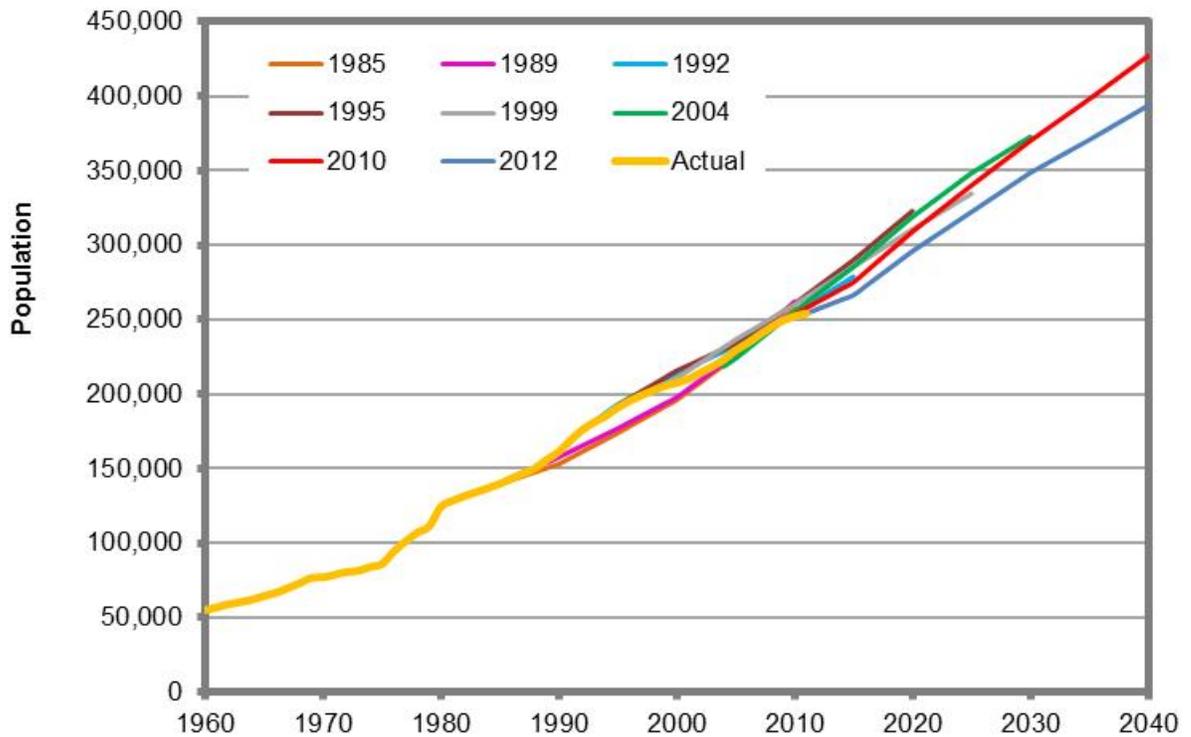


# Population and Employment County-wide Forecast

*For Thurston County*

## Thurston Regional Planning Council Forecasts



## Report

**Thurston Regional Planning Council**

Adopted July 13, 2012





**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**, and other topics determined by the Council.
- C. **Assemble** and **analyze data** that support local and regional decision making
- D. Act as a **“convener”**, build regional **consensus** on issues through information and citizen involvement.
- E. Build **intergovernmental consensus** on regional plans, policies, and issues, and advocate local implementation.

This report was prepared as part of the Thurston Regional Planning Council's 2012 regional work program.

**2012 MEMBERSHIP  
THURSTON REGIONAL PLANNING COUNCIL**

<b>Governmental Jurisdiction</b>	<b>Name of 2012 Representative</b>
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City of Olympia	<b>Nathaniel Jones</b> , Councilmember
City of Rainier	<b>Dennis McVey</b> , Councilmember
City of Tenino	<b>Bret Brodersen</b> , Councilmember
City of Tumwater	<b>Tom Oliva</b> , Councilmember
City of Yelm	<b>Robert Isom</b> , Councilmember
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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 and the Washington Department of Enterprise.

Thurston Regional Planning Council has been providing population and employment forecasts for Thurston County since the late 1960s. TRPC wishes to thank Pete Swensson for 37 years of service as Project Manager and primary analyst for the county-wide forecasts.

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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. They address both the county level and the neighborhood level. TRPC has been preparing these forecasts since the late 1960s. This report documents the 2012 county-wide forecast update.

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# Introduction

Over the past three 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 County-wide 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 county-wide 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. Policy-makers 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. (Both assumptions turned out to be on the high side.) 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, as in previous versions. Industry detail was increased from 24 industries to 35. 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. The new forecast is lower than the 2004 forecast for 2010 through 2025, and the same for 2030. In addition, the new forecast extends the projections to 2040. The new forecast remains within the high-to-low range of the OFM Growth Management Projections for Thurston County. 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 County-wide model was updated to reflect the continuing weakness in the economy, and adjustments to the state-wide employment forecast, which has a large effect on the local economy in Thurston County.

Efforts to distribute the forecast to areas within the county will continue through 2012.

# Economic Synopsis

The purpose of this section is to give a thumbnail sketch of the economic trends that have shaped Thurston County.

## The 1970s

The explosive growth of the recent past has been based on a number of factors that may or may not be repeated in the next few decades. 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 Westside. St. Peters Hospital moved to Lilly Road in 1971, eventually taking most of the medical community with it. Employment in medical services has since grown rapidly, accounting for half the employment in the local sector, compared to a state-wide norm of one-third. Thus Thurston County now “exports” these services to several nearby counties.

Similarly, West Olympia saw the construction of a regional shopping center in 1978, which attracted much 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 our 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 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 farmers 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 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 the Mottman Hill and along the Yelm Highway. Industrial growth too was 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 of the major 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 9.3 percent nationwide, and 7.5 percent in Thurston County by 2009. 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 in 2010. Population continued to increase even as jobs declined – in part due to the collapse in the housing market caused people to stay in place – and in part due to the expansion of Joint Base Lewis-McChord just to the north of the County.

## **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 population in Thurston County.

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# Background

## Assumptions

Every forecast is a product of the assumptions it makes. Some assumptions are detailed and explicit, such as future birth rates. 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. There will be 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 inter-relationships will largely reflect the general trends of the last twenty to thirty years.
3. The economic base behavioral model (EMPFOR) used to predict future employment trends adequately interprets historical trends and typifies the local economy.
4. 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 into Thurston County during the forecast period, except as may be explicitly assumed.
5. 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 sub-area versus another within Thurston County — could affect the projections.
6. The primary determinant of population growth in our community is the growth of jobs. That is, people may want to move here for the lifestyle, but most can only do so if there are jobs for them. Other determinants of population growth include retiree preferences and overall quality of life considerations (this is an attractive place to live, and people are willing to commute to a job outside of the County to live here).
7. The demographic model used to predict future population trends adequately interprets historical trends, and typifies local birth rates, death rates, and the age characteristics of in-migrants.
8. There will be no dramatic changes in our general lifestyle or living patterns within the time period covered by this forecast.

### Assumptions

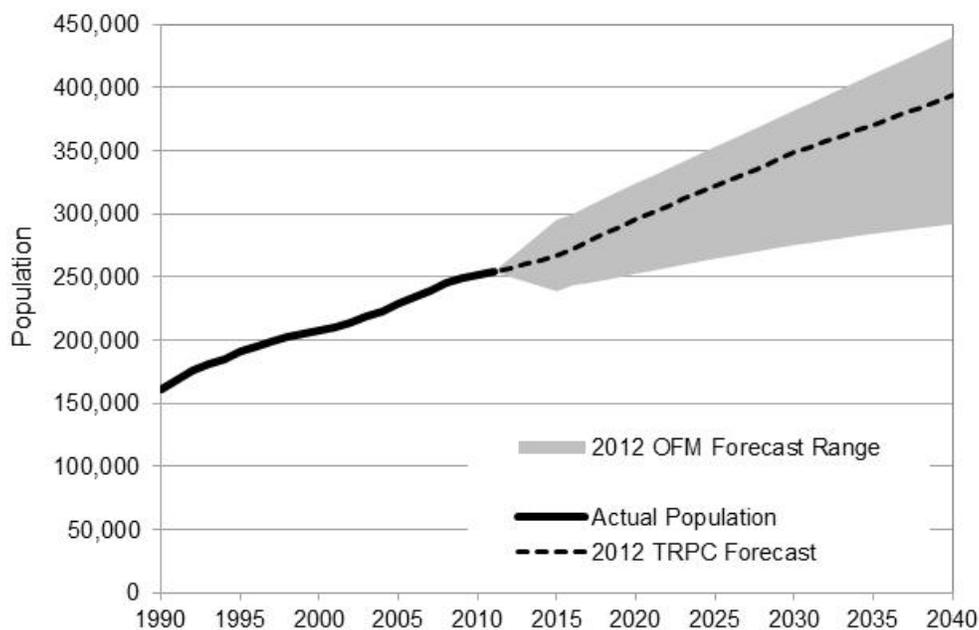
Some assumptions – such as availability of water, energy, fuel pricing, climate refugees – are of widespread concern – but there is not a definitive direction on how to model them.

## Relationship to Growth Management Act

The Growth Management Act requires that counties and cities base their planning on 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 forecast for each county. The consistency requirement means Thurston County must use a forecast that falls between the high and low OFM forecasts. If the local analysis leads to a forecast outside OFM's range, our region can appeal the OFM figures to the Western Washington Growth Hearings Board.

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 County-Wide 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.

### Comparison of OFM and 2012 TRPC Population Forecast



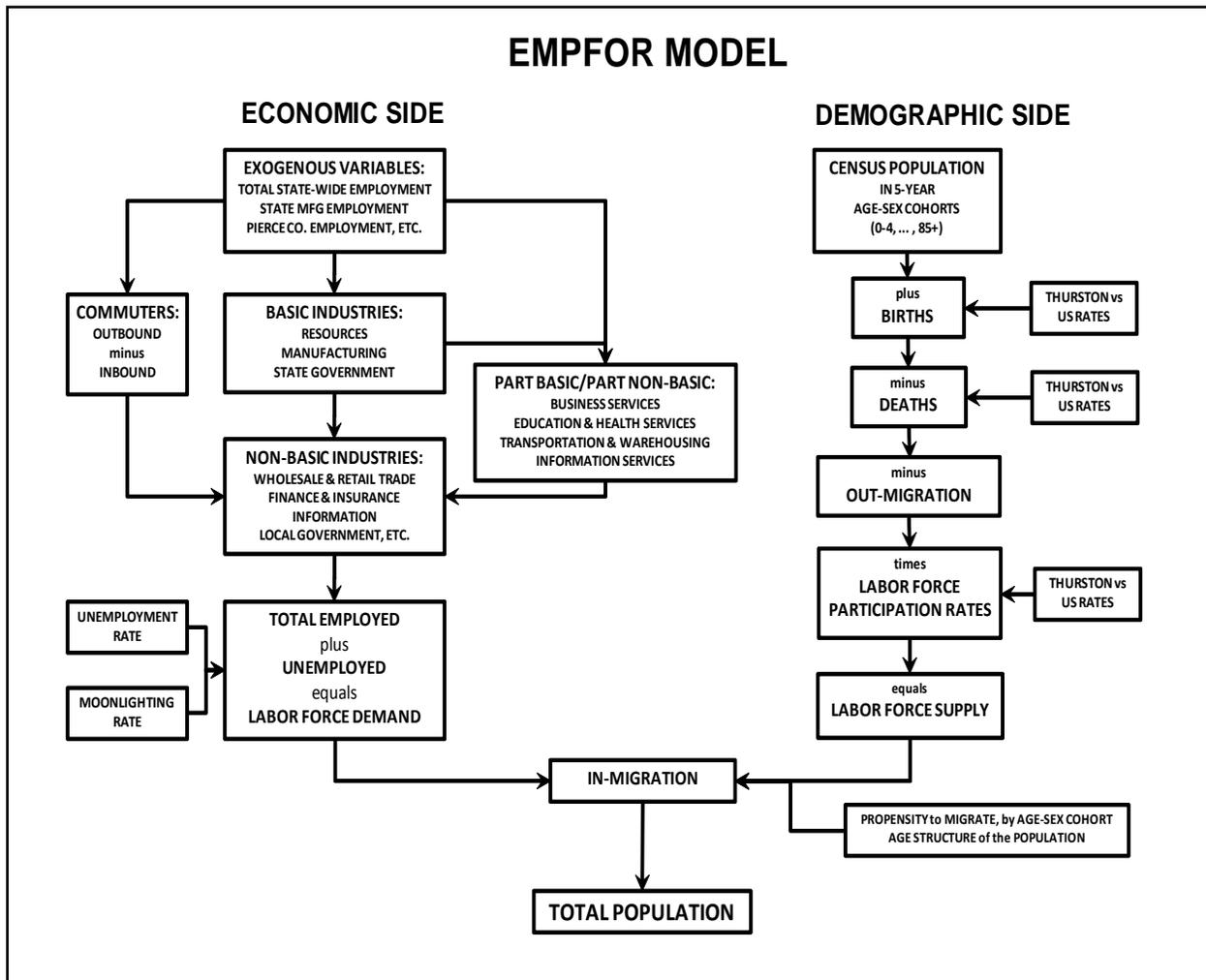
### Structure of the Forecast Model

The TRPC forecasting process involves multiple stages, and relies on both computer modeling and human judgment. The first stage is to forecast growth in population and employment at the county-wide level using a combination of demographic and economic modeling. The most recent county-wide forecast was adopted in early 2010. 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. A neighborhood-level allocation of the 2010 county-wide forecast has not yet been completed, and is targeted for completion in 2012. 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.

# County Level Employment and Population Forecasting Methodology

## Overview

TRPC uses a county-level model (EMPFOR) which links an econometric module to a demographic one. The econometric side forecasts employment and labor force *demand*, while the demographic side forecasts resident population and labor force *supply*. If the demand exceeds the supply, EMPFOR provides in-migration to make up the difference. Along with in-migrating workers come non-working children, students, spouses, and retirees.



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# Econometric Module

The **ECONOMETRIC MODULE** 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. Net outbound commuters (i.e., outbound commuters minus inbound commuters) are treated like a basic industry. In essence, they are exporting their labor and bringing in their salaries. The result of this analysis is a set of formulas to predict, for example, how many retail employees result if state government adds or subtracts 100 jobs.

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 1978-2008. This data is 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 must be split into the 36 individual industries used in the model (such as “wood products manufacturing” versus “food products manufacturing,” or “publishing” versus “software”).

