AGENDA
Forecast Advisory Committee
Thursday, January 11, 2018     3:00 p.m. – 4:30 p.m.
Thurston Regional Planning Council
Conference Room A, 1st Floor
2424 Heritage Court SW, Suite
Olympia, WA  98502-6031

1.  3:00 – 3:10 10 mins  Introductions
2.  3:10 – 3:40 30 mins  Office of Financial Management (OFM) Population Forecast Overview
3.  3:40 – 4:00 20 mins  Comparison of OFM and TRPC’s Previous Forecast
4.  4:00 – 4:20 40 mins  Employment Forecast – Review of Changes
5.  4:20 – 4:30 10 mins  Next Steps

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MEMORANDUM

TO: Population and Employment Forecast Advisory Committee

FROM: Veena Tabbutt, Research and Data Director

DATE: January 4, 2018


PURPOSE

Receive presentation on Office of Financial Management's updated countywide population forecast and review changes to the countywide employment forecast.

Summary:

- TRPC is updating the population and employment forecast for Thurston County.
- The first stage in this process is the update of the countywide employment and commute forecast.
- The forecast advisory committee met in November 2017 to review the countywide employment forecast. Their suggestions were incorporated into the final forecast.
- The final 2017 Employment Forecast is 0.8 percent higher than the 2012 Forecast for the year 2025, but is 3.2 percent lower than the 2012 Forecast for the year 2040. The main reason for the adjustment is differences in the Office of Financial Management's forecast of statewide employment, and an update of the regression-based formulas used for to forecast Thurston County employment.
- The state Office of Financial Management (OFM) completed an update of their county-level population forecast in late December 2017. TRPC staff coordinated with OFM throughout their update, and the updated forecast mirrors the changes in TRPC’s employment forecast.
- The final stages of the forecast are determining the distribution of population and employment to cities, neighborhoods, and planning areas. These stages are anticipated to be complete by the end of 2018.
Office of Financial Management’s County-level Population Forecast

The Office of Financial Management (OFM) released their updated county-level forecasts in late December 2017. TRPC staff coordinated with OFM as they developed their forecasts.

Yi Zhao, OFM’s chief demographer with the Forecasting and Research group will discuss the forecast methodology with the Advisory Committee.

Comparison of OFM and TRPC’s Previous Forecast

In the past TRPC has developed their own countywide population projections for Thurston County. Due to difficulties in obtaining statistically significant migration and commute data from the Census, TRPC staff will recommend using OFM’s Medium forecast for the Thurston county population forecast. TRPC will continue to develop the Thurston county employment forecasts, and the distributions of both population and employment to smaller areas within the county, such as cities and school districts.

![Population Projection Comparison (2010 to 2020)](image)

Both OFM’s 2012 Medium and TRPC’s 2012 population projections have been tracking well with actual growth. TRPC’s 2012 projection is slightly higher than actual growth, and OFM’s 2012 Medium projection was slightly lower than actual growth. OFM’s updated 2017 Medium projection is very similar to TRPC’s 2012 projection through 2020.

Beyond 2020-2025, OFM’s Medium projection reflects a slower rate of growth compared to TRPC’s 2012 projections. This is in alignment with TRPC’s updated draft 2017 employment forecast, which projects a slower rate of growth beyond 2025 than the previous forecast.
DISCUSSION POINT: TRPC staff are recommending the region use OFM's 2017 Medium population forecast, extended to 2045, as the updated Thurston County countywide forecast. TRPC staff will allocate the countywide population forecast to small areas (cities, planning areas) in the next phase of the forecast update.
MEMORANDUM
Page 4
January 4, 2018

Employment Forecast – Review of Changes

The following is a summary of input from the forecast advisory committee provided during meeting one, and subsequent changes to the employment forecast.

**Employment Forecast**

Themes that developed from the conversation:

1. Freight is, and will likely continue to be, a fast-growing sector. Several factors play into this:
   a. There are currently plans for a large employer to locate in Hawks Prairie – probably 100+ employees
   b. Overall there is a shift from brick and mortar retail, and increase in online sales, which makes freight transportation a growing sector
   c. Industrial sites in Thurston County have better freeway access, and relatively less congestion means there is less time navigating the local roads

There is, however, a question of land supply for future warehouses, especially as Hawks Prairie builds out.

The employment in the sector was increased to 10 percent (to account for 100 additional employees plus general growth between 2015 and 2020. After 2020, growth was set at 5 percent for each five-year interval.

![Freight Transportation](image)

*Updated Freight Transportation forecast*
2. Thurston County’s role as a health care hub continues to expand, even as finding people to fill the jobs continues to be an issue. One of the questions raised by a committee member was regarding the effect the aging baby boom will have on health care within the forecast horizon.

![Population Pyramid](image)

Based on the age cohorts charts developed by the Office of Financial management, by 2040, the county will continue to trend towards an older demographic. This will continue to drive growth in the health services industry.

3. Technology in manufacturing and other sectors. The committee discussed the increased automation of manufacturing and warehousing that results in a decrease in jobs, with a corresponding increase in information technology (IT) jobs to run the computers. IT employment falls into the Professional and Business Services category, which is already projected to be one of our fastest growing sectors. Therefore, the forecast was not adjusted, however the discussion was captured in the forecast documentation.
4. The relationship of state government (minus higher education) and professional and business services. The committee observed that during the Great Recession state employment decreased, but the state still had to provide services to the public, therefore many of the services were spun off to the private industry. During that time period (2008-2015) there was a decrease in state employment, and a rapid increase in employment in the professional and business services sector. A committee member also asked for further clarification on what was included in this sector. A summary of the discussion and greater detail on this sector was included in the forecast documentation.

After the committee meeting, TRPC staff looked at the relationship between the two sectors. Before the passage of Initiative 601, which capped growth in state government employment, a greater number of jobs were added to state government compared to the professional and business services sector. This changed after the passage of Initiative 601. The difference was even more acute during the Great Recession.

Comparison of growth in the state government and professional and business services sectors

![Graph showing state government and professional and business services growth](image)

<table>
<thead>
<tr>
<th>Time Period</th>
<th>State Government (minus Higher Education)</th>
<th>Professional and Business Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before I-601</td>
<td>1980-1993</td>
<td>6,669</td>
</tr>
<tr>
<td>After I-601 to Great Recession</td>
<td>1993-2008</td>
<td>3,926</td>
</tr>
<tr>
<td>From start of Great Recession</td>
<td>2008-2015</td>
<td>-819</td>
</tr>
</tbody>
</table>

While there was a rise in the professional, scientific, and technical services subsector (19 percent; 650 jobs) between first quarter 2008 and first quarter 2016, which may have been caused by the state contracting out technical services, this was not the subsector that accounted for majority of growth in the professional and business services sector. By far, the fastest growing subsector was administrative and support services, which grew by 72 percent (compared to a growth rate between 16 and 20 percent for the other three subsectors). The main reason for this was a rise in employment in temporary help services (temp agencies) during the Great Recession.
General Categories for the Professional and Business Services Sector

1. Professional, scientific, and technical services. Industries in the professional, scientific, and technical services subsector group establishments engaged in processes where human capital is the major input. These establishments make available the knowledge and skills of their employees, often on an assignment basis, where an individual or team is responsible for the delivery of services to the client.

2. Management of companies and enterprises. This sector includes three main types of establishments:
   - Those that hold the securities of (or other equity interests in) companies and enterprises
   - Those (except government establishments) that administer, oversee, and manage other establishments of the company or enterprise but do not hold the securities of these establishments
   - Those that both administer, oversee, and manage other establishments of the company or enterprise and hold the securities of (or other equity interests in) these establishments

3. Administrative and Support Services. This sector includes establishments engaged in activities that support the day-to-day operations of other organizations. The processes employed in this sector (e.g., general management, personnel administration, clerical activities, cleaning activities) are often integral parts of the activities of establishments found in all sectors of the economy.

5. A forecast committee member asked what accounted for the change in manufacturing shown in Figure 11. The rise in minerals/metals/furniture (from 8 percent to 47 percent) was largely the result of the growth of one firm – a glass manufacturer. The caption for the figure was updated.

![Figure 11: Changes in the manufacturing sector. Manufacturing in Thurston County has changed over the decades. Sectors such as wood products and beverages have reduced, while minerals, metals, and furniture (such as glass manufacturers) have grown.](image)

6. Retail Services: The committee discussed the changes in retail services, especially as it pertains to brick and mortar buildings. There was general agreement that the need for new retail space may decrease, but vacancies could be absorbed by other businesses such as services. As there didn’t seem to be any major concern about the draft retail trade forecast, it was not adjusted. The discussion was captured in the forecast documentation.

7. The committee discussed the difficulties of finding the workforce to fill jobs in high-growth sectors such as health services or construction, or in specialized industries such as manufacturing. One of the issues is that much of the workforce is now hitting retirement age, and there isn’t a sufficient supply of people entering the workforce to replace them. The value of apprenticeships and partnerships with school districts and higher education was discussed. In particular, the workforce for home builders is very constrained as people with experience are hitting retirement age, and the recession caused many local firms to go out of business.

8. There was a general discussion of how the region was diversifying, and that the influence of the state government sector was decreasing. It was noted, however, that the decisions the state makes on whether to build or lease new buildings, and where to site them, has a tremendous impact on our communities and land use. Woodland District in Lacey is an example where the state leased buildings for their useful life, then relocated employees to state-owned buildings, mainly on Capitol Campus. This left the Woodland District with a very large vacancy rate and large buildings that are difficult to fill. The state continues to build new, large buildings, that have additional vacant space, so the trend of empty formerly leased buildings is likely to continue.
Commute Forecast

The discussion around the commute forecast centered around the following topics:

1. The explosive growth in King County will ripple down to Pierce County, which in turn will ripple down to Thurston County.
2. Technology, such as autonomous vehicles, is not likely to have a large effect within the forecast horizon.
3. Telecommuting seems to be decreasing based on some national trends, rather than increasing.
4. We’re not likely to see any large regional offices in Thurston County. We are more likely to see smaller companies, especially specialized companies that combine to provide a range of services. Newer trends such a co-located work space may not be a large factor in suburban Thurston County.

The commute forecast was finalized after the release of the Office of Financial Management’s countywide forecasts.

Age Cohorts

Committee members asked how Thurston County’s age cohorts compared to the state and other counties. The following is a brief summary:
Thurston County, with 1.97% growth in 2015 ... looks like the state as a whole

And like our high growth neighbors

Pierce, 1.73% growth

Snohomish, 2.01% growth

But unlike our lower growth neighbors

Grays Harbor, -0.40% growth

Lewis, 0.30% growth

[Diagram showing population distribution by age and gender for each county]
MEMORANDUM
Page 11
January 4, 2018

Thurston has a more pronounced baby boomer ‘bump’ than King:

Comparing Thurston 2015 to the Thurston 2040 Forecast

Baby Boomers (age 76+)
Born 1946 - 1964

Age 51-69
Born 1971 - 1989

Age 20-38
Born 2002 - 2020
Next Steps


TRPC Adoption: TRPC adopts updated countywide forecasts in March 2018.

