

# **Manufacturing in Washington State, 1990-2002: Trends and Implications for the Industry and State**

**By:**        *SESRC – Puget Sound Division*  
              Alan Hardcastle

**and**

*Washington State*  
*Employment Security Department*  
Scott Bailey

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# **Manufacturing in Washington State 1990-2002**

## **Trends and Implications for the Industry and State**

Alan Hardcastle  
Senior Research Associate  
WSU-SESRC – Puget Sound Division

and

Scott Bailey  
Regional Economist  
Washington State Employment Security Department

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Social & Economic Sciences Research Center-Puget Sound Division  
203 E. 4<sup>th</sup> Avenue, Suite 521  
P.O. Box 43170  
Olympia, WA 98504-3170  
(360) 586-9292  
Fax: (360) 586-2279

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## EXECUTIVE SUMMARY

This report summarizes available data provided by the Employment Security Department on the manufacturing industry in Washington State. Specifically, the report analyzes employment and wage data for the period 1990-2000, with preliminary results for 2000-2002, and includes an analysis of data by county. Separate analyses for 11 of the state's manufacturing sub-sectors are included as appendices in this report. The report concludes with several recommendations for future research and activities designed to help improve the viability of manufacturing in Washington State.

### INTRODUCTION

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Despite a steady decline in industry employment over the past several decades, manufacturing remains a vital component of the Washington State economy. Currently, the manufacturing industry accounts for 13 percent of all employment in the state, representing more than 300,000 workers. At the same time, the industry provides 16 percent of total wages in the state, second only to the growing services sector. In addition, manufacturing continues to support high-wage jobs: The median hourly wage in the year 2000 was \$18.62, and average manufacturing wages for 2001 exceeded \$48,000 per year, the highest of all major industry groups. In the same year, the state's manufacturing employees collectively earned over \$16.4 billion. Manufacturing also generates a large number of additional jobs in the economy due to large supplier and distribution networks. In King County, where manufacturing accounts for more than 131,000 jobs (June, 2000), it is estimated that every manufacturing job adds another 1.5 to 3 jobs to the region's economy, a rate that is higher than for most other sectors.<sup>1</sup>

Manufacturing has long been subject to the ups and downs of regular market cycles and the pressures of an increasingly competitive global market. In recent years, however, the industry has also suffered the effects of pervasive national and state recessions, and soft global markets for specific products such as aircraft and electronics. Indeed, one important reason for the state's steep economic decline is Washington's large concentration in specific manufacturing sectors such as aircraft and aluminum. For example, between September 2001 and September 2002, manufacturing employment declined by more than 31,000 jobs, with nearly half of those reductions occurring in the aircraft sector alone.

The data analyzed in this report show that the manufacturing industry in Washington State continues to experience a general decline, with some growth in specific sectors and regions of the state. The state forecast for the industry is not very encouraging. It suggests that the industry has not yet bottomed out and that a general recovery in manufacturing employment will not begin until 2004, and then only slowly.

The consequence of this downward trend on state and local economies has been significant, with pronounced negative effects for specific regions of the state, including Cowlitz, Klickitat, and Grays Harbor counties, among others. A number of counties depend heavily on manufacturing to provide decent jobs as well as tax revenues used to provide basic services in local

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<sup>1</sup> Manufacturing still matters. University of Washington: Northwest Policy Center, Evans School of Public Affairs, September 2002.

communities, many of which have limited economic bases. In the past, reductions in high-wage manufacturing jobs in these counties have had a significant negative effect by reducing personal incomes and tax revenues that cities and communities depend on to support basic services.

## CONCLUSIONS

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Given the historical trends and forecasts outlined in this report, one could easily conclude that manufacturing in Washington State is an industry in crisis. An alternative conclusion, however, is that the state's manufacturing industry is simply evolving and experiencing the effects of severe, albeit predictable, market cycles. Indeed, the condition of Washington manufacturing mirrors many of the national trends experienced by the industry in recent years, as American companies struggle to compete in a marketplace rife with the myriad pressures of globalization. Because of the central role manufacturing plays in state and regional economies, however, continued decline of the industry is clearly a cause for new efforts aimed at revitalization.

This report provides an analytical model to identify the condition of manufacturing in Washington State. The findings provide an important starting point for understanding general trends in the industry and its sub-sectors, and a guidepost for future collaboration with the industry. However, the aggregate data included in this report are inherently limited and insufficient to provide a full description of the state of the industry. To round out this description, additional information is needed regarding the specific issues, and needs of manufacturing sub-sectors and employers and the implications of those needs for the industry. This detail is essential to help identify specific ways that industry and public sector agencies should support the industry, such as: targeted regional economic development, education, and workforce development initiatives.

One general recommendation, therefore, is that the findings contained in this report should be the basis for future research that incorporates other studies of the industry. Equally important, however, is to establish a collaborative partnership to direct this research and advise how best to revitalize the industry. Specific activities might include the following:

1. Establish an ongoing manufacturing advisory group. This industry-led partnership would advise the Association of Washington Business and Washington State economic development, workforce, and education partners about the changing skill requirements of the industry. This group could also address the specific conditions, policies, and practices that can help boost the long-term competitiveness of the state's manufacturing industry. Some of the findings of this paper provide issues for further discussion and research. Questions include:
  - a. Which manufacturing sectors should be targeted?
  - b. Should the focus be on small to mid-sized firms, where the most new growth has occurred, or should the focus be broader?
  - c. Should public investments in workforce education and training promote wage progression at all occupational levels, or target jobs where training appears to have the largest and most immediate effect on future wages?

2. Review and confirm the industry research. Based on this research, generate specific recommendations about economic and workforce development policies and practices that would enhance sector competitiveness statewide and regionally. This information could be used to augment work recommended by the Governor and currently underway by the state's community and technical colleges, the Office of Community, Trade and Economic Development and other agencies to accelerate the state's economic recovery by focusing on development of regionally strategic industry clusters.
  
3. Identify and review specific strategies to improve competitiveness. For example, explore how sector companies and industry associations can use the nationally-developed manufacturing skill standards to enhance workforce development as well as human resources practices. The manufacturing skill standards can also be used to deepen education-industry partnerships. Prior Learning Assessment (PLA) strategies should also be implemented to enable students, incumbent workers and job seekers to demonstrate skills learned in alternative education settings. PLA can help students reduce their time-to-degree, avoid redundant courses, and focus on attaining the skill sets they need and that employers require.

## INTRODUCTION

Washington State's manufacturing industry has experienced an overall decline in recent years. Yet, relatively little is known about the specific effects of this decline in different industry sectors and economic regions of the state. Fluctuations in manufacturing competitiveness can vary greatly by sector, product type and market forces. Some sectors, such as aerospace, undergo fairly predictable cycles of growth and decline, with significant, albeit short-term, effects on local economies and citizens. Other sectors, such as aluminum production, have seen steady declines with pervasive consequences for the regions in which those employers and employees reside. Emerging sectors, such as semiconductors, are just being established and offer promising new sources of future employment, revenue and economic growth.

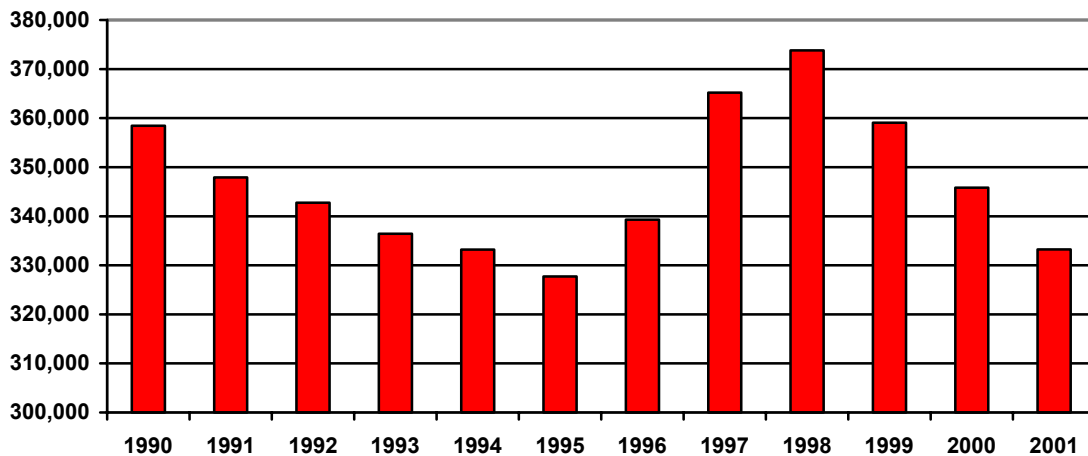
This research integrates existing Employment Security data on manufacturing industry sectors, employment, and wages in order to identify core historical trends in manufacturing across the state over the last decade. It includes analyses of preliminary data through 2002 and general forecasts for the industry through the middle of this decade. Separate analyses for 11 of the state's manufacturing sub-sectors are included as appendices in this report.

This first-tier analysis is intended to assess the general condition of manufacturing in the state, and to identify key industry sectors, trends and areas of the state where manufacturing is an important regional economic driver. Additional research based on these analyses should be conducted in conjunction with specific industry sectors and regions of the state for the following reasons: 1) to enhance understanding about the general and specific factors that effect manufacturing sector viability, 2) to identify economic development strategies for regions and local communities to consider, and 3) to determine the implications for education and workforce development policy at the state and the regional level.

## MANUFACTURING TRENDS, 1990-2000

Figure A shows the historical trends in state manufacturing employment between 1990-2000. Manufacturing employment declined from 1990 to 1995, rose for the next three years, and has fallen steadily since then. The net loss from 1990 to 2000 was an adjusted 12,600, or 3.5 percent.<sup>2</sup> Factory jobs slipped from an adjusted 16.7 percent of total employment down to 12.8 percent. Nationally, manufacturing declined by 3.9 percent, and the share of total employment fell from 17.6 percent to 14.2 percent.

**Figure A**  
**Manufacturing Employment in Washington State, 1990-2000**

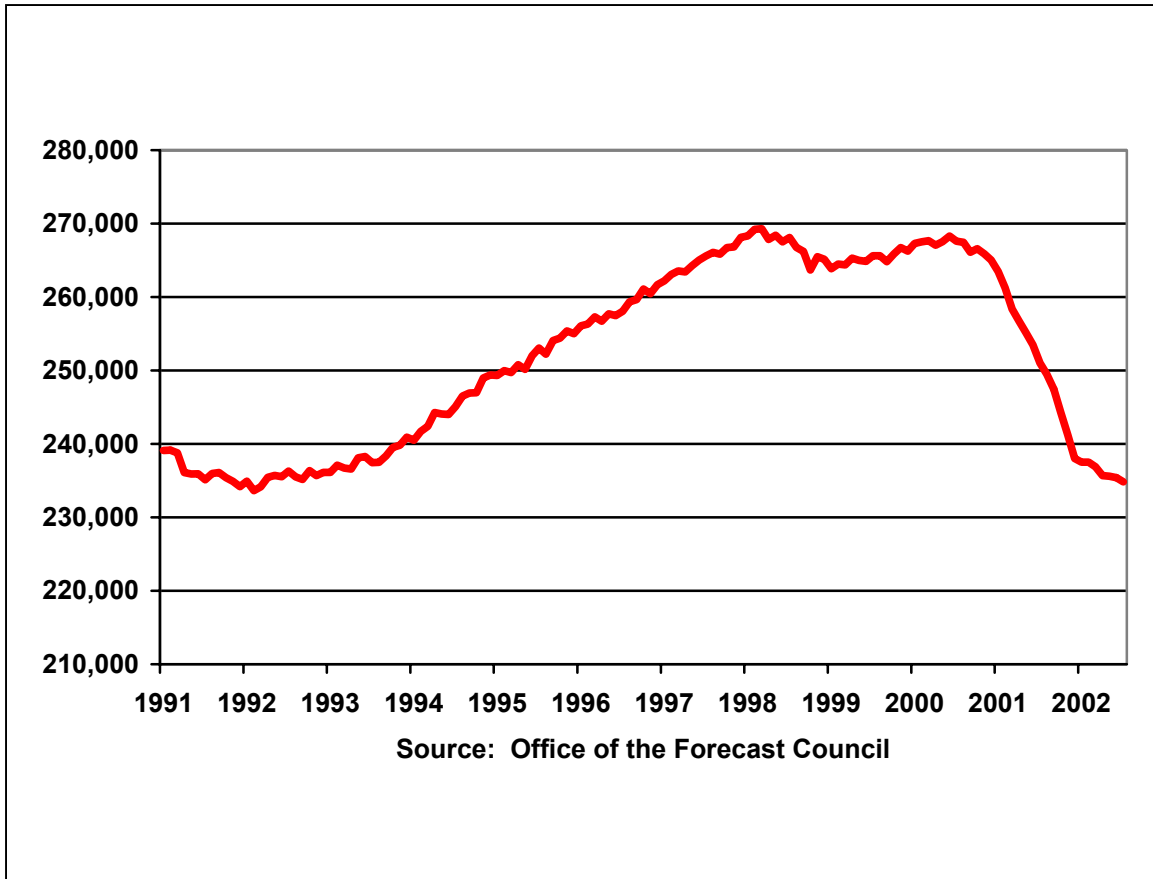


The size and cyclical nature of the aircraft industry has been the primary cause of employment ups and downs in Washington State. Employment in aircraft and parts began the decade at a peak of nearly 120,000 jobs, hit bottom in 1995 at 80,000, peaked again in 1998 at 113,000, and currently is at around 75,000. An additional round of job cuts recently announced by Boeing and further attrition forecasted for the industry will reduce that number even more in the short term.

When aircraft manufacturing jobs are factored out, the trend is a bit different. As shown in Figure B, non-aircraft employment bottomed out early in 1992, and then grew dramatically over the next six years, adding 33,000 jobs, or 10 percent. The highest gains were in industrial machinery (+8,100), electronics (+7,800), food processing (+4,000), and fabricated metals (+3,600).

<sup>2</sup> In 1991, a Hanford contractor was reclassified from chemical manufacturing to waste remediation. The exact amount of the firm's employment cannot be revealed. However, chemicals employment dropped from 13,200 in 1990 to 5,100 in 1991, so the adjustment can be estimated at 8,000.

**Figure B**  
**Non-Aerospace Manufacturing Employment**  
**(Monthly Seasonally-Adjusted Non-farm Data)**



Two years of economic stagnation in manufacturing followed, until the beginning of 2000, when employment plummeted. In mid-2002, non-aircraft manufacturing was only a thousand jobs above its February 1992 low. Currently, electronics, machinery, fabricated metals and food processing are still above 1992 levels, while lumber & wood products, aluminum, and paper have experienced major losses.

Table 1 breaks out employment changes and growth/decline percentages for all manufacturing industries in Washington State between 1990-2000.

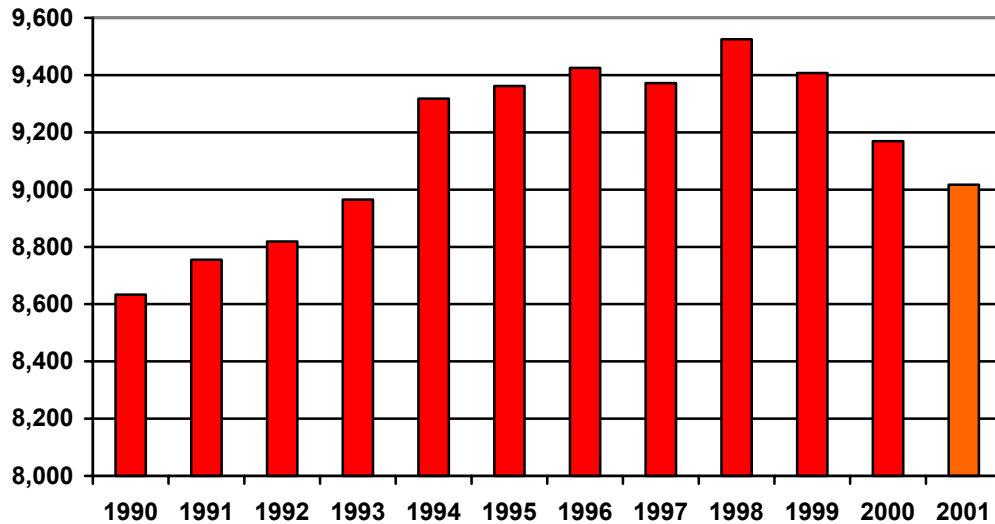
**Table 1**  
**Manufacturing In Washington State, 1990-2000**

SIC	Industry	1990	2000	Change	Growth
	Manufacturing	358,442	345,830	-12,612	-3.5%
20	Food Processing	37,625	40,942	3,317	9%
22	Textile Mill Products	1,359	1,057	-302	-22%
23	Apparel	5,899	6,428	529	9%
24	Lumber & Wood Products	39,159	32,191	-6,968	-18%
25	Furniture & Fixtures	4,010	4,713	703	18%
26	Paper & Paper Products	18,228	15,527	-2,701	-15%
27	Printing & Publishing	22,121	23,646	1,525	7%
28	Chemicals	5,231	6,059	828	16%
29	Petroleum & Coal Products	2,221	2,195	-26	-1%
30	Rubber & Plastics Products	6,786	9,936	3,150	46%
31	Leather & Leather Products	580	332	-248	-43%
32	Stone, Clay, And Glass Products	7,728	8,937	1,209	16%
33	Primary Metals	13,133	10,937	-2,196	-17%
34	Fabricated Metal Products	11,878	14,502	2,624	22%
35	Industrial Machinery & Computer Equipment	19,820	24,552	4,732	24%
36	Electronic & Electrical Equipment	11,178	19,867	8,689	78%
37	Transportation Equipment	130,741	101,026	-29,715	-23%
38	Instruments	14,609	14,480	-129	-1%
39	Miscellaneous Manufacturing	6,136	8,503	2,367	39%

### **CHANGES IN THE NUMBER AND SIZE OF MANUFACTURING FIRMS**

As shown in Figure C, the total number of manufacturing firms in the state increased substantially from 1990 through 1998, before declining over the next three years (2001 data are preliminary and will likely be revised upward somewhat). The gain was six percent from 1990 to 2000, and down to a four percent gain through preliminary 2001.

**Figure C**  
**Number of Manufacturing Firms**  
**2001 is Preliminary**



With the large number of employment reductions at Boeing, which cut over 40,000 jobs in the past four years alone, the average firm size fell from 48.4 to 44.1 employees. Employment grew substantially at smaller and mid-sized firms, however. As depicted in Table 2, companies with between 100-249 employees increased by more than 7,600 jobs (a three percent gain) while firms with 500-999 employees added 10,866 new jobs (a four percent gain) during the same period.

