FL
11340	Anderson, SC	37700	Pascagoula, MS
19260	Danville, VA	39100	Poughkeepsie-Newburgh-Middletown, NY
20764	Edison-New Brunswick, NJ	41780	Sandusky, OH
21940	Fajardo, PR	49500	Yauco, PR
26100	Holland-Grand Haven, MI		

**Table A3. Areas added to CES Publications**

Area Code	Area Title	Area Code	Area Title
10540	Albany, OR	26140	Homosassa Springs, FL
11640	Arecibo, PR	27980	Kahului-Wailuku-Lahaina, HI
13220	Beckley, WV	33220	Midland, MI
14100	Bloomsburg-Berwick, PA	33874	Montgomery County-Bucks County-Chester County, PA
15680	California-Lexington Park, MD	35100	New Bern, NC
16060	Carbondale-Marion, IL	35614	New York-Jersey City-White Plains, NY-NJ
16540	Chambersburg-Waynesboro, PA	42034	San Rafael, CA
19300	Daphne-Fairhope-Foley, AL	42700	Sebring, FL
20524	Dutchess County-Putnam County, NY	43420	Sierra Vista-Douglas, AZ
20700	East Stroudsburg, PA	44420	Staunton-Waynesboro, VA
20994	Elgin, IL	45540	The Villages, FL
23900	Gettysburg, PA	47460	Walla Walla, WA
24260	Grand Island, NE	48060	Watertown-Fort Drum, NY
24420	Grants Pass, OR	74854	Lynn-Saugus-Marblehead, MA
25220	Hammond, LA	93565	Middlesex-Monmouth-Ocean, NJ
25940	Hilton Head Island-Bluffton-Beaufort, SC	97962	Delaware County, PA

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## **Additional information**

Historical state and area employment, hours, and earnings data are available on the BLS website at [www.bls.gov/sae](http://www.bls.gov/sae). Inquiries for additional information on the methods or estimates derived from the CES survey should be sent by email to [sminfo@bls.gov](mailto:sminfo@bls.gov). Assistance and response to inquiries by telephone is available by dialing (202) 691-6559 during the hours of 8:30 am to 4:30 pm EST and Monday through Friday.