

**ANNUAL WORKFORCE INFORMATION GRANT PERFORMANCE REPORT PY 2015**

September 13, 2016

Washington state is submitting its Workforce Information Grant performance report for Program Year (PY) 2015, as required of grantees under Training and Employment Guidance Letter No. 39-14 (Change 1). This report summarizes accomplishments and challenges and provides recommendations for improvement to workforce information and services.

Washington state has completed the three deliverables required in PY 2015: populating and maintaining the Workforce Information Database (WIDb) with state and local data; producing state and local industry and occupational employment projections; and a statewide annual economic analysis report.

**I. Populating the Workforce Information Database (WIDb) with state and local data**

Throughout the year, the Washington State Employment Security Department's Labor Market and Performance Analysis (LMPA) division continued to populate and maintain the database tables designated as core tables in accordance with guidelines issued by the Analyst Resource Center (ARC).

LMPA has upgraded to version 2.6 of the Workforce Information Database. We completed the upgrade and data production on August 5, 2015. Our agency's IT staff have improved documentation for upgrading and uploading data into the new WIDb, which will reduce delays in the future.

We completed an update of our state licensing information in June 2016, making additions which will provide much richer information for policymakers, stakeholders and the public.

The Infogroup ARC database, which we use to populate our [Find Employers tool](#), was most recently updated in March 2016.

**II. Producing and disseminating industry and occupational employment projections**

[Employment projections](#) provide a general outlook for industry and occupational employment in Washington state. They provide job seekers, policymakers and training providers an idea of how much an industry or occupation is projected to change over time and show the future demand for workers.

On an annual basis, the Employment Security Department produces industry employment projections for two, five and 10 years from a base period. The base period for the two-year (short-term) projections is second quarter 2015. The base

period for the five-year (medium-term) and 10-year (long-term) projections is 2014. Staffing patterns for each industry are used to convert industry projections into occupational projections.

LMPA produced and distributed the industry and occupational [Employment Projections](#) for Washington state and its 12 local workforce development areas (WDAs) in May 2016. We continued our practice of annually updating these three sets of projections—two of which are required under this grant (two- and 10-year) and one of which is required by state law (five-year)—for the state as a whole and the 12 WDAs.

LMPA used a North American Industry Classification System (NAICS)-based historical industry employment time series from January 1990 through June 2015 for this project. However, they have been modified to match the industry definitions used by the U.S. Bureau of Labor Statistics' (BLS) Occupational Employment Statistics (OES) program. These modified industry definitions are called Industry Control Totals (ICTs). The Standard Occupational Classification (SOC) system is used to group occupations.

The Projections Managing Partnership (PMP) methodologies advise forecasters to combine alternative economic forecasting methods and to choose the best fitted model. The “fit” of a model is based on performance measures over the observed time periods. Washington state used this methodological approach, but implemented this based on the most advanced available models and tools. We also used leading economic indicators from IHS Global Insights forecast.

Since last year, the primary software used for forecasting has been R-software (R). R is an open source object-oriented language with advanced statistical and optimization features. It allows programmers to operate directly on vectors and matrices. This creates significant advantages over sequel-based languages, like SAS, when producing occupational projections.

**The following four classes of models were tested:**

1. Exponential smoothing; innovations state space autoregressive model with optimized selection of smoothing parameters (criteria minimum Mean Absolute Percent Error (MAPE)).
2. Auto ARIMA: optimized selection of parameters of ARIMA, seasonal ARIMA, period of seasonality, etc. with regressors (criteria: AIC (Akaike's information criterion)) - this is probably the most sophisticated single equation model available.
3. Naïve regression model which only includes seasonal dummies and time (linear trend) as regressors.
4. Dynamic linear regression model, which includes regressors (the same as for Auto ARIMA), seasonal dummies and linear trend.

**An optimization model was used for creating combined forecasts:**

- “In sample” and “out of sample (hold-out sample)” forecasts for each model class and actual initial series were used for parameters.
- Weights for each of the four model classes were subject to optimization.