**Table 2**  
**Percent Of Industry Employment By Size Of Firm**

# Employees	1990		2000		Change
	Count	%	Count	%	
<b>1-9</b>	16,217	4%	16,459	5%	242
<b>10-19</b>	15,245	4%	16,190	5%	945
<b>20-49</b>	30,710	8%	32,080	9%	1,370
<b>50-99</b>	31,407	9%	35,528	10%	4,121
<b>100-249</b>	46,915	13%	54,596	16%	7,681
<b>250-499</b>	33,272	9%	31,005	9%	-2,267
<b>500-999</b>	25,888	7%	36,754	11%	10,866
<b>1000+</b>	166,218	45%	123,301	36%	-42,917
<b>Total</b>	365,872	100%	345,913	100%	-19,959

Note: totals may not equal 100% due to rounding

## WAGE GROWTH

Despite overall declines in job growth, average manufacturing wages have actually risen, increasing from \$40,500 in 1990 to \$48,000 in 2000, which is more than 12 percent above the national average. Preliminary data for 2001 show a slight drop in average wages to just under \$48,000. The median wage, adjusted for inflation, rose by \$0.30 per hour.

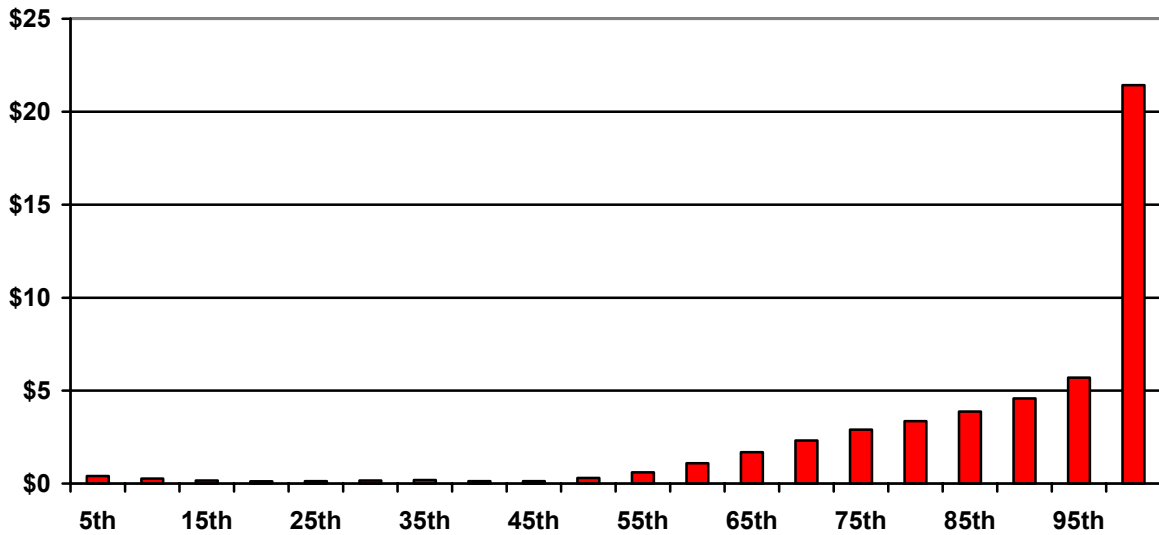
Table 3 shows the number of firms, employment, and payroll statistics for the 18 different manufacturing sectors in the year 2000.

**Table 3**  
**Manufacturing In Washington State, 2000**

SIC	Industry	Firms	Jobs	Payroll	Average Wage
	Manufacturing	9,169	345,830	\$16,281,288,444	\$47,079
20	Food Processing	863	40,942	\$1,307,193,883	\$31,928
22	Textile Mill Products	48	1,057	\$36,690,714	\$34,712
23	Apparel	429	6,428	\$148,714,480	\$23,135
24	Lumber & Wood Products	1,636	32,191	\$1,221,875,190	\$37,957
25	Furniture & Fixtures	224	4,713	\$138,156,601	\$29,314
26	Paper & Paper Products	139	15,527	\$809,712,230	\$52,149
27	Printing & Publishing	1,355	23,646	\$831,943,544	\$35,183
28	Chemicals	249	6,059	\$702,178,751	\$115,890
29	Petroleum & Coal Products	34	2,195	\$149,987,350	\$68,331
30	Rubber & Plastics Products	254	9,936	\$316,759,235	\$31,880
31	Leather & Leather Products	25	332	\$7,356,374	\$22,158
32	Stone, Clay, And Glass Products	365	8,937	\$326,130,115	\$36,492
33	Primary Metals	115	10,937	\$510,022,609	\$46,633
34	Fabricated Metal Products	661	14,502	\$488,863,922	\$33,710
35	Industrial Machinery & Computer Equipment	1,031	24,552	\$1,315,332,894	\$53,573
36	Electronic & Electrical Equipment	349	19,867	\$858,112,774	\$43,193
37	Transportation Equipment	679	101,026	\$5,949,036,570	\$58,886
38	Instruments	307	14,480	\$834,335,228	\$57,620
39	Miscellaneous Manufacturing	406	8,503	\$328,885,980	\$38,679

As shown in Figure D, however, the distribution of wage growth in the industry for the same period was very uneven, with the vast majority of gains accruing to individuals who were already earning high wages. Median wage gains for employees in relatively low-wage manufacturing jobs were negligible.

**Figure D**  
**Change in Median Hourly Wage by Percentile of Jobs,**  
**Adjusted for Inflation**



## GEOGRAPHIC TRENDS AND EFFECTS

The 1990's also witnessed a seesaw of activity for the manufacturing industry that varied greatly among different regions of the state:

- Half of all counties added manufacturing jobs during the 1990s.
- Fourteen counties enjoyed substantial job growth, while thirteen counties experienced a decline in jobs.
- Only eight counties experienced manufacturing growth that was as fast as the overall job total. However, almost all of these had a small base to build on, thus the actual number of new jobs generated was modest.

Table 4 shows changes in manufacturing employment by county in 1990-2000, including each county's share of the state's manufacturing employment.

**Table 4**  
**Manufacturing Employment By County**

County	1990	2000	Pct. of 2000	Change	Growth
State	358,442	345,830	100%	-12,612	-4%
King	171,450	144,168	42%	-27,282	-16%
Snohomish	48,663	53,809	16%	5,146	11%
Pierce	21,651	22,552	7%	901	4%
Spokane	19,360	21,970	6%	2,610	13%
Clark	16,716	19,364	6%	2,648	16%
Yakima	9,671	11,433	3%	1,762	18%
Cowlitz	10,220	9,692	3%	-528	-5%
Whatcom	8,638	9,410	3%	772	9%
Skagit	3,918	5,757	2%	1,839	47%
Grant	2,761	4,856	1%	2,095	76%
Remaining Counties	53,394	42,819	12%	-10,575	-20%

### MANUFACTURING SECTOR HIGHLIGHTS

The following section provides descriptive narrative and select details associated with the change in manufacturing employment by county between 1990-2000. The descriptions are intended to illustrate specific changes in manufacturing sub-sector employment.

- **King County** had 42 percent of all manufacturing jobs in the state in 2000, but suffered a substantial decline of 27,300 jobs, (-16%). Outside of aircraft and parts, the county actually *gained* 9,000 jobs in industries such as electronics, machinery, and food processing.
- **Snohomish County** had 16 percent of manufacturing jobs, and had the largest gain in factory jobs over the decade at 5,100 jobs (+11%). Transportation equipment, electronics, and machinery accounted for the majority of new jobs. Snohomish

continues to have one of the highest concentrations of factory jobs in the state—one out of every four jobs in the county is in manufacturing.

- **Pierce County** had the third-largest manufacturing base in the state at 22,600 or 7 percent of the total. The county added 900 jobs for a 4 percent growth rate. Growth in machinery & computers, plastics, transportation equipment and printing outpaced declines in food processing, lumber & wood products, and primary metals.
- In 2000, **Spokane County** was home to 22,000 factory jobs, up 2,600 or 13 percent from 1990. Gains in electronics, metal fabrication, food processing, and transportation equipment outpaced losses in machinery & computers and primary metals.
- **Clark County** added 2,600 jobs (+16%), the second-largest job gain, and held 6 percent of the state total. Electronics, computers & machinery, and fabricated metals were on the rise; paper and lumber & wood products both fell.
- **Yakima** was another county with sizable increases: 1,800 jobs (+18%). Two-thirds of the new jobs were in food processing and fabricated metals.
- **Cowlitz County** lost five percent of its manufacturing base during the 1990s, including more than 1,000 jobs in lumber & wood products, and 400 in paper. The loss came despite considerable diversification in food processing, metals, and machinery. Even with the decline, twenty-five percent of all jobs in the county were in the manufacturing industries, third highest in the state.
- **Whatcom County** experienced losses in food processing, but expansions in transportation equipment, fabricated metals, and machinery, netting an additional 800 jobs over the decade (+9%)
- In **Skagit County**, manufacturing growth was quite robust. There were 1,800 new jobs equaling an increase of 47 percent (+47%). It was also diverse, with new investments in transportation equipment, metal fabrication, machinery, food processing, and other industries.
- **Grant County** had an even higher growth rate—76 percent—adding 2,100 jobs, more than half of which were in food processing.

## REGIONAL DEPENDENCE ON MANUFACTURING

Different regions of the state vary markedly in their economic dependence on manufacturing. One way to determine regional dependence is to identify counties for which manufacturing represents a large percentage of total jobs. For the purpose of this analysis, the 10 counties with the largest percentage of manufacturing employment as a percent of total employment were selected.

Table 5 shows the results of this analysis, including total job changes for 1990-2000 and the percent of manufacturing employment growth or decline. As described earlier, Snohomish and Clark counties saw marked increases in total jobs over the decade, while Grays Harbor and Klickitat counties saw substantial declines.

**Table 5**  
**Counties With High Dependence On Manufacturing, 2000**

County	Total Jobs	Mfg. Jobs	Mfg. As % of Total	Mfg. Change, 1990-2000	Mfg. Growth, 1990-2000
State	2,703,237	345,830	12.8%	-12,612	-6%
Wahkiakum	811	248	30.6%	119	92%
Snohomish	209,317	53,809	25.7%	5,146	11%
Cowlitz	38,566	9,692	25.1%	-528	-5%
Klickitat	6,007	1,345	22.4%	-192	-12%
Stevens	9,992	1,944	19.5%	-2	0%
Pend Oreille	2,681	514	19.2%	119	30%
Walla Walla	24,023	4,181	17.4%	188	5%
Clark	113,758	19,364	17.0%	2,648	16%
Mason	12,088	2,039	16.9%	-40	-2%
Grays Harbor	23,661	3,953	16.7%	-1,641	-29%
Remaining Counties	2,262,333	248,741	11.0%	-18,429	-7%

## MANUFACTURING TRENDS AND FORECASTS: 2000 AND BEYOND

As noted previously in Figure A, seasonally-adjusted manufacturing employment peaked in July, 1998, and has been declining steadily since then, with no clear sign of when it will bottom out. Non-aircraft manufacturing has been falling since June 2000. Its rate of descent has slowed since December 2001, however.

Using June 2000 as the point of reference, every manufacturing industry has lost workers, and most have double-digit percentage declines. Table 6 shows that losses total 45,700, or 13 percent, with aircraft industry job losses accounting for 12,300. Nationally over the same period, manufacturing was down by 10 percent. Percentage losses are as great or greater in Washington for all industries except petroleum and plastics and computer and office equipment.

**Table 6**  
**Manufacturing In Washington State,**  
**June 2000 – July 2002**

SIC	Industry	6/00	7/02	Change	Growth
	Manufacturing	355,600	309,900	-45,700	-13%
20	Food Processing	41,700	39,500	-2,200	-5%
22/23/31	Textiles, Apparel & Leather	8,300	6,700	-1,600	-19%
24	Lumber & Wood Products	33,700	30,100	-3,600	-11%
25	Furniture & Fixtures	5,000	4,300	-700	-14%
26	Paper & Paper Products	16,100	13,700	-2,400	-15%
27	Printing & Publishing	24,600	21,800	-2,800	-11%
28	Chemicals	6,100	5,500	-600	-10%
29/30	Petroleum, Coal, Plastics	12,300	11,700	-600	-5%
32	Stone, Clay, And Glass Products	9,200	8,200	-1,000	-11%
33	Primary Metals	11,000	7,600	-3,400	-31%
333	Aluminum	6,900	3,800	-3,100	-45%
34	Fabricated Metal Products	15,100	13,300	-1,800	-12%
35	Industrial Machinery & Computer Equipment	25,800	21,600	-4,200	-16%
357	Computer and Office Equipment	6,200	5,900	-300	-5%
	Other industrial machinery	19,600	15,800	-3,800	-19%
36	Electronic & Electrical Equipment	20,300	15,800	-4,500	-22%
37	Transportation Equipment	102,600	88,000	-14,600	-14%
372	Aircraft & Parts	87,300	75,000	-12,300	-14%
	Other Transportation Equipment	15,300	13,000	-2,300	-15%
38	Instruments	14,800	13,900	-900	-6%
39	Miscellaneous Manufacturing	8,900	8,200	-700	-8%

The comparison with national figures would seem to indicate the following:

- Much of the loss of manufacturing is due to the national business cycle, or is aligned with global trends such as the slump in electronics.
- Some of the difference between the state and national figures can be attributed to particular industry concentrations in Washington in aircraft and aluminum.

The loss of factory jobs has been felt throughout Washington State, but some areas have been hit harder than others. In particular, manufacturing employment declines in Spokane County have been especially steep, as have reductions for counties in the southwestern part of the state: Clark, Cowlitz, Klickitat, and Skamania. King, Snohomish, and Pierce are all close to the state average in terms of the number of job losses. Yakima County, Benton-Franklin Counties, and Walla Walla County have managed to escape much of the downturn.

**Table 7**  
**Change In Manufacturing Employment By County**

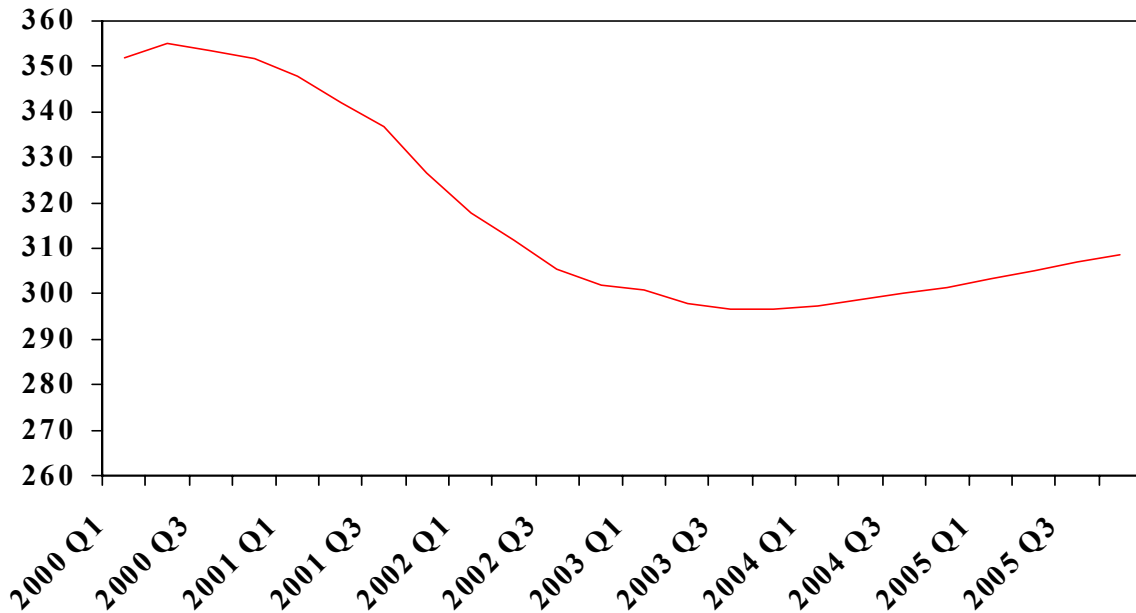
Area	June, 2000	June, 2002	Change	Growth
State	358,200	313,600	-44,600	-12%
King	147,900	131,600	-16,300	-11%
Snohomish	54,900	48,100	-6,800	-12%
Spokane	22,600	18,200	-4,400	-19%
Clark	19,900	16,300	-3,600	-18%
Cowlitz	9,980	7,950	-2,030	-20%
Pierce	23,400	21,400	-2,000	-9%
Whatcom	9,800	8,700	-1,100	-11%
Klickitat	1,420	720	-700	-49%
Thurston	4,200	3,700	-500	-12%
Chelan-Douglas	3,030	2,620	-410	-14%
Yakima	12,100	11,700	-400	-3%
Walla Walla	4,430	4,270	-160	-4%
Kitsap	2,400	2,300	-100	-4%
Skamania	310	220	-90	-29%
Benton-Franklin	5,900	6,200	300	5%
Remaining Counties	35,930	29,620	-6,310	-18%
<i>* Based on non-farm employment, which differs slightly from covered employment used elsewhere in this report.</i>				

## STATE FORECAST FOR MANUFACTURING EMPLOYMENT

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Washington State's Office of the Forecast Council suggests that the declines in manufacturing have yet to taper off. Indeed, by the fourth quarter of 2003, total manufacturing employment in the state is projected to fall to 296,500. By the fourth quarter of 2005, the state is forecast to employ 308,600, which represents an increase of just four percent over two years. Figure E shows the trends and forecast for manufacturing employment through 2005.

**Figure E**  
**The Future of Manufacturing**  
**Forecasted Employment (1000s), 2000-2005**



Source: Washington State Forecast Council, 11-6-02

## CONCLUSIONS

The historical trends and forecasts outlined in this report show that manufacturing in Washington State remains an important economic driver. Yet, manufacturing is an industry that has steadily declined and is projected to recover only modestly through the middle of this decade.

One interpretation of the data is that manufacturing is an industry in crisis. An alternative conclusion, however, is that the state's manufacturing industry is simply evolving in response to the competitiveness brought on by increasingly intense competition and a convergence of normal business cycles. Indeed, the plight of manufacturing in Washington mirrors many of the national trends experienced by the industry in recent years, as American companies struggle to compete effectively in a global marketplace.

At the same time, however, the data in this report also show some promising patterns of growth in specific sectors and regions of the state. Sub-sectors such as food processing, chemicals, metal and plastic products, electronic and electrical equipment and other specialty products have experienced some notable gains over the past decade. However, in many cases this growth occurred unevenly, with differential effects on those regions of the state that have limited economic bases. This was especially difficult for counties such as Klickitat and Grays Harbor, which saw job losses of 12 percent and 29 percent, respectively. In Cowlitz County, where manufacturing comprises 25 percent of total employment, the five percent decline accounted for 528 job losses.