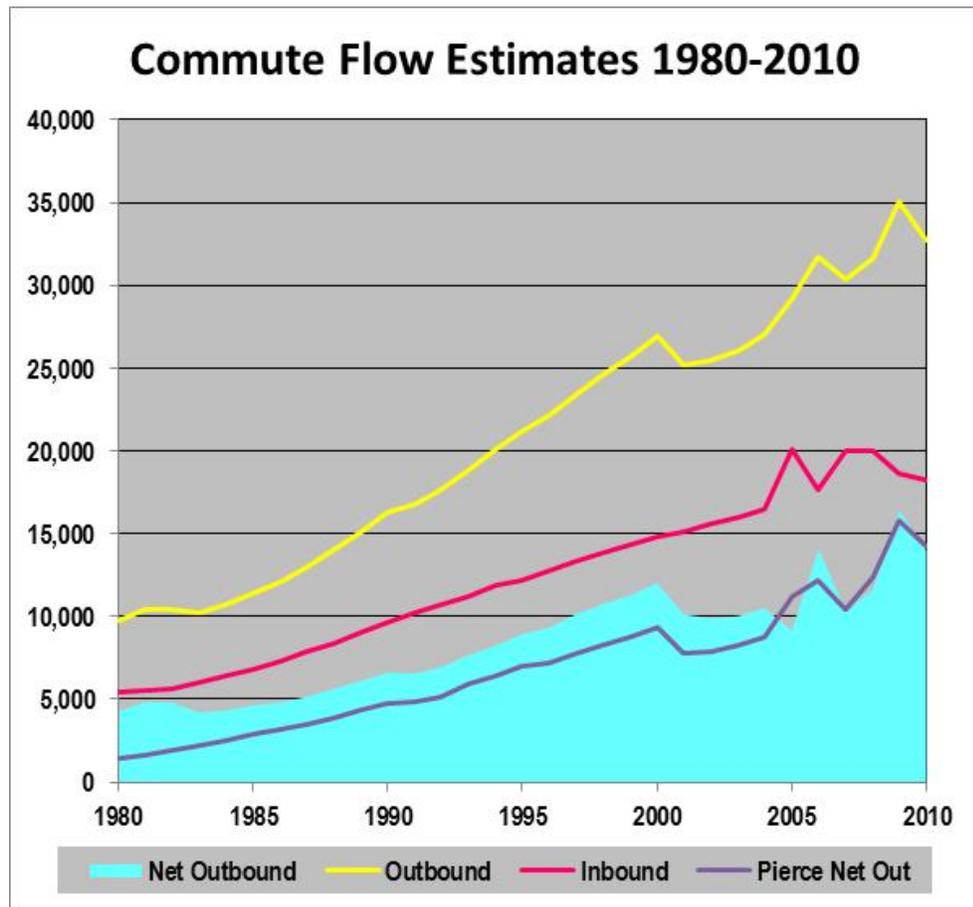
Shares of total employment by more detailed industry are estimated using data on those wage-and-salary workers that are covered by the unemployment insurance program, administered by the Department of Employment Security. This “ES-202” data covers about 79% of all local workers — more in some industries, less in others. Some industries have a large share of non-covered workers, such as real estate and many services.

# Specific Assumptions

## 1. Commuting Trends

For decades, various data has shown that people are commuting longer distances than before. We have data from the Decennial Censuses (1970-2000), the Census Bureau’s new annual American Community Survey (2005-08), and estimates for other years (e.g., intercensal years). The data is sparse, and subject to large margins of error. Note the irregularity of the estimate line for the decade 2000-09, reflecting both the impact of recessions, and the probable influence of statistical sampling error.

The number of outbound commuters surpassed the number of State Government workers in the late 1990s, so the impact on the forecast of the assumption for this factor is very large. In the future, how many people will commute inbound and outbound across the county line?



For a long time, there was a very strong pattern: increasing shares of the jobs in Pierce and King Counties going to Thurston residents. More of Thurston’s residents were deciding to take jobs there and commute. Also, more of the workers in Pierce and King Counties were deciding to move to Thurston and commute. Until recently, commuting to Lewis County was also weighted toward outbound (mostly from south Thurston County), while the exchange with Grays

Harbor and Mason has traditionally been weighted toward inbound. During the decade 2000-09, the trend appears to have accelerated for commuting to Pierce County, but to have slowed for

commuting to King County. In particular, the net outbound flow to Pierce County now dominates all other net flows combined.

The commute flow assumption is based initially on the pattern recommended by the advisory committee in 2004 and adjusted slightly by the 2009/2010 advisory committee. In 2012 the advisory committee considered modifying the commute assumption for a variety of reasons, including:

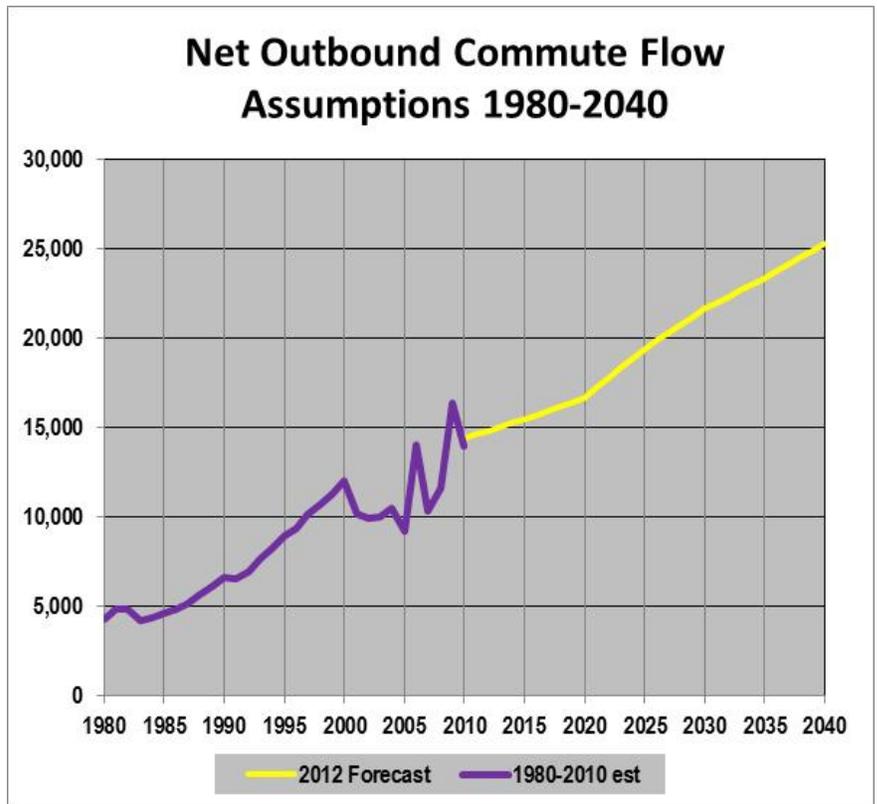
- Average home prices in Pierce County being lower than those in Thurston County for the first time in decades
- Higher percentage of foreclosure properties (50%) in Pierce County compared to Thurston County (20%)
- Congestion on Interstate 5

The committee recommended a short-term modification of the commute assumption to reflect the recovery from the recession. In the longer term the commute assumption remained the same as the previous forecast.

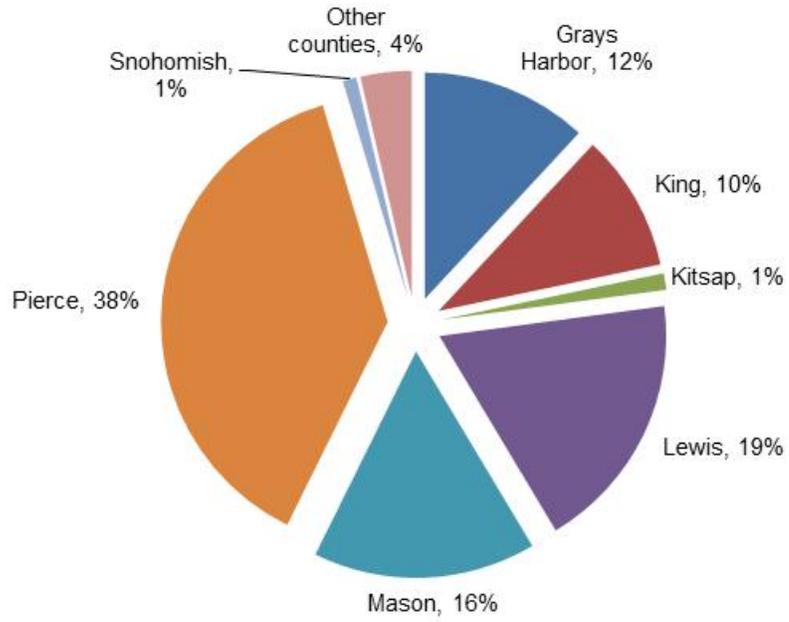
Commuting assumptions are always a challenge. Will increasing congestion and gas prices over time reduce the incentive to commute to jobs in other counties? On the other hand, increasing congestion in King and Pierce Counties has made commuting difficult on arterials from

outlying communities in those counties (e.g., commuting from Puyallup to Tacoma). Will lower housing costs and commuting from Thurston to Pierce Counties on I-5 be more attractive?

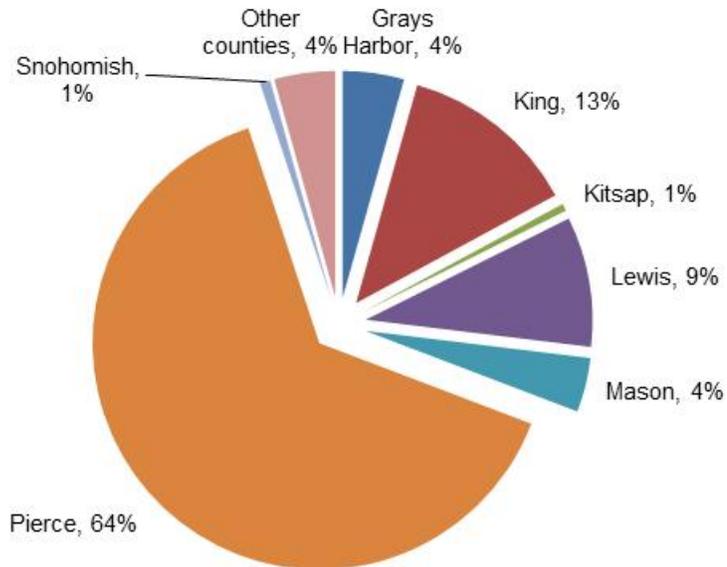
The model reflects the assumption that Thurston County will continue to receive spill-over growth from Pierce County, as Pierce continues to get spill-over growth from King County.



**Inbound Commuters: 2010 Estimate**



**Outbound Commuters: 2010 Estimate**



### Number of Commuters Into and Out of Thurston County

Civilian Inbound Commuters from:	Actual				Forecast							
	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040	
Grays Harbor	954	1,260	1,594	1,924	2,173	2,632	3,129	3,665	4,253	4,845	5,494	
King	1,305	1,542	1,792	1,780	1,792	2,044	2,305	2,577	2,871	3,152	3,458	
Kitsap	109	209	325	216	215	277	345	419	501	586	679	
Lewis	1,751	2,073	2,382	3,081	3,387	3,999	4,679	5,434	6,296	7,201	8,238	
Mason	1,437	2,102	2,842	2,795	2,901	3,465	4,072	4,721	5,433	6,143	6,921	
Pierce	3,754	4,384	4,955	6,655	6,951	7,950	8,991	10,077	11,250	12,379	13,607	
Snohomish	109	179	263	185	180	240	308	383	466	553	648	
Other counties	240	433	718	517	667	768	875	987	1,109	1,227	1,355	
<b>TOTAL:</b>	<b>9,659</b>	<b>12,182</b>	<b>14,871</b>	<b>17,153</b>	<b>18,266</b>	<b>21,375</b>	<b>24,704</b>	<b>28,264</b>	<b>32,179</b>	<b>36,086</b>	<b>40,399</b>	

Civilian Outbound Commuters to:	Actual				Forecast							
	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040	
Grays Harbor	682	779	951	1,385	1,449	1,640	1,685	1,736	1,779	1,812	1,835	
King	2,064	3,276	5,349	4,530	4,231	5,040	5,925	6,523	7,234	7,855	8,561	
Kitsap	181	226	268	206	175	227	274	323	379	439	507	
Lewis	2,592	2,797	2,843	3,131	3,086	3,480	3,680	3,867	4,038	4,192	4,341	
Mason	1,086	1,376	1,596	1,434	1,286	1,620	1,773	1,928	2,087	2,244	2,396	
Pierce	6,642	9,449	12,530	15,348	16,627	18,318	21,339	26,336	31,105	35,467	40,420	
Snohomish	172	201	244	161	242	262	293	320	352	382	417	
Other counties	974	1,139	1,305	1,389	1,442	1,567	1,731	1,966	2,182	2,363	2,565	
<b>TOTAL:</b>	<b>14,393</b>	<b>19,243</b>	<b>25,086</b>	<b>27,584</b>	<b>28,539</b>	<b>32,155</b>	<b>36,699</b>	<b>42,998</b>	<b>49,155</b>	<b>54,754</b>	<b>61,042</b>	

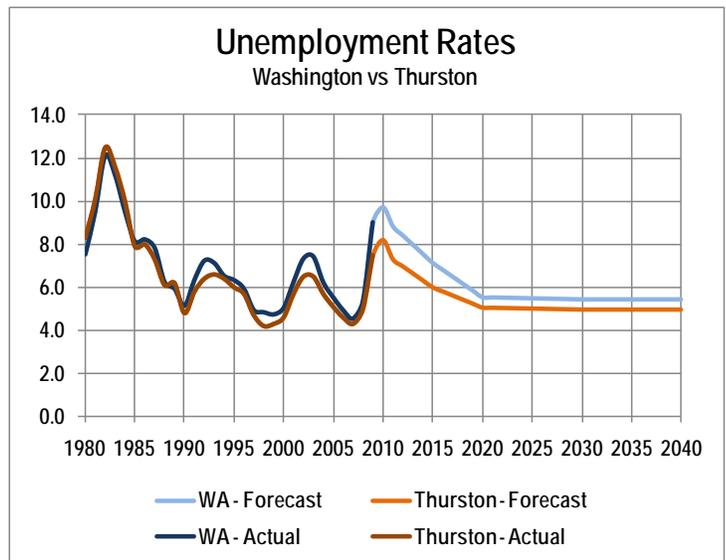
Civilian Net Outbound Commuters	Actual				Forecast							
	1990	1995	2000	2005	2010	2015	2020	2025	2030	2035	2040	
Grays Harbor	-272	-481	-643	-539	-724	-992	-1,444	-1,929	-2,474	-3,033	-3,659	
King	759	1,734	3,557	2,750	2,439	2,997	3,620	3,946	4,363	4,703	5,102	
Kitsap	72	17	-57	-10	-41	-50	-71	-96	-122	-147	-172	
Lewis	841	724	461	50	-301	-519	-999	-1,567	-2,258	-3,009	-3,897	
Mason	-351	-726	-1,246	-1,361	-1,616	-1,845	-2,299	-2,793	-3,346	-3,899	-4,525	
Pierce	2,888	5,065	7,575	8,693	9,676	10,368	12,348	16,259	19,855	23,088	26,813	
Snohomish	63	22	-19	-24	63	22	-15	-63	-114	-171	-231	
Other counties	734	706	587	872	775	799	855	978	1,073	1,137	1,210	
<b>TOTAL:</b>	<b>4,734</b>	<b>7,061</b>	<b>10,215</b>	<b>10,431</b>	<b>10,273</b>	<b>10,780</b>	<b>11,996</b>	<b>14,734</b>	<b>16,976</b>	<b>18,669</b>	<b>20,642</b>	