Advisory Committee Meeting Three – mid-year 2018 – Review Land Supply Assumptions

Advisory Committee Meeting Four – fall 2018 – Review draft Population Allocations

Advisory Committee Meeting Five – late fall 2018 – Review draft Employment Allocations.

TRPC Review and Adoption of forecast allocations in late 2018, early 2019.
TRPC
Countywide Employment and Commute Forecast

Population and Employment Forecast for Thurston County

Thurston County In-bound and Out-bound Commuters
2006-2010 Average

Outbound  Inbound
1,000     1,000
5,000     5,000
10,000    10,000

January 4, 2018
**THURSTON REGIONAL PLANNING COUNCIL (TRPC)** is a 22-member intergovernmental board made up of local governmental jurisdictions within Thurston County, plus the Confederated Tribes of the Chehalis Reservation and the Nisqually Indian Tribe. The Council was established in 1967 under RCW 36.70.060, which authorized creation of regional planning councils.

TRPC’s mission is to “Provide Visionary Leadership on Regional Plans, Policies, and Issues.”

**To Support this Mission:**

A. Support **regional transportation** planning consistent with state and federal funding requirements.
B. Address **growth management, environmental quality, economic opportunity**, and other topics determined by the Council.
C. **Assemble** and **analyze data** that support local and regional decision making
D. Act as a “**convener**” to build regional **consensus** on issues through information and citizen involvement.
E. Build **intergovernmental consensus** on regional plans, policies, and issues, and advocate local implementation.

**2017 MEMBERSHIP**

**THURSTON REGIONAL PLANNING COUNCIL**

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<tr>
<th>Governmental Jurisdiction</th>
<th>Name of Representative</th>
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<tr>
<td>City of Lacey</td>
<td>Virgil Clarkson, Councilmember</td>
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<td>City of Olympia</td>
<td>Nathaniel Jones, Councilmember</td>
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<td>City of Rainier</td>
<td>George Johnson, Councilmember</td>
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<td>City of Tenino</td>
<td>David Watterson, Councilmember</td>
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<td>City of Tumwater</td>
<td>Tom Oliva, Councilmember</td>
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<td>City of Yelm</td>
<td>JW Foster, Mayor</td>
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<tr>
<td>Confederated Tribes of the Chehalis</td>
<td>Amy Loudermilk, Staff</td>
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<td>Reservation</td>
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<td>Nisqually Indian Tribe</td>
<td>Alan Vanell, Councilmember</td>
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<td>Town of Bucoda</td>
<td>John Hutchings, County Commissioner</td>
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<tr>
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<td>Chuck Namit, School Board Member</td>
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<tr>
<td>North Thurston Public Schools</td>
<td>Justin Montermini, School Board Member</td>
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<td>Mel Murray, Staff</td>
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<td>Tumwater School District</td>
<td>Karen Messmer, Authority Member</td>
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<td>Intercity Transit</td>
<td>Cynthia Pratt, Board Member</td>
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<td>LOTT Clean Water Alliance</td>
<td>Joe Downing, Port Commissioner</td>
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<td>Port of Olympia</td>
<td>Russell Olsen, PUD Commissioner</td>
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<td>PUD No. 1 of Thurston County</td>
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**Associate Members**

- Economic Development Council of Thurston County: **Michael Cade**, Executive Director
- Lacey Fire District #3: **Gene Dobry**, Commissioner
- Puget Sound Regional Council: **vacant**
- Timberland Regional Library: **Cheryl Heywood**, Library Director
- The Evergreen State College: **Jeanne Rynne**, Director of Facilities Services

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<th>Vice Chair</th>
<th>Secretary</th>
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<td>Nathaniel Jones, City of Olympia</td>
<td>JW Foster, City of Yelm</td>
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Marc Daily, Executive Director
### Population and Employment Forecast
#### Advisory Committee
#### 2017-2018

<table>
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<th>Organization/Jurisdiction</th>
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<tr>
<td>Allison Osterberg</td>
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<tr>
<td>Andy Ryder</td>
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<tr>
<td>Angela White</td>
<td>Olympia Master Builders</td>
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<td>Christy Osborne</td>
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<td>Clarita Mattox</td>
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<td>Clark Gilman</td>
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<td>David Ginther</td>
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<td>David Schaffert</td>
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<td>Jeremy Davis</td>
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<td>Jonathan Stephenson</td>
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<td>Katrina Van Every</td>
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<td>Kevin Pestinger</td>
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<tr>
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Acknowledgments

The Thurston Regional Planning Council wishes to thank the many public agencies that have provided source data and information in this edition of the Population and Employment Forecast. In particular, we wish to thank the Washington Department of Employment Security, Labor Market and Economic Analysis Branch, the Washington Department of Enterprise, and the Washington Office of Financial Management.

Thurston Regional Planning Council has been providing population and employment forecasts for Thurston County since the late 1960s.

For More Information

Contact Veena Tabbutt, Research and Data Director, Thurston Regional Planning Council, (360) 956-7575, or email at tabbutv@trpc.org.
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# Table of Contents

Summary .................................................................................................................................................. 1

Introduction ......................................................................................................................................... 3

  MODELING HISTORY .......................................................................................................................... 3
  RELATIONSHIP TO GROWTH MANAGEMENT ACT ........................................................................... 5
  HOW THE FORECASTS AND FORECAST MODELS ARE USED ................................................................. 6
  STRUCTURE OF THE FORECAST MODEL ............................................................................................... 7
  ASSUMPTIONS ..................................................................................................................................... 8

Historic Employment Trends ..................................................................................................................... 9

  OVERVIEW .......................................................................................................................................... 9
  THE 1970S .......................................................................................................................................... 10
  THE 1980S .......................................................................................................................................... 10
  THE 1990S .......................................................................................................................................... 11
  THE 2000S .......................................................................................................................................... 12
  THE 2010S .......................................................................................................................................... 12
  WHAT WILL THE FUTURE BRING? ......................................................................................................... 14

Countywide Employment Forecast ........................................................................................................... 15

  COMPARISON WITH PREVIOUS FORECAST ............................................................................................ 17
  METHODOLOGY .................................................................................................................................... 18
  RELIABILITY OF THE ECONOMETRIC MODEL ....................................................................................... 20

Employment Forecasts by Sector .............................................................................................................. 21

  RESOURCES AND UTILITIES .................................................................................................................. 21
  CONSTRUCTION .................................................................................................................................. 22
  MANUFACTURING ................................................................................................................................. 23
  WHOLESALE TRADE, TRANSPORTATION, AND WAREHOUSING ............................................................. 25
  RETAIL TRADE .................................................................................................................................... 26
  FINANCE, INSURANCE, REAL ESTATE ....................................................................................................... 27
  INFORMATION ..................................................................................................................................... 28
  PROFESSIONAL AND BUSINESS SERVICES .......................................................................................... 29
  EDUCATION, HEALTH, AND SOCIAL SERVICES ...................................................................................... 31
  ARTS, ENTERTAINMENT, AND RECREATION .......................................................................................... 33
  ACCOMMODATIONS AND FOOD SERVICES ........................................................................................... 34
  OTHER SERVICES ................................................................................................................................. 34
  STATE GOVERNMENT ............................................................................................................................ 35
  FEDERAL GOVERNMENT ......................................................................................................................... 38
  LOCAL AND TRIBAL GOVERNMENT ........................................................................................................ 39
  TRIBAL ENTERPRISES ............................................................................................................................ 40

Commute Forecast ................................................................................................................................... 41

  COMMUTE TRENDS ............................................................................................................................... 41
  COMMUTE ASSUMPTIONS ....................................................................................................................... 45
  COMMUTE FORECAST ............................................................................................................................. 49

Appendix I: Thurston County Employment and Commute Forecast ........................................................ 50

Appendix II: Sources of Employment Data ............................................................................................... 52

Appendix III: Detailed Forecast ................................................................................................................. 55
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Summary

The Thurston Regional Planning Council (TRPC) develops updated population and employment forecasts every three to five years. These forecasts are used for transportation, sewer, water, land use, school, and other local governmental planning purposes. They are also used by the private sector for market studies and business planning. Forecasts are developed for both the county level and the neighborhood level. TRPC has been preparing these forecasts since the late 1960s. This report documents the 2017 countywide employment forecast update.
Introduction

Modeling History

Over the past four decades, Thurston County has experienced one of the highest growth rates in the nation. This growth has generated a need for new schools and hospitals, and prompted major investments in water, sewer, and transportation facilities. As these investments are expensive and must be planned many years in advance, forecasts of future population growth and its distribution are used to estimate where and when new facilities will be needed. For this reason, the Thurston Regional Planning Council (TRPC) has prepared population and employment forecasts periodically since 1969. Local jurisdictions, however, were not required to use the figures for the purposes of developing comprehensive planning documents and capital facilities plans prior to 1990.

This all changed with the passage of Senate Bill 2929 in 1990, known as the Growth Management Act, which required that certain fast-growing counties plan for the future in a very specific and prescribed manner.

The key provision in the Growth Management Act required that the state Office of Financial Management prepare a twenty-year population forecast for each county in the state. Counties required to plan are directed that:

“Based upon the population forecast made for the county by the Office of Financial Management, the urban growth areas in the county shall include areas and densities sufficient to permit the urban growth that is projected to occur in the county for the succeeding twenty-year period.”

In 1992 Thurston County, in consultation with the cities and towns, adopted the Countywide Planning Policies. One provision in these policies was that:

“The state Office of Financial Management growth management planning population projections for Thurston County will be used as the range of population to be accommodated for the coming 20 years.

Within the overall framework of the OFM population projections for the County Thurston Regional Planning Council will develop countywide and smaller area population projections, pursuant to RCW 36.70A.110 and based on current adopted plans, zoning and environmental regulations and buildout trends.”

The 1992 forecast was the first to incorporate data from the 1990 Census, along with other new information. A round of military base closings elsewhere in the nation was leading to increased troop levels at Fort Lewis. The countywide model was updated to incorporate revised assumptions for off-base military personnel and their families living in Thurston County. Also in 1992, the population allocation model was used to evaluate the effects of land use policy alternatives. The major question was whether the community’s 1988 urban growth areas would meet the requirements of the 1990 Growth Management Act. Would these areas provide adequate capacity for twenty years’ growth? The analysis found that there was more than enough room.
In 1995-1996, the forecast was updated to incorporate several changing trends since the 1992 analysis. The adoption of Initiative 601 in 1993 had lowered the outlook for State government employment growth. Policymakers were hoping that aggressive efforts to attract industry would offset some of these effects. Hence the model assumptions for the future included both lower state government employment and higher manufacturing employment than in earlier forecasts. Finally, having recently adopted land use plans and zoning ordinances to meet the requirements of the Growth Management Act, these changes were modeled in the population allocation model.