- Eight calculated variables (two for each model class) were used to define objective functions, subject to minimization. For each of the models the following were used: MAPE for testing “in full “sample” and MAPE for testing for 24-month “out of sample” (hold-out sample).
- The average between averages of four MAPE’s, for “in sample” and “out of sample” testing was subject to minimization.

LMPA also created change factors for a limited numbers of cells. This was done where state historical series were available and were consistent with the suggested change factors from national files.

LMPA started with aggregated levels of projections, and then used the IHS Global Insight model and inputs from forecasting staff from the Washington State Economic and Revenue Forecast Council.

The aggregated projections were separated into industry and sub-state component parts. To smooth the results, LMPA used basic stability controls for dynamic systems. The flexibility of the R-software models permitted the estimation of the employment impacts of major labor market disruptions, such as plant closings or new plant openings. New this year was the use of an optimization method for adjusting different levels of aggregations.

We continued the process of converting occupational projections into skills projections. This new process attempts to convert occupational projections into skill projections. We rely on the content of employers’ job postings rather than the predefined, general O\*NET skills. The main source for this analysis was a download of the top 100 hard skills for each detailed (six-digit SOC) occupation for Washington state from [WANTED Analytics](#). This year we used a larger three-year sample. This site is available through a contract with the Conference Board Help Wanted OnLine®. While the results of this attempt should be considered as preliminary, we believe that the attempt to use employer identified skills from job postings deserves some attention.

Short-term projections based on old staffing patterns were completed and delivered to the national Projections Central website, according to PMP requirements in February 2016. Short-, medium- and long-term projections, based on new staffing patterns were completed in the fourth quarter of PY 2015 and became available to the public in electronic form in May 2016. The long-term projections were delivered to the national Projections Central website, according to PMP requirements in June 2016. The specific milestones were as follows:

- Updated NAICS-based historical industry employment database – January 2016.
- Produced short-term statewide projections, based on old staffing patterns – February 2016.
- Prepared and balanced NAICS-based short-, medium- and long-term industry projections for the state and all areas – March 2016.
- Prepared NAICS-based staffing pattern; derived from the latest OES survey data – April 2016.
- Prepared short-, medium- and long-term occupational projections – May 2016.

- Populated the Workforce Information Database (formerly ALMIS) and the Employment and Economic Information website with state and WDA projections – May 2016.
- LMPA posted long-term projections to the national Projections Central website, according to PMP requirements – June 2016.

Washington state law ([RCW 50.38.050](#)) requires five-year employment projections by industry and occupation in addition to the two- and 10-year projections required by this grant. LMPA receives state funding in order to produce the five-year projections and other specified labor market information. The grant money is used to produce the two- and 10-year projections. The funding from this grant, along with the five-year projections funding, enabled LMPA to provide Washington’s labor market information customers with a more detailed and comprehensive view of Washington’s economy. This detailed and comprehensive view would not have been possible without the funds from this grant.

**Suggested improvement in projections process, models and tools:**

While projections tools and methods were pretty much up to date at the time when they were developed, there has been continued significant new developments in models and software tools over the past year.

In terms of models, there has been a move away from specified models to optimized selections inside specified classes of models. This has significantly improved the process of selection of the best models for specific time series. In terms of data handling, there has been ongoing and significant improvements made to the object-oriented R software. Occupational projections by their very nature require the use of matrix structures. Object-oriented software not only simplifies this type of programming, but also drastically increases the speed of data processing. R software is constantly being updated with new capabilities.

Our choice of R was driven by the fact that R has more advanced statistical and forecasting options (specifically the well-developed “forecast” package). We think that it would be advantageous to all forecasting efforts and outputs to encourage other states in their use of more up to date methodologies and software tools. We are willing to provide the technical details (including the sharing of the well developed and tested codes for forecasting and data processing) of our projections process.

**III. Annual economic analysis and other reports**

Consistent with this grant and required by state law, LMPA published a detailed annual economic analysis report to provide statewide information for economic policy development, training program planning and resource allocation by the governor, the state Workforce Investment Board (WIB, known as the Workforce Training and Education Coordinating Board), local WIBs (known as Workforce Development Councils), state legislators, as well as other partners including community and technical colleges, economic development organizations and other talent development stakeholders.