<b>Military Inbound</b>	<b>2,147</b>	<b>1,802</b>	<b>1,979</b>	<b>2,629</b>	<b>4,138</b>	<b>4,675</b>	<b>4,675</b>	<b>4,675</b>	<b>4,675</b>	<b>4,675</b>	<b>4,675</b>
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<b>Total Net Outbound Commuters</b>	<b>6,881</b>	<b>8,863</b>	<b>12,194</b>	<b>13,060</b>	<b>14,411</b>	<b>15,455</b>	<b>16,671</b>	<b>19,409</b>	<b>21,651</b>	<b>23,344</b>	<b>25,317</b>
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## 2. Unemployment Rates

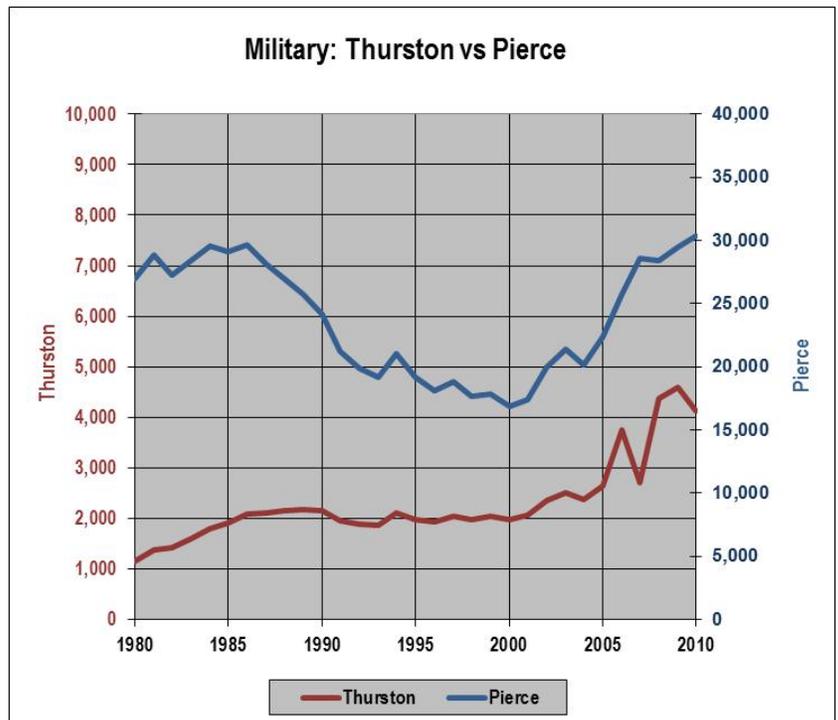
The model requires unemployment rate assumptions to use for the future forecast periods. Over the last 20 years, Thurston County's unemployment rates have tracked very closely to those of Washington State, but missing the worst of the peaks during recessions. With the current recession, statewide unemployment rates peaked at 10% in late 2009 and early 2010, but are now declining. This trend was forecasted by the Office of Forecast Council.



Thurston County tends to have a bit lower unemployment rates than the state. The model uses a series where Thurston's future rates follow the direction of State forecasts, ending at a rate just below the State's long-run forecasted rate.

## 3. Joint Base Lewis-McChord Personnel Living in Thurston County

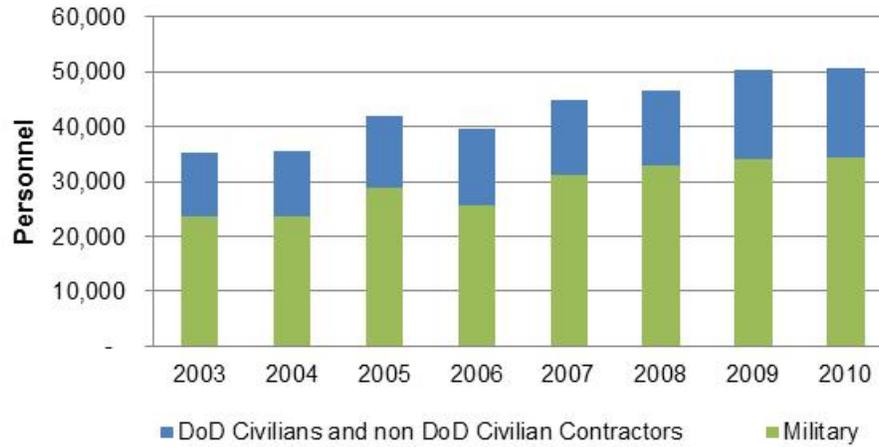
Over the last two decades, there has been a gradual increase in the number of Joint Base Lewis-McChord active-duty military personnel living in Thurston County. However, the total troop strength levels at the Joint Base are difficult to predict even in the short run, much less the long run. Base realignments have resulted in troops being moved to Joint Base Lewis-McChord starting in the early 1990s, but there has been no resultant long-term increase of military personnel living in Thurston County until the recent wars in Afghanistan and Iraq. The total dropped a little from time to time, probably reflecting overseas deployments.



The new forecast assumes a stable level of military living in Thurston County after the completion of the current phase of Joint Base Lewis-McChord growth in 2012-2016, using the current share (about 13%) of Joint Base Lewis-McChord troop levels. The number of active duty military living in Thurston County will not likely be at a stable level, but rather is likely to go both up and down unpredictably over the long range.

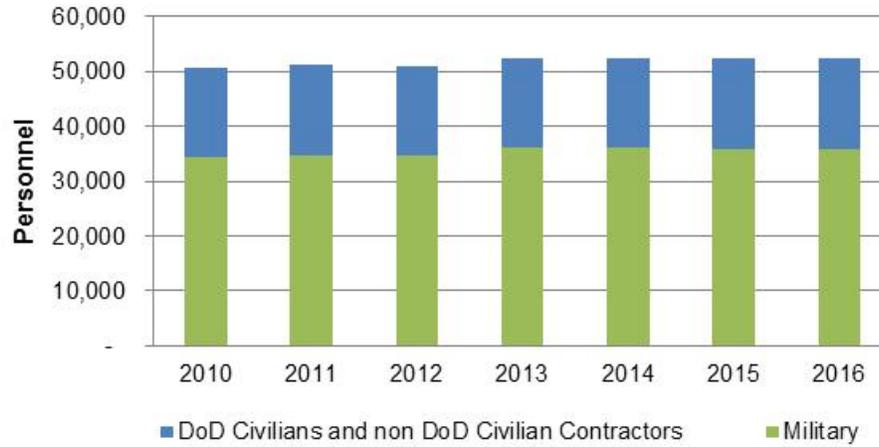
### Expansion of Joint Base Lewis-McChord - Historic

Note: DoD is Department of Defense



### Expansion of Joint Base Lewis-McChord - Projections

Note: DoD is Department of Defense



Source: Joint Base Lewis-McChord Growth Coordination Plan.

#### 4. State Government Employment Trends

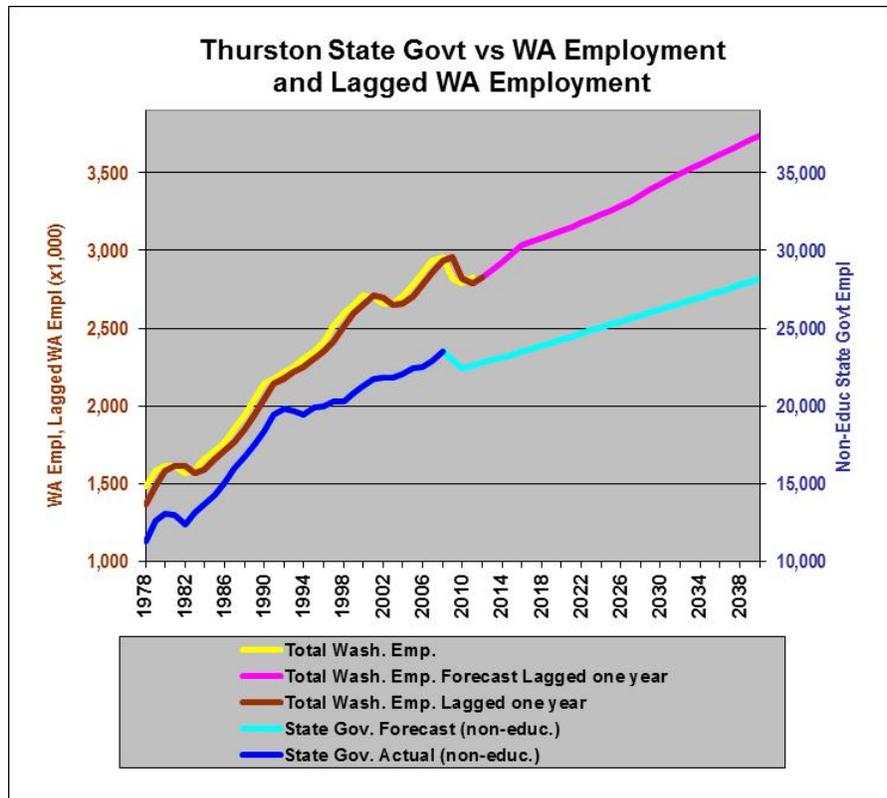
The passage of Initiative 601 in 1993 ensured that trends in State Government employment would change, probably permanently.

Non-educational State Government employment was calculated with a formula that relates non-educational State Government employment in Thurston County to state-wide total non-agricultural wage and salary employment.

Before the passage of Initiative 601 in 1993, State employment in Thurston County tracked closely and concurrently with state-wide 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, the growth rate slowed, and State Government employment began to lag Washington employment growth patterns by a year.

This all fits with the I-601 requirements which 1) limit the growth of State 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 Washington employment boomed, State Government 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 fell, and the same happened during and after the recession of 2007-12.



## 5. Manufacturing Employment

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

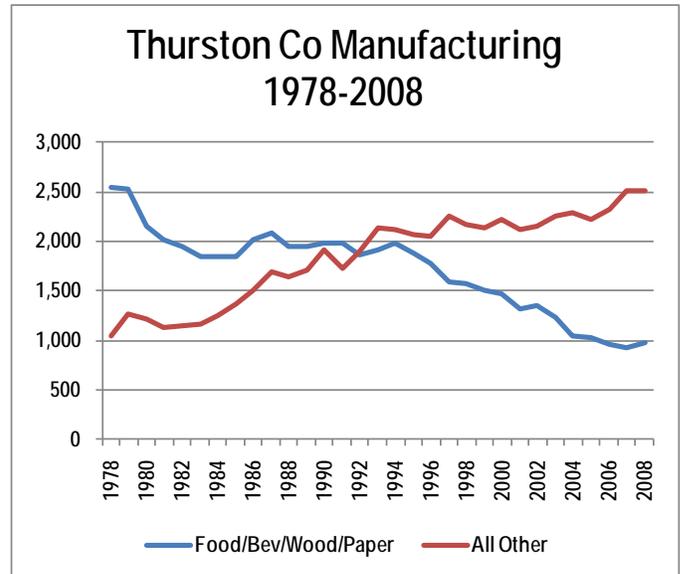
Thurston County’s manufacturing employment is likely to grow slowly too. While big employers are lost from time to time (e.g., Hardel plywood, Miller brewery), small ones are gained constantly (e.g., Callisons). This has been an ongoing trend since early 1980s. As elsewhere, the local manufacturing sector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

The forecasting model makes separate projections for each of ten manufacturing industries. Inevitably, some projections will be too high and others too low. This is a highly volatile and uncertain sector. It is assumed that manufacturing employment will track state-wide trends, dropping during recessions and rebounding thereafter. In the long run, the model projects slow growth.

Assumptions can be programmed in to accommodate new industries that may be poised to enter the community, or old ones about to shrink or relocate (note: the model works in five-year intervals). The 2010 forecast does not insert any specific assumptions about new industries about to appear.

## 6. Other Industries

In particular, the Chehalis and Nisqually tribes both have casinos and related enterprises that serve a mix of local and export (i.e., out-of-county) markets. Both have expanded over time, making major changes to the local economy. 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, but at a much slower rate than in the past.

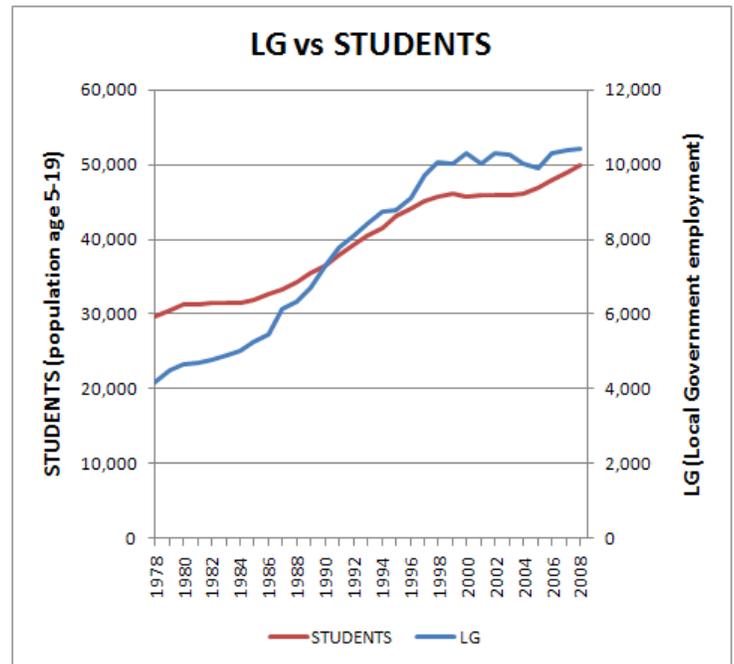


## 7. Local Government Employment

About two-thirds of the employment in local 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, TRPC, Timberland Regional Library, and so on. The Forecast Advisory Committee observed that the local government employment projection in the first draft 2010 forecast was growing at a rate higher than the population growth rate.

They felt that both 1) the effect of revenue-limiting initiatives (e.g., I-747, which generally limits property tax revenue growth to 1% annually) and 2) the changing demographic profile of the population (children will be a smaller share of the population in 2040) would lead to slower growth of local government employment.

The revised draft modified the formula for the local government employment projection. The local government employment projection now grows (in part) in relation to the number of children in the K-12 age cohorts, and it grows more slowly (1.7% average per year) than overall population growth (1.9% average per year).



## 8. Other Factors

***NOTE: Uncertainties surrounding the future availability of municipal water supplies could completely change the growth trends. Water issues are currently being studied by others, and can be incorporated into a future forecast, but they are beyond the scope of this study.***

The model incorporates a variety of other demographic, social, and economic factors that together determine the ultimate results. These include birth rates, death rates, labor force participation rates, multiple-job-holding rates, and the age structure of the migration stream.

Birth rates and death rates change relatively slowly and are relatively predictable. Thurston county rates differ from national ones, and both are changing over time. Both national trends and local ones (1980-2007) have been factored into the projected rates for Thurston County. “Natural increase” (i.e., births minus deaths) has accounted for only 15-30% of the growth Thurston County has experienced over the last three decades (depending on the period examined), while net migration has accounted for all the rest.