In 1998-1999 TRPC focused its update primarily on technical improvements, though the model, as always, reflected changes due to evolving state and local trends. The employment model was revised to use the Bureau of Economic Analysis data on total employed persons – both wage and salary workers and proprietors – rather than wage and salary workers alone. Industry detail was increased from 24 industries to 33. Commuting trends into and out of Thurston County were extensively analyzed. Labor force participation rates for older workers (age 55 and up) were revised to account for the effect of increasing education levels on longer working careers. Birth rates and death rates in the demographic model were overhauled.

In 2004, the forecast update was focused again on technical improvements. The results of the 2000 Census were incorporated into the forecast, and both the future county-to-county commuting trends and unemployment rates were overhauled. The forecast allocations were finalized in 2004, and updated again in 2007 to fully incorporate the 2007 Buildable Lands land capacity analysis.

In February 2010, the county-wide forecast was updated. This forecast is the first to move away from the Standard Industrial Classification (SIC) classification of employment sectors, converting to the North American Industry Classification System (NAICS). The conversion required an extensive back casting of the data series.

In 2012 the countywide forecast was updated to reflect the continuing weakness in the economy, and adjustments to the statewide employment forecast, which has a large effect on the local economy in Thurston County.

In 2017 countywide economic forecast was updated without any major changes in methodology, however, all the regression-based formulas were recalculated to take into account the Great Recession. In addition, TRPC coordinated with the Washington State Office of Financial Management as they developed their county Growth Management Act population forecasts, in lieu of developing a separate countywide population forecast for Thurston County, as the data past models relied upon for migration and commuting were no longer available at the scale and accuracy needed for the population forecast. The 2017 extends the forecast horizon to 2045.
Relationship to Growth Management Act

The Growth Management Act requires that counties and cities base their planning on population forecasts that are consistent with those prepared by the Population Studies Division of the Office of Financial Management (OFM). OFM prepares a high, medium, and low population forecast for each county. The consistency requirement means Thurston County must use a population forecast that falls between the high and low OFM forecasts. In the past TRPC prepared a local countywide population forecast. For this forecast update, TRPC coordinated with OFM as they updated their county forecasts, rather than develop a separate countywide population forecast. TRPC continues to develop countywide employment forecasts, and small area distributions of both the population and employment forecast.

Under the Growth Management Act, counties have the responsibility for what forecasts will be used locally. The Act requires consultation among the local jurisdictions before action. In their Countywide Planning Policies, Thurston County delegated the review and approval of the forecasts to the Thurston Regional Planning Council. This not only takes advantage of the technical expertise at TRPC, but also provides for the necessary consultation.
How the Forecasts and Forecast Models are Used

Local jurisdictions, utilities, transit providers, consultants, and nonprofits, use TRPC’s forecasts and forecast models in a variety of ways for general planning purposes. The countywide employment forecast is used to develop small area employment allocations. Employment is distributed to a small geography so that it can be reported for a variety of geographies, including:

- Transportation analysis zones
- Transit planning areas
- Water utility planning areas
- Cities, urban growth areas, tribal reservations
- Planning areas
- Watershed boundaries
- School district boundaries
- Fire district boundaries

In order to maintain consistency between planning efforts, local jurisdictions in Thurston County have agreed to use the same forecast in their planning efforts, and a variety of stakeholders participate in the development and review of the regional models.

Both the transportation and small area population and employment forecast models can also be used to model alternatives, or scenarios. The official TRPC forecast is considered a Baseline model, or the model that shows future conditions absent any major changes in policy or external circumstances. Scenarios can be modeled by changing assumptions. Some assumptions that can be modified include the following:

Countywide Employment Forecast

- Commute forecast
- Explicit assumptions for each employment sector

Countywide Population Forecast

- The countywide population forecast could be raised or lowered to simulate the effects of a recession or influx of climate migrants, for example. The alternative forecast could then be run through the small area models.

Small Area Population and Employment Forecasts

- Zoning or critical areas. Changes in zoning or critical area regulations will change estimates of land supply, which in turn will impact the small area distribution of both population and employment.

Travel Demand Models

- Travel lane or intersection alternatives. Changes in travel lanes or intersections affect travel demand distribution on the network.
- Transit frequency. Changes in transit availability will affect the amount of people using transit for travel.
- Parking costs. Changes in parking costs will affect where and how people travel.
Structure of the Forecast Model

The TRPC forecasting process involves multiple stages, and relies on both computer modeling and human judgment. The first stage is to forecast growth in employment at the county level using an econometric model, and coordinate with the state Office of Financial Management as they develop county population forecasts. The second stage is to break down those figures to the neighborhood level using a large database of developable lands, development trends, and zoning densities. Within each stage are many sub-tasks and detailed assumptions. The overall approach is to base the modeling on a great many small assumptions, rather than a few giant leaps of faith.

Structure of TRPC Forecast Models

[Diagram showing the structure of TRPC forecast models with details on each stage including County Level Population and Employment, OFM County Population Forecasts, TRPC Countywide Econometric Model, Land Use / Buildable Land Model, Population Forecast Model, Employment Forecast Model, Regional Travel Demand Model, Dynamic Traffic Assignment Model, and Travel Demand Models.]
**Assumptions**

Every forecast is a product of the assumptions it makes. Some assumptions are detailed and explicit. They are documented in each updated forecast. Others are more general and implicit, but also have major importance in determining the outcome. They are as follows:

1. **No major war, depression, or extensive natural disaster during the period covered by this forecast.** In fact, the model is designed to look at “average” economic conditions; it does not attempt to predict the timing of business cycles, such as recessions or recoveries.

2. **Thurston County will continue to be influenced by the patterns of growth or decline of Washington State and the Puget Sound Region.** Future demographic and employment interrelationships will largely reflect the general trends of the last twenty to thirty years.

3. **No major existing employers will close or move from the county during the forecast period,** except as may be explicitly assumed for each forecast update. Likewise, no new major employers will move to Thurston County during the forecast period, except as may be explicitly assumed.

4. **Infrastructure will be provided as needed,** according to the currently adopted policies of the various jurisdictions. Significant changes in the relative availability or costs of needed infrastructure — either a) for Thurston County versus other counties, or b) for one subarea versus another within Thurston County — could affect the projections.

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Some assumptions – such as availability of water, energy, fuel pricing, climate refugees – are of widespread concern but there is not a definitive direction on how to model them.
Historic Employment Trends

Overview

Thurston County employment showed steady growth over the last 35 years, somewhat comparable to overall employment growth in Washington State, but highly influenced by its position as the capital of Washington State. During the 1980s, county employment grew at a higher rate than overall state employment growth, likely due to an increase in state government employment. This ended with the passage of Initiative 601, which slowed growth in the state government sector. The county was more resilient during the 2001 recession, which saw a drop in dot.com industries, which are a large sector for the state, especially the Seattle area, but not a large sector in Thurston County. During the Great Recession in the late 2000s, the county was slightly more resilient than the state as the recession started, but was also much slower to recover, likely due in large part to the slow recovery in state government employment.

The county’s economy has diversified over the years. State employment was more than one quarter of our work force in 1980 (26 percent), and accounts for 17 percent today. Conversely, with two regional hospitals, the education, health, social services, combined with arts, entertainment, and recreation comprised 9 percent of the jobs in 1980, but captures a 16 percent share today. Growth share in the professional and business services has almost tripled between 1980 (4 percent) and 2015 (11 percent), with actual number of employees increasing seven-fold.

Figure 1: Thurston County Employment, 1980 and 2015.
The 1970s

Thurston County entered the 1970s with its economy in transition. The 1960s saw the gradual decline of the local forest products industry, culminating in the closure of two mills in 1967. At the same time, state government employment was on the rise, taking over the role of major employer in the community. During the 1970s, it continued to grow strongly, reflected in a large expansion of the State Capitol Campus to the east of Capitol Way. Other major events also dramatically changed the community, reflecting a diversification of the local economy. The Evergreen State College opened in 1971, starting the growth spurt of the Olympia's Westside. St. Peters Hospital moved to Lilly Road in 1971, eventually taking most of the medical community with it.

Similarly, West Olympia saw the construction of a regional shopping center in 1978, which attracted commercial activity to the area. This development, in turn, resulted in a decrease in the “leakage” of retail sales to Pierce and King Counties.

In nearby Grays Harbor County, construction of the Satsop Nuclear Plant began in 1977. Roughly half of the peak employment of 4,000 lived in Thurston County. This added a considerable stimulus to the local economy.

While state and federal government employment grew by 52 percent during the 1970s, employment in trade and services grew by 87 percent and 145 percent respectively. Population grew by 62 percent during the 1970s, as housing starts doubled previous levels. To meet the needs, new schools were built all over the county. The downtown Olympia sewage treatment plant, which became operational in 1982, and many of the major trunk lines, were also completely rebuilt.

The 1980s

As quickly as the boom began, it ended. By 1980, Thurston County was in the start of a long slump that lasted until the middle decade. From 1980 through 1983, manufacturing employment declined. State and federal government employment dropped in both 1981 and 1982. In 1983 work on the Satsop Nuclear Plant was halted. Growth slowed to a trickle.

But fluctuations in business cycles are typically expected to occur. It is useful to remember that the late 1960s were also boom years, and the early 1970s were also a slow period. The late 1980s and early 1990s brought a resurgence of growth to our local economy.

As the county pulled out of the recession of the early 1980s, new construction began to boom once again. Major projects began to change the face of our several communities. Olympia built a new performing arts center, a community center, a farmer’s market, and several major expansions of the successful Percival Landing waterfront boardwalk. Private dollars flowed into many renovated historic downtown buildings. Other downtown sites saw major new office complexes.

Olympia’s Westside saw the construction of the community’s second hospital. Many new offices were built near the Capital Mall and near the county courthouse. Several large apartment complexes and a large new retirement center also came to the Westside. Lacey’s Core Area was the scene of major renovations and expansions to South Sound Shopping Center. A commercial center anchored by Fred Meyer opened across the street. Other major new offices sprang up in Rowe Six and Woodland Square. Other
commercial development followed the strong residential growth to the south and east of Lacey. Major new community commercial development came to the Yelm Highway and Hawks Prairie areas. Responding to the growth, the North Thurston School District rebuilt the North Thurston High School and the South Bay Elementary School, and built new grade schools on Abernathy Road and in The Meadows subdivision.

Tumwater saw strong residential growth, especially on Tumwater Hill and along Yelm Highway. Industrial growth was also strong, particularly in the Mottman Industrial Park and the Thurston Airdustrial Center. Tumwater expanded its industrial and land base with annexations to the west and to the south, taking in the airport and the Airdustrial Center. Strong growth to the west of Tumwater led the Tumwater School District to build a new grade school at Black Lake. A new Costco store opened on Littlerock Road, dramatically boosting retail sales in Tumwater.

The South County also saw strong growth, especially in the Yelm area. Although the South County remained rural in nature, many residents commuted to jobs in the North County, or at Fort Lewis, Tacoma, or Centralia.