The [\*2015 Labor Market and Economic Report\*](#) is an annual overview of Washington state's economy. It includes analyses of employment conditions and trends, unemployment, wages, income and employment projections. The report also devotes greater detail on the seasonal, structural and cyclical aspects of employment and includes economic comparisons with other states.

Throughout the year, LMPA staff conducted special studies and economic analyses at the statewide and local levels. During this reporting period, 638 items were published. These reports and data sets, including publication dates, are available on [Washington state's labor market information website](#), and further detail on specific reports is provided below.

### **Monthly**

- [\*Monthly Employment Report\*](#): Comprehensive, monthly reports on Washington state's job market. We report the unemployment rate statewide and by county, the number of people in Washington's workforce and the number of people employed by industry and county. This report relies on current labor force statistics developed in partnership with the U.S. Bureau of Labor Statistics and is the basis of a major monthly press release on the state's economy.
- [\*Labor area summaries\*](#): Monthly labor area summaries provide labor market information for each of the metropolitan areas and counties in Washington state. This information is screened by LMPA's six regional labor economists who are located around the state and are the primary points of contact for regional labor market information. The labor area summaries provide vital information to decision makers and media, timed according to the monthly release of local labor market statistics by BLS.
- [\*Employer Demand Reports\*](#): Monthly reports reflecting the top 25 skill sets and certifications that employers are looking for in workers, as well as the top 25 occupations and employers. These reports are based on WANTED Analytics and Help Wanted OnLine® data from the Conference Board, which provide a measure of real-time labor demand gathered from online job ads.
- [\*Labor Market Supply/Demand Reports\*](#): The labor market supply/demand reports provide a gap analysis for detailed occupations along with comparisons of online job postings and Employment Security Department data on unemployment insurance (UI) claimants. The annual version takes into account the number of graduates from colleges and universities entering the workforce as well as the number of UI claimants and WorkSource participants.
- [\*Washington Employment Estimates\*](#): This data series provides monthly estimates of nonfarm employment by industry in Washington state. CES survey data and quarterly benchmarked data are provided at the state, metropolitan area and county levels.
- [\*Unemployment Benefits Report\*](#): Monthly unemployment benefits reports by legislative district, congressional district and county, as well as monthly reports on federally funded extended benefits and outstanding loan balances from the federal unemployment insurance trust fund.

- [Labor Force](#): Local area unemployment statistics are monthly estimates of the labor force including employment, unemployment and unemployment rates statewide, by county and by metropolitan area.

### Quarterly

- [Business Employment Dynamics](#): A national and state view of changes to businesses and the job market.
- [Unemployment Insurance Trust Fund Forecast](#): This report provides the status and updated projections of the state's unemployment insurance trust fund.
- [Covered Employment \(QCEW\)](#): Industry employment and wage data from employer tax records.
- [WorkSource System Performance Reports](#): The WorkSource system performance dashboards provide data and analysis for the state's WorkSource system. The LMPA division produces them for the state and its 12 individual workforce development areas (WDAs). The statewide dashboard contains the performance indicators and data for each quarter.

### Annually

- [Learn about an occupation](#): This tool distinguishes among occupations as “in demand,” “balanced” and “not in demand” across the state and within individual WDAs. We evaluate short- and long-term employment projections to determine whether employment opportunities in more than 800 occupations are expected to increase or decrease. The local workforce development councils then review, adjust and approve that initial list on the basis of their local, on-the-ground experience. The list is used to determine eligibility for a variety of training and support programs. During PY 2015, we continued to make improvements to the information available for each specific occupation by area, making it easier for job seekers to directly connect to job postings and further details on occupation and training options. *This tool is the most visited page on LMPA's website.*
- [Find employers](#): LMPA's website allows users to find contact information for more than 315,000 employers in Washington state. Users can search by area for an industry or occupation or employer name. Since identifiable information gathered through the U.S. Bureau of Labor Statistics is strictly confidential, this information is provided by Infogroup. *This tool is the second most visited page on LMPA's website.*
- [Labor Market and Economic Report](#): Provides an annual overview of Washington state's economy (discussed in more detail above).
- [Agricultural employment and wages](#): LMPA's website allows users to find information on agricultural employment and wages in Washington state, including:
  - [Covered employment and wages in agriculture](#): covered agricultural employment over time; regional patterns in covered agricultural employment; estimated seasonal and nonseasonal covered employment;

seasonal employment by industry subsector; seasonal employment by agricultural reporting area; and wages by agricultural reporting area and industry subsector.