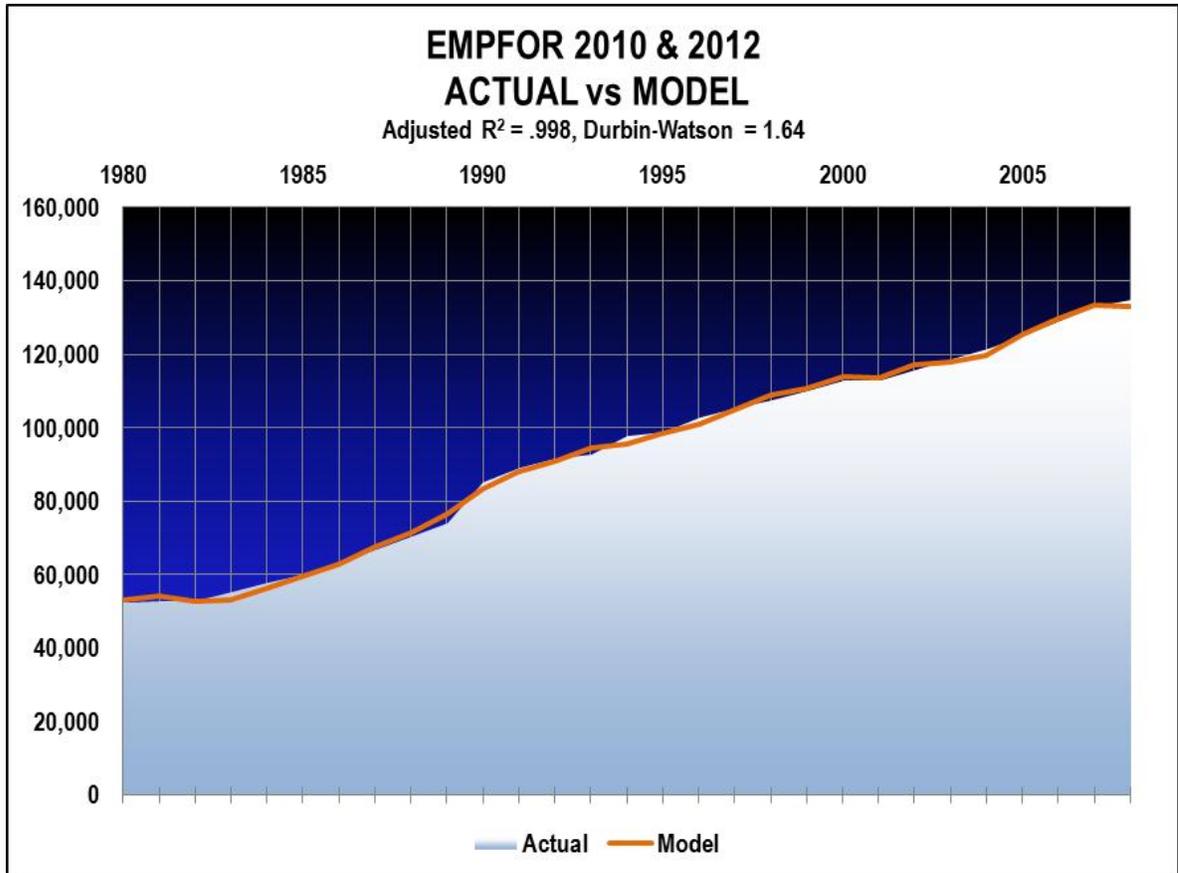
Labor force participation rates (LFPRs) and multiple-job-holding rates (i.e., moonlighting) are also significant factors. The model incorporates separate LFPRs for each 5-year age-sex cohort from age 15 up. These change over time. The changes in local LFPRs are linked in the model to projected national changes. The changing demographics — e.g., aging Baby Boomers — leads to a projection of population growing faster than total jobs; but the population’s increasing

educational attainment moderates that trend a little as better-educated older workers stay in the work force longer than preceding generations.

Moonlighting rates are used as a calibration factor to balance the total number of jobs with the total number of workers during the historic period. Then those same rates are used in future periods, except that moonlighting rate assumptions are set lower during the 2010 recession-affected period.

## Reliability of the Econometric Module

The EMPFOR model was “back-cast” to test its ability to replicate the historic employment data (1978-2008) used to create it. In other words, how well does it predict the past? This test showed an  $R^2$  of 0.998 for predicted total employment versus actual total employment. An  $R^2$  of 1.0 represents a perfect fit. The Durbin-Watson statistic was also calculated at 1.64; a value between 1.0 and 2.0 shows statistical significance.



## Thurston County Total Employment Projections, 2010-2040

Industry	Actual		Forecast				
	2010	2015	2020	2025	2030	2035	2040
Agriculture, forestry, fishing, & related	2,780	2,480	2,600	2,620	2,640	2,670	2,670
Mining	110	150	160	170	180	200	210
Utilities	180	250	270	280	290	290	300
Construction	5,620	8,380	9,160	10,110	11,010	11,810	12,700
Manufacturing	3,100	3,200	3,480	3,530	3,500	3,540	3,630
Durable Goods	n/a	1,830	2,040	2,070	2,000	1,990	2,020
Nondurable Goods	n/a	1,370	1,440	1,460	1,500	1,550	1,610
Wholesale trade	3,250	3,410	3,630	3,810	3,960	4,100	4,280
Retail trade	14,660	16,100	17,200	18,300	19,500	20,500	21,500
Transportation and warehousing	2,310	2,960	3,190	3,470	3,730	3,940	4,180
Information	1,280	1,630	1,740	1,820	1,890	1,960	2,050
Finance and insurance	4,610	4,380	4,710	5,190	5,650	6,000	6,400
Real estate and rental and leasing	5,470	5,390	5,620	5,960	6,280	6,530	6,810
Professional and business services	13,000	15,300	17,500	19,500	21,800	23,900	26,200
Education, Health, & Social Services	17,000	19,000	20,900	22,500	24,500	26,000	27,500
Arts, entertainment, and recreation	2,750	2,960	3,400	3,780	4,190	4,600	5,020
Accommodation and food services	8,270	9,200	10,000	10,700	11,530	12,170	12,810
Other services, except public administration	7,380	9,070	9,950	10,990	12,030	12,880	13,780
Federal government - civilian	1,010	980	1,110	1,050	1,180	1,120	1,240
State government	24,300	24,900	26,000	27,100	28,200	29,300	30,400
State government, except education	n/a	23,300	24,300	25,200	26,200	27,200	28,200
State education	n/a	1,620	1,710	1,830	1,970	2,100	2,230
Local government	11,400	12,200	13,300	14,700	15,800	16,900	18,000
<b>Total Local Employment<sup>1</sup></b>	<b>128,500</b>	<b>142,000</b>	<b>153,900</b>	<b>165,600</b>	<b>177,800</b>	<b>188,400</b>	<b>199,700</b>
Net Outbound Civilian Commuters <sup>2</sup>	10,250	10,800	12,000	14,750	17,000	18,650	20,650
Military	4,150	4,700	4,700	4,700	4,700	4,700	4,700
Total Civilian Employed Persons <sup>3</sup>	116,900	122,700	134,400	147,000	160,700	170,800	181,800
Civilian Unemployed Persons	10,400	7,700	7,200	7,700	8,500	9,000	9,600
<b>Total Civilian Labor Force<sup>4</sup></b>	<b>127,300</b>	<b>130,400</b>	<b>141,600</b>	<b>154,700</b>	<b>169,200</b>	<b>179,800</b>	<b>191,400</b>
<b>Total Thurston County Population</b>	<b>252,300</b>	<b>266,000</b>	<b>296,000</b>	<b>322,000</b>	<b>349,000</b>	<b>371,000</b>	<b>394,000</b>

Source: TRPC - Population and Employment Forecast Work Program, 2012.

Explanations: Medium Growth Scenario. Employment figures represent annual averages. Population figures are for April 1 of each year. (Detail may not add to total due to rounding.)

<sup>1</sup>Total Local Employment is the number of positions available in Thurston County.

<sup>2</sup>Net Outbound Civilian Commuters is calculated by subtracting persons commuting into Thurston County from persons commuting out of Thurston County.

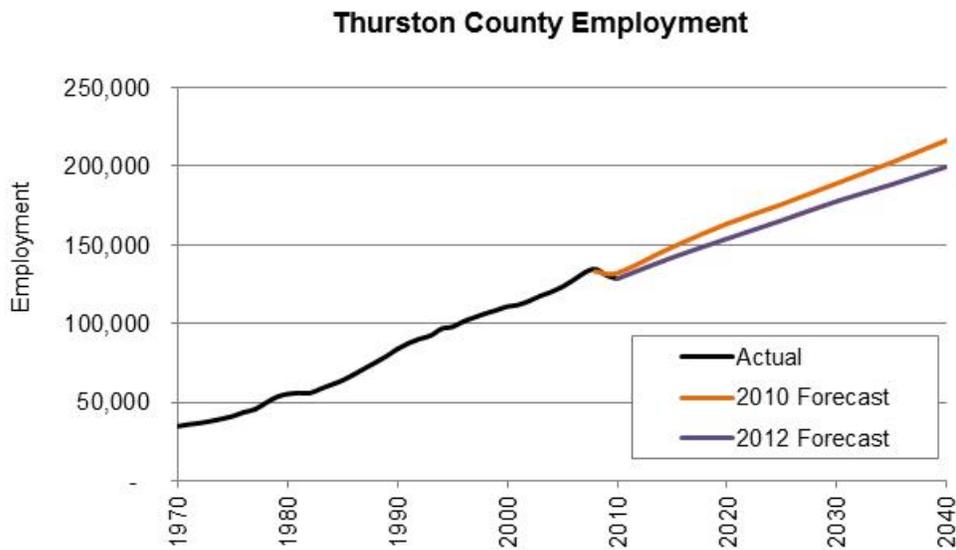
<sup>3</sup>Total Employed Persons is the number of Thurston County residents that are employed.

<sup>4</sup>Total Labor Force is calculated by adding Total Civilian Employed Persons and Civilian Unemployed Persons.

## Comparison with Previous Forecast

The 2012 Employment Forecast is 8.4 percent lower than the 2010 Forecast for the year 2040. The main reason for the adjustment is a decrease in state-wide employment, which has a tremendous impact on the local economy in Thurston County. In short, the Great Recession that began in 2007 has lasted longer than anticipated, and there is a continuing weakness in the economy that is expected to have long term effects.

Thurston County has only experienced a decrease in employment twice in the last 30 years – in 1981, when the decrease was several hundred jobs, and in 2009 and 2010 during the Great Recession. It is for this reason that the long-range forecast has been adjusted.



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# Demographic Module

## Labor Force Participation

The demographic module forecasts future resident population in 36 five-year age-sex cohorts (e.g., males age 0-4, females age 0-4, etc.). Starting with the latest Decennial Census population, EMPFOR adds births and subtracts deaths. Out-migration is then estimated by cohort. The available labor force *supply* is calculated using labor force participation rates by cohort. Finally, the difference between labor force demand and supply generates the forecast of in-migration.

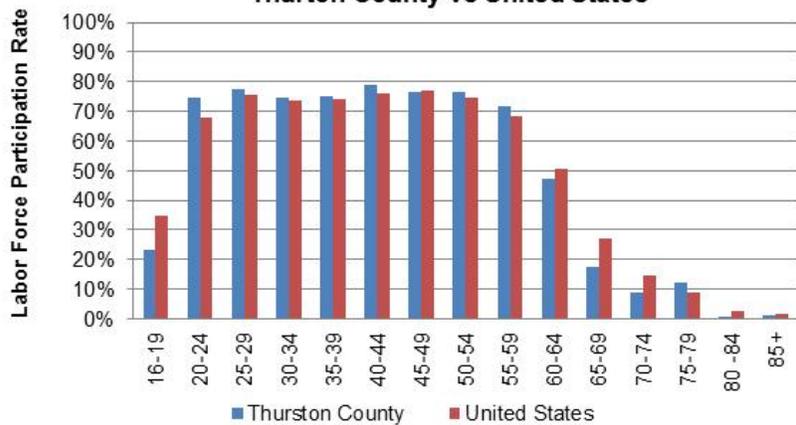
Cohort-specific five-year survival rates (the opposite of death rates) are developed from 1980-2007 county-level vital statistics from the Washington State Department of Health. Similarly, cohort-specific five-year fertility rates (i.e., birth rates per thousand females in each 5-year cohort) are developed from the same source. For the forecast period, Thurston County survival rates and fertility rates are projected as a ratio of national rates, based on historic ratios.

Labor force participation rates are based on 1980-2005 Census data. Cohort-specific rates for ages 15-54 are developed as ratios of national rates projected by the Bureau of Labor Statistics. Local rates were based on age-, and sex-specific rates calculated from the Census Public Use Microdata Sample (PUMS) for Thurston County.<sup>1</sup>

**Males - 2010 Labor Force Participation Rates  
Thurston County vs United States**



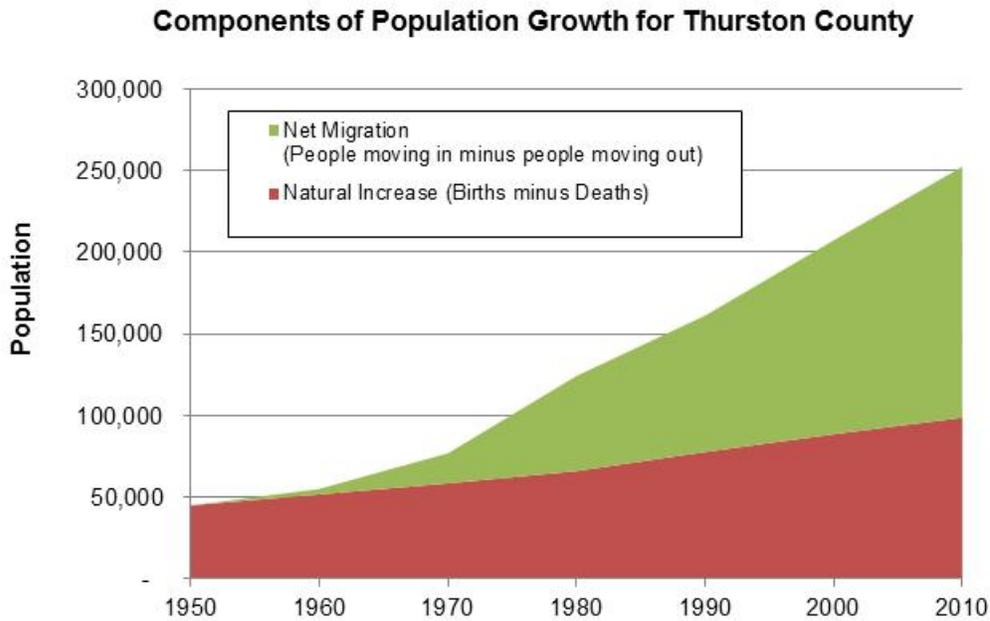
**Females - 2010 Labor Force Participation Rates  
Thurston County vs United States**



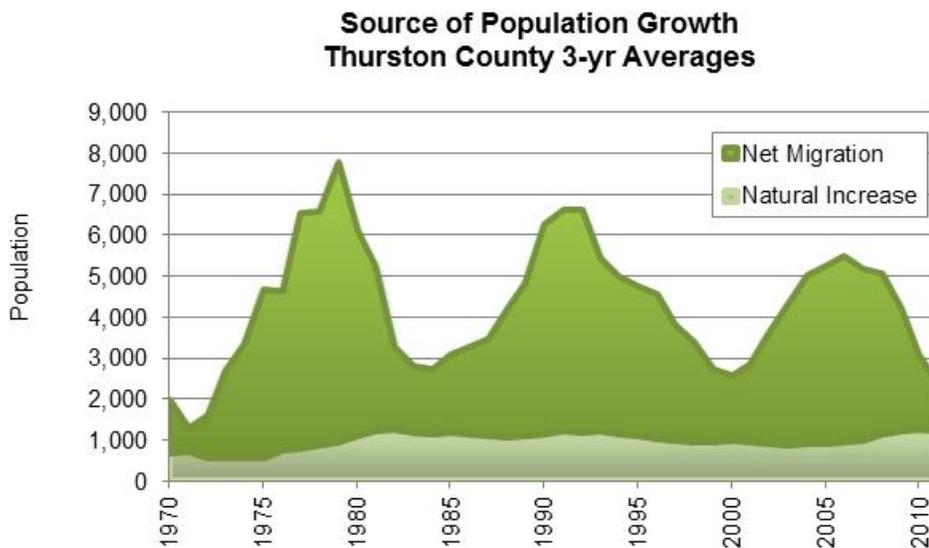
<sup>1</sup> Decennial PUMS data is only a 5% sample, so it has a relatively high uncertainty band. To address this, the PUMS data was controlled to the full Decennial Census Summary File 3 (SF3) sample survey data (a 16% sample) for each of the specific attributes. Take a hypothetical example: SF3 data reports there are 1,000 males age 55-59 *in* the labor force, and 500 *not in* the labor force. It also reports there are 400 with bachelor's degrees and 1,100 without. It does not specify how many of those are in the labor force and how many are not. The PUMS data gives a breakdown, but its subtotals do not add up to 1,500 total; hence, it must be adjusted.