Even though our growth rate rebounded from its low point in the early 1980s, it did not regain the extreme high of the late 1970s.

**The 1990s**

The rebound continued through the early 1990s. Population grew at a moderate rate, similar to that experienced in the 1980s. Growth was strongest in Yelm, Rainier, and Lacey, changing the distribution of the county’s population. The Tumwater school district built the Black Hills High School. Employment growth continued to be strong in the retail sector, with several large retail chains, including Home Base and Home Depot, moving into the region. While Olympia continued to dominate the retail market, Yelm, Tumwater and Lacey carved out larger shares. The face of downtown Olympia changed during the 1990s. The Yardbirds department store closed down in the early part of the decade, to be replaced by senior housing. A new home for the Farmers Market was built at the north end of Capital Way, where it was joined by a restaurant, office complex, and coffee brewing facility several years later.

The manufacturing industry continued to be strong in the early part of the decade, but slowed down in the later part, as growth was offset by the relocation or downsizing of several manufacturers, including the Hardel Lumber plant in West Olympia. The construction of Northwest Landing, north of the Nisqually River in Pierce County, brought many high-tech workers to the region to work for Intel. Many of the Intel workers settled in Thurston County.

Across the country, the 1990s was a time of downsizing the military with numerous base closures occurring. An expected influx of displaced personnel to the Fort Lewis base had not yet materialized though, and was not anticipated in the TRPC forecast from that time. State government underwent several major changes during the 1990s. Beginning in 1992, there was a period of decentralization, with satellite campuses developed in Lacey and Tumwater for the Departments of Ecology and Labor and Industries respectively. A new Department of Natural Resources building was constructed on the Capitol Campus. In 1993, with the passage of Initiative 601, state spending was severely limited, resulting in a dramatic drop in the rate of new job growth.
The 1990s overall was a time of stability and low unemployment. The first half was also a time of rapid growth in jobs and population, while the second half was a time of very slow growth rates.

The 2000s

At the end of the 1990s, many state offices were consolidated, and new agency headquarters relocated near and around Tumwater’s emerging Town Center. In Lacey, the Hawks Prairie area was beginning to see rapid industrial and residential growth. By the mid-2000s the area of Hawks Prairie around Marvin Road was becoming a major retail center. A quick succession of large retail stores opened, culminating in a regional attractor – Cabela’s sporting goods store – in 2007. In the south County, the Grand Mound area saw big changes with the location of the Great Wolf Lodge destination resort. This partnership of the Confederated Tribes of the Chehalis Reservation and business community led to new investment in this largely rural community located off the interstate between Tumwater and Chehalis.

The national economic downturn after 2001 had its impact in Thurston County. Growth in employment slowed, but overall population and employment continued to increase, albeit at a lower rate. The housing market began to pick up in 2003, and Thurston County saw a rapid increase in new homes permitted until 2006-2007. The mid-2000s saw fairly low unemployment rates in Thurston County, staying below five percent. This changed in 2008 with the national financial crisis. Unemployment rose to 9.6 percent nationwide, and 9.0 percent in Thurston County by 2010 – the highest level since the 1980s. Housing prices collapsed, home sales plummeted, and new home starts dropped to their lowest levels in decades. 2009 was the first year since the 1980s where employment decreased – rather than experienced a slowdown in growth – and this decrease continued into 2011. Population continued to increase even as jobs declined, in part due to the collapse in the housing market causing people to stay in place and in part due to the expansion of Joint Base Lewis-McChord just to the north of the County.

The 2010s

As the county entered the 2010s, the region was still in the midst of the Great Recession. Thurston County experienced a steady decrease in employment from 2008-2011, but employment did not recover to 2008 levels until 2013-2014. Unemployment began to decrease in the early 2010s, and was back to average levels by 2016, leading to an increase in population in-migration. New home construction continued its recession-induced slump until midway through the decade. Residential building picked up in 2016, with multifamily construction at the highest levels the region has seen since data have been collected (1994). Retail sales followed the same pattern as total employment, with a slump starting in 2008 and continuing through 2014-2015. By 2016, retail sales were back to prerecession levels.
Figure 2: **Thurston County unemployment rate.** Thurston County’s unemployment rate is cyclical, representing boom and bust periods. Unemployment is inversely related to migration; when unemployment is low, in-migration is high. Source: US Bureau of Labor Statistics.

Figure 3: **Components of population change.** Natural increase is the difference between births and deaths, while migration is the difference between people moving to and from the region. The 1970s saw the greatest amount of net migration to our region. While natural increase remains fairly steady, net migration is strongly influenced by employment opportunities. Source: Washington State Office of Financial Management.
Figure 4: Residential building activity. Residential units permitted are new homes permitted in Thurston County. Building activity increases during economic boom cycles, such as the mid-2000s. Source: TRPC compilation of local jurisdiction building permits.

What will the future bring?

It is clear that the future will bring changes, but what changes, and how much change is difficult to predict. Although it is not possible to know the future, systematic and reasonable assumptions can be made about it. When forecasts are prepared, historical trends in the national, state, and local economy are interpreted, then used to provide a foundation to TRPC’s computer model to project future employment and commute trends in Thurston County.
Countywide Employment Forecast

Employment in Thurston County is expected to grow by 42% in the next 30 years, or approximately 60,000 new jobs. Overall, the county’s employment forecast closely mirrors the state’s employment forecast.

Figure 5: Comparison of Thurston County and Washington State employment forecasts. Source: Thurston Regional Planning Council; Washington State Forecast: Office of Financial Management, Long-Term Economic Forecast.
The four largest employment sectors in Thurston County account for 53 percent of the jobs today:

- State Government (17 percent)
- Education, Health, and Social Services (14 percent)
- Professional and Business Services (11 percent)
- Retail Trade (11 percent)

Education, health, and social services is the fastest growing sector of the larger employment sectors, and by 2040 is expected to pass State government as our largest employment sector. Professional and business services has been our fastest growing employment sector in the past, and recently became our third largest sector, growing larger than retail trade.

Figure 6: Comparison of Thurston County’s four largest employment sectors.
Comparison with Previous Forecast

The 2017 Employment Forecast is 0.8 percent higher than the 2012 Forecast for the year 2025, but is 3.2 percent lower than the 2012 Forecast for the year 2040. The main reason for the adjustment is differences in the Office of Financial Management’s forecast of statewide employment, and an update of the regression-based formulas used for to forecast Thurston County employment.

Figure 7: Comparison of Thurston County’s current and previous employment forecasts.
Methodology

The Econometric Model forecasts future employment demand in about three dozen local economic sectors. In economic models these are called “industries” EMPFOR is an “economic base behavioral model.” The “economic base” part means that it assumes that overall employment trends are driven by the fortunes of our economic base — i.e., those industries that export goods or services outside Thurston County — thus bringing home jobs and dollars. These are referred to as our “basic industries” — for example, state government and manufacturing. The rest are called “non-basic industries” — for example, retail trade and local government. They mainly serve the local community, and their fortunes are dependent on those of the basic industries.

The “behavioral” part means that the model looks at how employment in one industry behaves when employment in another industry goes up or down. Of course, jobs in state government do not directly beget jobs in local retail trade. It actually takes place through the intermediary of dollar flows. More complicated models than ours — such as those used by state and national economic forecasters — factor in dollar flows based on salary levels, labor productivity rates, purchases of goods and services by industry, and so on.

We use multiple regression analysis to correlate employment trends in local basic industries to state-level trends in those industries — for example, in local versus state-level plastic products manufacturing. Then employment in local non-basic industries is correlated with local basic industries.

The analysis examines total employment by industry, which includes both business owners (“proprietors”) and wage-and-salary workers. The methodology starts with time-series data on total employment in 23 major industry divisions (such as “manufacturing,” “information,” or “retail trade”) from the period 1978-2015. These data are from the Regional Economic Information System (REIS) of the Bureau of Economic Analysis, US Department of Commerce. Using data on employment covered by unemployment insurance, the major industries are split into the 33 individual industries used in the model (such as “wood products manufacturing” versus “food products manufacturing,” or “publishing” versus “software”).

Shares of total employment by more detailed industry are estimated using data on those wage-and-salary workers that are covered by the unemployment insurance program, administered by the Department of Employment Security. This “ES-202” dataset covers about 77 percent of all local workers — more in some industries, less in others. Some industries have a large share of non-covered workers, such as real estate and many service industries.
Structure of TRPC Countywide Econometric Model

- Summarize Historic Population and Employment 1978 to 2015
- Develop Relationships
- Project Future Employment 2020 to 2045

- State Employment
- Thurston County Basic Industries
- Thurston County Non-Basic Industries
- OFM County Population Estimates
- Correlations for Thurston Basic Employment Sectors
- Correlations for Non-Basic Employment Sectors
- Correlation for Commute Sector
- OFM State Employment Forecast
- Thurston Employment Forecast 2020-2045
- OFM County Population Forecasts
- Thurston Commute Sector
Reliability of the Econometric Model

The EMPFOR model was “back-cast” to test its ability to replicate the historic employment data (1980-2015) used to create it. In other words, how well does it predict the past? This test showed an adjusted $R^2$ of 0.998 for predicted total employment versus actual total employment. An $R^2$ of 1.0 represents a perfect fit.

Figure 8: Comparison of Actual versus Predicted Employment.

![Graph showing Actual versus Predicted Employment with $R^2 = 0.998$]
Employment Forecasts by Sector

The countywide employment forecast is the sum of the forecasts for 33 employment sectors. This section details trends in those sectors and the assumptions used to forecast them.

Resources and Utilities

The share of employment in the resource sector (agriculture, forestry, and fishing and mining) has decreased from 5 percent in 1980 to 2 percent in 2015. The agriculture, forestry, and fishing sector grew until the mid-1990s, and then began a slow decline, stabilizing through the 2000s. The statewide forecast for this sector is slow but steady growth (10 percent between 2015 and 2045). The forecast assumption for Thurston County is that the resource sector will grow at the same rate as the statewide resource forecast.

The mining sector has experienced a slow but steady increase since 1980. This trend is expected to continue.

The utilities sector has remained fairly stable over the last few decades, and is not expected to change appreciably.

Figure 9: Resource and utilities sectors forecast.
Construction

The construction sector grew steadily over the decades, with new construction booming due to rapid population and employment growth in the county. The sector was hit especially hard during the Great Recession, as the housing industry stagnated. The recovery in this sector has been slower than other sectors, and has not yet reached pre-Great Recession levels.

The forecast for the construction sector was developed by relating the sector to a formula containing state construction, local manufacturing, and federal and state government employment growth. This resulted in a forecast of slow but steady growth, at a greatly reduced pace than the pre-Great Recession boom.

Figure 10: Construction sector forecast.
Manufacturing

In the long run, Washington State is expected to buck the national trend of declining employment in manufacturing. This is because many of the state's industries are newer, technology-oriented ones like computing equipment, rather than older, “structurally mature” ones, like steel. Thus, while employment in beverages and wood products, may be declining, machinery and plastics will probably grow, though more slowly than industries such as services.