This report provides an analytical model to identify the condition of manufacturing in Washington State. However, the aggregate data included in this report are inherently limited and insufficient to provide a full description of the state of the industry. The findings of this report do provide an important starting point for understanding general trends in the industry and its sub-sectors, providing a guidepost for future collaboration with the industry. Some of the findings appear to warrant further research and discussion, for example:

- Which types of manufacturing should be targeted? The data presented in this paper show patterns of growth and decline in specific manufacturing sub-sectors. While some of these patterns are cyclical (i.e. aircraft), changing market conditions and business strategies could significantly alter traditional patterns, making it harder to predict sector decline, recovery and economic importance. Targeting growing and emerging sectors raises questions about the stage of development, types of support needed, and the use of public investment, especially in emerging areas.

Other questions to consider might include these issues:

- Should the focus be on small to mid-sized firms, where most new growth has occurred, or more broad to include the state's largest companies?
- Should public investments in workforce education and training promote wage progression at all occupational levels, or target high-end manufacturing jobs where training appears to have the greatest and most immediate effect on future wages?

One general recommendation is that the findings contained in this report should be the basis for future research that incorporates other studies of the industry, and which would include the

formation of a panel of industry representatives from one or more sectors and regions. The goal of this panel might include the following:

1. To serve in an advisory capacity to the Association of Washington Business, and to state economic development, workforce, and education agencies about the changing skill requirements of the industry. This industry-driven panel would look at specific conditions; policies and practices that could help boost the long-term competitiveness of the state's manufacturing industry. Members of this panel would be in an ideal position to discuss the questions posed earlier in this section, and to work toward a unified industry perspective regarding the most effective ways to enhance the viability of the state's manufacturing industry.
2. Reviewing and confirming the industry research, and generating specific recommendations about economic and workforce development issues, policies and practices that would enhance sector competitiveness statewide and regionally. Panel recommendations would enhance current efforts to boost the state's economic recovery by focusing on development of regionally strategic industry clusters.<sup>3</sup> This approach, first advocated by Harvard professor Michael Porter, describes how industries are often clustered together in regions because of the natural characteristics and workforce pool in a region, including the inter-industry ties that cause some industries to locate near others.<sup>4</sup> To date, regional strategies have been strongly supported by the Governor's Office, and supported or partially implemented the State Board for Community and Technical Colleges, the Office of Community, Trade and Economic Development, the Employment Security Department, and the Workforce Training and Education Coordinating Board.

Porter argues that that regional competitiveness can be enhanced by paying explicit attention to inter-industry ties, and by providing the public services uniquely needed by strong clusters in a particular region. Special education programs that provide skilled workers for the major clusters in a region are among the strategies for improving industry competitiveness. Work currently underway by the state's community and technical colleges identifies manufacturing as among the key industry clusters (and an economic development priority) for about half of the state's economic regions. One intent of regional economic development is to identify and support industry clusters and specific sub-sectors that provide a competitive advantage. This work requires significant regional and industry sector coordination and support. With support from the Association of Washington Business and other state stakeholders, the advisory group structure described above could easily become the *de facto* manufacturing regional advisory group for the state.

3. Identifying and supporting implementation of specific strategies to improve competitiveness. For example, the panel could consider how the nationally-developed manufacturing skill standards can be used by sector companies, industry associations and education providers to

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<sup>3</sup> See Sommers, P. and Heg, D. Occupational Demand and Supply by Industry Cluster and Region; October 2002; and Sommers, P. Cluster Strategies for Washington, December 2001. Both reports from the Daniel J. Evans School of Public Affairs, University of Washington.

<sup>4</sup> Porter, M. On Competition. Cambridge, MA: Harvard Business School Publications, 1998.

enhance workforce development, human resources practices, and to deepen education-industry partnerships.<sup>5</sup>

Another approach is to accelerate work to implement Prior Learning Assessment (PLA) strategies. PLA enables students, incumbent workers and job seekers to demonstrate skills learned in alternative education settings, thereby increasing education efficiencies. As with skill standards, PLA emphasizes competency attainment, not “seat time,” as the best measure of achievement. PLA has the potential to help students reduce their time-to-degree, to avoid redundant courses, and to focus on the skill sets they need and that employers require.

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<sup>5</sup> The state’s community and technical college and secondary school systems, other partner agencies and industry have made significant investments in the development and use of skill standards to improve education and training programs in a variety of fields. For more information see: <http://www.wa-skills.com>

## APPENDIX A: FOOD PROCESSING

The food processing industry in the state of Washington finished the 1990s with more employers, more jobs, and a higher average wage than in 1990. Along the way, the industry peaked in 1996, with the boom and subsequent decline of the Seattle-based fish processing fleet being the major influence.

The food processing industry has nine major segments: meat, dairy, fruits & vegetables, milling, baking, sugar, oils, beverages, and all other food products. The most important processed specialties, ranked by employment, are fish, frozen fruits & vegetables, canned fruits and vegetables, breads, and meatpacking.

<b>FOOD PROCESSING (SIC 20) IN WASHINGTON STATE, 2000</b>					
<b>SIC</b>	<b>Industry</b>	<b># Firms</b>	<b>Jobs</b>	<b>Payroll</b>	<b>Average Wage</b>
20	Food Processing	863	40,942	\$1,307,193,883	\$31,928
201	Meat Products	52	5,196	\$135,053,171	\$25,992
2011	Meat packing plants	17	2,730	\$72,578,621	\$26,586
2013	Sausages and other prepared meats	25	946	\$28,547,487	\$30,177
2015	Poultry slaughtering and processing	10	1,518	\$33,927,063	\$22,350
202	Dairy Products	33	1,614	\$66,167,332	\$40,996
203	Preserved Fruits and Vegetables	130	13,797	\$371,759,263	\$26,945
2033	Canned fruits and vegetables	42	4,419	\$112,963,870	\$25,563
2037	Frozen fruits and vegetables	41	6,701	\$183,526,387	\$27,388
2038	Frozen specialties	18	933	\$27,483,970	\$29,458
204	Grain Mill Products	64	1,813	\$72,230,016	\$39,840
2045	Prepared flour mixes and doughs	12	855	\$37,112,965	\$43,407
205	Bakery Products	97	3,580	\$107,178,850	\$29,938
2051	Bread, cake, and related products	74	3,044	\$97,339,363	\$31,977
206	Sugar and Confectionery Products	34	868	\$23,633,977	\$27,228
207	Fats and Oils	15	316	\$9,614,972	\$30,427
208	Beverages	123	3,429	\$117,559,014	\$34,284
2082	Malt beverages	29	1,026	\$27,881,772	\$27,175
2084	Wines, brandy, and brandy spirits	74	871	\$24,011,380	\$27,568
2086	Bottled and canned soft drinks	11	1,234	\$53,475,105	\$43,335
209	Miscellaneous food products	317	10,459	\$396,219,495	\$37,883
2091	Canned and cured seafood	37	873	\$24,781,883	\$28,387
2092	Fresh or frozen prepared fish	133	6,742	\$292,275,834	\$43,352
	All other food products	145	2,714	\$86,939,571	\$32,034

Some of these segments are rooted in the state's agricultural base, some in the sea, and some are more related to consumer markets rather than the resource base.

## Status 2000

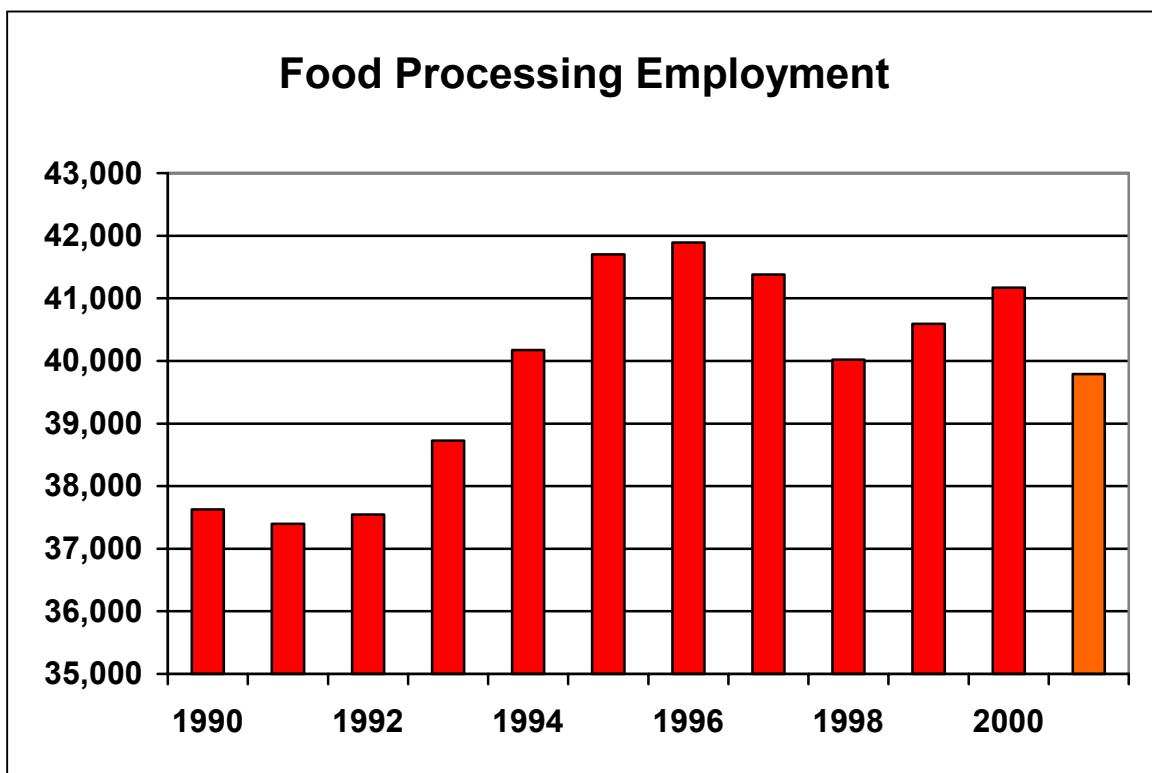
In the year 2000, the food processing industry had:

- 863 firms, 9 percent of the state total for manufacturing
- 40,900 jobs, 12 percent of the state total
- Total payroll of \$1.3 billion, 8 percent of the state total
- An average annual wage of \$31,900, 32 percent below the average for all of manufacturing, and 2 percent below the U.S. industry average
- Median hourly wage of \$12.45, 32 percent below the manufacturing median
- An average size of 58.0 for firms with employment, versus 44.1 for all of manufacturing

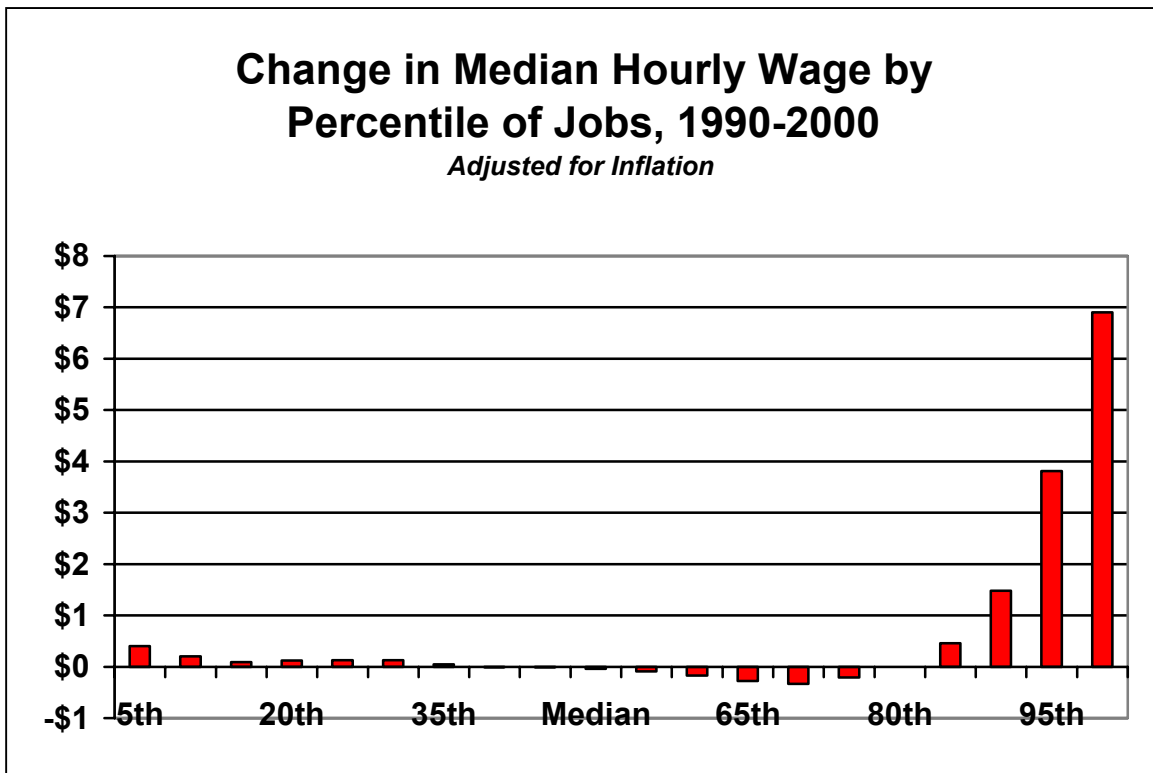
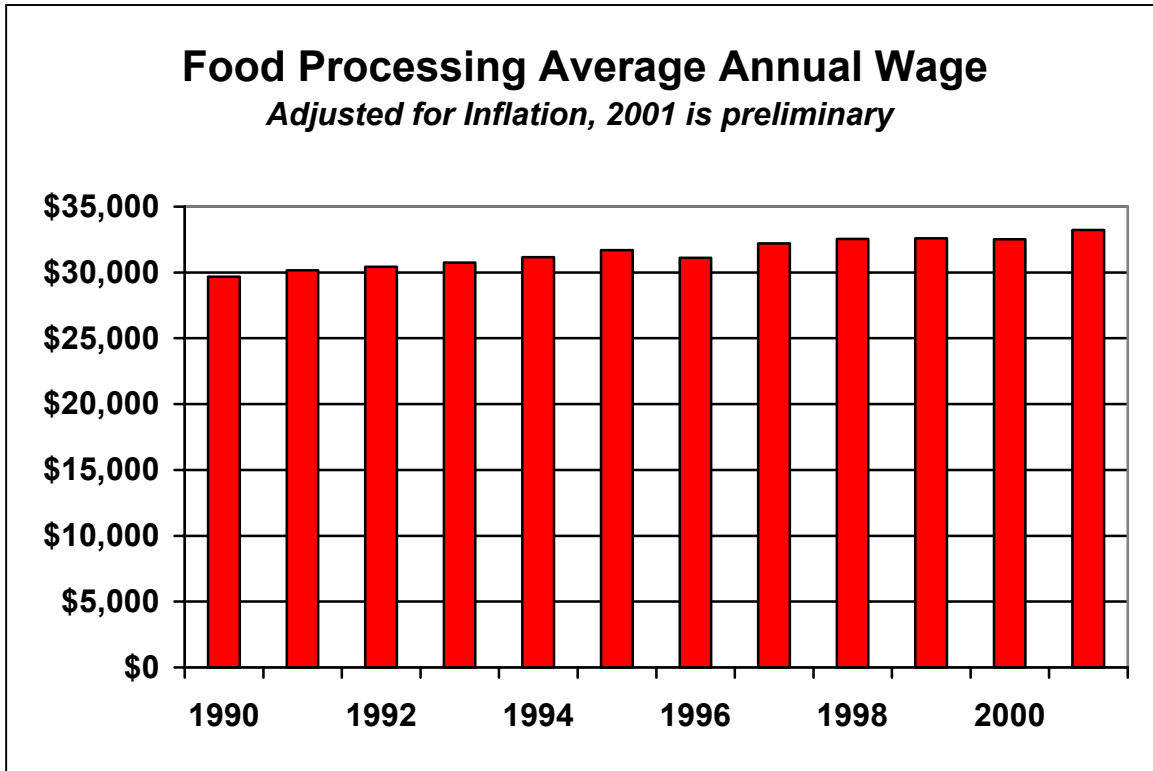
## Trends, 1990 – 2000

Industry employment was 37,600 in 1990, peaked at 41,900 in 1996, and reached 40,900 in 2000. Job totals have bounced between 40,000 and 42,000 since 1994. The increase of 9% from 1990 to 2000 was much greater than the national growth rate of 1%.

The number of employers didn't change much, moving from 249 to 254. Real average annual wages trended upward from \$27,200 to \$31,900, growing at about the same pace



as all of manufacturing, and at a faster rate than the industry nationally. The median hourly wage increased by 10 percent, from \$11.73 to \$12.87, with pay raises at roughly the same percentage across the wage scale except for the upper 5 percent of jobs. The average firm size declined somewhat, from 61.3 to 58.0, due to the drop in the number of mid-sized firms.



<b>PERCENT OF INDUSTRY EMPLOYMENT BY SIZE OF FIRM</b>			
<b># Employees</b>	<b>1990</b>	<b>2000</b>	<b>All of Manufacturing</b>
<b>1-9</b>	3%	3%	5%
<b>10-19</b>	4%	4%	5%
<b>20-49</b>	10%	10%	9%
<b>50-99</b>	10%	13%	10%
<b>100-249</b>	16%	17%	16%
<b>250-499</b>	20%	8%	9%
<b>500-999</b>	22%	27%	11%
<b>1000</b>	14%	19%	36%
<b>Average Size</b>	61.3	58.0	44.1

### **Geographic Detail**

A third of all food-processing jobs in the state are in King County. King captured half of all the industry job growth over the decade as well, adding almost 1,700 jobs. Most of King's gain came in seafood processing, but grain mill products and processed meats also expanded. Yakima County had ten percent of statewide employment. All of its 600 new jobs were in processed fruits and vegetables. Grant County grew by nearly 50%; like Yakima, most of its growth came in processed fruits and vegetables. Pierce County suffered a sharp decline, with more than half the loss in processed meats. Whatcom County also lost food-processing jobs, mostly in seafood and other food products.

<b>FOOD PROCESSING EMPLOYMENT BY COUNTY</b>					
<b>County</b>	<b>1990</b>	<b>2000</b>	<b>Pct. of 2000</b>	<b>Change</b>	<b>Growth</b>
State	37,625	40,942	100%	3317	9%
King	11,784	13,447	33%	1,663	14%
Yakima	3,630	4,251	10%	621	17%
Grant	2,110	3,263	8%	1,153	55%
Benton	1,764	2,116	5%	352	20%
Spokane	1,184	1,693	4%	509	43%
Pierce	2,928	1,688	4%	-1,240	-42%
Whatcom	1,703	1,438	4%	-265	-16%
Snohomish	1,181	1,392	3%	211	18%
Franklin	1,419	1,292	3%	-127	-9%
Skagit	1,166	1,268	3%	102	9%
Clark	1,189	1,179	3%	-10	-1%
Other	7,567	7,915	19%	348	5%

*Rest of State for 2000 does not include Thurston or Chelan.*

## Segment Detail

### Meat products

Of the net gain of 3,300 jobs over the decade, almost a third was in meat products. Employment in meat packing, processed meat, and poultry all expanded. The single largest new investment came at the Foster Farms poultry plant in Kelso, which started up in 1998. Despite the gain in jobs (+26%), total gross income climbed by just 13%. Meat products is the lowest-wage segment of the industry, with an average wage of \$25,985 and a median hourly wage of \$12.21. There were 46 employers in the segment in 2000, with the five largest employers having over 80 percent of employment. Twenty percent of employment was in King County, and most of the rest was not disclosable at the county level due to confidentiality rules.