## Natural Increase and Migration

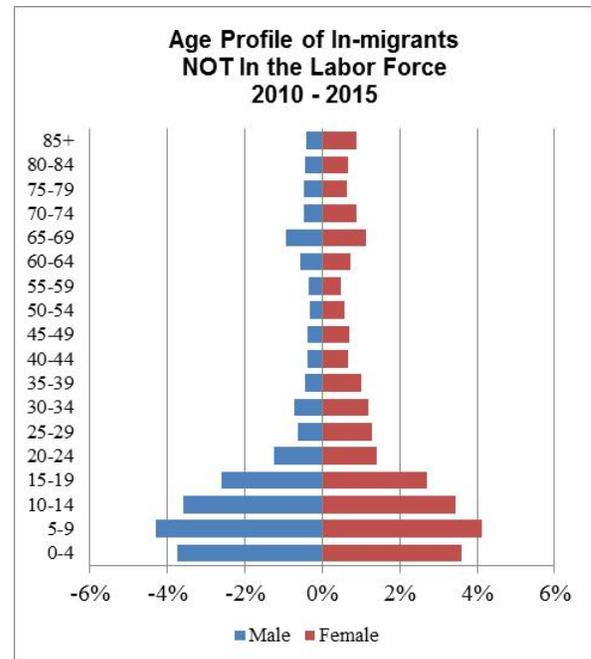
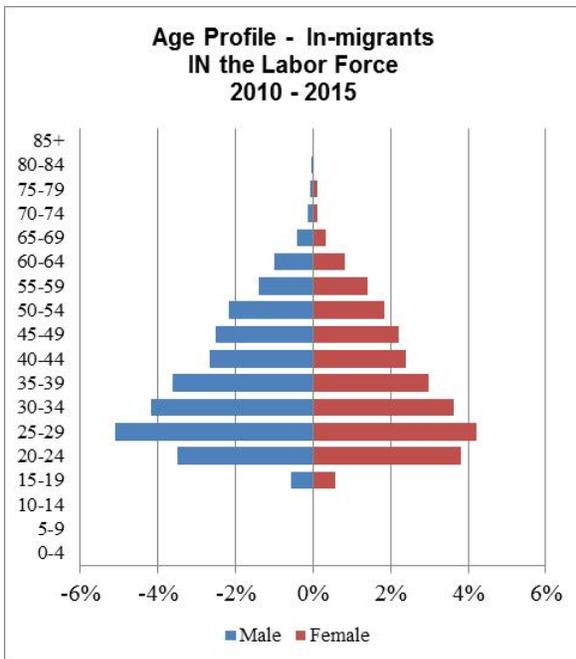
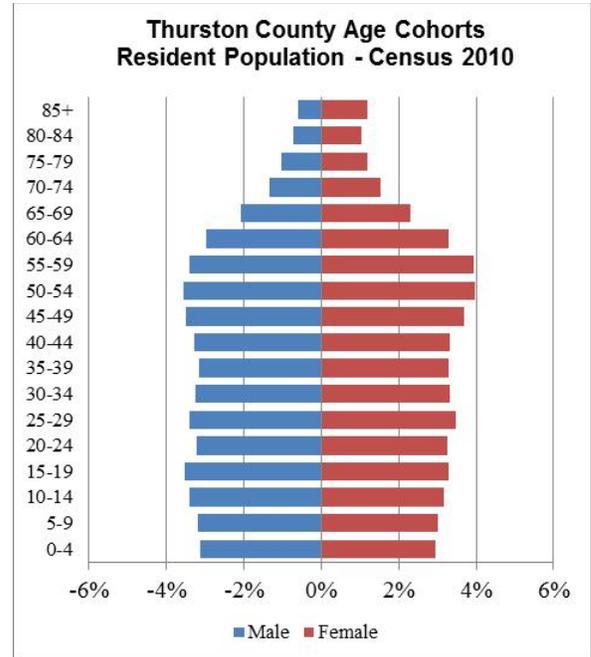
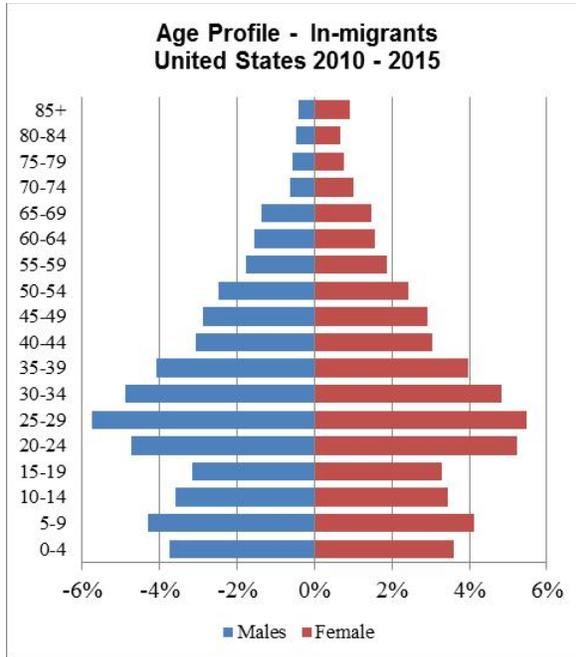
Thurston County has historically had a high rate of population growth from migration – or people moving here.



Migration tends to fluctuate with booms and bust periods of economic growth. In the last four decades, Thurston County has experienced three boom-bust cycles of growth. During all of this time, population continued to grow. It was the rate of growth that differed.



The methodology used in TRPC's County-wide Forecast looks carefully at the age structure of the migration stream. Young people are more footloose. As people get older, they tend to put down roots. Hence the in-migrating population has more young people than the resident population. Of the people that migrate into Thurston County, it is estimated that 52 percent come here for jobs – new jobs, and jobs that have become vacant as workers retire. The remainder move here for other reasons. Many are the partners, spouses, or children of people who come here for a job. Others move to join extended family members – such as parents moving in with adult children, or young adult children moving in with parents. Others come here for retirement or to go to College or University.



The age profile of the out-migrating population is a little bit different. Many young people leave Thurston County in their late teens and early twenties, while others enter in their late twenties and early thirties. Using Census data, EMPFOR combines a calculation of both the propensities to migrate of the various age-sex cohorts, and the changing age structure of the US population, which is the main source of the migration stream.

## Population Forecast by Age-Gender Cohorts Thurston County, 1980-2040

Age	1980			1985			1990			1995		
	Males	Females	Total									
	<b>0-4</b>	4,918	4,762	9,680	5,592	5,268	10,860	6,085	5,605	11,690	6,845	6,432
<b>5-9</b>	4,945	4,683	9,628	5,458	5,196	10,654	6,586	6,296	12,882	7,339	7,024	14,363
<b>10-14</b>	5,410	5,050	10,460	5,440	5,063	10,503	6,393	5,864	12,257	7,861	7,220	15,081
<b>15-19</b>	5,685	5,424	11,109	5,502	5,275	10,777	5,786	5,572	11,358	6,994	6,567	13,561
<b>20-24</b>	5,323	5,436	10,759	5,252	5,419	10,671	5,176	5,293	10,469	5,853	5,946	11,799
<b>25-29</b>	5,507	5,966	11,473	5,884	6,115	11,999	5,868	6,134	12,002	6,460	6,426	12,886
<b>30-34</b>	5,395	5,633	11,028	6,041	6,499	12,540	6,631	7,189	13,820	7,366	7,644	15,010
<b>35-39</b>	4,395	4,339	8,734	5,862	6,226	12,088	6,947	7,729	14,676	8,003	8,711	16,714
<b>40-44</b>	3,341	3,241	6,582	4,671	4,648	9,319	6,645	6,947	13,592	7,886	8,509	16,395
<b>45-49</b>	2,926	2,927	5,853	3,552	3,522	7,074	5,092	5,019	10,111	7,101	7,430	14,531
<b>50-54</b>	2,855	3,005	5,860	3,039	3,044	6,083	3,663	3,595	7,258	5,439	5,390	10,829
<b>55-59</b>	2,757	3,005	5,762	2,842	3,112	5,954	3,025	3,265	6,290	3,903	4,005	7,908
<b>60-64</b>	2,471	2,635	5,106	2,799	3,183	5,982	2,861	3,265	6,126	3,185	3,421	6,606
<b>65-69</b>	1,924	2,273	4,197	2,355	2,702	5,057	2,771	3,293	6,064	2,916	3,384	6,300
<b>70-74</b>	1,379	1,830	3,209	1,831	2,311	4,142	2,230	2,659	4,889	2,642	3,298	5,940
<b>75-79</b>	867	1,382	2,249	1,131	1,704	2,835	1,495	2,158	3,653	1,806	2,555	4,361
<b>80-84</b>	508	946	1,454	632	1,169	1,801	812	1,501	2,313	1,124	1,903	3,027
<b>85+</b>	346	775	1,121	403	994	1,397	510	1,278	1,788	697	1,660	2,357
<b>Total</b>	<b>60,952</b>	<b>63,312</b>	<b>124,264</b>	<b>68,286</b>	<b>71,450</b>	<b>139,736</b>	<b>78,576</b>	<b>82,662</b>	<b>161,238</b>	<b>93,420</b>	<b>97,525</b>	<b>190,945</b>

**Sources:** 1980, 1990 and 2000 Census, 1985, 2000, 2010, 2005 OFEM Estimates, and TRPC - Population and Employment Forecast Work Program, 2012.

**Explanation:** Figures are as of April 1; darkest shading represents baby boom echo; lighter shading represents baby boom.

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## Population Forecast by Age-Gender Cohorts Thurston County, 1980-2040

Age	2000			2005			2010			2015		
	Males	Females	Total									
<b>0-4</b>	6,597	6,293	12,890	6,867	6,571	13,438	7,922	7,459	15,381	7,909	7,517	15,425
<b>5-9</b>	7,330	7,049	14,379	7,244	6,989	14,233	8,037	7,592	15,629	8,553	8,292	16,845
<b>10-14</b>	7,957	7,390	15,348	8,183	7,597	15,779	8,587	7,972	16,559	8,998	8,236	17,234
<b>15-19</b>	8,224	7,622	15,845	8,813	8,234	17,046	8,881	8,335	17,216	9,102	8,682	17,785
<b>20-24</b>	6,690	6,701	13,391	7,794	7,801	15,595	8,101	8,224	16,325	8,248	8,218	16,466
<b>25-29</b>	6,538	6,428	12,967	6,905	6,757	13,662	8,602	8,804	17,406	8,286	8,413	16,699
<b>30-34</b>	7,070	7,068	14,138	6,885	6,854	13,739	8,202	8,407	16,609	8,684	8,809	17,494
<b>35-39</b>	7,929	8,370	16,298	7,670	7,920	15,590	7,986	8,290	16,276	8,737	9,047	17,784
<b>40-44</b>	8,304	9,101	17,405	8,425	9,195	17,620	8,315	8,416	16,731	8,434	8,728	17,162
<b>45-49</b>	8,295	9,007	17,302	9,235	9,915	19,150	8,785	9,323	18,108	8,963	9,136	18,098
<b>50-54</b>	7,514	7,777	15,291	8,813	9,223	18,036	8,946	9,989	18,935	9,190	9,710	18,900
<b>55-59</b>	5,385	5,445	10,830	7,407	7,616	15,023	8,572	9,913	18,485	8,900	9,964	18,864
<b>60-64</b>	3,757	3,852	7,609	5,009	5,128	10,136	7,534	8,306	15,840	8,147	9,371	17,519
<b>65-69</b>	2,972	3,298	6,269	3,488	3,781	7,270	5,213	5,799	11,012	6,913	7,726	14,639
<b>70-74</b>	2,578	3,187	5,766	2,692	3,165	5,857	3,405	3,867	7,272	4,537	5,346	9,883
<b>75-79</b>	2,046	2,980	5,026	2,069	2,897	4,966	2,562	2,995	5,557	2,805	3,509	6,313
<b>80-84</b>	1,396	2,191	3,587	1,585	2,496	4,081	1,786	2,590	4,376	1,935	2,490	4,425
<b>85+</b>	937	2,020	2,957	1,223	2,516	3,739	1,516	3,031	4,547	1,644	3,224	4,867
<b>Total</b>	<b>101,519</b>	<b>105,779</b>	<b>207,298</b>	<b>110,306</b>	<b>114,655</b>	<b>224,961</b>	<b>122,952</b>	<b>129,312</b>	<b>252,264</b>	<b>129,984</b>	<b>136,418</b>	<b>266,402</b>

Sources: 1980, 1990 and 2000 Census, 1985, 2000, 2010, 2005 OFM Estimates, and TRPC - Population and Employment Forecast Work Program, 2012.

Explanation: Figures are as of April 1; darkest shading represents baby boom echo; lighter shading represents baby boom.