Thurston County’s manufacturing employment is likely to grow slowly too. While big employers are lost from time to time (e.g., Hardel plywood, Miller brewery), small ones are gained constantly. This has been an ongoing trend since early 1980s. As elsewhere, the local manufacturing sector is hard hit by recessions, when they occur.

**Figure 11: Changes in the manufacturing sector.** Manufacturing in Thurston County has changed over the decades. Sectors such as wood products and beverages have reduced, while minerals, metals, and furniture (such as glass manufacturers) have grown.

The forecast model makes separate projections for seven manufacturing industries or groups of industries. Inevitably, some projections will be too high and others too low. Manufacturing is a highly volatile and uncertain sector, especially as the number of employees in each industry is fairly low compared to large sectors such as state government. It is assumed that manufacturing employment will track to statewide trends, dropping during recessions and rebounding thereafter. In the long run, the model projects slow growth.

Assumptions can be programmed into the model to accommodate new industries that may be poised to enter the community, or old ones about to shrink or relocate. The 2017 forecast does not insert any specific assumptions about new industries about to appear.

The forecast for manufacturing relies heavily on the state’s forecast for state manufacturing sectors. The forecast is for slow but steady growth in Thurston County’s manufacturing sector.
Figure 12: Manufacturing forecast.
Wholesale Trade, Transportation, and Warehousing

Employment in both the wholesale trade and the freight transportation sectors has grown steadily over the decades. Wholesale trade was fairly resilient to the Great Recession, and is projected to grow steadily in the future. The forecast was developed through relationships to state transportation, warehousing, and utilities forecasts, as well as basic industries such as manufacturing and state government.

A draft forecast for freight transportation was developed for review by the forecast advisory committee. The committee observed that freight is, and will likely continue to be, a fast-growing sector. Several factors play into this:

- There are currently plans for a large employer to locate in Hawks Prairie – probably 100+ employees
- Overall there is a shift from brick and mortar retail, and increase in online sales, which makes freight transportation a growing sector
- Industrial sites in Thurston County have better freeway access, and relatively less congestion means there is less time navigating the local roads

There is, however, a question of land supply for future warehouses, especially as Hawks Prairie builds out. Based on the committee’s input, the employment in this sector was increased by 100 additional employees between 2015 and 2020, and rounded up to reflect a growth rate of 10 percent. After 2020, growth was set at 5 percent for each five-year interval.

Passenger transportation, which includes taxis, airport transportation, and firms that are contracted for school bus services, remained fairly steady until recently, when a few new firms located in Thurston County, including a firm that provides transportation for railroad employees and a firm that employs personal shoppers. The forecast is for very slow growth in the future. School bus drivers employed by school districts are included in local employment, as are Intercity Transit employees.

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**Figure 13: Wholesale trade and transportation and warehousing forecasts.**
Retail Trade

Retail trade is broken into two projections: motor vehicles and parts, and other retail trade. Auto sales showed steady growth over the decades, but was hit hard by the Great Recession with employment dropping by 18 percent. Other retail saw rapid growth in the 1980s, as Thurston County became a major retail center with the opening of Capital Mall in the late 1970s. After that the sector saw steady growth. This sector was not heavily impacted by the Great Recession, with employment dropping by just 4 percent.

The forecasts for retail trade were calculated with a formula that included total Washington State employment, and Thurston County state government employment and manufacturing. The real question for these sectors is how well will the past predict the future. For auto sales, the infusion of autonomous vehicles into the marketplace, and potential for ride sharing, could mean less private vehicle ownership. With other retail sectors, the move to online retail sales could mean less brick and mortar retail stores, and therefore less retail employees, replaced by warehousing and freight transportation employees.

The advisory committee discussed the changes in retail services, especially as it pertains to brick and mortar buildings. There was general agreement that the need for new retail space may decrease, but vacancies could be absorbed by other businesses such as services. As there didn’t seem to be any major concern about the draft retail trade forecast, it was not adjusted.

Figure 14: Retail trade forecast.
Finance, Insurance, Real Estate

The finance, insurance, and real estate sectors have experienced steady growth over the last few decades. These sectors are non-basic, meaning that they serve a local population and are not strongly influenced by state trends. The forecasts for these sectors were calculated by relating them to other large industries in Thurston County, which resulted in a forecast of steady growth.

![Finance, Insurance, and Real Estate](image)

**Figure 15: Finance, insurance, and real estate forecast.**
Information

The forecast for the information sector is broken into three sectors:

- Publishing
- Software
- Other information

Publishing, which mainly includes newspapers and print publishing, has seen a steady decline as online media becomes more prevalent. This forecast for this sector was calculated based on state forecasts of publishing. Publishing is expected to decline to almost zero in the future.

On the other hand, there has been a steady increase in the software sector since the 1990s, and this sector is projected to continue to grow. The forecast is calculated with a formula relating Thurston County software growth to both local the manufacturing sector and state growth in the software sector.

The other information sector includes movie theaters, television providers like COMCAST, radio, and television stations. Growth in this sector has been erratic as firms come and go, but in general there has been a steady increase in employment. The forecast is calculated with a formula relating the Thurston County other information sector to state growth in the other information sector.

![Information Sector Forecast](image)

**Figure 16: Information sector forecast.**
Professional and Business Services

Professional and business services is the third largest sector of Thurston County employment, after state government and the education, health, and social services sector, surpassing retail trade in 2015. By far, this was the fastest growing sector of employment in Thurston County between 1980 and 2015, growing from just over 2,000 jobs in 1980 to almost 16,000 in 2015, and was fairly resilient to the effects of the Great Recession. In general, these are businesses and services that support other businesses and local and state government.

The forecast for professional and business services is calculated with a formula relating Thurston County growth in this sector to forecast growth in the state professional and business services and education, health, and social services sectors.

The forecast for this sector shows it remaining above the retail sector in coming years (see Figure 6).

This sector is broken down into four general categories:

1. Professional, scientific, and technical services. Industries in the professional, scientific, and technical services subsector group establishments engaged in processes where human capital is the major input. These establishments make available the knowledge and skills of their employees, often on an assignment basis, where an individual or team is responsible for the delivery of services to the client.

2. Management of companies and enterprises. This sector includes three main types of establishments:
   - Those that hold the securities of (or other equity interests in) companies and enterprises
   - Those (except government establishments) that administer, oversee, and manage other establishments of the company or enterprise but do not hold the securities of these establishments
   - Those that both administer, oversee, and manage other establishments of the company or enterprise and hold the securities of (or other equity interests in) these establishments

3. Administrative and Support Services. This sector includes establishments engaged in activities that support the day-to-day operations of other organizations. The processes employed in this sector (e.g., general management, personnel administration, clerical activities, cleaning activities) are often integral parts of the activities of establishments found in all sectors of the economy.


During review of the draft forecast, the forecast committee observed that during the Great Recession state employment decreased, but the state still had to provide services to the public, therefore many of the services were spun off to the private industry. During that time period (2008-2015) there was a decrease in state employment, and a rapid increase in employment in the professional and business services sector.

After the committee meeting, TRPC staff looked at the relationship between the two sectors. Before the passage of Initiative 601, which capped growth in state government employment, a greater number of jobs were added to state government compared to the professional and business services sector. This
changed after the passage of Initiative 601. The difference was even more acute during the Great Recession.

![Figure 17: Comparison of growth in the state government and professional and business services sectors.](image)

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Growth in Number of Employees</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>State Government (minus Higher Education)</td>
</tr>
<tr>
<td>Before I-601</td>
<td>1980-1993</td>
</tr>
<tr>
<td>After I-601 to Great Recession</td>
<td>1993-2008</td>
</tr>
<tr>
<td>From start of Great Recession</td>
<td>2008-2015</td>
</tr>
</tbody>
</table>

While there was a rise in the professional, scientific, and technical services subsector (19 percent; 650 jobs) between first quarter 2008 and first quarter 2016, which may have been caused by the state contracting out technical services, this was not the subsector that accounted for majority of growth in the professional and business services sector. By far, the fastest growing subsector was administrative and support services, which grew by 72 percent (compared to a growth rate between 16 and 20 percent for the other three subsectors). The main reason for this was a rise in employment in temporary help services (temp agencies) during the Great Recession.

The advisory committee also discussed the increased automation of manufacturing and warehousing that results in a decrease in jobs, with a corresponding increase in information technology (IT) jobs to run the computers.
Education, Health, and Social Services

Education, health, and social services is the second largest employment sector in Thurston County, surpassing retail trade in 2000. It is projected to become the largest sector in the future, and is anticipated to pass state government sometime between 2035 and 2040 (see Figure 6).

Thurston County is a regional hub for health services, which means it provides health services not only for local residents, but also residents from nearby counties. With two regional hospitals and many supporting health and social services, the employment sector has experienced rapid and steady growth since the 1980s. It was one of the few sectors that was fairly resilient to the effects of the Great Recession. In addition to health and social services, the sector includes education services, including private schools and daycares.

Demographics are likely to play a large role in the growth of jobs in this sector. The baby boom generation is the largest age cohort in Thurston County today. As the boomers age, there will be a greater need for both health and social services.

The forecast for the education, health, and social services sector is calculated with a formula relating Thurston County growth in this sector to forecast growth in the state education, health, and social services and the professional and business services sectors.
Figure 18: Age cohorts for Thurston County. The baby boom generation, those born roughly between 1946 and 1964, were approximately 51 to 69 years old in 2015. As this large age-cohort ages, there will be an increasing need for health and social services. Source: Office of Financial Management 2017 county forecasts.
**Arts, Entertainment, and Recreation**

The arts, entertainment, and recreation sector is one of Thurston County’s smaller sectors, but has experienced the second largest growth rate of any sector in Thurston County, mirroring other service industries. Tribal Enterprises, which include tribal casinos, are included under local and tribal government.

Arts, entertainment, and recreation services are a mix of arts and entertainment, such as theaters and museums, and recreation such as fitness clubs, sports clubs, and facilities for other recreational centers, such as laser tag. Movie theaters are not in this category; they fall into the information sector. Since 1980, there has been rapid and steady growth in this sector.

The forecast for this sector is calculated with a formula relating it to growth in state education and health services, and the Thurston County professional and business services sector.

![Arts, Entertainment, and Recreation](image)

*Figure 19: Arts, entertainment, and recreation forecast.*
Accommodations and Food Services

The accommodations and food services sector has grown moderately since the 1980s. It represented about 6 percent of Thurston County jobs in 1980, and currently represents around 7 percent. It contains businesses such as hotels and restaurants.

The forecast for this sector is calculated with a formula relating it to growth in local business and health care sectors.

Other Services

The other services sector currently represents about 6 percent of the jobs in Thurston County. Other services are those services not covered in the preceding categories, such as equipment and machinery repairing, promoting or administering religious activities, grantmaking, advocacy, providing drycleaning and laundry services, personal care services, death care services, pet care services, photofinishing services, temporary parking services, and dating services. The growth in this sector has been sporadic in the past, with growth spurts as new businesses came to town, followed by periods of low growth. The Great Recession did not have as severe an effect on this sector as on other sectors.