- [\*Prevailing wages and practices in Washington\*](#): an overview of the federal agricultural recruitment system; establishing prevailing wages; establishing prevailing and normal or common practices; certified H-2A applications in Washington; prevailing wages in Washington; and prevailing and normal or common practices in Washington.
- [\*Employment Projections\*](#): Two-, five- and 10-year industry and occupational projections (discussed in more detail above). Users have access to a report based on the projections, detailed methodology information and detailed data tables for the three sets of projections.
- [\*County Profiles\*](#): County profiles highlight aspects of the economic health of each of Washington's counties. The facts and figures are useful for grant applications, strategic planning, economic development and other research projects. We compose each county profile using data we collect and data from the U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis, U.S. Census Bureau, Washington State Department of Revenue, Washington State Office of Financial Management and other resources.
- [\*Occupational Employment and Wage Estimates\*](#): Our Occupational Employment and Wage Estimates are counts of workers and entry-level, average and experienced-worker wage estimates for more than 800 occupations. Data are displayed statewide, by metropolitan statistical area and nonmetropolitan areas.
- [\*Median and Average Hourly Wage Report\*](#): The median and average hourly wage report are hourly and annualized wage estimates for the state as a whole and by county. The tables include annual data going back to 1990 for the state and each county. Unadjusted, inflation-adjusted and annualized data are listed, as well as a breakout for the private sector.
- [\*Distressed areas list\*](#): LMPA produces the list of distressed areas—counties where the three-year unemployment rate is at least 20 percent higher than the statewide average—to assist users with identifying areas that may qualify for certain publicly funded programs to spur job growth and economic development.
- [\*EB-5 investor targeted employment areas\*](#): LMPA identifies the list of counties that qualify as targeted employment areas—where unemployment is at least 50 percent higher than the national rate—to assist users with identifying areas that may qualify for special exceptions under the federal EB-5 foreign investment program. The Employment Security Department also provides additional technical assistance, if requested, for information on sub-county geographic areas.
- [\*Training Benefits Report\*](#): Annual report to the Washington State Legislature providing an update on the unemployment insurance [\*Training Benefits Program\*](#). The Training Benefits Program pays extended unemployment benefits to eligible participants while they attend approved training to learn new job skills. The report is based on a survey of Training Benefits participants, unemployment insurance administrative data, and community and technical college enrollment data.

- [Establishment Size Report](#): Establishment size data provide a count of establishments and their size class based on their number of employees for each county. We tabulate the number of establishments by size class, industry sector and subsector by county for the state.
- [Self-Employment Assistance Program Report](#): The purpose of the Self-Employment Assistance Program (SEAP) is to assist eligible unemployed individuals in creating new businesses and job opportunities across Washington state. In this study, we analyze the effects of SEAP training on participants' self-employment, wage and unemployment benefits.
- [Green Economy Jobs Report](#): The Green Economy Jobs Report provides a complete overview of private and public sector green jobs in Washington state. Topics include education and experience requirements, necessary job skills and industries with green jobs.

#### **IV. Customer consultations**

LMPA has maintained multiple methods of collecting feedback from customers regarding their use of and need for labor market products and services. Methods for collecting data on customers' use of labor market products and services include web analytics and automated tracking of ad hoc requests.

LMPA uses customer feedback to improve both its deliverables and its delivery system. To assist customers in accessing and understanding labor market information posted on its labor market information website, the LMPA division maintains a Labor Market Information Center with an [online interface](#). Trained individuals staffing that center can assist clients in locating the appropriate information and answer questions about it. We have also created a [short video](#), placed on our main landing page, which moves through the website and describes its contents.