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## Population Forecast by Age-Gender Cohorts Thurston County, 1980-2040

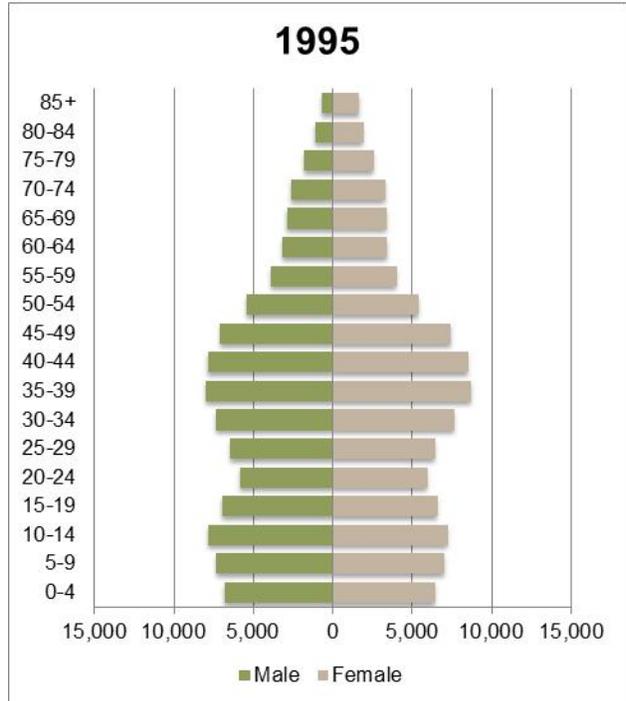
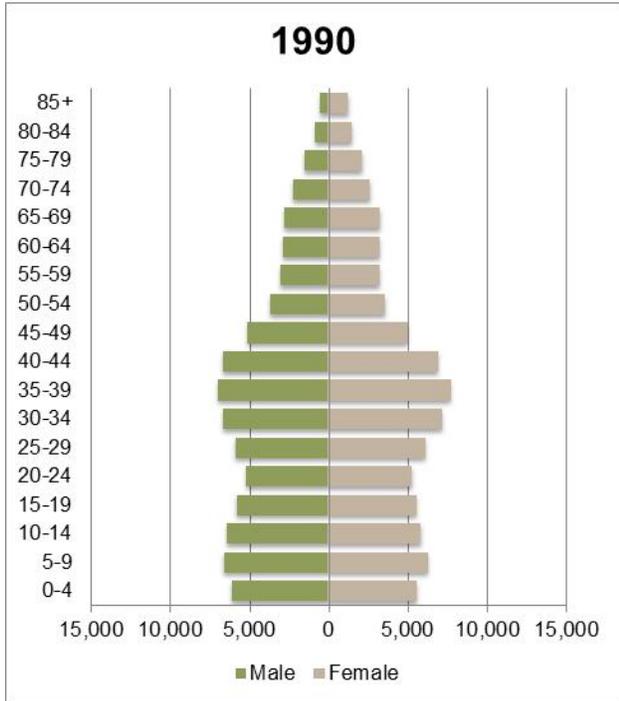
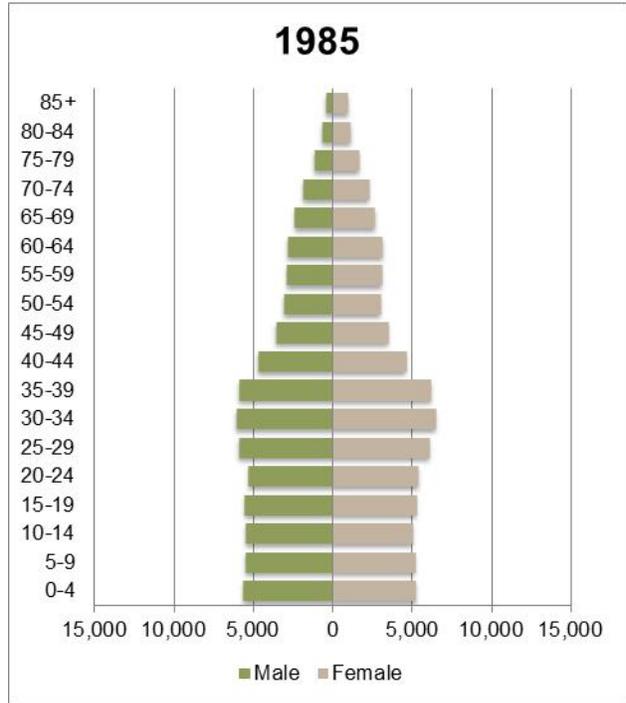
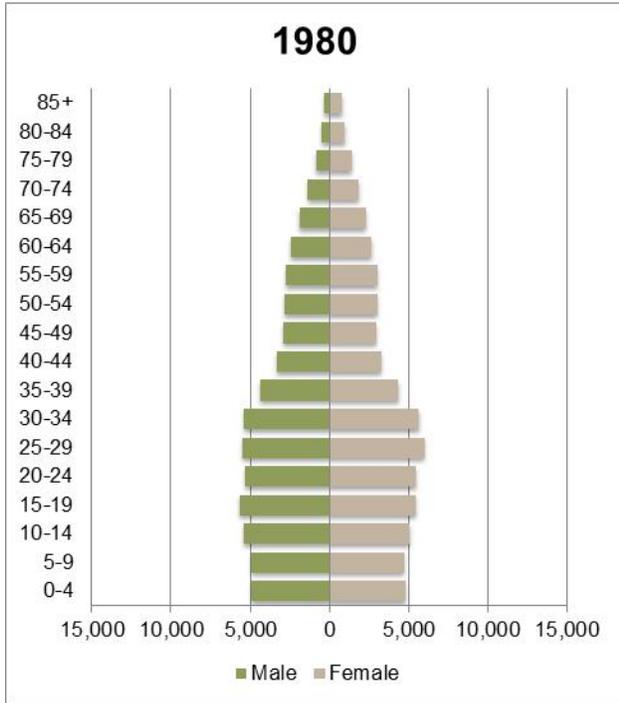
Age	2020			2025			2030			2035			2040		
	Males	Females	Total												
0-4	8,511	8,097	16,608	9,061	8,619	17,680	9,575	9,109	18,684	10,116	9,623	19,739	10,689	10,168	20,857
5-9	9,340	9,112	18,452	9,891	9,660	19,551	10,507	10,261	20,768	11,036	10,781	21,817	11,642	11,373	23,015
10-14	10,085	9,420	19,504	10,869	10,196	21,065	11,533	10,829	22,362	12,180	11,437	23,617	12,778	12,001	24,779
15-19	10,153	9,551	19,704	11,174	10,643	21,817	12,045	11,513	23,558	12,745	12,188	24,933	13,431	12,845	26,277
20-24	8,986	9,108	18,094	9,797	9,838	19,635	10,686	10,801	21,487	11,444	11,587	23,031	12,094	12,250	24,344
25-29	9,294	9,287	18,581	9,596	9,730	19,326	10,442	10,545	20,987	11,218	11,382	22,600	11,982	12,174	24,157
30-34	9,364	9,439	18,803	10,107	10,099	20,207	10,334	10,443	20,777	11,155	11,257	22,412	11,923	12,072	23,996
35-39	9,988	10,218	20,206	10,641	10,855	21,496	11,405	11,572	22,977	11,544	11,831	23,375	12,432	12,742	25,174
40-44	9,573	9,873	19,445	10,784	11,017	21,801	11,522	11,751	23,274	12,256	12,455	24,711	12,366	12,681	25,046
45-49	9,442	9,763	19,205	10,487	10,808	21,295	11,792	12,052	23,844	12,579	12,844	25,423	13,335	13,578	26,913
50-54	9,605	9,745	19,350	9,980	10,249	20,229	11,009	11,267	22,276	12,331	12,524	24,855	13,157	13,355	26,512
55-59	9,406	10,005	19,411	9,699	9,937	19,636	10,048	10,394	20,442	11,019	11,352	22,372	12,328	12,606	24,934
60-64	8,820	9,818	18,638	9,285	9,878	19,163	9,515	9,781	19,296	9,815	10,168	19,983	10,722	11,058	21,781
65-69	7,845	9,073	16,918	8,552	9,594	18,147	9,033	9,731	18,764	9,194	9,592	18,786	9,466	9,928	19,394
70-74	6,218	7,389	13,607	7,084	8,658	15,743	7,801	9,281	17,082	8,259	9,463	17,722	8,398	9,316	17,714
75-79	3,839	4,953	8,792	5,262	6,806	12,068	6,063	8,014	14,077	6,752	8,688	15,440	7,187	8,922	16,109
80-84	2,230	2,998	5,228	3,032	4,155	7,186	4,197	5,731	9,928	4,898	6,785	11,683	5,544	7,473	13,017
85+	1,886	3,429	5,315	2,200	3,923	6,124	2,896	5,074	7,971	3,087	5,002	8,089	3,679	5,972	9,651
<b>Total</b>	<b>144,583</b>	<b>151,278</b>	<b>295,861</b>	<b>157,502</b>	<b>164,665</b>	<b>322,167</b>	<b>170,404</b>	<b>178,150</b>	<b>348,554</b>	<b>181,627</b>	<b>188,961</b>	<b>370,589</b>	<b>193,152</b>	<b>200,515</b>	<b>393,667</b>

Sources: 1980, 1990 and 2000 Census, 1985, 2000, 2010, 2005 OFM Estimates, and TRPC - Population and Employment Forecast Work Program, 2012.

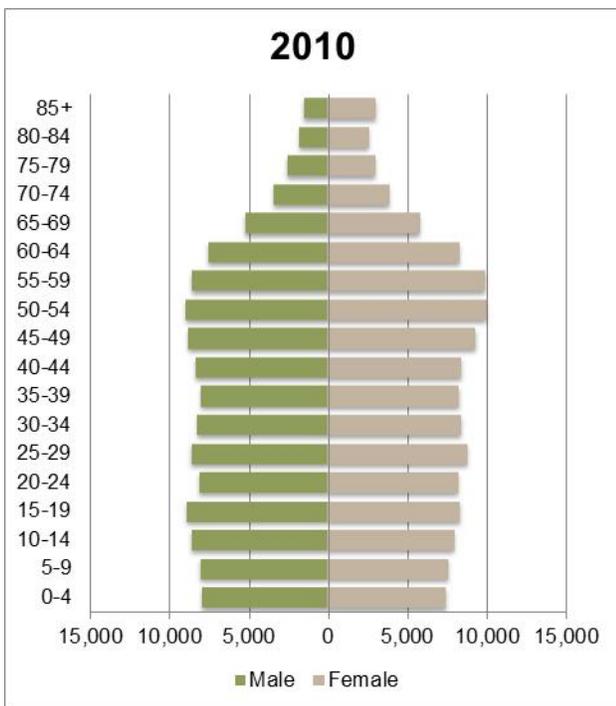
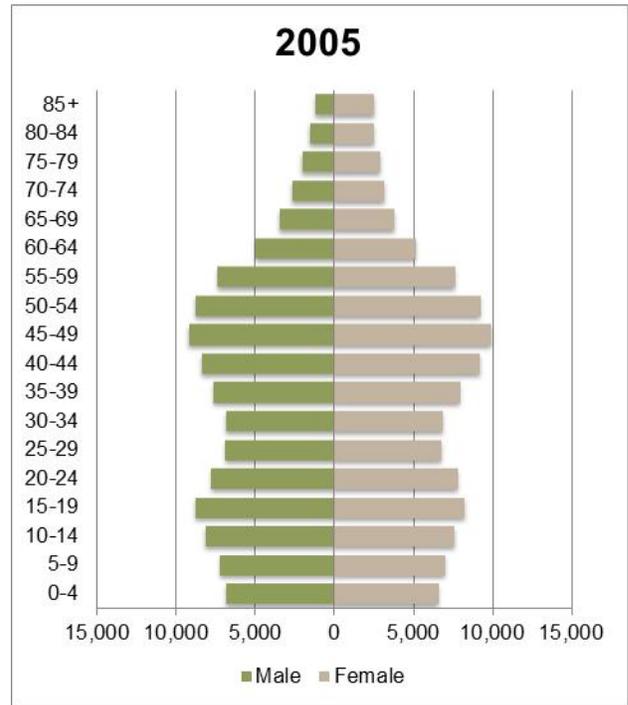
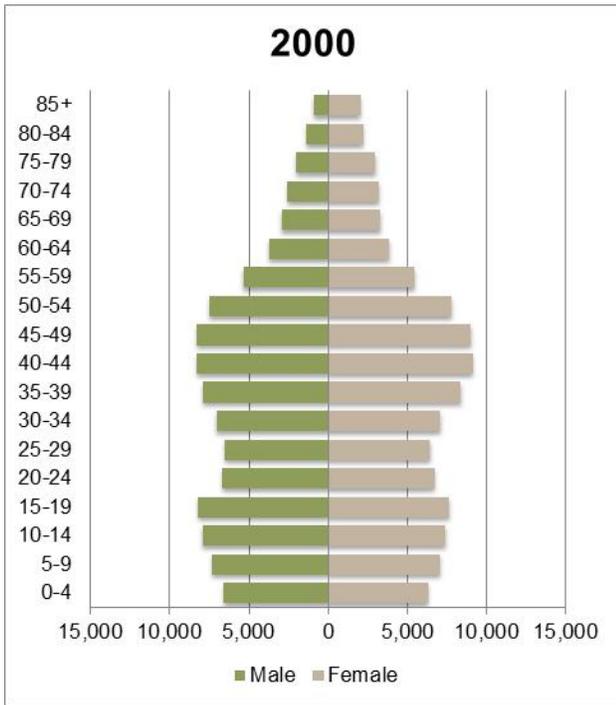
Explanation: Figures are as of April 1; darkest shading represents baby boom echo; lighter shading represents baby boom.