The forecast for this sector is calculated with a formula relating it to growth in the state business sector and overall state employment growth.

![Graph](accommodations-food-services-other-services.png)

**Figure 20:** Accommodations and food services, and other services forecast.
State Government

State Government without Higher Education

The passage of Initiative 601 in 1993 ensured that trends in state government employment would change, probably permanently. Before the passage of Initiative 601 in 1993, state government employment in Thurston County tracked closely and concurrently with statewide total non-agricultural wage-and-salary employment. After its passage, even though it had not yet officially gone into effect, the governor and legislature took immediate actions. There were layoffs and the growth rate slowed. This all fits with the I-601 requirements which 1) limit the growth of state government spending to the growth of population (which is caused by growth in jobs) and inflation over the previous three years, and 2) limit the growth of revenue (which stagnates when jobs decline).

After 1996, although statewide employment boomed, state government employment continued to grow at a measured pace. Not all of this can be ascribed to the effects of I-601, since there were also changes in governorships and in party control of the legislature during this period.

During and after the recession of 2001, state government employment declined slightly. During the Great Recession, state government employment declined considerably, and didn’t begin to rebound until 2010. In 2015, it still had not rebounded to pre-Great Recession levels, even though statewide employment had rebounded.

State government employment in Thurston County outpaced state population growth until the passage of Initiative 601. For the next nearly two decades, state government employment kept pace with population growth, until the Great Recession. Employment is rebounding at a slightly higher pace than state population growth.

Figure 21: State government employment compared to population growth.
The forecast for state government employment without higher education was calculated with a formula that relates state government employment without higher education in Thurston County to statewide total non-agricultural wage-and-salary employment, and statewide state and local government. State government outpaced growth in Washington employment until the passage of Initiative 601.

State government was more resilient than overall employment during the 2001 recession, but was hit harder by the Great Recession than overall employment, with a relatively greater loss in jobs, and slower recovery. The forecast for the state government employment sector is influenced by the state’s forecast of both state and local government employment, and total employment. It shows a slightly lower growth rate compared to the post-Great Recession recovery, followed by steady employment growth, comparable to the post I-601 period.

Figure 22: Thurston State Government compared to Washington total employment.

Figure 23: Thurston County state government employment, without higher education, forecast.
State Government Higher Education

There are two public higher education institutions in Thurston County, The Evergreen State College (Evergreen) and South Puget Sound Community College (SPSCC).

The forecast for Evergreen was based on an estimate of full-time (FTE) equivalent students provided by the college. This was converted to employees by looking at the average of the FTE equivalent students per job between 1976 and 2015.

The formula for SPSCC was based on relating growth at the college to growth at Evergreen and State employment growth.

The employment forecast for Evergreen shows very slow growth overall, with employment regaining to pre-Great Recession levels by the end of the forecast period.

The employment forecast for SPSCC, which was less impacted by the Great Recession, shows a higher rate of growth.

Figure 24: State higher education forecast.
Federal Government

Federal government employment is not a large sector of Thurston County employment. The forecast is broken out into three categories, post office, other federal civilian employment, and military.

The forecast for the post office is based on a formula relating post office employment to local government and other services. The forecast is for a fairly low growth rate.

Other civilian federal government includes some federal agencies, and every ten years, a little increase in employment due to the Federal Census. The forecast also reflects this bump due to the Census, meaning that the forecasts on even years are higher than the forecasts for the mid-decade years.

Military employment is military personnel stationed in Thurston County, such as National Guard or recruitment centers. It excludes those people employed at Joint Base Lewis-McChord (JBLM), as those jobs are included in a forecast of Pierce County employment. Employment at JBLM is considered in our commuter forecast. The forecast for the Thurston County military sector was derived from taking the average employment in this sector from 2000 to 2015, and extending it into the future.

![Figure 25: Federal Government forecast.](image-url)
Local and Tribal Government

About two-thirds of the employment in local and tribal government is in the school districts, with the remainder representing county government, city government, tribal government, and the various special purpose districts like the Port of Olympia, Thurston Regional Planning Council, Timberland Regional Library, and so on.

The formula used to develop the forecast for this sector was based on growth in Washington State total employment, state and local government employment, and other services. It resulted in a forecast for slow and steady growth – more robust than the last 15 years which was dominated by a variety of revenue-limiting initiatives (e.g., I-747, which generally limits property tax revenue growth to 1 percent annually), but less robust than the 1990s.

Figure 26: Forecast for Local and Tribal Government.
Tribal Enterprises

Tribal enterprises comprise mainly of tribal casinos and associated businesses. Thurston County currently has two tribal casinos and related enterprises that serve a mix of local and export (i.e., out-of-county) markets. In 1988 the federal Indian Gaming Regulatory Act (IGRA) was passed by Congress, and the first tribal casino in the state was opened in 1991. Locally, the Confederated Tribes of the Chehalis opened a casino in 1995, and the Nisqually Indian Tribe followed in 1997. Both have expanded over time, making major changes to the local economy. The Lucky Eagle Casino underwent an expansion between 2015 and 2017. At the time of this forecast, the expansion was complete, but the number of new employees, estimated at around 50 to 75, was not reflected in base data, and was therefore explicitly programmed into the forecast.

Representatives of the tribes advised that the growth of employment at the casinos has largely flattened out, since the maximum number of gaming machines allowed is set by a compact with the State. Based on the advice of the tribes, the forecast projects continued growth in tribal enterprise employment based on growth in both local and outside markets.

Figure 27: Forecast for tribal enterprises.
Commute Forecast

Commute Trends

For decades, various data have shown that people are commuting longer distances than before. These sources include the Decennial Censuses (1970-2000), the Census Bureau’s annual American Community Survey (2005-15), and estimates for other years (e.g., intercensal years). The data are sparse, and subject to large margins of error. Note the irregularity of the estimate line for the decade 2000-15 in Figure 28, reflecting the influence of statistical sampling error.

Previous models developed forecasts of commute trends based on job projections developed by Puget Sound Regional Council for the counties to the north, and population estimates developed by the Office of Financial Management for the other counties. In the past, the commute forecast was used in the regression formulas for many non-basic industries, and therefore had a tremendous impact on the forecast. For the 2017 forecast update, the commute forecast was not used to forecast other sectors as it was considered too variable.

![Commute Flow Estimates](image)

**Figure 28: Annual estimates of commute flow.** The number of Thurston County in-bound and out-bound commuters has grown steadily over the decades. Thurston County’s out-bound commute has always been stronger than the in-bound commute. Data irregularities starting in 2000 with a change in Census sampling frequency has made this data set difficult to correlate with employment data. Source: US Census.

Since the 1970s, the ratio of out-bound to in-bound commuters has held steady, with around 1.7 out-bound to every in-bound commuter. This means that Thurston County has a fairly strong net out-bound commute, which has grown decade over decade.
Figure 29: Ratio of out-bound to in-bound commuters. Thurston County has more residents traveling to other counties for work, than residents of other counties traveling to Thurston County for work. Since the 1970s, the ratio of out-bound to in-bound commuters has remained relatively steady. Source: US Census Bureau.

When the Interstate 5 was built in the 1950s and 1960s, it was envisioned as a means of travel for freight and people over long distances – such as state to state travel. In the 1960s and 70s, there were around 2,000 to 2,500 commuters traveling from Thurston County to Pierce or King Counties. This number has increased to around 25,000 commuters today.

By far, the greatest number of out-bound commuters travel to Pierce County – no surprise given the large amount of jobs in Pierce County, many of them near the Thurston County border on Joint Base Lewis-McChord. King County also has a fairly strong net out-bound commute pattern, and Lewis County has a slight out-bound commute pattern. In contrast, the commute pattern to Grays Harbor and Mason Counties show a fairly strong in-bound commute pattern.
Figure 30: Map of in-bound and out-bound commute flows.
Figure 31: Comparison of Thurston County commuters by county in 1970 and today. In the 1970s, around 2,000 to 2,500 people per day traveled from Thurston to Pierce or King County for employment. Today, over 20,000 people per day travel from Thurston to Pierce County, and another five thousand travel to King County. That is a lot of commuters in buses, vanpools, carpools, and single-occupancy vehicles, most using Interstate 5. Source: US Census Bureau.
Table 2: Summary of in-bound and out-bound commuters by county.

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<td>Net Outbound Commuters</td>
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<td>Out-bound / In-bound</td>
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<td>3.1</td>
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<td>1.8</td>
<td>1.7</td>
<td>1.8</td>
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Source: US Census Bureau.

**Commute Assumptions**

Commuting assumptions are always a challenge. Many of Thurston County’s residents commute to JBLM, however it is difficult to predict future jobs on JBLM as decisions regarding military bases are made at the national level. Other questions must be considered. Will increasing congestion and gas prices over time reduce the incentive to commute to jobs in other counties? On the other hand, increasing congestion in King and Pierce Counties has made commuting difficult on arterials from outlying communities in those counties (e.g., commuting from Puyallup to Tacoma). How will housing costs factor in? Housing prices in King County are increasing rapidly, and for now, housing in Pierce County is slightly higher than Thurston County.
Figure 32: Median home sales by county. Home prices in King County are increasing more quickly than those in Pierce and Thurston Counties. This will likely mean that more people will commute from Pierce and Thurston to higher-wage jobs in King. Home prices in Pierce are slightly higher than those in Thurston. If this trend continues, it is likely that people will drive even further in order to have a slightly more affordable house, as people rarely factor in the price and time of commuting when making their home purchase. Source: Washington Center for Real Estate Research.

Figure 33: Median household income by county. People tend to commute further for higher-wage jobs. As the wage gap between King County and Thurston County grows, there will likely be an increase in commuters. Source: Washington State Office of Financial Management.
Figure 34: Washington gas prices. As gas prices go up, people tend to reduce their commute or take alternatives to drive-alone trips. Gas prices are the lowest they’ve been in a decade.

Figure 35: Intercity Transit vanpool ridership. Intercity Transit’s vanpool ridership went up when gas prices went up, and decreased when gas prices went down. Vanpools are used by many commuters. Source: Intercity Transit.
Figure 36: Employees – Joint Base Lewis-McChord. Employment at JBLM grew by almost 25,000 between 2003 and 2010. Around 29 percent of JBLM’s workforce resides in Thurston County. Source: JBLM ASIP Historical Data.