<b>FOOD PROCESSING (SIC 20) EMPLOYMENT GROWTH</b>					
<b>SIC</b>	<b>Industry</b>	<b>1990</b>	<b>2000</b>	<b>Change</b>	<b>Growth</b>
20	Food Processing	37,625	40,942	3,317	8.8%
201	Meat Products	4,113	5,197	1,084	26.4%
2011	Meat packing plants	2,295	2,730	435	19.0%
202	Dairy Products	1,745	1,615	-130	-7.4%
203	Preserved Fruits and Vegetables	13,250	13,801	551	4.2%
2033	Canned fruits and vegetables	3,931	4,419	488	12.4%
2037	Frozen fruits and vegetables	6,009	6,701	692	11.5%
204	Grain Mill Products	1,454	1,828	374	25.7%
205	Bakery Products	3,430	3,437	7	0.2%
2051	Bread, cake, and related products	3,164	3,044	-120	-3.8%
206	Sugar and Confectionery Products	726	866	140	19.3%
207	Fats and Oils	168	305	137	81.5%
208	Beverages	3,346	3,421	75	2.2%
209	Misc. Food Products	9,393	10,523	1,130	12.0%
2092	Fresh or frozen prepared fish	5,750	6,742	992	17.3%

### Dairy products

Employment in dairy products declined slightly over the decade. Jobs at cheese factories dropped, due in part to the closure of a Mt. Vernon producer in 1992. Dairy jobs fell early in the decade before stabilizing. On the plus side, employment in dehydrated milk grew steadily. The median wage was \$18.99 in 2000. Half of the 1,600 jobs were in King County. The six largest firms employ 80 percent of the labor in this segment.

## **Preserved fruits and vegetables**

Fruit and vegetable processors added more than 500 jobs during the 1990s. Frozen fruits and vegetables rose by almost 700 jobs, and frozen specialties and canneries each grew by almost 500. However, employment in dehydrated fruits, vegetables, and soups fell by 800, due to a large closure early in the decade. There were 98 employers in the segment in 2000; the largest eleven had 9,700 employees, over 70 percent of total employment. The median hourly wage was \$12.50 in 2000, 7% higher than in 1990. Yakima and Grant counties each had one-fifth of the 13,800 jobs in 2000; Benton hosted 12 percent of the total.

## **Grain mill products**

Employment in grain mill products grew by 25 percent, almost 400 jobs. Most of the expansion came in prepared flour mixes and doughs; there was a decline in prepared feeds (for livestock). Nearly two-thirds of employment was in King County.

## **Bakery products**

Bakery products employment has been near 3,500 for most of the decade. The number of commercial bakeries increased by about 50%; however, five firms have more than half the employment in the industry. Two-thirds of bakery jobs were in King County, while 18 percent was in Spokane.

## **Sugar and confectionary products**

This segment employed about 600 workers through most of the decade, until the return of sugar beet processing in Moses Lake in 1998 helped boost total jobs to almost 900. Most employment in the segment is with candy makers, which dropped 150 jobs. Average wages were low at \$22,000 in 1990, but rose to over \$27,000 in 2000. The segment is dominated by three firms, which account for two-thirds of total employment. Thirty percent of employment was in Pierce County, and the rest was not disclosable.

## **Fats and oils**

This smallest segment within food processing nearly doubled its employment over the decade to 300 jobs. The number of employers and average wage changed little during that time. Half of fats and oils employment was in Whatcom County.

## **Beverages**

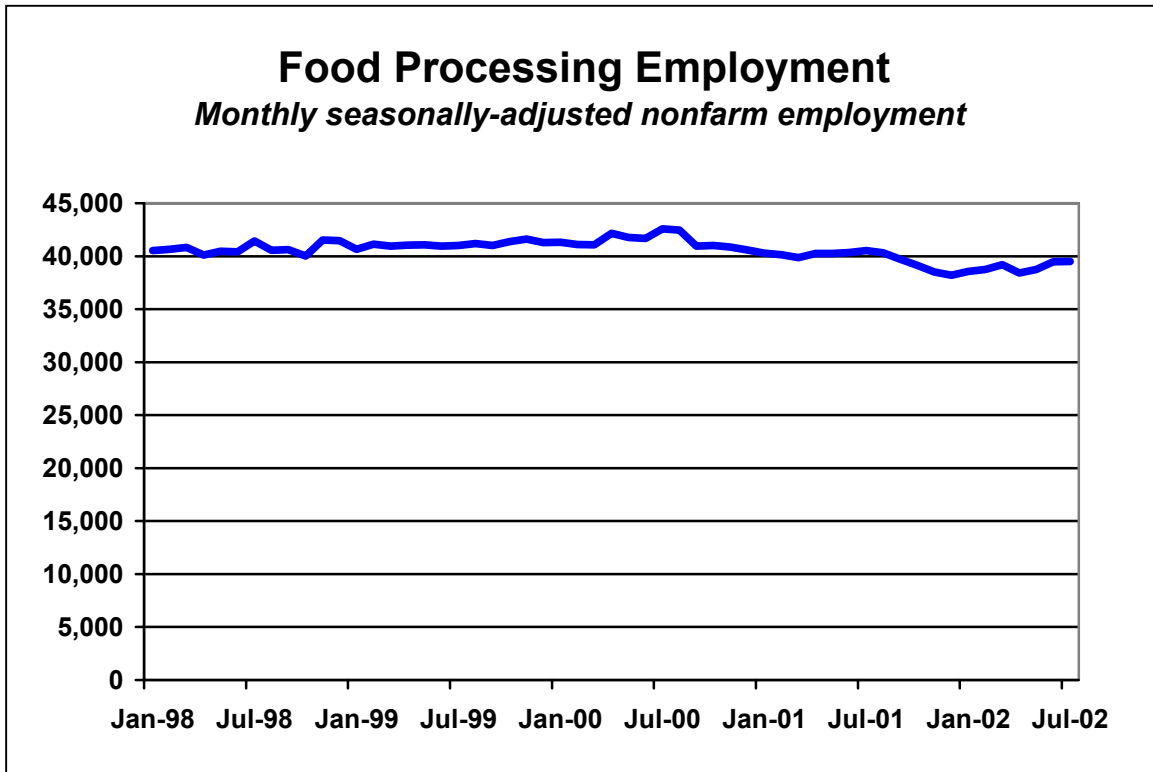
Beverage employment rose slightly in a turbulent decade. Beer brewers expanded by 20 percent thanks to the growth of microbreweries, some of which developed into regional brewers. Employment topped 1,000 in 2000. Wineries expanded by two thirds, reaching 870 jobs. Soft drinks declined by 400 jobs, one fourth of their total. The number of employers in this segment grew by 40 percent, from 68 to 97, while the average wage declined slightly. Some 44% jobs were in King County, and another 16% were in Thurston County.

## Miscellaneous food products

Employment in miscellaneous food products climbed from 9,400 in 1990 to 12,900 in 1997, before falling to 10,500 in 2000. Fresh/frozen fish accounted for most of the boom and bust, rising from 5,800 jobs to 9,100, and then declining to 6,700, as the processor fleet (over)expanded into Alaska. Canned/preserved fish declined steadily from 1,500 to 900 jobs. Roasted coffee, with just 60 jobs in 1990, added 400. Average wages in this segment rose 20% to \$37,900. A bit more than half of all jobs were in King County.

### Trends, 2000 – Current

From 2000 through July 2002, food-processing employment has fallen by 2,600 jobs, or 6 percent. Preserved fruits and vegetables is down by 1,000 jobs. Losses were spread around the state.



## APPENDIX B: LUMBER & WOOD PRODUCTS

With declining timber harvests and growing productivity, it was no surprise that lumber & wood products employment took a nosedive in the 1990s. One out of every six lumber jobs disappeared during the decade.

Lumber & wood products includes logging (which is actually an agricultural activity, and will be recognized as such when NAICS, the new industrial coding system, is implemented in 2003); sawmills producing lumber and specialty products such as shingles and shakes; structural products such as plywood, millwork, cabinets, and trusses; wood containers; mobile homes and prefabricated wood buildings; and other wood products such as treated wood. Major activities, in terms of employment, include sawmills, logging, millwork, and plywood.

### Status 2000

In the year 2000, the lumber & wood products industry had:

- 1,636 firms, 18 percent of the state total for manufacturing
- 32,200 jobs, 9 percent of the state total
- Total payroll of \$1.2 billion, 8 percent of the state total
- An average annual wages of \$38,000, 19 percent below the average for all of manufacturing, but 38 percent above the U.S. industry average
- Median hourly wage of \$15.81, 15 percent below the manufacturing median
- Average size of firms with employment: 169.6, versus 44.1 for all of manufacturing

LUMBER & WOOD PRODUCTS (SIC 24) IN WASHINGTON STATE, 2000					
SIC	Industry	# Firms	Jobs	Payroll	Average Wage
24	Lumber & Wood Products	1,636	32,191	\$1,221,875,190	\$37,957
2411	Logging	913	6,606	\$252,031,213	\$38,152
242	Sawmills	248	12,884	\$594,237,716	\$46,122
2421	Sawmills and planing mills, general	180	11,584	\$549,242,777	\$47,414
2426	Hardwood dimension & flooring mills	13	1,011	\$37,705,948	\$37,296
2429	Specialty sawmills	55	295	\$7,331,634	\$24,853
243	Millwork, Plywood & Structural Members	280	9,380	\$281,151,380	\$29,973
2431	Millwork	125	3,926	\$114,955,711	\$29,281
2434	Wood kitchen cabinets	80	1,987	\$53,007,600	\$26,677
2436	Softwood veneer and plywood	23	1,822	\$62,534,457	\$34,322
2439	Other structural wood members	43	1,178	\$32,938,523	\$27,961
244	Wood Containers	NA	NA	NA	NA
245	Mobile homes & prefab wood buildings	41	921	\$26,485,366	\$28,757
	Other lumber & wood products	163	2,867	\$85,684,604	\$29,887
NA = Confidential data					

## Trends, 1990 – 2000

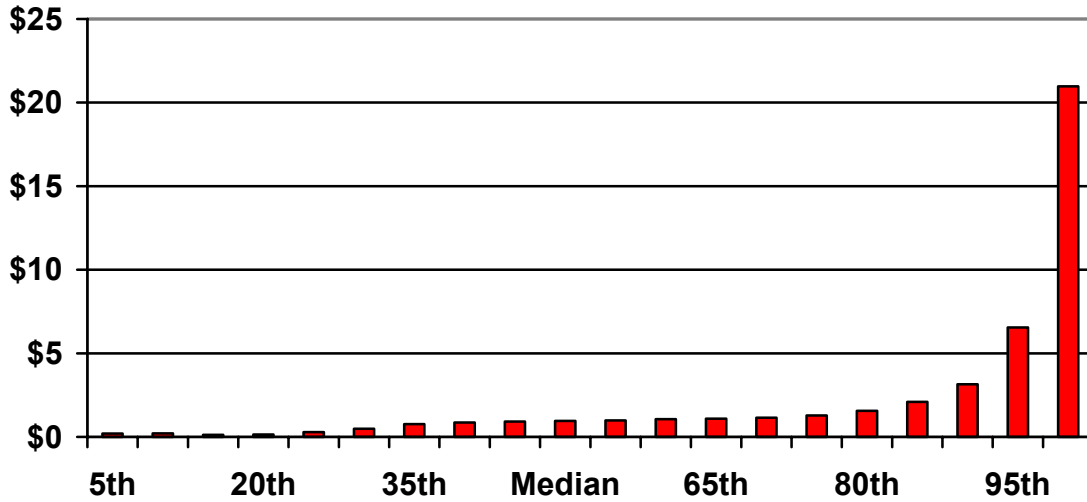
Industry employment was 39,200 in 1990, dropped sharply to 35,600 in 1991, and declined slightly to 34,700 over the next six years. Since 1997, employment has decreased steadily by about 1,000 a year. The total loss over the decade came to 7,000 jobs (-18%); in contrast, national employment rose by 12% over the same period.



The number of employers dwindled from almost 2,000 in 1990 to fewer than 1,640 in 2000. Real average wages trended upward from \$33,200 in 1990 to \$38,700 in 2000. The median hourly wage rose by nearly a dollar an hour, from \$14.85 in 1990 to \$15.80 in 2000, a gain of 6%. Wage gains were smaller in absolute and percentage terms for lower-wage workers, and larger for higher-wage workers, especially for the upper ten percent of jobs.

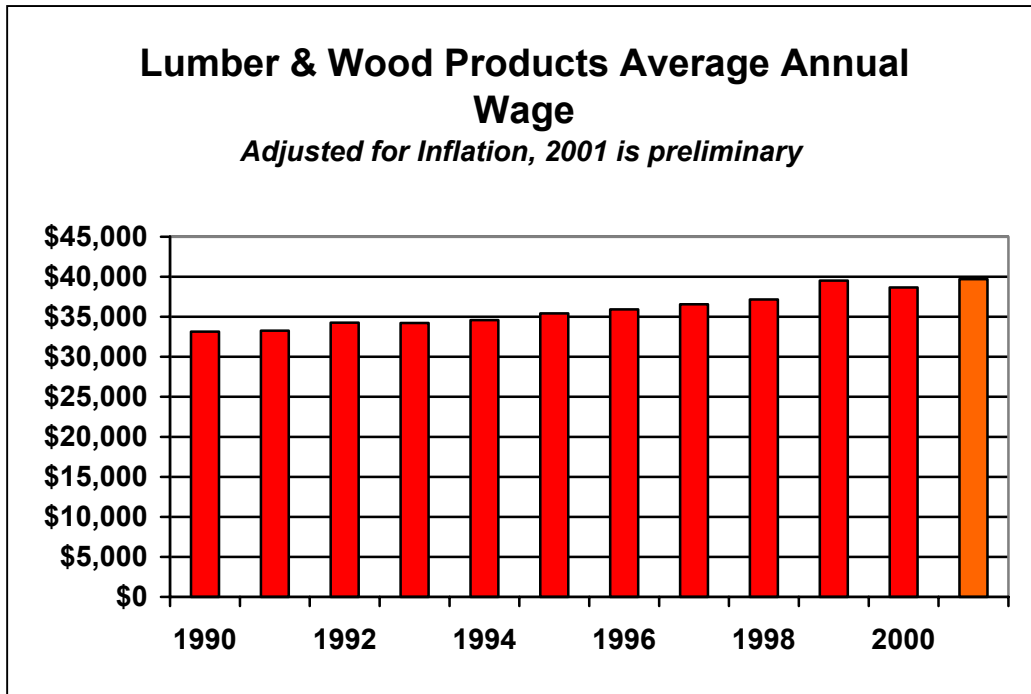
## Change in Median Hourly Wage by Percentile of Jobs, 1990-2000

*Adjusted for Inflation*



## Lumber & Wood Products Average Annual Wage

*Adjusted for Inflation, 2001 is preliminary*



Job losses did little to change the average size of firms or the distribution of employment by firm size.

<b>PERCENT OF INDUSTRY EMPLOYMENT BY SIZE OF FIRM</b>			
<b># Employees</b>	<b>1990</b>	<b>2000</b>	<b>All of Manufacturing</b>
<b>1-9</b>	10%	9%	5%
<b>10-19</b>	8%	8%	5%
<b>20-49</b>	13%	12%	9%
<b>50-99</b>	15%	12%	10%
<b>100-249</b>	20%	23%	16%
<b>250-499</b>	8%	11%	9%
<b>500+</b>	26%	26%	47%
<b>Average Size</b>	23.3	25.2	44.1

### **Geographic Detail**

One out of every six lumber & wood products jobs are in King County, where Weyerhaeuser is located. Pierce and Snohomish each have about ten percent. Another 21 percent are in heavily wooded counties in the western part of the state—Lewis, Grays Harbor, and Cowlitz. A few counties enjoyed an increase in lumber & wood products employment over the decade, but many suffered substantial losses. Some of the highest percentage losses were in the southwest part of the state (Cowlitz, Clark, Skamania), and Okanogan lost half of its industry employment.

<b>LUMBER &amp; WOOD PRODUCTS EMPLOYMENT BY COUNTY</b>					
<b>County</b>	<b>1990</b>	<b>2000</b>	<b>Pct. of 2000</b>	<b>Change</b>	<b>Growth</b>
State	39,159	32,191	100%	-6,968	-18%
King	7,341	5,260	16%	-2,081	-28%
Pierce	4,419	3,693	11%	-726	-16%
Snohomish	3,097	3,232	10%	135	4%
Lewis	2,503	2,241	7%	-262	-10%
Grays Harbor	2,798	2,174	7%	-624	-22%
Cowlitz	3,122	2,105	7%	-1,017	-33%
Yakima	1,490	1,717	5%	227	15%
Mason	1,414	1,411	4%	-3	0%
Whatcom	1,224	1,409	4%	185	15%
Spokane	952	1,221	4%	269	28%
Stevens	1,128	1,212	4%	84	7%
Clark	1,564	936	3%	-628	-40%
Clallam	1,411	933	3%	-478	-34%
Thurston	995	724	2%	-271	-27%
Okanogan	1,212	636	2%	-576	-48%
Skagit	851	560	2%	-291	-34%
Pacific	647	434	1%	-213	-33%
Chelan	236	252	1%	16	7%
Asotin	122	180	1%	58	48%
Skamania	469	165	1%	-304	-65%
Rest of State	2,164	1,696	5%	-468	-22%

## Segment Detail

Timber harvests in the state declined by 36% from 1990 to 2000<sup>6</sup>. *Logging* employment followed suit, falling by more than 2,700 jobs, almost 30 percent. While the loss was spread across the state, counties hit the hardest include Cowlitz (-560), Chelan (-370), Grays Harbor (-340), and Snohomish (-300). The average wage rose from \$33,300 in 1990 to \$39,000 in 1999, before declining slightly over the next two years. However, the median hourly wage was basically flat over the decade, at just over \$18 per hour. In 2000, Lewis, Grays Harbor, King, and Cowlitz counties each had about 10 percent of the state total employment of 6,600 jobs. From 1990 to 2000, sawmill employment dropped from 16,200 to 13,000, a loss of 3,200 jobs or 20 percent. Over the same period, lumber production expanded by at least 12 percent<sup>7</sup>. Thus much of the job loss could be traced to structural change arising from a shift to more productive facilities. Employment at specialty sawmills, many of which produced shakes and shingles, plunged. A number of counties sustained sizable job losses, some of which were not publicly disclosable. Among the ones that were: Pierce County (-490), Grays Harbor (-270), Cowlitz (-200), Stevens (-160). Whatcom County added over 100 sawmill jobs, thanks in part to Canadian firms that expanded into the county in the late 1980s.