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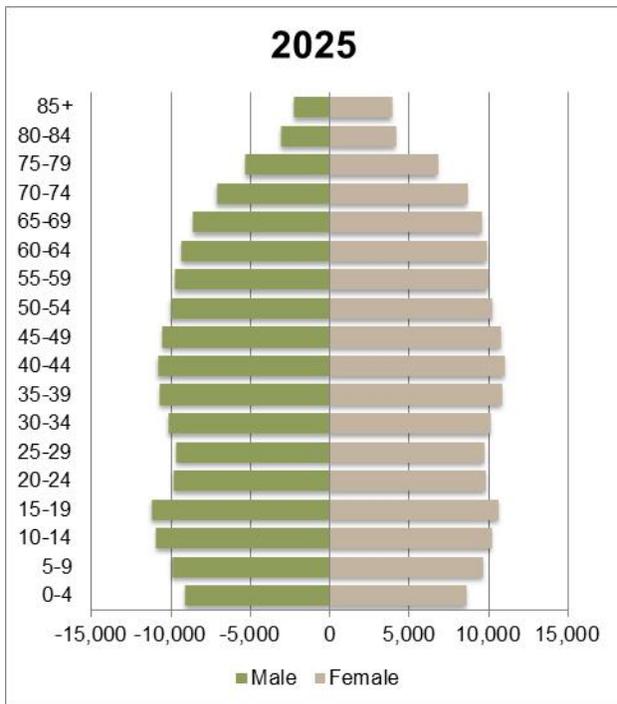
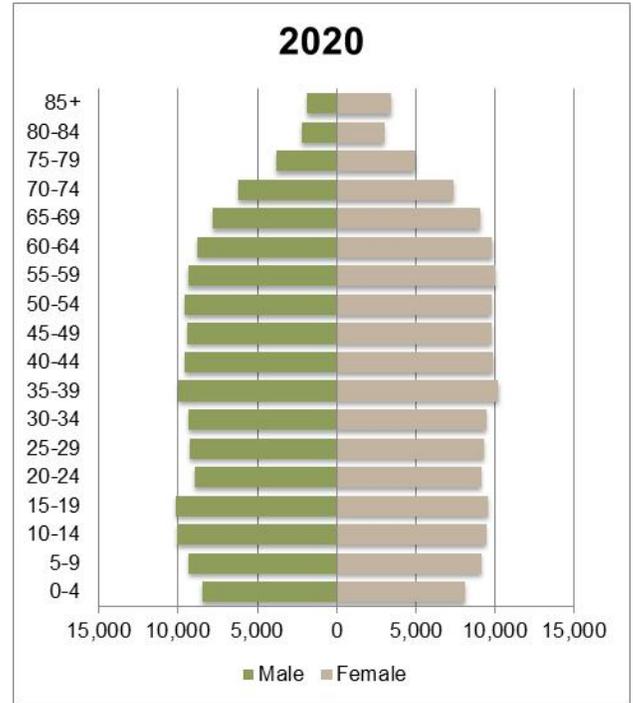
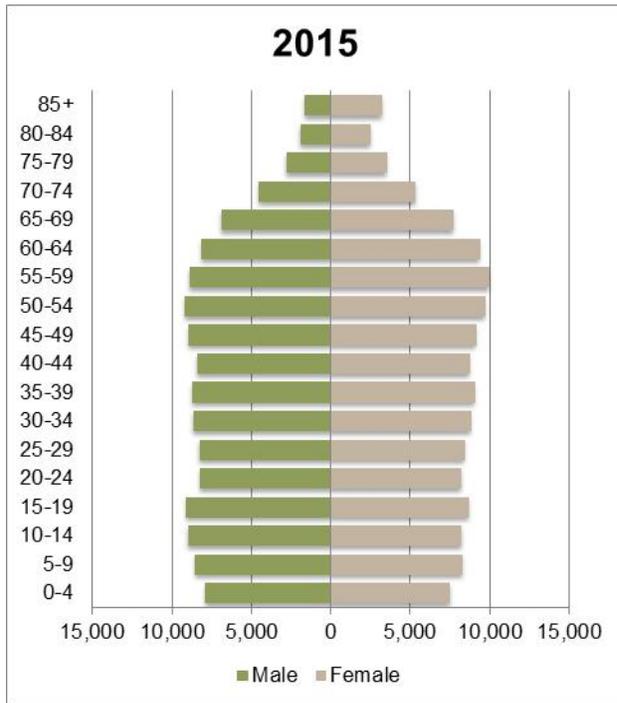
## Population Pyramids, Thurston County, 1980-2040



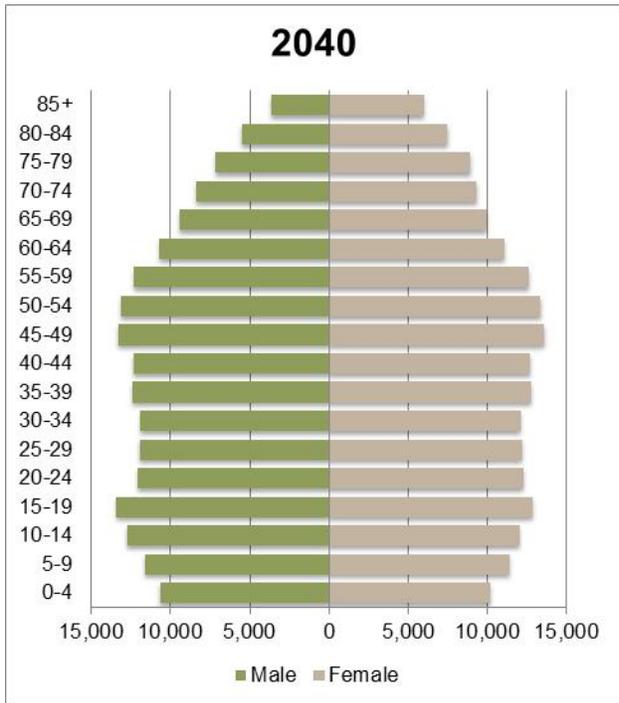
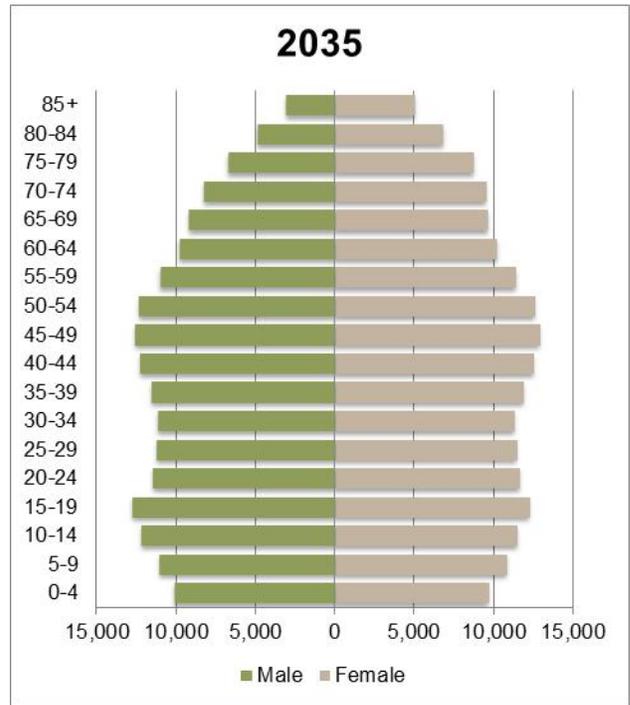
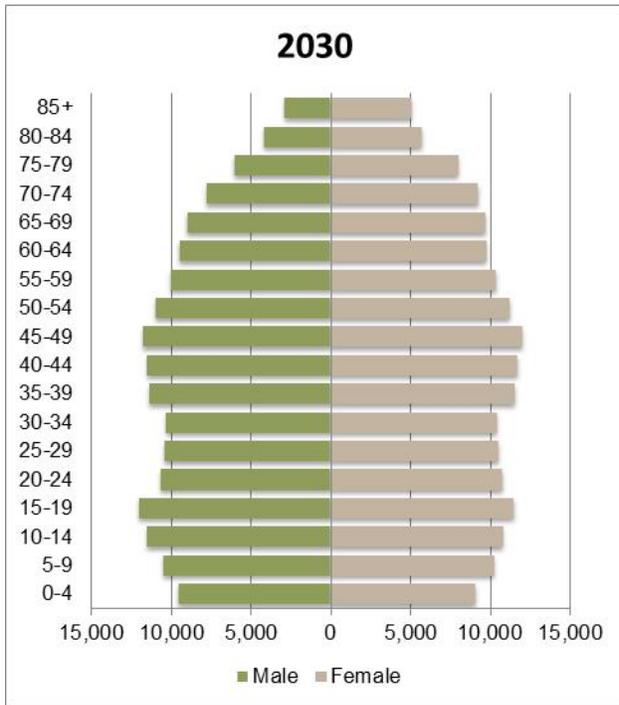
## Population Pyramids, Thurston County, 1980-2040



### Population Pyramids, Thurston County, 1980-2040

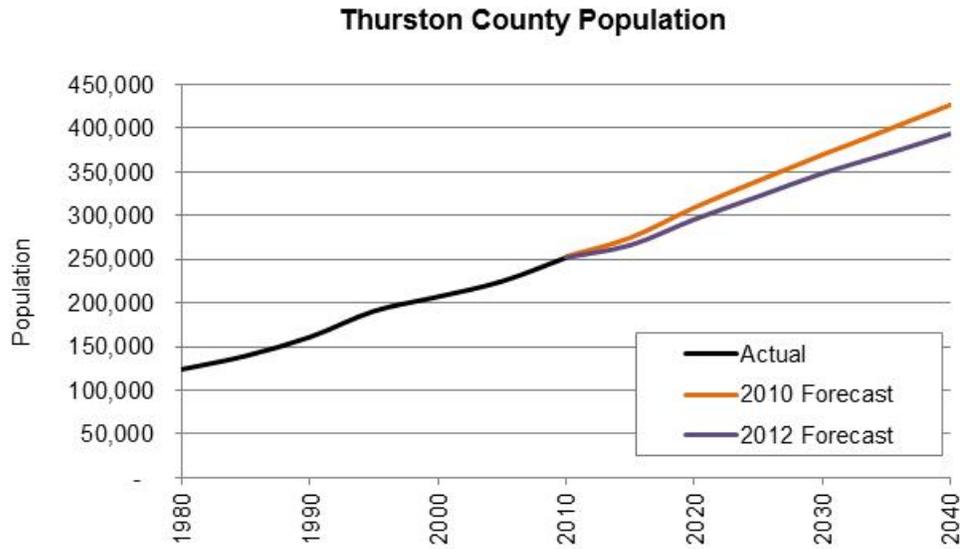


### Population Pyramids, Thurston County, 1980-2040



## Comparison with Previous Population Forecast

The population forecast is strongly influenced by jobs. With an adjustment in the employment forecast due to the continuing effects of the Great Recession, there was a similar adjustment in the population forecast. The difference was 7.8 percent by 2040.



# Dwelling Unit Estimates

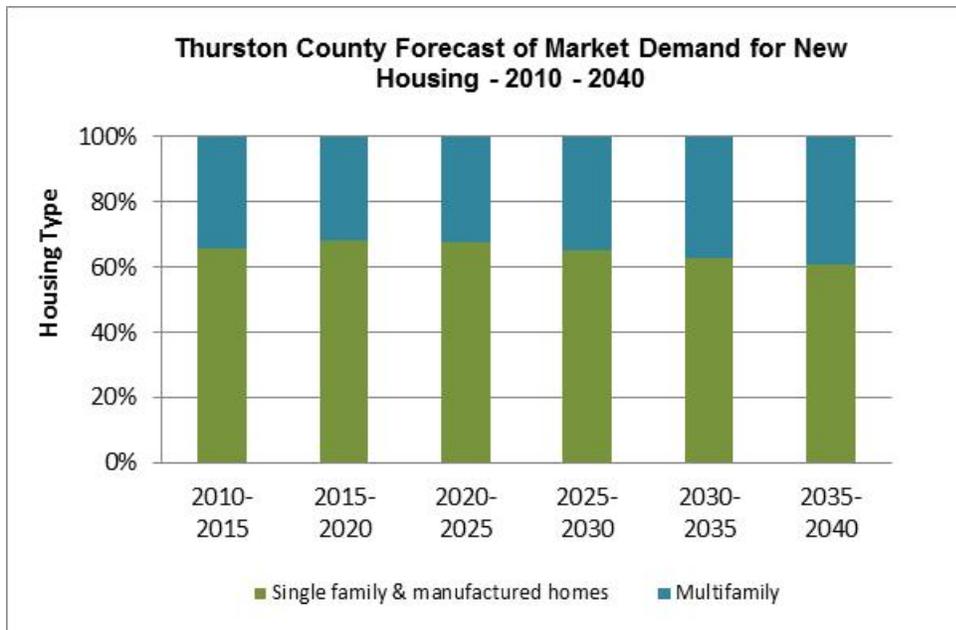
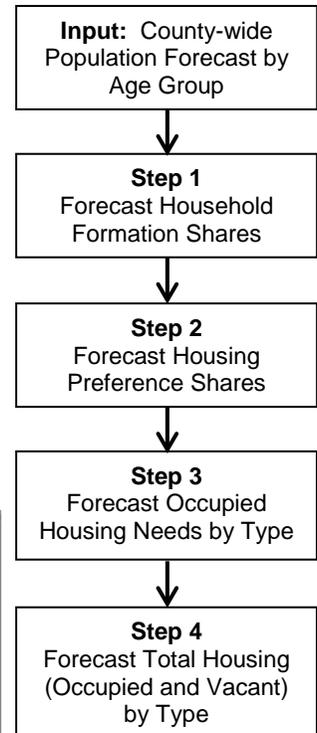
Estimates of future dwelling unit demand for Thurston County are developed from the county-wide population forecast.

TRPC uses a four step process to forecast dwelling unit demand based on how households form, and what type of housing units people typically prefer during differ stages of their lives. The estimates are based on typical Thurston County household preferences, derived from thirty years of Census information.

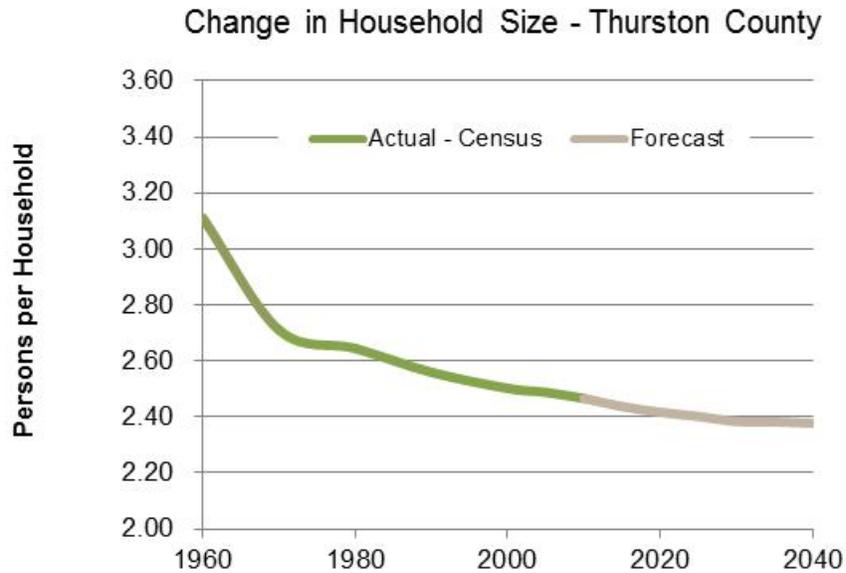
Driven mainly by demographic trends – the aging of the baby boom generation – multi-family homes will gain an increasing share of Thurston County’s housing market over the next 30 years. This will include demand for accessory dwelling units, duplexes, townhomes, and senior assisted-living facilities.

Today, 78 percent of our housing stock is in single-family homes (either stick built or manufactured homes) with the remaining 22 percent multi-family homes. By 2035-2040 – it is estimated that around 40 percent of the demand for new homes will be multifamily units, and our total housing stock will be around 73 percent multi-family units. This is comparable to Pierce County today – where Census estimates show around 71 percent of their housing stock in single-family housing.

## Process Used to Forecast Dwelling Units Demand



Average Household Size: Average household size (occupied units) is 2.47 people per household in 2010, and forecast to decrease to 2.37 in 2040. Household population does not include group quarters.



Vacancy Rate Assumption: Vacancy rate was 7% in 2010. The forecast assumes a decrease in vacancy rate. 5.7% in 2015; 4.9% 2020 to 2040.