Figure 37: Resident Active Duty military personnel. Resident active duty personnel are a component of the service members shown in Figure 12, along with Guard and Reserve. The number of Active Duty personnel residing in Thurston County, but most likely commuting to JBLM, was fairly steady for decades, until the 2000s when JBLM experience rapid growth. Source: U.S. Census.
Commute Forecast

In the past, the commute flow baseline forecast was the aggregate of forecasts of commute patterns between Thurston and adjacent counties. Those forecasts were based on employment forecasts for Snohomish, King, and Pierce counties, and population forecasts for Lewis, Mason, and Grays Harbor Counties respectively. Due to the data irregularities in commute data from 2000 on, TRPC staff no longer had confidence in this method of forecasting commute patterns. In addition, the Puget Sound Regional Council is in the midst of updating employment forecasts for Snohomish, Pierce, and King Counties. For the 2017 update, TRPC treated commuters like other industries, and forecasted growth in in-bound and out-bound commuting based on a multiple regression analysis taking into account the population of adjacent counties and Thurston County employment. This resulted in a baseline commute forecast, assuming past relationships could predict the future.

The 2017 commute forecast is lower than the 2012 forecast. At the time the 2012 forecast was developed, JBLM was experiencing rapid growth, and there was a corresponding rapid increase in commuters. Since then, growth on JBLM has stabilized, and commuting is hampered by the chronic congestion on I-5. This is balanced, somewhat, by the lower housing prices in Thurston County and the rapid increase in housing in Seattle.

Figure 38: 2017 commute forecast.
## Appendix 1: Thurston County Employment and Commute Forecast

**EMPFOR 2017**  
**ECONOMETRIC FORECASTING MODEL**  
**DRAFT Detailed Industry Forecasts**  

<table>
<thead>
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<td>200</td>
<td>200</td>
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<td>In-bound commuters</td>
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<td>20,943</td>
<td>24,200</td>
<td>26,700</td>
<td>28,700</td>
<td>30,700</td>
<td>32,500</td>
<td>34,300</td>
</tr>
<tr>
<td>Net out-bound commuters</td>
<td>15,159</td>
<td>14,333</td>
<td>15,500</td>
<td>16,300</td>
<td>17,400</td>
<td>18,400</td>
<td>19,200</td>
<td>20,100</td>
</tr>
</tbody>
</table>

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Appendix II: Sources of Employment Data

The 1978-2015 employment data for the econometric module was developed from a variety of sources and techniques, since a single source for the data was unavailable. The organization of employment data by industry was changed from the Standard Industrial Classification (SIC) codes to the North American Industrial Classification System (NAICS) codes in 2001, as a result of the North American Free Trade Agreement (NAFTA) adopted in 1993. SIC codes were based on the product or service produced by the industry, while NAICS codes are based on the type of process used by the industry to produce its product or service. About one-third of the SIC codes have a direct counterpart in the NAICS classification. The rest are substantially changed, with some SIC industries split into new NAICS industries, some combined to make new NAICS industries, and some a mix of splitting and recombining. The historic data series based on SIC codes prior to 2001 needed to be converted to estimates based on NAICS codes.

The techniques used for the state-level data were somewhat different than those used for the county-level data. A general description of methodology is as follows:

**Washington State Employment**

The TRPC EMPFOR forecasts use state-level forecasts of employment by industry as predictor variables. These state-level forecasts are in the form of non-agricultural wage and salary workers. The Washington State Employment Security Department (ESD) had already converted the SIC series state-level data to NAICS codes for the period since 1990. It was necessary to convert the 1978-1989 data from SIC to NAICS codes.

Employment by NAICS codes at the six digit level of detail (highest) was available from ESD for the period 1990-2002, for employment covered by unemployment insurance (“ES202” data). Employment by SIC codes at the four digit level of detail (highest) was available from ESD for the period 1981-1996. Using iterative proportional fitting, an allocation table of the state-level data was created to estimate the shares of each SIC industry that was assigned to the various three-digit NAICS industry groups for the overlapping period 1990-1996. The initial population of the seed values in the iterative proportional fitting was drawn from the national allocation proportions reported for 1997, the first year of NAICS use. Numerous cycles of fitting were performed to allocate four-digit SIC detailed industries to the three-digit NAICS groups. Next the four-digit SIC industries were aggregated to (mostly) two-digit SIC industry groups and additional cycles of fitting were performed until the data mostly converged. This was done separately for each of the years 1990-1996.

Using the results from the 1990-96 period, the allocation proportions were then projected backwards to 1978, typically fitting logarithmic curves to the data. These allocation proportions developed from the ES202 data were then applied to the Non-Agricultural Wage and Salary data to derive an estimated NAICS major industry series.
Thurston County Employment

The TRPC EMPFOR forecasts are based on total employment as defined and reported by the Bureau of Economic Analysis (BEA). This includes both employees and proprietors (business owners and employees who work on commission rather than wages or salaries). The county-level BEA total employment data is reported at the two-digit major industry group level for NAICS 2001-most recent. Prior to 2001, the data was reported by SIC major industries. The methodology to develop a series based on NAICS for all years was as follows:

**Years 2001-10:** Total employment by industry was available for all major industry sectors (two-digit) for Thurston County directly from BEA. Covered employment by industry was available for detailed industries (six-digit level if needed) for Thurston County from ESD. The EMPFOR model uses mostly two-digit industry detail, plus a few three- or four-digit detailed industries, particularly in the manufacturing and information industries. For these more detailed industries it was necessary to disaggregate total employment by major industry sector into the more detailed categories. In particular, it was necessary to disaggregate the proprietors (business owners and workers paid by commission). State-level data on both ES202 workers and total workers by detailed industry were available from ESD and BEA respectively; this was used to determine the share of proprietors to assign to each detailed industry at the county level.

**Years 1990-2000:** At the state level, total employment by detailed industry (from BEA) and covered employment by detailed industry (from ESD) were available in both NAICS and SIC. At the county level, only covered employment was available (from ESD) by detailed industry, in both NAICS and SIC; and total employment by SIC (from BEA). The goal was to find a way to calculate the proprietors (non-covered employment) for the county-level employment by the NAICS industry sectors used by EMPFOR, so they could be added to the covered employment to derive total employment by EMPFOR sectors.

The adjustment was done in two stages. The first stage was to calculate three ratios for the period 2001-2007: 1) the Washington ratio of total employment to covered employment, 2) the Thurston County ratio of total employment to covered employment, and 3) the ratio of the two ratios. Since the Washington ratio was available for the period 1990-2000 as well, the third ratio was projected backward using logarithmic curves to construct an estimated Thurston county ratio for this period. This county ratio was then used to create preliminary estimates of total employment by industry.

The second stage was to calculate the shares of proprietors (non-covered employment) by industry implied by the difference between the estimated total employment and the ES202 covered employment. This was done for major industry groups (NAICS two-digit level).

The third stage was to adjust the proprietors by major industry so that the total proprietors would match the total reported by BEA.

The next several stages involved using the same strategy to disaggregate the proprietors by detailed industry (typically NAICS three-digit level), particularly in the manufacturing and information major sectors.
Years 1978-1989: Only SIC data were available at the county level, for both covered and total employment.

The first stage was to create a data series of estimated ES202 covered employment by NAICS from the SIC data. Using iterative proportional fitting, an allocation table of the county-level ES202 data were created to estimate the shares of each SIC industry that was assigned to the various three-digit NAICS industry groups for the period 1990-2001. The initial population of the seed values in the iterative proportional fitting was drawn from the national allocation proportions reported for 1997, the first year of NAICS use. Numerous cycles of fitting were performed to allocate four-digit SIC detailed industries to the three-digit NAICS groups. Next the four-digit SIC industries were aggregated to (mostly) two-digit SIC industry groups and additional cycles of fitting were performed until the data mostly converged. This was done separately for each of the years 1990-2001.

Next, the allocation shares for apportioning the SIC industry groups to the NAICS industry groups were projected backwards from the 1990-2001 period into the 1978-1989 period, generally using logarithmic curves. These allocation shares were applied to the SIC-based industry group data to develop the NAICS-based industry group covered employment estimates.

Once the ES202 covered estimates were set, iterative proportional fitting was used to create initial apportionments of the proprietors (uncovered employment) from the SIC total employment data series to the NAICS categories for each year during the period 1990-2000. Seed values were created by the apportioning the total employment by SIC group into the NAICS groups using the same shares as for covered employment, then subtracting covered employment from total employment. Iterative proportional fitting was then used to control alternately to total proprietors by SIC, then to total proprietors by NAICS, until the data mostly converged. Allocation shares were then projected backwards from the results of the 1990-2000 data to the period 1978-1989, generally using logarithmic curves. Estimated proprietors by NAICS industry group generated from this procedure were then added to estimated covered employment to obtain the initial estimates of total employment by industry group.

The next steps are the same as for the second stage calculations for the 1990-2000 data: calculate the shares of proprietors (non-covered employment) by industry implied by the difference between the estimated total employment and the ES202 covered employment. This was done for major industry groups (NAICS two-digit level).

Then proprietors by major industry were adjusted so that the total proprietors would match the total reported by BEA.

The next several stages involved using the same strategy to disaggregate the proprietors by detailed industry (typically NAICS three-digit level), particularly in the manufacturing and information major sectors.
Appendix III: Detailed Forecast

This section documents how the detailed forecast was developed.

**Forecast Type:**

Explicit: Forecast is made with explicit assumptions outlined in the main documentation.

Predicted: Forecast is developed based on relationships to other local or state employment sectors. Graphs outlining these the relationship of these sectors and the predicting variables between 1980 and 2015, and the resulting correlations, are included in this appendix following the tables.

Sum: Forecast is the sum of other sectors.