<b>LUMBER &amp; WOOD PRODUCTS (SIC 24) EMPLOYMENT GROWTH</b>					
<b>SIC</b>	<b>Industry</b>	<b>1990</b>	<b>2000</b>	<b>Change</b>	<b>Growth</b>
24	Lumber & Wood Products	39,159	32,191	-6,968	-18%
2411	Logging	9,357	6,604	-2,753	-29%
2421	Sawmills and planing mills, general	14,281	11,584	-2,697	-19%
2426	Hardwood dimension & flooring mills	845	1,011	166	20%
2429	Special product sawmills	1,017	295	-722	-71%
2431	Millwork	4,534	3,926	-608	-13%
2434	Wood kitchen cabinets	1,587	1,987	400	25%
2436	Softwood veneer and plywood	2,657	1,822	-835	-31%
2439	Other structural wood members	1,017	1,178	161	16%
2451	Mobile homes	769	368	-401	-52%
	Other Lumber & Wood Products	3,095	3,416	321	10%

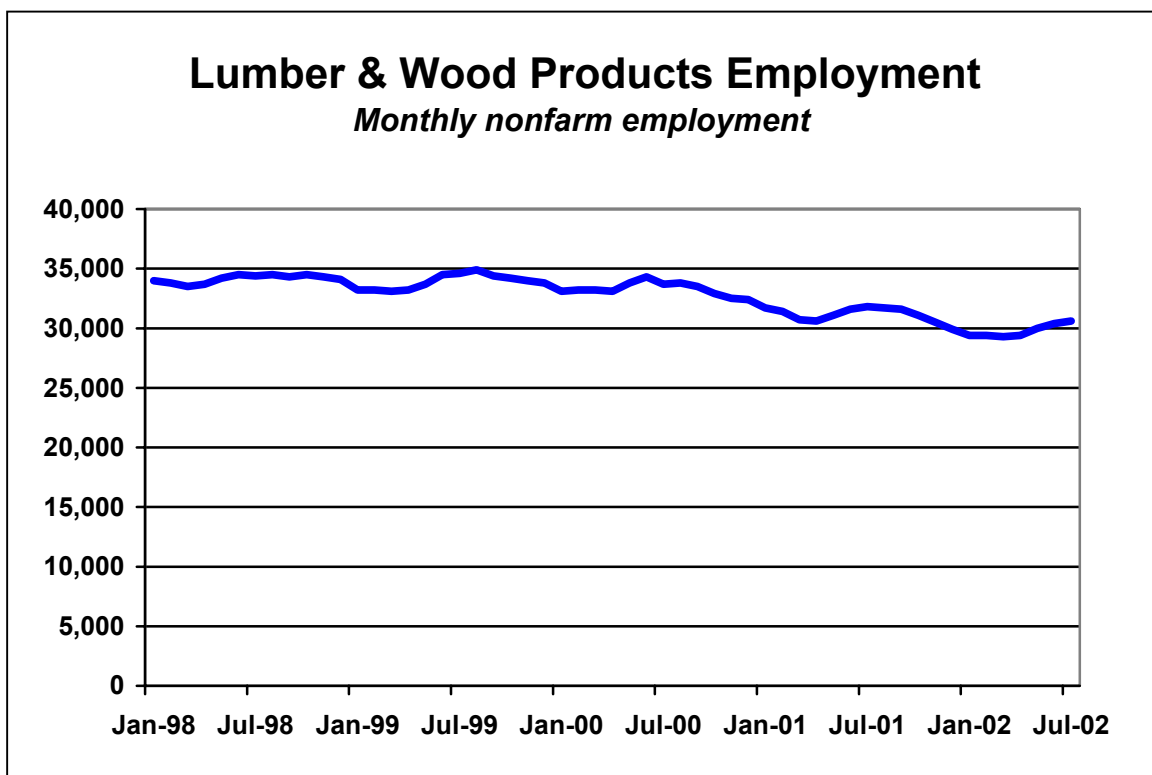
<sup>6</sup> Washington Department of Natural Resources annual timber harvest reports.

<sup>7</sup> Debra D. Warren, *Production, Prices, Employment, and Trade in Northwest Forest Industries, All Quarters 2000*, US Forest Service, January 2002. Note that while timber harvests declined, exports of raw logs fell by roughly the same amount, leaving the amount of timber available for domestic mills little unchanged.

Employment in other wood products declined by almost 1,000 jobs over the decade. Plywood suffered the biggest drop, losing more than 800 jobs as a number of mills closed due to higher timber prices and competition from cheaper substitutes such as chipboard. Millwork endured a turbulent decade, with over 80 firms closing, but 60 new firms opening their doors. When expansions and contractions were totaled up, the net loss stood at 600 jobs. Kitchen cabinet production expanded with the housing market; employment grew by 25%. “Other structural wood members”—such as trusses, laminates, and engineered beams—grew as well. Employment in mobile homes, however, was cut in half, as an industry shakeout led to three closures and a major layoff.

### Trends, 2000 – Current

In 2001, lumber & wood products employment fell by another 1,400 jobs, including 300 in logging, 700 in lumber, and 200 in wood products. Snohomish and Spokane declined by 300 each, and Lewis and Mason by 200. Seasonally adjusted employment remained close to 30,400 throughout the first half of 2002.



## APPENDIX C: PAPER PRODUCTS

The paper & paper products industry includes pulp mills, paper mills (which may or may not include a pulping facility), and converting mills which take convert paper stock into various paper products such as boxes, bag, tissues, and envelopes. Converting mills may be part of a larger paper milling operation or may stand independently. Because of the overlap, data by detailed SIC should be viewed with some caution. The paper industry is tied to the timber industry, because much of the raw material used for pulping consists of wood chips from sawmills. Some logs are also chipped for use in pulp mills.

### Status 2000

In the year 2000, the paper industry had:

- 139 firms, 2 percent of the state total for manufacturing
- 15,500 jobs, 4 percent of the state total

<b>PAPER &amp; PAPER PRODUCTS (SIC 26) IN WASHINGTON STATE, 2000</b>					
SIC	Industry	# Firms	Jobs	Payroll	Average Wage
26	Paper & Paper Products	139	15,527	\$809,712,230	\$52,149
2611	Pulp mills	8	1,283	\$72,156,598	\$56,241
2621	Paper mills	28	7,548	\$434,922,083	\$57,621
2631	Paperboard mills	8	1,382	\$88,638,361	\$64,138
	Paper products	95	5,314	\$213,995,188	\$40,270
2653	Corrugated and solid fiber boxes	28	1,900	\$78,824,785	\$41,487
2673	Bags: plastics, laminated, & coated	11	1,000	\$36,684,962	\$36,685
	Other Paper Products	56	2,414	\$98,485,441	\$40,798

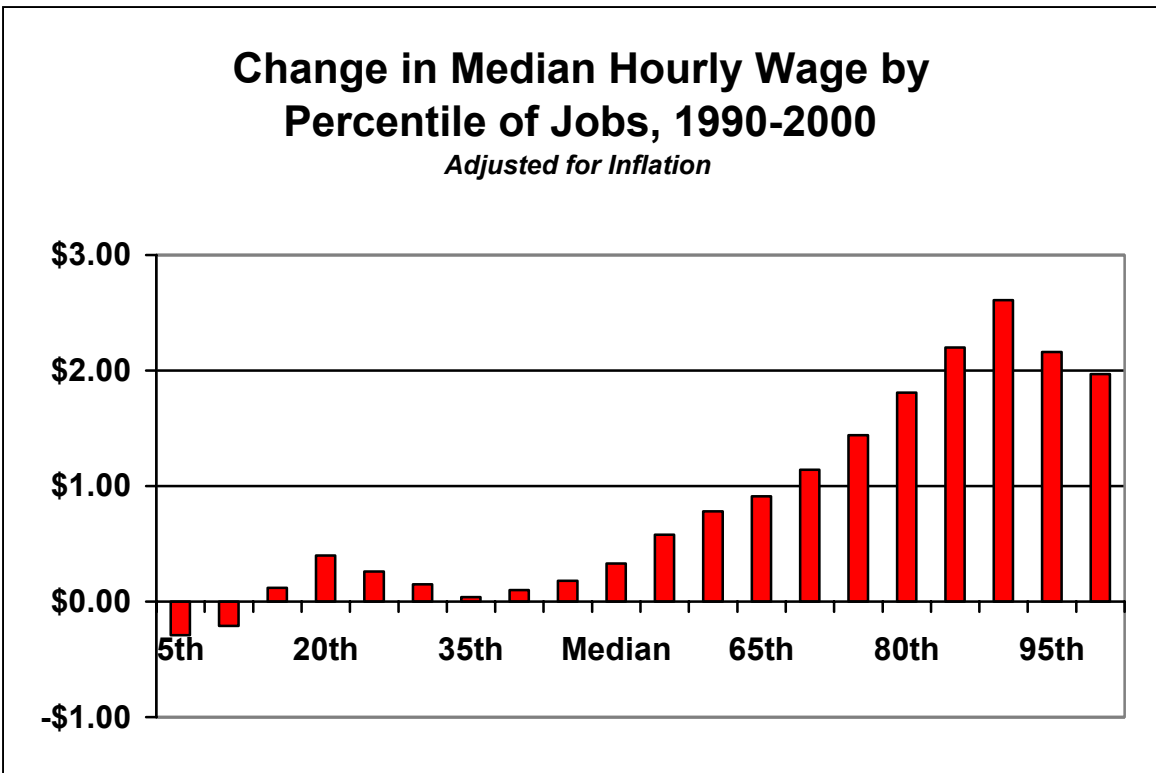
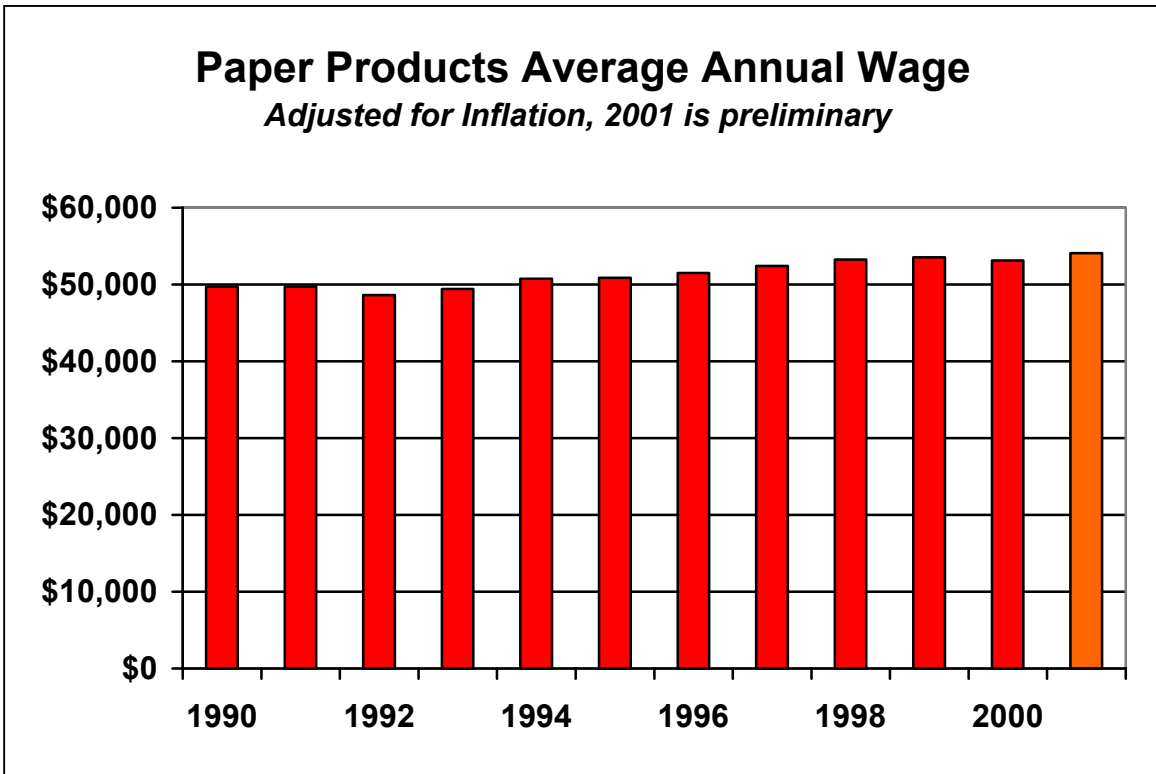
- Total payroll of \$810 million, 5 percent of the state total
- An average annual wages of \$52,100, 11 percent above the average for all of manufacturing, and 21 percent above the U.S. industry average
- Median hourly wage of \$22.53, 21 percent above the manufacturing median
- Average size of firms with employment: 168.8, versus 44.1 for all of manufacturing

### Trends, 1990 – 2000

Industry employment declined steadily over the decade from 18,200 to 15,500, a loss of 2,700 jobs or –15 percent. In comparison, U.S. paper employment fell by only 6 percent. The number of employers increased early in the decade and has remained at about 140 since 1992. Real average wages have risen from \$49,700 in 1990 to \$54,100 in 2000. The median hourly wage inched upward from \$22.20 to \$22.53 over the same period.



Real average annual wages increased by 7 percent, from \$48,800 in 1990 to \$52,100 in 2000. The median hourly wage went up only one percent, from \$22.20 in 1990 to \$22.53 in 2000. Hourly wages decreased for the lowest-paid 10 percent of jobs, and gains were small for other jobs below the median.



The number of companies with employment rose slightly from 87 in 1990 to 92 in 2000, while the average firm size declined from 204 to 169. The percentage of industry employment at large firms dropped sharply from 54 percent to 36 percent,

<b>PERCENT OF INDUSTRY EMPLOYMENT BY SIZE OF FIRM</b>			
<b># Employees</b>	<b>1990</b>	<b>2000</b>	<b>All of Manufacturing</b>
<b>1-9</b>	1%	1%	5%
<b>10-19</b>	1%	1%	5%
<b>20-49</b>	3%	3%	9%
<b>50-99</b>	5%	4%	10%
<b>100-249</b>	9%	20%	16%
<b>250-499</b>	15%	13%	9%
<b>500-999</b>	13%	23%	11%
<b>1000+</b>	54%	36%	36%
<b>Average Size</b>	203.5	168.8	44.1

### Segment Detail

Virtually every segment of the paper industry lost employment during the decade. Pulp mills, paper mills, and paperboard mills all cut employment. A number of mills closed outright, and others trimmed employment and cut production in the wake of intense competition from imports and from the Southeast U.S. Paper products jobs as a whole declined slightly. There was a substantial expansion in production of corrugated and solid fiber boxes, along with losses in other lines such as folding paperboard boxes and coated bags.

<b>PAPER &amp; PAPER PRODUCTS (SIC 24) EMPLOYMENT GROWTH</b>					
<b>SIC</b>	<b>Industry</b>	<b>1990</b>	<b>2000</b>	<b>Change</b>	<b>Growth</b>
26	Paper & Paper Products	18,228	15,527	-2,701	-15%
2611	Pulp mills	2,060	1,283	-777	-38%
2621	Paper mills	9,197	7,548	-1,649	-18%
2631	Paperboard mills	1,614	1,382	-232	-14%
	Paper products	5,357	5,314	-43	-1%
2653	Corrugated and solid fiber boxes	1,492	1,900	408	27%
2673	Bags: plastics, laminated, & coated	1,124	1,000	-124	-11%
	Other Paper Products	2,741	2,414	-327	-12%

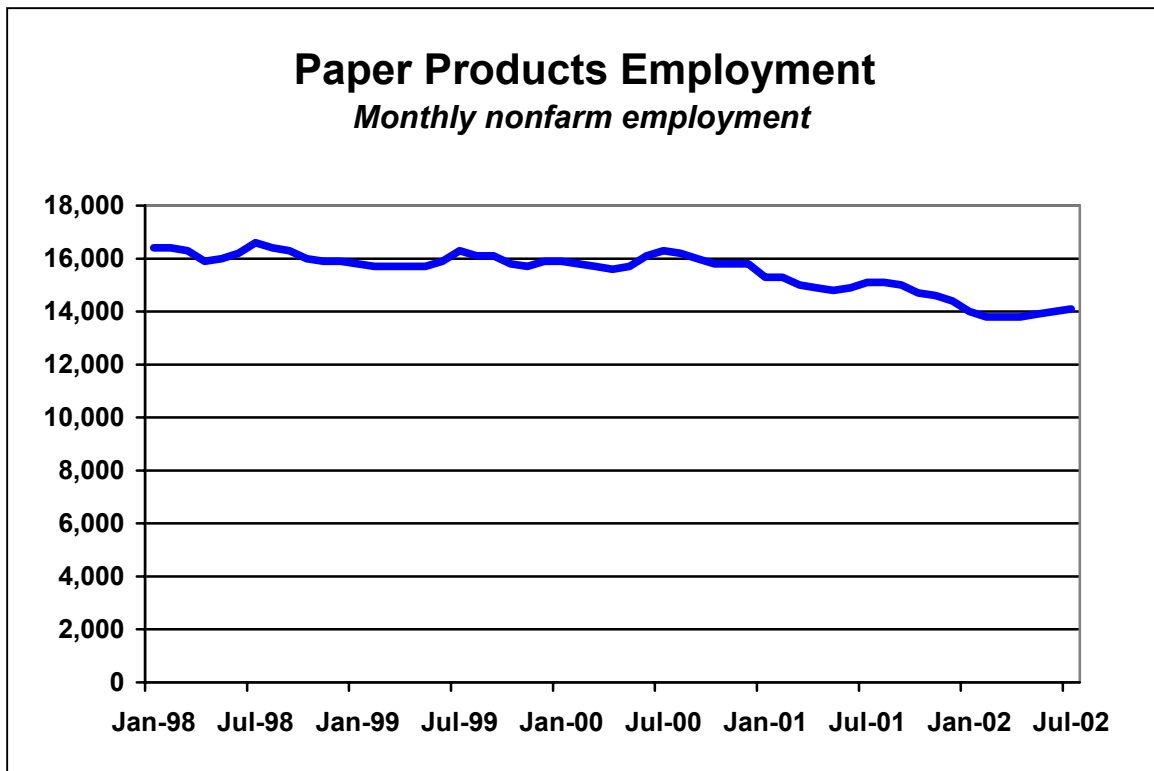
### Geographic Detail

In 2000, three counties hosted more than half of the state's paper employment: Cowlitz, Clark, and King. Over the decade, job losses were concentrated in Snohomish, Clark, Clallam, and Cowlitz, which together accounted for almost 90 percent of the state decline. King and Spokane were two of the few counties to enjoy an increase in paper jobs.