LMPA provides training to the WorkSource centers in order to facilitate a better understanding of the current tools available, how to use them, and information on new products which are then transmitted to their customers. In effect, this gives LMPA a larger impact by having the WorkSource centers play a key role in making labor market information more accessible around the state.

LMPA solicits input from WorkSource (Washington's One-Stop system) and WDC managers and other customers on the regional labor economists' performance of their responsibilities. That feedback is taken into account in individuals' performance evaluations, as well as broader planning for products and services.

#### **V. Activities undertaken to meet customer needs**

LMPA has further developed the use of The Conference Board's Help Wanted OnLine® data to meet our customers' needs. We have developed monthly [Labor Market Supply/Demand Reports](#), which provide a comparison of online job postings and the Employment Security Department's data on unemployment insurance claimants and WorkSource participants. The data is organized by WDA and occupation category. These reports provide a measure of real-time labor demand

gathered from online job ads, and combine that with what we know about individuals currently looking for work with relevant experience. The annual version of the supply/demand report takes into account the number of graduates from colleges and universities entering the workforce as well as the number of UI claimants and WorkSource participants.

Given the importance of the [Learn about an occupation tool](#) to our customers, we make updates to the information for each specific occupation by area on an annual basis, making it easier for job seekers to directly connect to further details on the occupation and training options. As in years past, the Learn about an Occupation tool is the most frequently visited portion of LMPA's website in PY 2015.

LMPA presented our [annual economic symposium](#) in October 2015. We developed an agenda that featured a panel of employers giving their perspectives on workforce needs. Economists also spoke on the state of the state's labor market and finding the gap in comparing real-time employer demand, occupational projections and the labor market supply. A preview of our new website design was also presented featuring improved data visualization tools using Tableau software.

## **VI. New tools and resources**

LMPA has further developed the use of The Conference Board's Help Wanted OnLine® data to meet our customers' needs. We have developed monthly Labor Market Supply/Demand Reports, which provide a comparison of online job postings and the Employment Security Department's data on unemployment claimants and WorkSource job seekers. The data is organized by WDA and occupation category. These reports provide a measure of real-time labor demand gathered from online job ads, and combine that with what we know about individuals currently looking for work with relevant experience.

In PY 2015, LMPA launched a [new website](#) to improve our delivery of labor market information. The new site, launched in April 2016, is integrated into [www.esd.wa.gov](http://www.esd.wa.gov), making it easier for job seekers, businesses, policy makers, and our partners throughout the state to find key data that enable well-informed decisions about the labor market.

Before we could improve the old website, we knew we needed to step outside and take a fresh look. We began by gathering customer input. We gathered information primarily through conversations and interactions with our customers. We compared notes: What data do different types of customers need the easiest access to, and what do they use this information for? Does the current navigation logic make sense to visitors, and how could we improve it? We worked together to create a design that would be more intuitive, with a goal of improving accessibility to labor market information.

We all experience the economy locally, and decision makers want to find data and information specific to their location. Based on feedback from multiple customers statewide, we built an interactive map on our home page. If you click on your county, you go to a county-specific homepage that includes a display of some frequently cited indicators, along with a menu of county-specific information. Each page has a county profile and links to datasets for sub-state geographies, including counties and Metropolitan Statistical Areas (groups of counties associated with an

urbanized area). We also developed data visualizations using Tableau software. Visualizations allow visitors to immediately start engaging with the data. We will continue to develop and refine this site based on customer feedback.

## VII. Efforts to create and support partnerships and collaborations

### *Regional labor economists*

LMPA's six regional labor economists continued to work with local partners, including workforce development councils, economic development councils, WorkSource Centers and legislative entities, to better understand local labor markets and effectively communicate that information to customers with varying degrees of knowledge and expertise. The regional labor economists, who are located in WorkSource centers, worked throughout the year with these local partners to identify their specific needs and tailor information and services to meet those needs. The services included periodic economic briefings on changes in local labor market conditions, training on occupational and career information and tools, and input and technical assistance with local strategic planning. In PY 2015 their contacts by customer type broke out as follows:

- Workforce organization/councils 22.6%
- Media – newspaper, radio, TV 20.5%
- Government agency 18.4%
- Business/business association 11.5%
- Educational institution 10.0%
- Economic development organization 6.6%
- Other customers 10.5%