**Table 3: List of Thurston County detailed sectors, abbreviations, and type of forecast.**

<table>
<thead>
<tr>
<th>Thurston County Sector</th>
<th>Abbreviation</th>
<th>Forecast Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, forestry, fishing, &amp; related</td>
<td>AGFOR</td>
<td>Explicit</td>
</tr>
<tr>
<td>Mining</td>
<td>MINING</td>
<td>Predicted</td>
</tr>
<tr>
<td>Utilities</td>
<td>UTIL</td>
<td>Predicted</td>
</tr>
<tr>
<td>Construction</td>
<td>CONST</td>
<td>Predicted</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>MFG</td>
<td>Sum</td>
</tr>
<tr>
<td>Non-durable</td>
<td>NONDUR</td>
<td>Sum</td>
</tr>
<tr>
<td>Food prod mfg</td>
<td>FOOD</td>
<td>Predicted</td>
</tr>
<tr>
<td>Beverage &amp; tobacco prod mfg</td>
<td>BEV</td>
<td>Predicted</td>
</tr>
<tr>
<td>Textile mills &amp; prods, apparel, &amp; chems</td>
<td>ONONDUR</td>
<td>Predicted</td>
</tr>
<tr>
<td>Durable</td>
<td>DUR</td>
<td>Sum</td>
</tr>
<tr>
<td>Wood prod mfg - 3-yr rolling average</td>
<td>WOODAVG</td>
<td>Predicted</td>
</tr>
<tr>
<td>Petroleum, coal, plastics, &amp; rubber prod mfg</td>
<td>PLASTC</td>
<td>Predicted</td>
</tr>
<tr>
<td>Other durable</td>
<td>ODUR</td>
<td>Predicted</td>
</tr>
<tr>
<td>Paper, Printing, Fabricated Metals, Machinery, Computers</td>
<td>MANCOM2</td>
<td>Predicted</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>WT</td>
<td>Predicted</td>
</tr>
<tr>
<td>Retail trade</td>
<td>RT</td>
<td>Sum</td>
</tr>
<tr>
<td>Motor vehicle and parts dealers</td>
<td>AUTO</td>
<td>Predicted</td>
</tr>
<tr>
<td>All other retail</td>
<td>ORETL</td>
<td>Predicted</td>
</tr>
<tr>
<td>Transportation and warehousing</td>
<td>TRANS</td>
<td>Sum</td>
</tr>
<tr>
<td>Freight transportation</td>
<td>TRANSF</td>
<td>Predicted</td>
</tr>
<tr>
<td>Passenger transportation</td>
<td>TRANSP</td>
<td>Predicted</td>
</tr>
<tr>
<td>Information</td>
<td>INFO</td>
<td>Sum</td>
</tr>
<tr>
<td>Publishing</td>
<td>PUBL</td>
<td>Predicted</td>
</tr>
<tr>
<td>Software</td>
<td>SOFTWR</td>
<td>Predicted</td>
</tr>
<tr>
<td>Recording, broadcasting, telecom, etc.</td>
<td>OINFO</td>
<td>Predicted</td>
</tr>
<tr>
<td>Finance and insurance</td>
<td>FIN_INS</td>
<td>Predicted</td>
</tr>
<tr>
<td>Real estate and rental and leasing</td>
<td>RE_RENTS</td>
<td>Predicted</td>
</tr>
<tr>
<td>Professional and business services</td>
<td>BUSR</td>
<td>Predicted</td>
</tr>
<tr>
<td>Education, Health, &amp; Social Services</td>
<td>EDU_HSR</td>
<td>Predicted</td>
</tr>
<tr>
<td>Arts, entertainment, and recreation</td>
<td>REC</td>
<td>Predicted</td>
</tr>
<tr>
<td>Accommodation and food services</td>
<td>ACCOM_FS</td>
<td>Predicted</td>
</tr>
<tr>
<td>Other services, except public administration</td>
<td>OSRV</td>
<td>Predicted</td>
</tr>
<tr>
<td>Thurston County Sector</td>
<td>Abbreviation</td>
<td>Forecast Type</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Federal, civilian</td>
<td>FG</td>
<td>Sum</td>
</tr>
<tr>
<td>Post Office</td>
<td>USPS</td>
<td>Predicted</td>
</tr>
<tr>
<td>Federal government - other civilian</td>
<td>OFG</td>
<td>Predicted</td>
</tr>
<tr>
<td>State government</td>
<td>SG_TOT</td>
<td>Sum</td>
</tr>
<tr>
<td>State government, non-education</td>
<td>SG</td>
<td>Predicted</td>
</tr>
<tr>
<td>The Evergreen State College</td>
<td>TESC</td>
<td>Explicit</td>
</tr>
<tr>
<td>South Puget Sound Community College</td>
<td>SPSCC</td>
<td>Predicted</td>
</tr>
<tr>
<td>Local government (from BEA, includes tribal casinos)</td>
<td>LG_TOT</td>
<td>Sum</td>
</tr>
<tr>
<td>Local government minus tribal casinos</td>
<td>LG</td>
<td>Predicted</td>
</tr>
<tr>
<td>Tribal casinos</td>
<td>CASINOS</td>
<td>Predicted</td>
</tr>
<tr>
<td>Military (stationed in Thurston, e.g., National Guard)</td>
<td>MIL</td>
<td>Explicit</td>
</tr>
<tr>
<td>Total Thurston County Employment</td>
<td>THURTOTEMP</td>
<td>Sum</td>
</tr>
<tr>
<td>Net Outbound Commuters</td>
<td>COMMTR1</td>
<td>Sum</td>
</tr>
<tr>
<td>Outbound commuters (5 yr rolling avg after 2000)</td>
<td>COMOUTAVG</td>
<td>Predicted</td>
</tr>
<tr>
<td>Inbound commuters (5 yr rolling avg after 2000)</td>
<td>COMINAVG</td>
<td>Predicted</td>
</tr>
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Table 4: List and source of state and regional sectors used as predicting variables in the forecast.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Abbreviation</th>
<th>Source for Forecast</th>
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<tbody>
<tr>
<td><strong>Population Variables</strong></td>
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<tr>
<td>Population of King County (/100)</td>
<td>KPOP</td>
<td>OFM Medium Forecast</td>
</tr>
<tr>
<td>Population of Pierce County</td>
<td>PPOP</td>
<td>OFM Medium Forecast</td>
</tr>
<tr>
<td>Population of Snohomish County</td>
<td>SPOP</td>
<td>OFM Medium Forecast</td>
</tr>
<tr>
<td>Population of Mason, Lewis, &amp; Grays Harbor</td>
<td>MLGHPPOP</td>
<td>OFM Medium Forecast</td>
</tr>
<tr>
<td>Population of Thurston County</td>
<td>THURPOP</td>
<td>OFM Medium Forecast</td>
</tr>
<tr>
<td><strong>Statewide Employment Sectors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Resources (logging + mining)--Wash</td>
<td>NATRESW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Construction--Wash</td>
<td>CONSTW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Food products--Wash</td>
<td>FOODW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Beverages, textile mills &amp; prods, apparel, &amp; chems</td>
<td>ONONDURW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Wood products--Wash</td>
<td>WOODW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Petroleum, coal &amp; plastic prod--Wash</td>
<td>PLASTCW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Minerals, metals, elec, transp, furniture, &amp; misc prod mfg less Aerospace--Wash</td>
<td>ODURW2</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Minerals, furniture, misc prod mfg--Wash</td>
<td>ODURW1</td>
<td>WA Forecast</td>
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<td>Fabricated metal products--Wash</td>
<td>FMW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Machinery, computers, electrical eqt, &amp; appliance mfg--Wash</td>
<td>MACHNSW</td>
<td>WA Forecast</td>
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<td>Transportation, warehousing, utilities--Wash</td>
<td>TRWUW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Newspaper, Book &amp; Directory Publishers--Wash</td>
<td>PUBLW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Software Publishers--Wash</td>
<td>SOFTWRW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Recording, broadcasting, telecom, ISPs, etc.--Wash</td>
<td>OINFOW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Professional and business services--Wash</td>
<td>BUSRW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Education &amp; Health Services--Wash</td>
<td>EDU_HSRW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>State and Local Government -- Wash</td>
<td>SLGW</td>
<td>WA Forecast</td>
</tr>
<tr>
<td>Total Non-Ag Wage &amp; Salary workers--Wash</td>
<td>EMPW</td>
<td>WA Forecast</td>
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<tr>
<td>EMPW, lagged one year</td>
<td>LAGEMPW</td>
<td>calc</td>
</tr>
<tr>
<td>EMPW, lagged two years</td>
<td>LAG2EMPW</td>
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<td><strong>Thurston County Employment Combinations</strong></td>
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<tr>
<td>OFG+SG+TESC+SPSCC</td>
<td>FSG2</td>
<td>Sum</td>
</tr>
<tr>
<td>USPS+OFG+SG</td>
<td>FSG3</td>
<td>Sum</td>
</tr>
<tr>
<td>Manufacturing, except BEV &amp; WOOD</td>
<td>MFG3</td>
<td>Sum</td>
</tr>
<tr>
<td>Manufacturing, except WOOD</td>
<td>MFG4</td>
<td>Sum</td>
</tr>
<tr>
<td>MFG3, lagged one year</td>
<td>LAGMFG3</td>
<td>calc</td>
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<tr>
<td>Dummy variables to account for a change in conditions such as a large firm moving into or leaving the region.</td>
<td>DUM(Year)</td>
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</tr>
<tr>
<td>US Census workers every 10 years</td>
<td>CENSUS(Year)</td>
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Figure 39: Detailed graphs showing predicted versus actual historic data for each sector.
BEV vs ONONDURW, EMPW, DUM82, DUM84, DUM99, DUM02, DUM03, DUM10, DUM14
1980-2015
Adjusted $R^2 = .940$, Durbin-Watson = 1.697

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<th>Actual</th>
<th>Predicted</th>
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<td>1983</td>
<td>600</td>
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<td>1984</td>
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<td>1986</td>
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<td>1988</td>
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<td>2014</td>
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</tr>
<tr>
<td>2015</td>
<td>0</td>
<td>0</td>
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</table>

ONONDUR vs ONONDURW, LAG2EMPW, DUM82, DUM85, DUM90, DUM94, DUM97, DUM06, DUM08, DUM13
1980-2015
Adjusted $R^2 = .909$, Durbin-Watson = 1.97

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual</th>
<th>Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>400</td>
<td>400</td>
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<tr>
<td>1981</td>
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<td>300</td>
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**ODUR vs WOODW, ODURW2, EMPW, DUM81**

1980-2015

Adjusted $R^2 = .946$, Durbin-Watson = 0.648

**MANCOM2 vs TRWUW, FMW, MACHNSW, EMPW, FSG3, ODURW1**

1980-2015

Adjusted $R^2 = .804$, Durbin-Watson = 1.29
TRANSP vs TRUW, FSG2, MSG2, DUM9092, DUM12
1980-2015
Adjusted $R^2 = .959$, Durbin-Watson = 1.39

PUBL vs PBULW, DUM82, DUM01, DUM08, DUM13
1980-2015
Adjusted $R^2 = .958$, Durbin-Watson = 1.64
FIN_INS vs EDU_HSR, DUM11
1980-2015
Adjusted $R^2 = .981$, Durbin-Watson = 1.15

RE_RENTS vs BUSR, DUM05, DUM07, DUM11
1980-2015
Adjusted $R^2 = .970$, Durbin-Watson = 1.24
BUSR vs BUSRW, EDU_HSRW, DUM01, DUM07
Adjusted $R^2 = .995$, Durbin-Watson = 1.65

EDU_HSR vs EDU_HSRW, BUSRW
Adjusted $R^2 = .991$, Durbin-Watson = 0.57
The graph shows the comparison between actual and predicted employment for two different datasets:

1. **REC vs EDU_HSRW, BUSR, DUM11**
   - Adjusted $R^2 = .984$, Durbin-Watson = 0.95
   - The graph plots employment from 1980 to 2014, with the blue line representing actual employment and the red line representing predicted employment.

2. **CASINO vs THURPOP, PPOP, MLGHPPOP, DUM04**
   - Adjusted $R^2 = .984$, Durbin-Watson = 1.53
   - Similar setup as above, with a significant increase in employment around 1995.
LG vs EMPW, OSRV, SLGW, DUM11
Adjusted $R^2 = .981$, Durbin-Watson = 0.717

COMOUTAVG vs KPOP, PPOP, SPOP, MLGHPPOP, THURPOP
Adjusted $R^2 = .993$, Durbin-Watson = 0.737
COMINAVG vs PPOP, MLGHPOP, THURTOTEMP
Adjusted $R^2 = .995$, Durbin-Watson $= 1.11$