<b>PAPER &amp; PAPER PRODUCTS EMPLOYMENT BY COUNTY</b>					
<b>County</b>	<b>1990</b>	<b>2000</b>	<b>Pct. of 2000</b>	<b>Change</b>	<b>Growth</b>
Cowlitz	4,028	3,579	23%	-449	-11%
Clark	3,292	2,625	17%	-667	-20%
King	2,118	2,388	15%	270	13%
Pierce	1,444	1,169	8%	-275	-19%
Snohomish	1,750	928	6%	-822	-47%
Grays Harbor	1,112	750	5%	-362	-33%
Yakima	862	750	5%	-112	-13%
Spokane	239	340	2%	101	42%
Clallam	783	320	2%	-463	-59%
Thurston	458	305	2%	-153	-33%
Rest of State	2,142	2,373	15%	231	11%

### **Trends, 2000 – Current**

Since December 2000, seasonally adjusted paper employment has fallen by more than 2,000 jobs, from 15,800 to 13,700. Layoffs in Cowlitz (-700), the closure of a paper machine at a mill in Clark (-200), and the closure of a pulp mill in Whatcom have done most of the damage.





## APPENDIX D: CHEMICALS

Discussion of the chemicals industry will be limited to 1991 to the present, because a major employer which was classified in the industry in 1990 was recoded in 1991.

The chemicals industry has eight major segments: industrial inorganic chemicals, plastics and synthetic materials, drugs, soaps, paint, industrial organic chemicals, agricultural chemicals, and all other chemicals.

### Status 2000

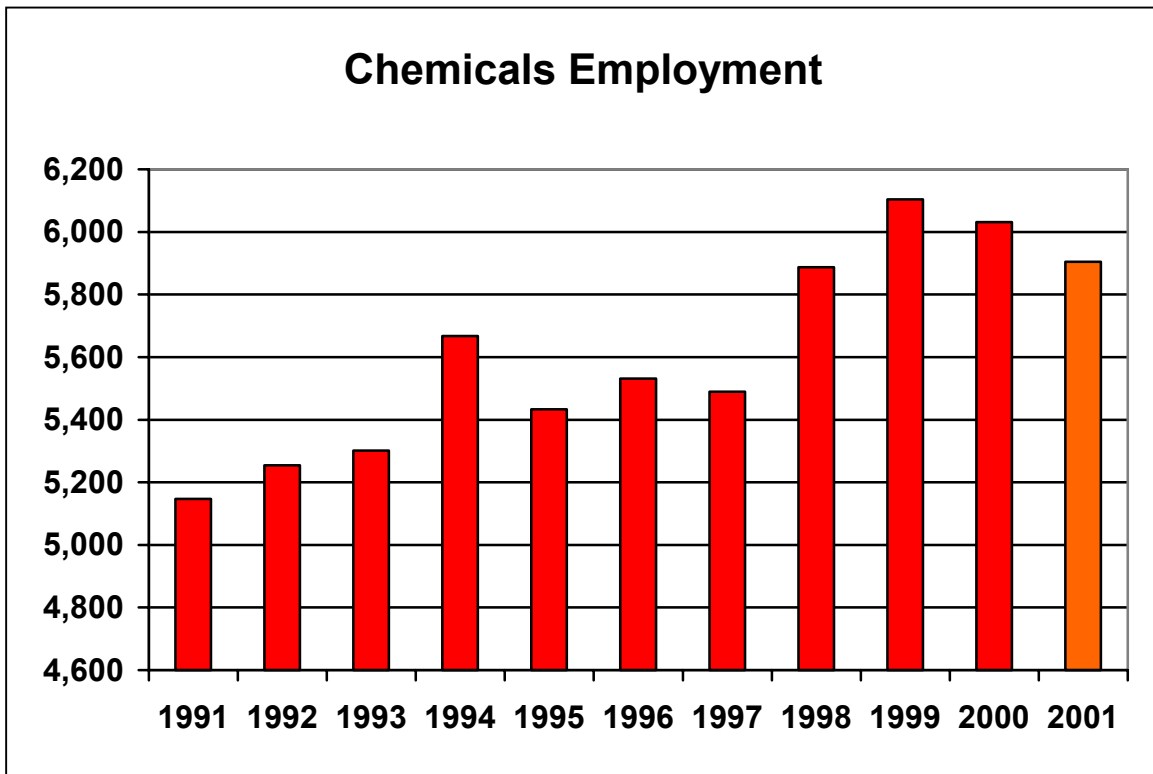
In the year 2000, the chemicals industry had:

- 249 firms, 3 percent of the state total for manufacturing
- 6,100 jobs, 2 percent of the state total
- Total payroll of \$702 million, 4 percent of the state total
- An average annual wage of \$115,900, 146 percent above the average for all of manufacturing, and double the U.S. industry average
- Median hourly wage of \$22.00, 18 percent above the manufacturing median
- An average size of 28.5 for firms with employment, versus 44.1 for all of manufacturing

<b>CHEMICALS (SIC 28) IN WASHINGTON STATE, 2000</b>					
SIC	Industry	# Firms	Jobs	Payroll	Average Wage
28	Chemicals And Allied Products	249	6,059	\$702,178,751	\$115,890
281	Industrial inorganic Chemicals	*	*	*	*
2819	Industrial inorganic chemicals,*	14	1,110	\$74,395,887	\$67,023
282	Plastics materials and synthetics	*	*	*	*
283	Drugs	67	2,221	\$500,632,912	\$225,409
2834	Pharmaceutical preparations	30	1,320	\$462,917,749	\$350,695
284	Soap, cleaners, and toilet Goods	*	*	*	*
285	Paints and allied products	20	516	\$21,946,325	\$42,532
286	Industrial organic chemicals	11	266	\$15,064,849	\$56,635
287	Agricultural chemicals	32	449	\$21,435,971	\$47,742
	Other chemicals	105	1,497	\$68,702,807	\$45,894
*Excludes alkalis, chlorine, gases, and pigments.					

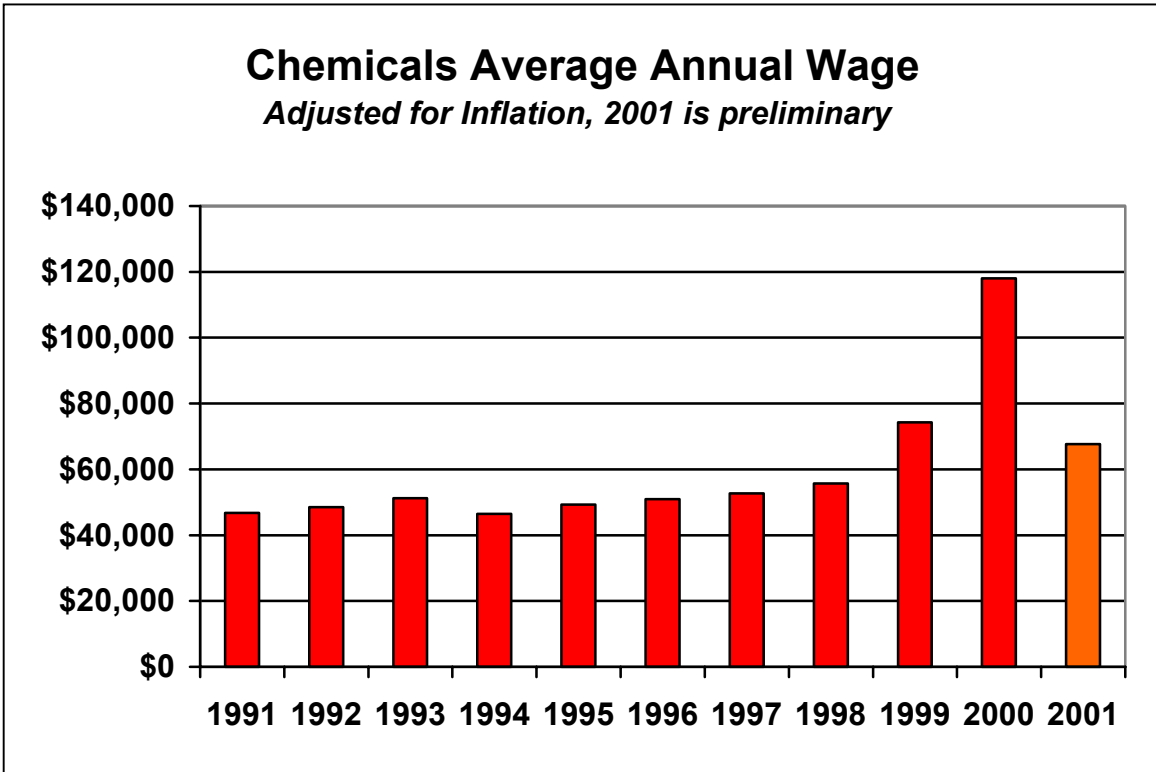
### Trends, 1991 – 2000

Chemical jobs climbed from 5,100 to 6,100, a gain of 18 percent. Employment spiked in 1994 due mostly to a jump in pharmaceuticals, before falling in 1995 due to declines in pharmaceuticals and paints. Employment grew rapidly again in 1998-2000, again led by pharmaceuticals. Nationally, employment fell by 6 percent over the same period.

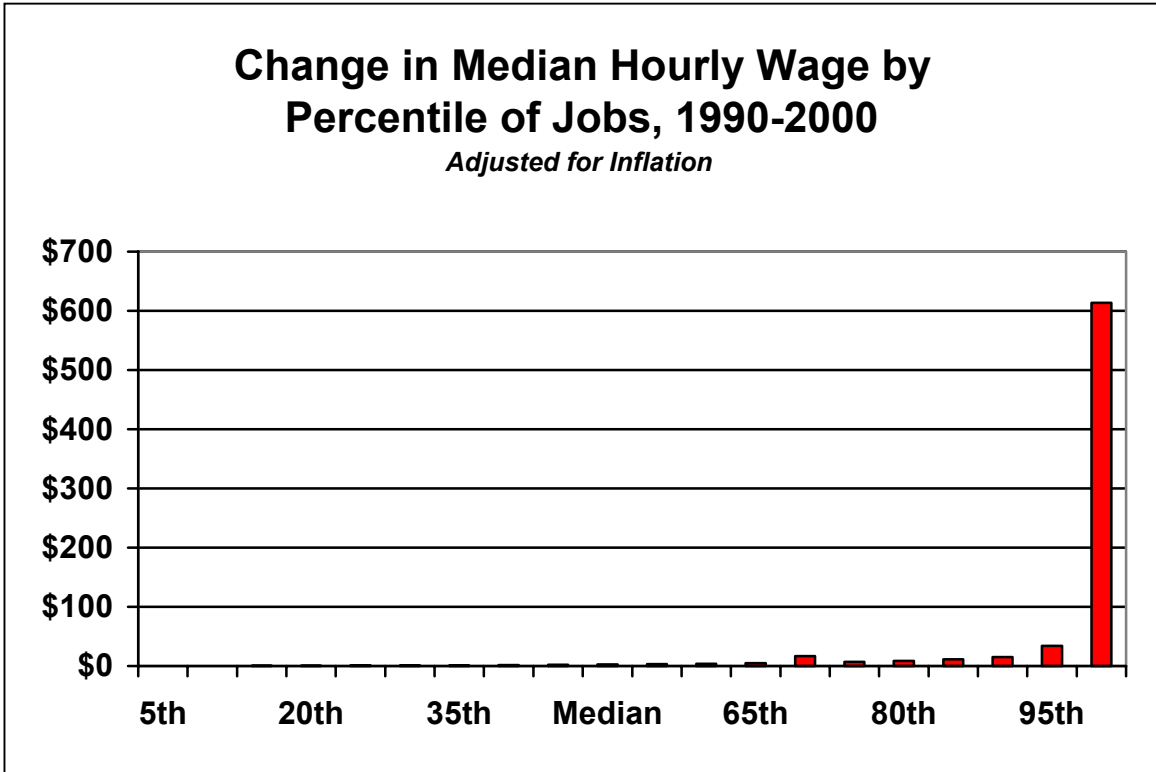


The average annual wage, adjusted for inflation, moved up steadily from \$46,000 in 1991 to \$54,700 in 1998. The impact of stock options pushed wages up to \$72,800 in 1999 and \$116,000 in 2000. Preliminary data for 2001 indicate that stock options were not a factor, with the average wage considerably lower but still much higher than the average for all of manufacturing.

The median hourly wage was \$22.00 per hour in 2000, up 14 percent; for pharmaceuticals, the median was \$28.29. Wage gains were only 3 to 5 percent for the lowest-paid jobs, 14 percent at the median, and considerably more for higher-paid jobs.



Employment by size of employer shifted very little over the decade, with a slight decline in employment at larger firms, and a slight drop in average firm size.



<b>PERCENT OF INDUSTRY EMPLOYMENT BY SIZE OF FIRM</b>			
<b># Employees</b>	<b>1991</b>	<b>2000</b>	<b>All of Manufacturing</b>
<b>1-9</b>	6%	7%	5%
<b>10-19</b>	6%	7%	5%
<b>20-49</b>	17%	18%	9%
<b>50-99</b>	17%	17%	10%
<b>100+</b>	54%	50%	71%
<b>Average Size</b>	31.8	28.5	44.1

### **Geographic Detail**

More than a third of all chemicals jobs in the state are in King County; and over three-fourths of all pharmaceutical jobs are there as well. King added 600 jobs over the decade, capturing two-thirds of all the industry job growth. Most of King's gain came in pharmaceuticals. The same was true for Clark County.

<b>CHEMICALS EMPLOYMENT BY COUNTY</b>					
<b>County</b>	<b>1991</b>	<b>2000</b>	<b>Pct. of 2000</b>	<b>Change</b>	<b>Growth</b>
State	5,148	6,059	100%	911	18%
King	1,752	2,358	39%	606	35%
Pierce	665	539	9%	-126	-19%
Spokane	522	488	8%	-34	-7%
Clark	203	365	6%	162	80%
Snohomish	NA	346	6%	NA	NA
Grant	NA	146	2%	NA	NA
Yakima	NA	141	2%	NA	NA
Grays Harbor	108	132	2%	24	22%
Skagit	85	79	1%	-6	-7%
Rest of State	1,597	1,465	24%	-132	-8%
NA = Not available due to confidentiality.					

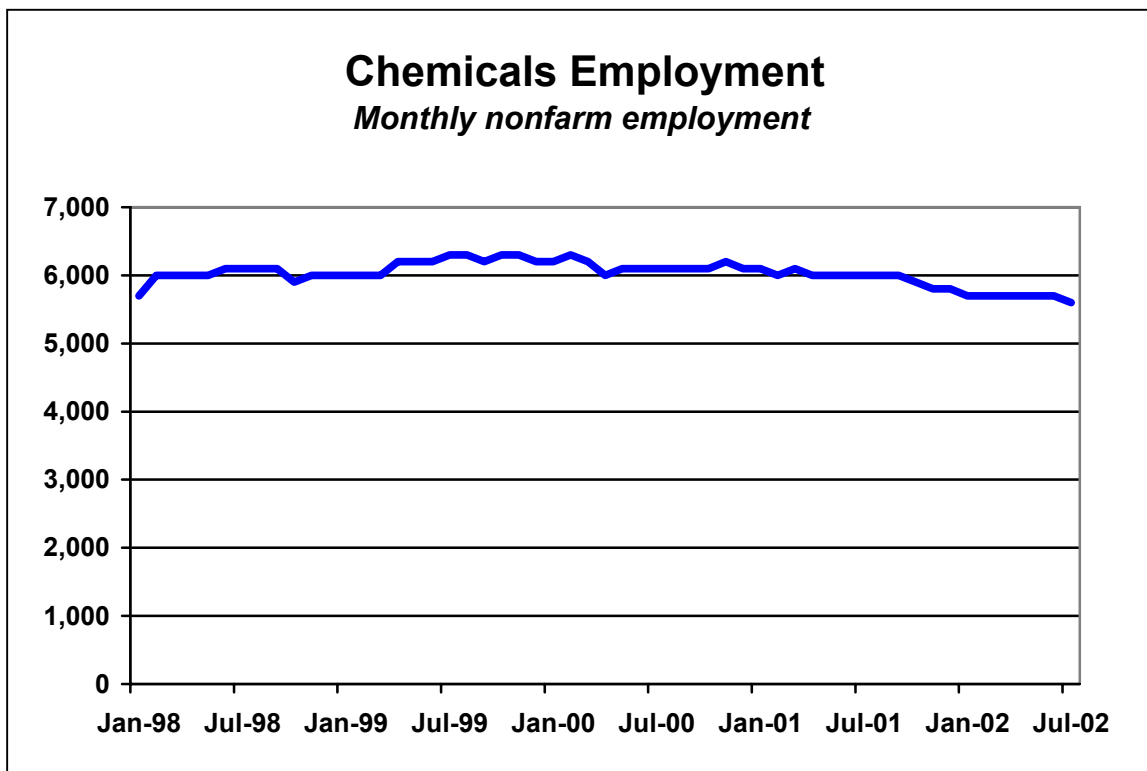
## Segment Detail

Pharmaceuticals and other drugs generated almost all of the new jobs over the 1991-2000 period. Soaps, cleaners, and toiletries grew by 200, but industrial chemicals, paints, and agricultural chemicals all declined.

<b>CHEMICALS EMPLOYMENT GROWTH</b>					
<b>SIC</b>	<b>Industry</b>	<b>1991</b>	<b>2000</b>	<b>Change</b>	<b>Growth</b>
28	Chemicals And Allied Products	5,148	6,059	911	18%
281	Industrial Inorganic Chemicals	*	*	*	*
2819	Industrial inorganic chemicals, nec	1,125	1,110	-15	-1%
282	Plastics Materials and Synthetics	*	*	*	*
283	Drugs	1,003	2,221	1,218	121%
2834	Pharmaceutical preparations	508	1,320	812	160%
284	Soap, Cleaners, and Toilet Goods	*	*	*	*
285	Paints and allied products	626	516	-110	-18%
286	Industrial Organic Chemicals	393	266	-127	-32%
287	Agricultural Chemicals	580	449	-131	-23%
	Other Chemicals	1,421	1,497	76	5%

## Trends, 2000 – Current

Since the end of 2000, the state has lost 600 chemical jobs. The industry is now 700 below its peak in February 2000. Preliminary data indicate Spokane, Pierce, and Benton have all lost chemical jobs.



## APPENDIX E: RUBBER & PLASTICS

The rubber & plastics industry in the state of Washington is mostly a diversified plastics industry, along with a relatively small amount of production of rubber products. Plastic products include vinyl windows, plastic sheets and films, laminated plastic, bottles, resins, foam, pipes, plumbing fixtures (mainly hot tubs and tub/showers) and a wide range of molded plastic products.