Total dwelling units:

2010: 108,182 (Census)

2040: 170,800 (Preliminary estimate – will be adjusted slightly during the allocation phase, as household size will vary depending on Census Tract )

## Details

### Step 1 – Forecast Household Formation Shares

For each of nine age groups, forecast how households form at different life stages after accounting for population in group quarters. During different life stages, the percentage of population that lives in various types of households changes. For instance, children are most often householders (live in someone else's house) or in group quarters. The share of population living in single person households increases steadily as people age. Shares by age group are forecast for each of the following types of households:

1. Group quarters such as jails, dorms, or nursing homes
2. Single person households
3. Two or more person households
  - a. Head of household or a
  - b. Householder (such as spouse or child)

### Step 2 – Forecast Housing Preference Shares

For each of nine age groups and household type, forecast preference for type of dwelling units (housing type). Different types of households show a preference for different types of housing. The demand for multifamily (attached) housing is highest for single people aged 15-34 and seniors. Two or more person households show a preference for single-family homes. Dwelling unit types are forecast in four categories.

1. Group quarters
2. Single-family homes
3. Multifamily home
4. Manufactured homes (homes that are built off site and moved to the property)

### Step 3 – Forecast Occupied Housing Needs by Type

Combine the results of the county-wide population projections by age groups, forecast of household formation (Step 1), and forecast of housing types (Step 2) to develop forecasts of housing type by age groups. The sum of these forecasts results in a county-wide forecast of *occupied* housing types.

### Step 4 – Forecast Total (Occupied and Vacant) Housing

Apply a vacancy rate (based on average vacancy rates by type) to determine total occupied and unoccupied housing needs.

# Sensitivity Analysis

Based on feedback from Forecast Advisory Committee, a sensitivity analysis of the county-wide model has been included in the forecast documentation. This sensitivity analysis examines some of the major inputs into the model – and their effects on overall model results of both the population and employment forecasts. This analysis was developed to provide a more explicit and detailed analysis of key assumptions related to the draft population projection. Some of the assumptions/data layers included in the sensitivity analysis were ones that are either derived from other agencies (regional, state, or national sources) or difficult to forecast based on past trends.

Input Assumption/Data Layer	Change in Assumption	Employment 2040		Population 2040	
		Number	Difference	Number	Difference
County-wide forecast	n/a	199,700	n/a	393,700	n/a
Washington State Employment Forecast (this forecast is developed by OFM based on forecasts of national and international trends)	Increase by 3% 2020; 6% 2030; 9% 2040 compared to current projection	210,200	5.3%	408,000	3.6%
	Decrease by 3% 2020; 6% 2030; 9% 2040 compared to current projection	189,200	-5.3%	380,000	-3.6%
King, Pierce, Snohomish and Kitsap Counties Employment (affects outbound commute)	Increase by 3% 2020; 6% 2030; 9% 2040 compared to current assumption	204,500	2.4%	407,900	3.6%
	Decrease by 3% 2020; 6% 2030; 9% 2040 compared to current assumption	194,900	-2.4%	379,600	-3.6%
Joint Base Lewis-McChord (decisions made at a national level)	Increase number of military personnel living in Thurston County and commuting to Pierce County by 1,000 starting in 2015	200,300	0.3%	396,500	0.7%
	Decrease number of military personnel living in Thurston and commuting to Pierce County by 1,000 starting in 2015	199,100	-0.3%	391,000	-0.7%
State Government (excluding education)	Increase by 3% 2020; 6% 2030; 9% 2040 compared to current projection	204,400	2.4%	400,000	1.6%
	Decrease by 3% 2020; 6% 2030; 9% 2040 compared to current projection	195,000	-2.4%	387,400	-1.6%
Health Care	Increase of 1,000 employees – by 2020	201,400	0.9%	396,000	0.6%
State College	Evergreen State College doubles in size by 2040	200,900	0.6%	395,300	0.4%

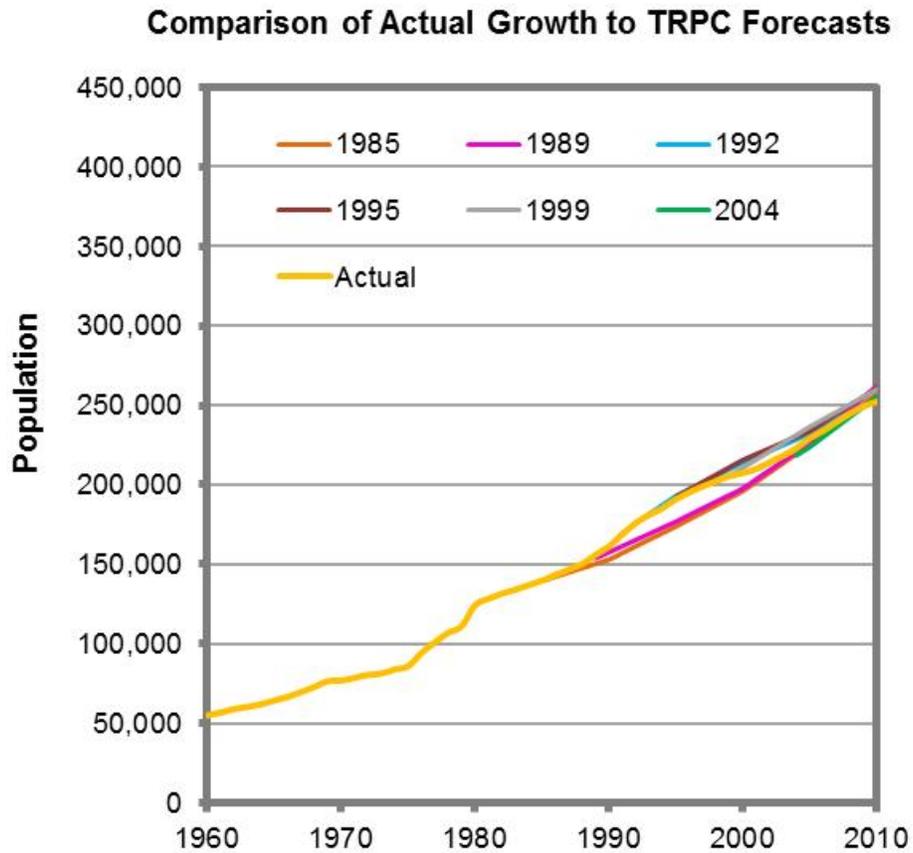
Over the last three decades there has been a steady increase in the share of jobs in the Puget Sound region that are held by commuters from other counties. This applies to both inbound and outbound commuters. In short, the number of commuters is increasing at a faster rate than the increase in jobs. The following represent the sensitivity to the forecast model to various adjustments to the commute assumption:

1. Instead of an increase based on projecting past trends, set the rate of increase at 75 percent of the current forecast assumption
2. Shift the commute assumption slowly at first, (similar to 1) and then taper to 50 percent of the current forecast assumption starting in 2025
3. Instead of an increase based on projecting past trends, set the rate of increase at 50 percent of the current forecast assumption

Input Assumption/Data Layer	Change in Assumption	Employment 2040		Population 2040		Commuters 2040		
		Number	Diff.	Number	Diff.	Inbound Comm.	Outbnd Comm.	Net Outbound Comm.
County-wide Forecast	n/a	199,700	n/a	393,700	n/a	40,400	61,000	20,600
Increase in share of jobs held by commuters (both inbound and outbound commuters)	Rate of increase in share of jobs held by commuters set at 75 percent of current assumption	197,300	-1.2%	386,700	-1.8%	36,900	55,700	18,800
	Rate of increase in share of jobs held by commuters set at 75 percent of current assumption until 2025, and then set to 50 percent of current assumption to the end of the forecast period	196,200	-1.8%	383,300	-2.6%	35,100	53,000	17,900
	Rate of increase in share of jobs held by commuters set at 50 percent of current assumption	194,900	-2.4%	379,500	-3.6%	33,400	50,300	16,900

# Reliability of Regional Forecast

The EMPFOR track record for overall reliability is good. Seven TRPC forecasts include the year 2010 in their time horizons: 1985, 1989, 1992, 1996, 1999, 2004, and 2009. They vary in accuracy for the predicted 2010 population from 0.4% error (2009) to 3.8% error (1989), with an average error of 2.0%. The average annual growth rate was 2.4% during the period 1985-2010. Looked at another way, the forecasts ALL correctly predicted that Thurston County would reach a population of 250,000 between 2008 and 2010 (i.e., by 2009 give or take one year).



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## FORMULAS

The formulas in the econometric side of the model were derived from multiple regression analysis using the software package SPSS, version 12.0.1. The variables and their coefficients are as follows:

NAICS	VARIABLE	NAME	FORMULA	Adjusted R <sup>2</sup>	Durbin-Watson
111-115	Agriculture, forestry, fishing, & related	AGFOR	= 873 + 239.3*NATRESW9308 + 226*DUM88	.962	1.80
21	Mining	MINING	= -27 + 0.00212*BASIC4 + 0.0175*MFG3	.852	1.31
22	Utilities	UTIL	= 0 + 0.0578*MFG + 0.0267*TRANSF - 55*DUM79 + 30*DUM84 + 60*DUM94 + 36*DUM01 - 89*DUM03	.832	1.62
23	Construction	CONST	= -1213 + 0.1637*BASIC4 - 342*DUM01	.972	1.12
311	Food products mfg	FOOD	= 138 + 3.805*FOODW - 89*DUM87 + 70*DUM94 + 93*DUM00 - 49*DUM04	.911	1.74
312	Beverages & tobacco products mfg	BEV	= 31 + 5.225*FOODW + 227*DUM82 + 83*DUM84 + 70*DUM94 - 103*DUM99 + 156*DUM02 + 157*DUM03	.927	1.54
313-316, 325	Textile mills & prods, apparel, & chemicals mfg	ONONDUR	= -67 + 14.37*ONONDURW - 27*DUM82 - 101*DUM85 + 43*DUM90 + 67*DUM94	.836	1.28
321	Wood products mfg	WOODAVG	= 0 + 14.73*WOODW + 169*DUM80 - 131*DUM84 + 182*DUM87 + 198*DUM96 + 196*DUM98	.974	1.54
322	Paper products mfg	PA	= 151 + 11.01*PAW + 1.325*PAW_DUM89 - 61*DUM84 - 68*DUM88 + 60*DUM91 - 60*DUM92	.898	1.68
323	Printing & related support mfg	PR	= -409 + 13.46*PRW + 11.08*PRW_DUM80 + 0.09173*FSG4 + 37*DUM83 + 47*DUM85	.899	1.35
324, 326	Petroleum, coal, plastics, & rubber mfg	PLASTC	= -511 + 74.76*PLASTCW + 16.82*DUM87 + 221*DUM06	.885	1.23
327-331, 336-339	Minerals, metals, elec, transp, furniture, etc. mfg	ODUR	= -245 + 47.47*ODURW1 + 90*DUM95 - 195*DUM01 - 238*DUM06	.953	1.78
332	Fabricated metal products mfg	FM	= -276 + 32.63*FMW + 48*DUM94 + 89*DUM96 - 24*DUM01 + 74*DUM8282 + 71*DUM6787	.606	1.91
333-335	Machinery, computers, electrical eqt, & appliance mfg	MACHNS	= -526 + 15.32*MACHNSW - 13.278*MACHNSW_DUM02 - 19*DUM90 + 508*DUM02	.721	1.16
42	Wholesale trade	WT	= 738 + 0.7363*TRANSF + 0.2937*MFG3 + 0.007053*BASIC3_DUM9092 - 264*DUM90 - 594*DUM03	.910	1.12
441	Motor vehicle and parts dealers	AUTO	= 431 + 0.003476*ORETL + 0.02184*LAGBAS8 - 118*DUM89 - 94*DUM01	.976	1.26
442-454	All other retail	ORETL	= 412 + 0.2718*EDU_HSR + 0.1944*FSG4 + 0.0945*LAGBAS - 1132*DUM90	.989	1.53

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NAICS	VARIABLE	NAME	FORMULA	Adjusted R <sup>2</sup>	Durbin-Watson
481-484, 486, 488-493	Freight transportation	TRANSF	= -484 + 0.3504*BASIC4 + 7.163*TRWUW - 5.218*TRWUW_DUM90 + 67.4*DUM90 - 526*DUM02	.985	1.21
485, 487	Passenger transportation	TRANSP	= 76 + 0.05209*WT + 0.01728*CMTR_CIV - 79*DUM01 + 180*DUM9092	.915	1.88
5111	Publishing	PUBL	= -59 + 7.916*PUBLW + 0.08580*IFG3 + 27*DUM01	.868	1.27
5112	Software	SOFTWR	= 0 + 2.897*SOFTWRW - 40*DUM94 + 16*DUM97 + 22*DUM99	.957	1.24
512-519	Recording, broadcasting, telecom, ISPs, etc.	OINFO	= 333 + 0.1098*RE_RENTS + 0.1111*LAGMFG3 - 121*DUM89 + 142*DUM01	.963	1.71
52	Finance and insurance	FIN_INS	= -288 + 0.09978*COMMTR + 0.1936*RT + 117*DUM99	.989	1.32
53	Real estate and rental and leasing	RE_RENTS	= 2311 + 0.7032*FIN_INS - 691*DUM00 - 1205*DUM06 + 611*DUM07	.952	1.44
54-56	Professional and business services	BUSR	= -390 + 35.99*BUSRW + 0.0306*LAGBAS5 - 2317*DUM01	.994	1.92
61-62	Education, Health, & Social Services	EDU_HSR	= -3029 + 38.75*EDU_HSRW + 0.119*BASIC8 - 502*DUM90	.997	1.73
71	Arts, entertainment, and recreation	REC	= -132 + 0.1796*BUSR + 0.001630*MLGHPPOP	.979	1.16
72	Accommodation and food services	ACCOM_FS	= 1148 + 0.4238*EDU_HSR + 553*DUM90 + 642*DUM98 - 703*DUM04	.988	1.87
81	Other services, except public administration	OSRV	= -1155 + 0.9994*FIN_INS + 0.1550*EDU_HSR + 0.0514*BASIC6	.993	1.75
	Post Office	USPS	= -592 - 0.2423*SG + 0.2575*FSG2 + 0.0828*BASIC5 - 0.0787*BASIC7 + 0.0213*LAGBAS - 0.0220*LAGBAS6 - 67*CENSUS80 - 78*CENSUS90	.962	1.99
	Federal government - other civilian	OFG	= 265 + 0.9780*LAG2EMPW + 77.44*CENSUS + 133.0*CENSUS80	.905	1.38
	State government, except education	SG	= 6046 + 5.889*LAGEMPW_IDUM93 + 10.78*EMPW_DUM93 - 10375*DUM93	.994	1.01
	South Puget Sound Community College	SPSCC	= -31 + 0.07222*OSRV + 71*DUM89 - 73*DUM00 + 67*DUM03	.988	1.79
	Local government minus tribal casinos	LG	= 0 + 0.0623*STUDENTS + 0.1802*BASIC5 - 4789*DUM01 + 753*DUM03	.995	1.54

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# Sources of Employment Data

The 1978-2008 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 (WSESD) 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 WSESD 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 WSESD 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 WSESD. 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 was available from WSESD 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-wide level, total employment by detailed industry (from BEA) and covered employment by detailed industry (from WSESD) were available in both NAICS and SIC. At the county level, only covered employment was available (from WSESD) 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 (uncovered 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 (uncovered 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 was 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 was 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 (uncovered 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.

### **For More Information**

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