### *Occupations in Demand*

On an annual basis, LMPA and the local Workforce Development Councils (WDCs) have continued to partner on an Occupations in Demand list, which is used for determining individuals' eligibility for a variety of training and support programs and populates our website's [Learn about an occupation tool](#). LMPA initiates the annual process by distinguishing among occupations that are "in demand," "balanced" and "not in demand" on the state and WDA level. The WDCs then review, adjust and approve that initial list on the basis of their local, on-the-ground experience. As changes in economic conditions effected occupational demand, the LMPA economists and WDC staff worked together to update the list to reflect current occupational demand and supply conditions. In accordance with state law, the WDCs are responsible for changes to the list throughout the year, with which LMPA's regional labor economists provide technical assistance as requested.

### *Sharing Data*

LMPA has served as a leader amongst Washington's state agencies in supporting and developing an open data portal. In addition, we have extensive data-sharing agreements with other state and local government agencies, planning councils, education institutions and research centers. Our [data-sharing request page](#) includes

an online request form, sample data-sharing agreements, eligibility criteria and definitions of confidential data. Our site has already served as a model for other states in developing similar online resources for their customers.

#### *One-Stop management reports*

Our division continues to publish performance measures and has introduced [Labor Market Supply/Demand Reports](#) for our state's WorkSource (One-Stop) system. The labor market supply/demand reports represent comparisons of online job postings and data on unemployment insurance claimants and WorkSource participants. The data is organized by WDA and occupation category.

The quarterly performance dashboards provide meaningful data and analysis to WorkSource system leaders in order to develop better customer service strategies. Every customer using this information is speaking the same performance language, from the U.S. Department of Labor (DOL) and our Governor to the Workforce Development Council (WDC) board members and contractors.

#### *Performance*

LMPA has continued to take a leadership role for developing and maintaining outcome measures and leading indicators for each of the agency's four goals. The Executive Leadership Team relies on our knowledge and insights to guide what we measure and why. That is both a great opportunity and responsibility.

#### *WIOA implementation*

LMPA has provided full support of Washington's WIOA implementation efforts. The LMPA director and System Performance manager have both served on subcommittees and task forces convened by the state workforce board, particularly focused on performance.

The LMPA director serves as one of four Labor Market Information director members of the Workforce Information Advisory Committee established in WIOA. She adds this to her long-standing commitments with the National Association of State Workforce Agency's Labor Market Information Committee.

### **VIII. Activities to leverage LMI-WI funding**

LMPA continues to actively collaborate and partner in [Washington's Statewide Longitudinal Data System \(SLDS\)](#) grant by sharing weekly unemployment insurance (UI) claims information, UI wage records and Labor Exchange Reporting System (LERS) files. This partnership is further enhanced with funding from a "round five" [Workforce Data Quality Initiative \(WDQI\)](#) grant. The state's [Education Research and Data Center](#) (ERDC), which leads Washington's SLDS, will continue under WDQI to refine requirements for analytical data marts that link education and workforce data to better serve research and policy analysts.

LMPA's deliverables related to WDQI will enhance job seekers', employers' and policy makers' abilities to make informed decisions. The first deliverable is a research project on labor supply to determine the source of employees for new and expanding employers and the destination of employees from declining industries and employers. Previous work done for the [2015 Training Benefits Net-impact study](#) has informed the data extraction and structure for the labor supply research which is

using UI wage files from both Washington state quarterly wage files and Wage Record Interchange System (WRIS) 2 for out of state wage information. A second research deliverable is a study of workforce data quality and completeness which will document the availability of workforce data over time and geography, changes in variable definitions over time and inconsistencies in data definitions and measurements.

## **IX. Recommendations to the Employment and Training Administration for changes and improvements to WIG requirements**

We encourage the Employment and Training Administration (ETA) to continue their much needed and appreciated support for the infrastructure essential to developing short- and long-term employment projections, which includes everything from the Local Employment and Wage Information System (LEWIS), to the Analyst Resource Center (ARC), to the new replacement methodology.