### Status 2000

In the year 2000, the rubber & plastics industry had:

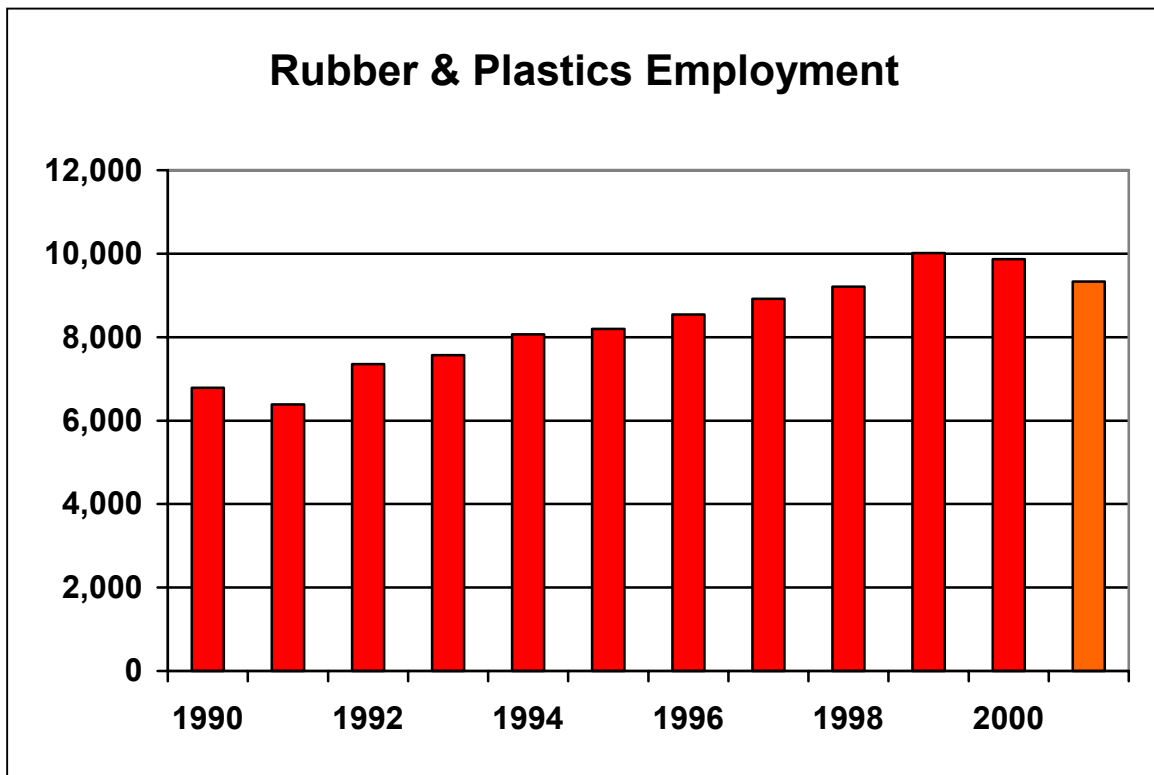
- 254 firms, 3 percent of the state total for manufacturing
- 9,900 jobs, 3 percent of the state total

<b>RUBBER &amp; PLASTICS (SIC 30) IN WASHINGTON STATE, 2000</b>					
SIC	Industry	# Firms	Jobs	Payroll	Average Wage
30	Rubber And Plastics Products	254	9,936	\$316,759,235	\$31,880
308	Miscellaneous Plastics Products	219	9,240	\$296,974,240	\$32,140
3081	Unsupported plastics film & sheet	5	513	\$19,993,371	\$38,973
3082	Unsupported plastics profile shapes	9	955	\$33,881,127	\$35,478
3083	Laminated plastics plate & sheet	4	201	\$7,154,424	\$35,594
3084	Plastics pipe	6	319	\$12,251,662	\$38,406
3085	Plastics bottles	9	742	\$28,365,261	\$38,228
3086	Plastics foam products	11	555	\$19,773,487	\$35,628
3087	Custom compound purchased resins	5	216	\$10,334,346	\$47,844
3088	Plastics plumbing fixtures	15	410	\$11,115,983	\$27,112
3089	Miscellaneous plastics products	157	5,394	\$155,537,100	\$28,835
	Rubber Products	35	696	\$19,784,995	\$28,427

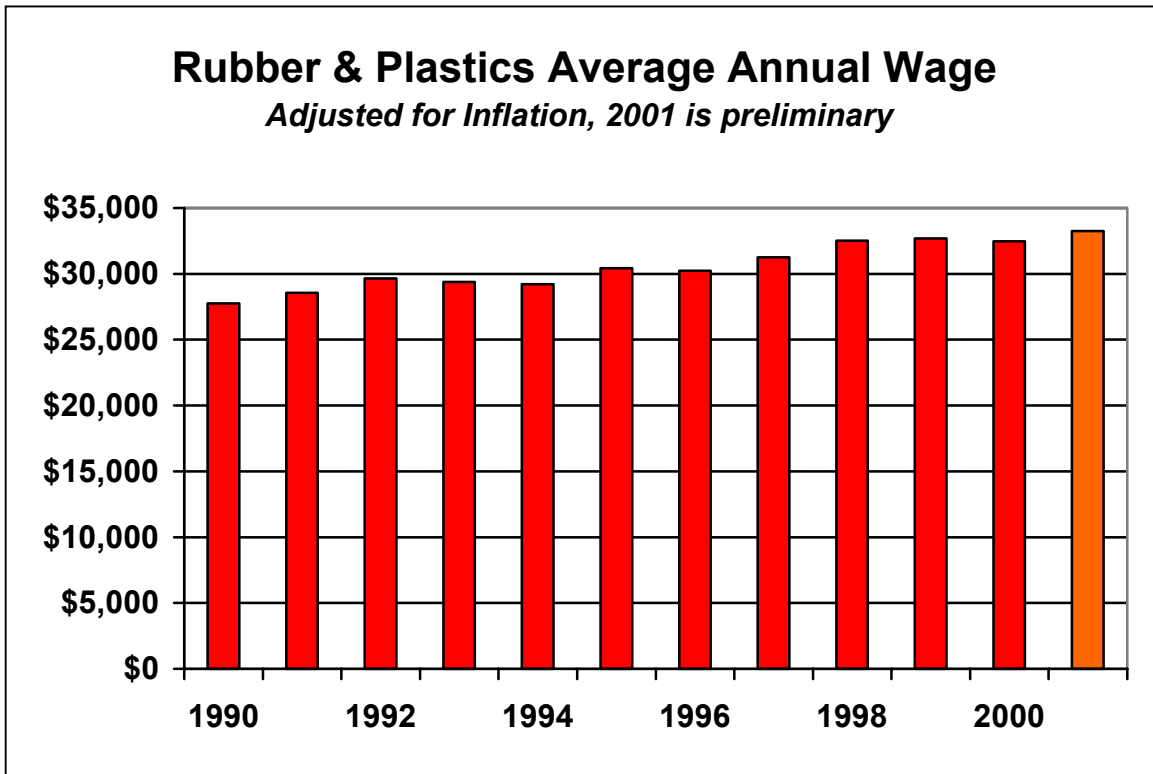
- Total payroll of \$317 million, 2 percent of the state total
- An average annual wage of \$31,900, 32 percent below the average for all of manufacturing, and 4 percent below the U.S. industry average
- Median hourly wage of \$12.87, 31 percent below the manufacturing median
- An average size of 40.8 for firms with employment, versus 44.1 for all of manufacturing

## Trends, 1990 – 2000

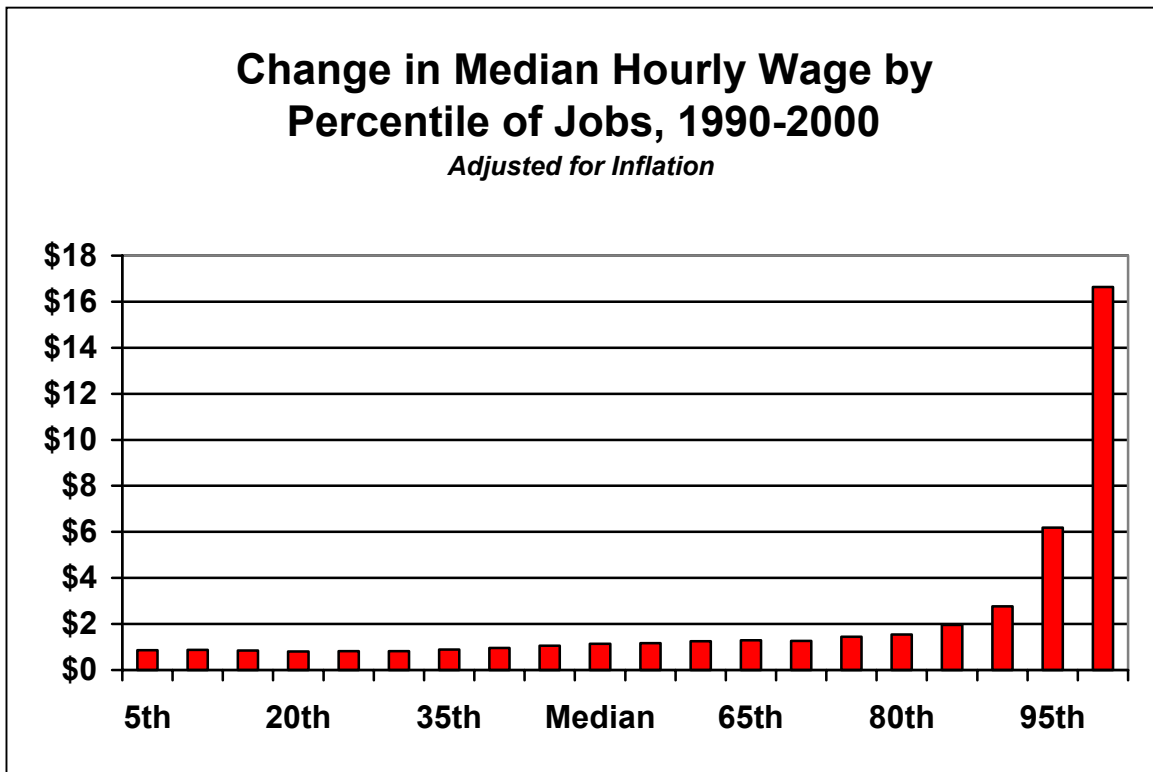
Industry employment was 6,800 in 1990, and after a slight drop in 1991 rose steadily through 1999 to 10,000. Employment dipped by 100 in 2000. The net gain was still a substantial 3,100 jobs, +46 percent, much faster than the national growth rate of 13 percent over the same period.



The number of employers didn't change much, moving from 249 to 254. Real average annual wages trended upward from \$27,200 to \$31,900, growing at about the same pace as all of manufacturing, and at a faster rate than the industry nationally. The median hourly wage increased by 10 percent, from \$11.73 to \$12.87, with pay raises at roughly the same percentage across the wage scale except for the upper 5 percent of jobs.



Employment in the industry shifted markedly to larger firms, with average firm size rising from 28.6 to 40.8. Firms with 100 or more employees moved up from 40 percent of total employment in 1990 to 54 percent in 2000.



<b>PERCENT OF INDUSTRY EMPLOYMENT BY SIZE OF FIRM</b>			
<b># Employees</b>	<b>1990</b>	<b>2000</b>	<b>All of Manufacturing</b>
<b>1-9</b>	6%	4%	5%
<b>10-19</b>	7%	4%	5%
<b>20-49</b>	24%	17%	9%
<b>50-99</b>	23%	22%	10%
<b>100+</b>	40%	54%	71%
<b>Average Size</b>	28.6	40.8	44.1

### Geographic Detail

Rubber & plastics employment was concentrated in metro areas, but grew in both urban and rural counties. In 2000, King County had just over a third of industry jobs, Pierce another 17 percent, and Clark 10 percent. Pierce and Snohomish added the most jobs, and no area had a decline in employment.

<b>RUBBER &amp; PLASTICS EMPLOYMENT BY COUNTY</b>					
<b>County</b>	<b>1990</b>	<b>2000</b>	<b>Pct. of 2000</b>	<b>Change</b>	<b>Growth</b>
State	6,786	9,936	100%	3,150	46%
King	3,282	3,444	35%	162	5%
Pierce	1,004	1,651	17%	647	64%
Clark	713	1,026	10%	313	44%
Snohomish	331	878	9%	547	165%
Yakima	416	739	7%	323	78%
Thurston	NA	595	6%	NA	NA
Spokane	187	480	5%	293	157%
Whatcom	255	403	4%	148	58%
Chelan	NA	202	2%	NA	NA
Kitsap	43	102	1%	59	137%
Rest of State	555	1,183	12%	628	113%

*Rest of State for 2000 does not include Thurston or Chelan.*

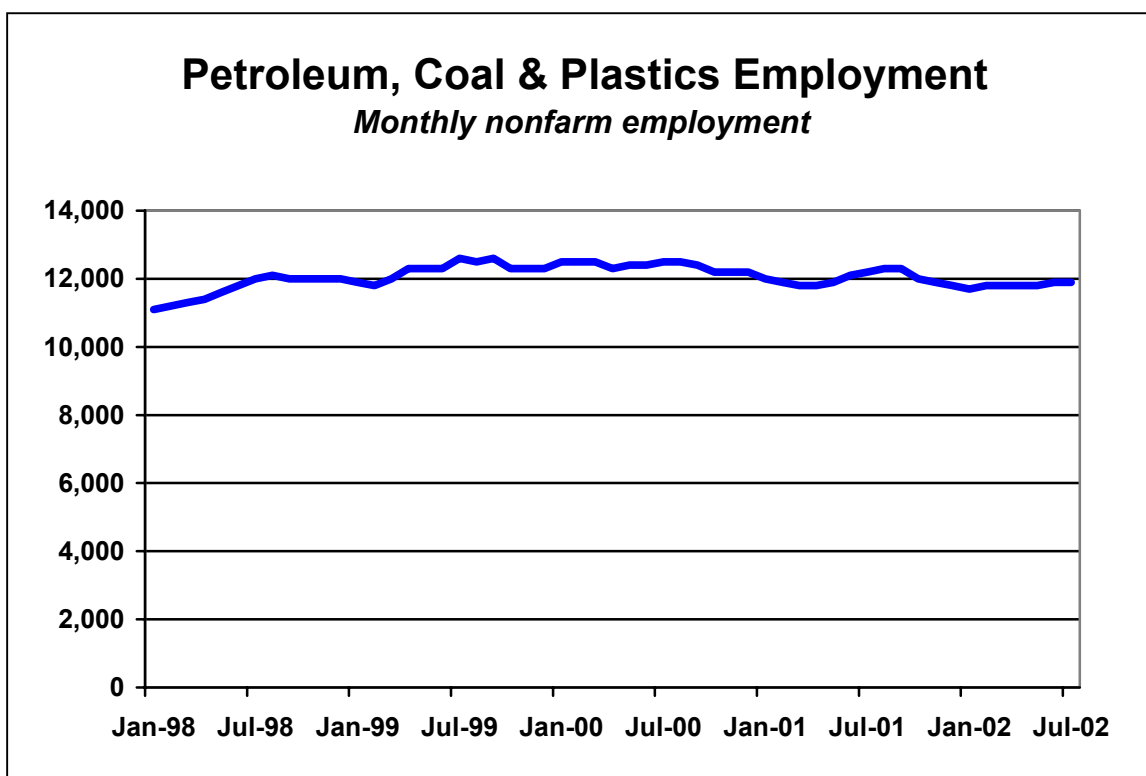
### Segment Detail

While data below is presented by detailed product line, in practice it is difficult to nail down plastics companies into a single specific industry, because many of them have a diverse array of products. Two of the larger employers in plastics film & sheet and plastics profile shapes make vinyl windows and doors (or “profiles” of windows and doors), and another specializes in traffic safety products. Both of these detailed industries enjoyed substantial employment growth during the 1990s, as did producers of plastic bottles, an increasingly popular substitute for glass. While employment in plumbing fixtures (spas and tub enclosures) and plastic foam for packaging declined, the loss of jobs in resins was due to coding issues. Most of the job growth, however, was in miscellaneous plastics products which includes firms producing a wide array of goods, including vinyl windows, truck parts, and many other specialized molded plastic parts.

<b>RUBBER &amp; PLASTICS EMPLOYMENT GROWTH</b>					
<b>SIC</b>	<b>Industry</b>	<b>1990</b>	<b>2000</b>	<b>Change</b>	<b>Growth</b>
30	Rubber And Plastics Products	6,786	9,936	3,150	46%
308	Miscellaneous Plastics Products	6,337	9,240	2,903	46%
3081	Unsupported plastics film & sheet	233	513	280	120%
3082	Unsupported plastics profile shapes	455	955	500	110%
3083	Laminated plastics plate & sheet	220	201	-19	-9%
3084	Plastics pipe	338	319	-19	-6%
3085	Plastics bottles	396	742	346	87%
3086	Plastics foam products	668	555	-113	-17%
3087	Custom compound purchased resins	313	216	-97	-31%
3088	Plastics plumbing fixtures	494	410	-84	-17%
3089	Miscellaneous plastics products	3,220	5,394	2,174	68%
	Rubber Products	449	696	247	55%

### **Trends, 2000 – Current**

On a percentage basis, rubber & plastics has been the manufacturing industry least impacted by the recession, dropping by only 600 jobs from its peak two years ago. Almost half of the loss was due to the closure of Triquest Plastics in Vancouver. The company had been a major supplier of molded printer cases to Hewlett-Packard, and was unsuccessful in diversifying its customers after H-P shifted printer production from Vancouver overseas in 1998.



## APPENDIX F: PRIMARY METALS

The primary metals industry includes mills and foundries that produce steel and steel products, and nonferrous (non-iron) metals and metal products such as aluminum.

### Status 2000

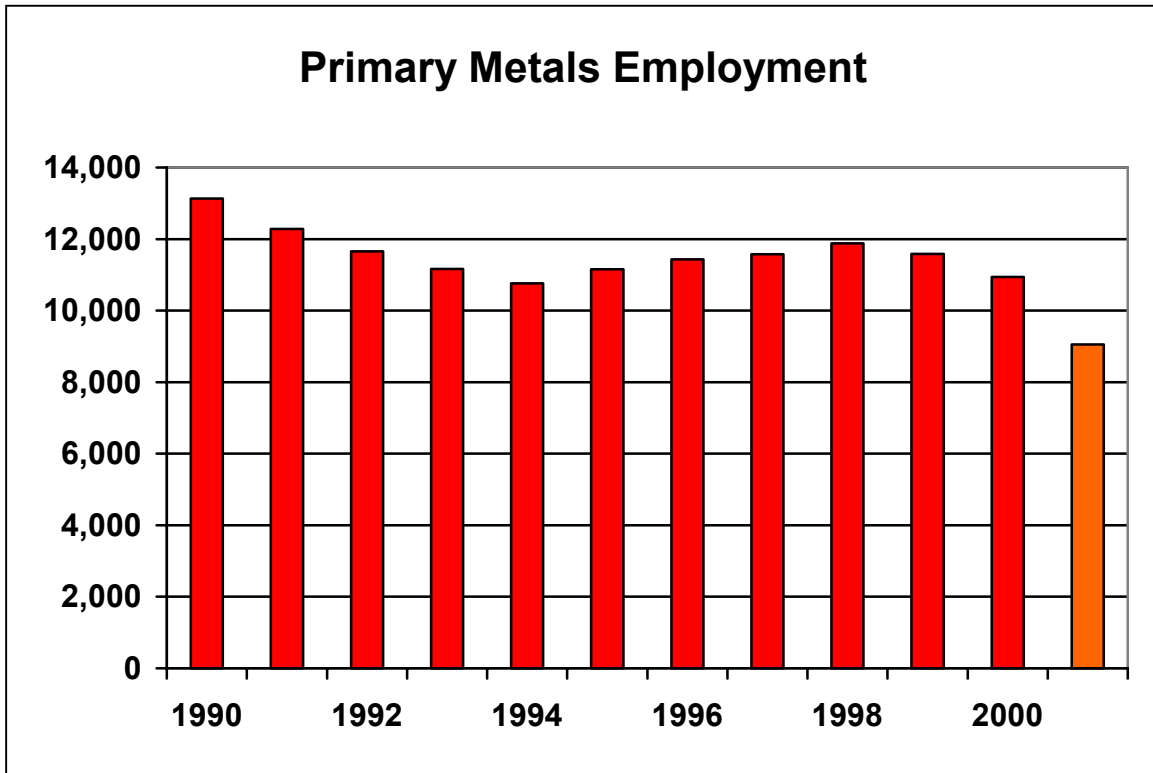
In the year 2000, the primary metals industry had:

- 115 firms, 1 percent of the state total for manufacturing
- 10,900 jobs, 3 percent of the state total
- Total payroll of \$510 million, 3 percent of the state total
- An average annual wage of \$46,600, just below the average for all of manufacturing, and 9 percent above the U.S. industry average
- Median hourly wage of \$19.35, 4 percent above the manufacturing median
- An average size of 104.9 for firms with employment, versus 44.1 for all of manufacturing

<b>PRIMARY METALS (SIC 33) IN WASHINGTON STATE, 2000</b>					
SIC	Industry	# Firms	Jobs	Payroll	Average Wage
33	Primary Metal Industries	115	10,937	\$510,022,609	\$46,633
3312	Blast furnaces and steel mills	6	390	\$23,652,930	\$60,649
3321	Iron foundries	7	361	\$9,566,618	\$26,500
3325	Other steel foundries	11	739	\$27,102,178	\$36,674
3334	Primary aluminum	11	4,812	\$233,024,289	\$48,426
3339	Other primary nonferrous metals	5	735	\$39,623,757	\$53,910
3353	Aluminum sheet, plate, and foil	7	1,106	\$60,444,135	\$54,651
3356	Other nonferrous rolling and drawing	4	908	\$38,928,966	\$42,873
	Other primary metals	64	1,886	\$77,679,736	\$41,188

### Trends, 1990 – 2000

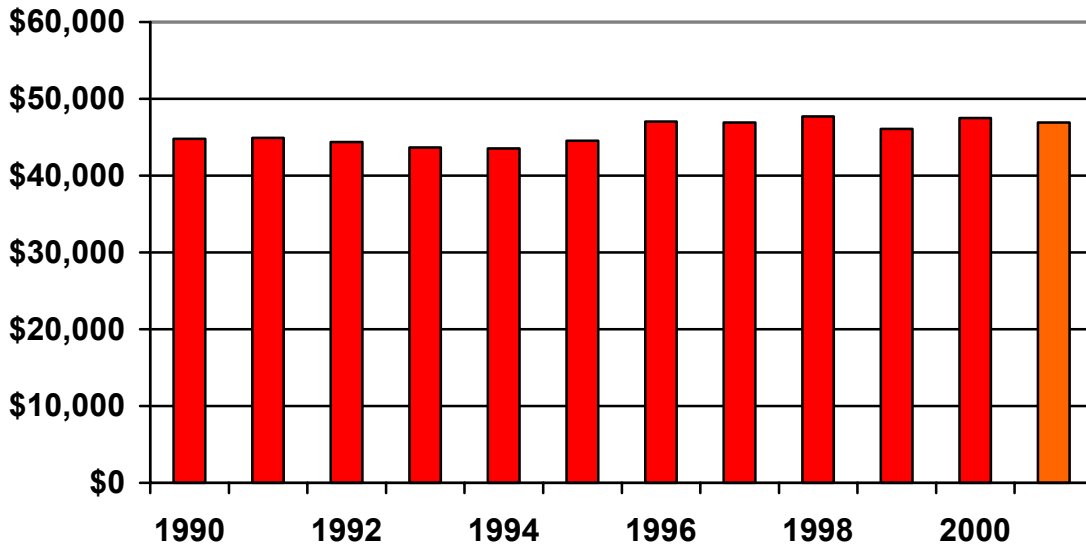
Between 1990 and 2000, one out of every six primary metals jobs in the state disappeared. Total employment fell from 13,100 to 10,900, a drop of 2,200 or 17 percent. Employment declined steadily from 1990 to 1994, rose modestly through 1998, and then slipped downward the next two years.



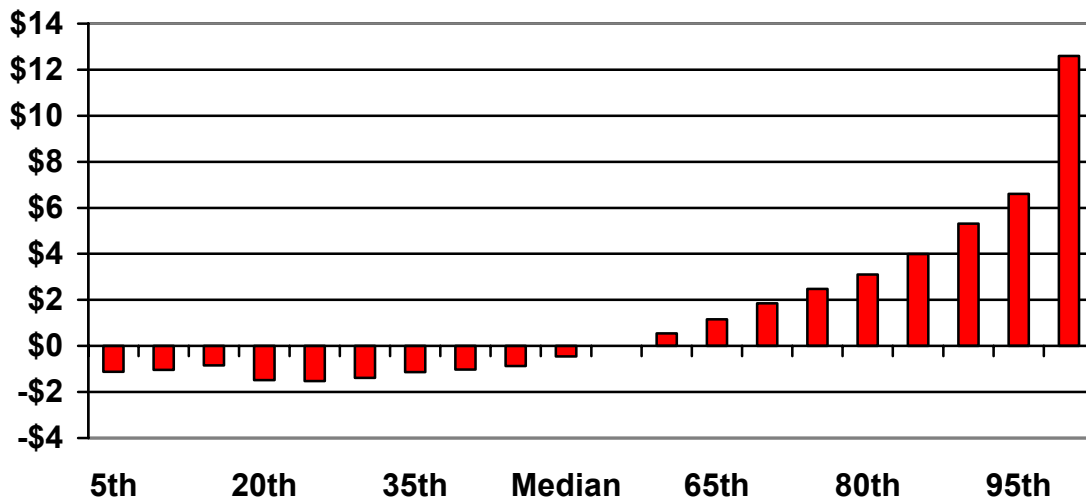
Real average wages began the decade at \$45,000, slid over the next few years as aluminum employment declined, before climbing to \$47,000 in 1996. There has been little change since then. The median hourly wage was \$19.80 in 1990, and was a bit volatile through the latter half of the decade before settling in at \$19.42 in 2000. Wage inequality increased over the decade, with lower wage jobs losing ground and higher wage jobs increasing in compensation.

The percentage of industry employment in large firms fell over the decade, bringing average firm size down from 146 to 105, still the third highest in the state after aerospace and paper.

### Rubber & Plastics Average Annual Wage *Adjusted for Inflation, 2001 is preliminary*



### Change in Median Hourly Wage by Percentile of Jobs, 1990-2000 *Adjusted for Inflation*



<b>PERCENT OF INDUSTRY EMPLOYMENT BY SIZE OF FIRM</b>			
<b># Employees</b>	<b>1990</b>	<b>2000</b>	<b>All of Manufacturing</b>
<b>1-9</b>	1%	1%	5%
<b>10-19</b>	1%	2%	5%
<b>20-49</b>	5%	6%	9%
<b>50-99</b>	8%	8%	10%
<b>100-249</b>	7%	10%	16%
<b>250-499</b>	10%	12%	9%
<b>500+</b>	69%	60%	47%
Average Size	146.0	104.9	44.1

### Geographic Detail

Spokane County has been the home of more than a quarter of the state's metal jobs. Cowlitz has maintained close to a 10 percent share, while King's percentage fell from 14 to 10 percent. Most counties lost metals jobs over the decade; Grant and Benton were two of the few that didn't.

<b>PRIMARY METALS EMPLOYMENT BY COUNTY</b>					
<b>County</b>	<b>1990</b>	<b>2000</b>	<b>Pct. of 2000</b>	<b>Change</b>	<b>Growth</b>
State	13,133	10,937	100%	-2,196	-17%
Spokane	3,580	3,171	29%	-409	-11%
Cowlitz	1,273	1,202	11%	-71	-6%
King	1,759	1,108	10%	-651	-37%
Pierce	1,082	642	6%	-440	-41%
Grant	NA	561	5%	NA	NA
Benton	NA	387	4%	NA	NA
Snohomish	193	164	1%	-29	-15%
Rest of State	4,729	3,702	34%	-1,027	-22%
NA = Not available due to confidentiality. Rest of state in 2000 does not include Grant and Benton.					

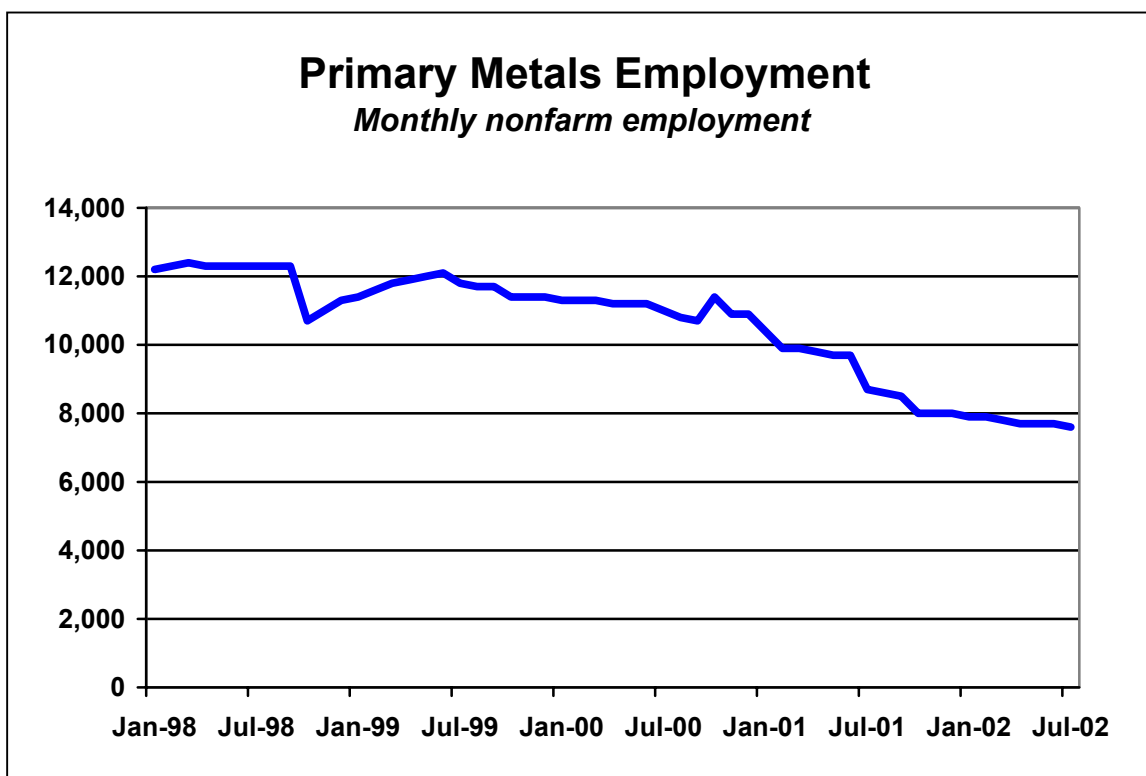
### Segment Detail

Aluminum smelters reduced payrolls by 1,200 jobs, and steel mill employment declined by almost 500 jobs after a closure. Much of the balance came in aluminum processing, following the closure of three different operations in Clark and Cowlitz counties early in the decade. On the plus side, a dozen new operations sprouted up with a variety of products.

<b>PRIMARY METALS (SIC 33) EMPLOYMENT GROWTH</b>					
<b>SIC</b>	<b>Industry</b>	<b>1990</b>	<b>2000</b>	<b>Change</b>	<b>Growth</b>
33	Primary Metal Industries	13,133	10,937	-2,196	-17%
3312	Blast furnaces and steel mills	867	390	-477	-55%
3321	Iron foundries	184	361	177	96%
3325	Other steel foundries	998	739	-259	-26%
3334	Primary aluminum	6045	4812	-1,233	-20%
3356	Other nonferrous rolling and drawing mills	742	908	166	22%
	Other primary metals	4,297	3,727	-570	-13%

### **Trends, 2000 – Current**

Primary metals employment began destabilizing in September 1998 (in part due to a labor dispute), and went into a nosedive in October 2000, when low aluminum prices and the spike in energy costs led to the shutdown of most of the smelters in the state. Industry employment plunged from 11,600 to 7,600 in July 2002. There continues to be speculation about which if any of the smelters will return to production. Several have changed ownership over the past year.



## APPENDIX G: FABRICATED METALS

The rubber & plastics industry in the state of Washington is mostly a diversified plastics industry, along with a relatively small amount of production of rubber products. Plastic products include vinyl windows, plastic sheets and films, laminated plastic, bottles, resins, foam, pipes, plumbing fixtures (mainly hot tubs and tub/showers) and a wide range of molded plastic products.

### Status 2000

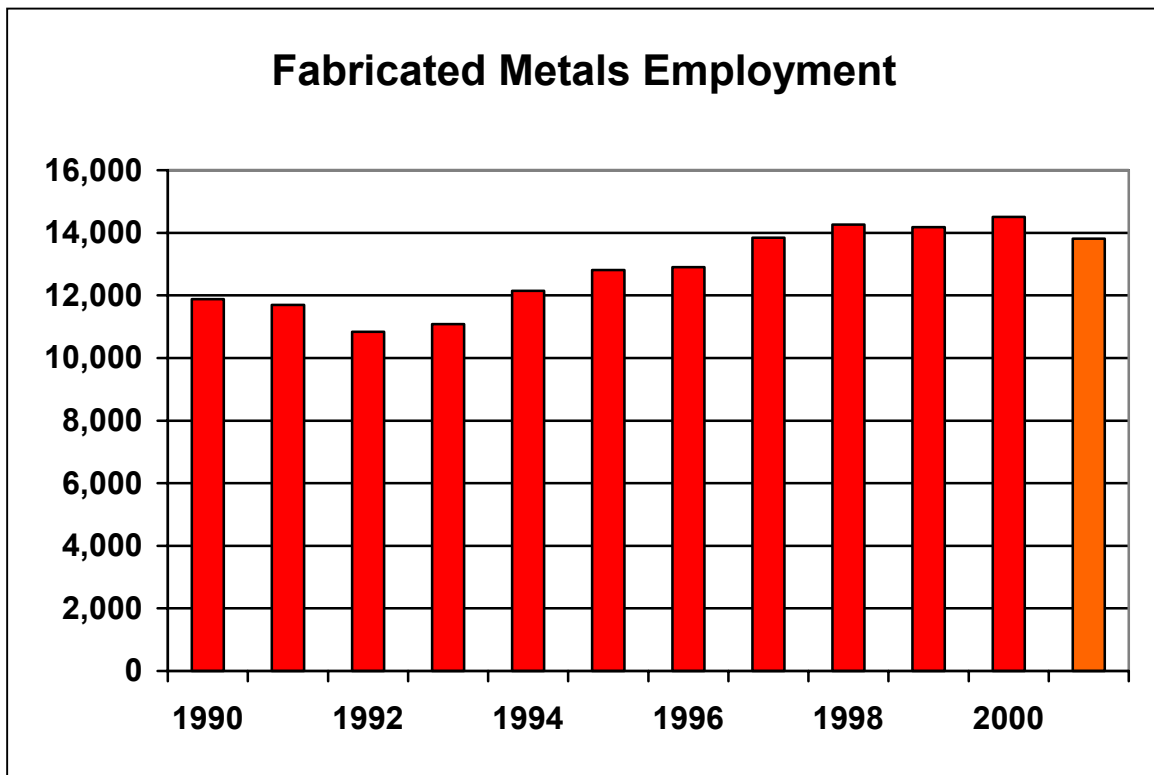
In the year 2000, the rubber & plastics industry had:

- 661 firms, 7 percent of the state total for manufacturing
- 14,500 jobs, 4 percent of the state total
- Total payroll of \$489 million, 3 percent of the state total
- An average annual wage of \$33,700, 28 percent below the average for all of manufacturing, and 6 percent below the U.S. industry average
- Median hourly wage of \$14.40, 23 percent below the manufacturing median
- An average size of 24.5 for firms with employment, versus 44.1 for all of manufacturing

<b>FABRICATED METALS (SIC 34) IN WASHINGTON STATE, 2000</b>					
SIC	Industry	# Firms	Jobs	Payroll	Average Wage
34	Fabricated Metal Products	661	14,502	\$488,863,922	\$33,710
341	Metal cans and shipping containers	*	*	*	*
3411	Metal cans	7	495	\$24,688,874	\$49,877
342	Cutlery, hand tools, and hardware	*	*	*	*
343	Plumbing and heating, except electric	13	839	\$29,471,966	\$35,127
3433	Heating equipment, except electric	13	839	\$29,471,966	\$35,127
344	Fabricated structural metal products	358	7,757	\$262,453,437	\$33,834
3441	Fabricated structural metal	78	1,587	\$59,769,899	\$37,662
3442	Metal doors, sash, and trim	28	1,140	\$36,822,024	\$32,300
3443	Fabricated plate work (boiler shops)	34	753	\$28,793,673	\$38,239
3444	Sheet metalwork	110	2,887	\$89,609,616	\$31,039
3446	Architectural metal work	83	798	\$25,196,008	\$31,574
3448	Prefabricated metal buildings	16	508	\$19,205,006	\$37,805
345	Screw machine products, bolts, etc.	*	*	*	*
346	Metal forgings and stampings	33	943	\$32,039,570	\$33,976
3469	Misc. metal stampings	26	754	\$22,757,250	\$30,182
347	Metal services	103	1,988	\$58,462,897	\$29,408
3471	Plating and polishing	53	1,196	\$38,115,648	\$31,869
3479	Metal coating and allied services	51	790	\$20,445,445	\$25,880
348	Ordnance and accessories	*	*	*	*
349	Misc. fabricated metal products	*	*	*	*
3494	Valves and pipe fittings	11	539	\$19,910,942	\$36,941
3496	Misc. fabricated wire products	20	431	\$16,683,245	\$38,708
	Other fabricated metal products	116	1,510	\$45,152,991	\$29,903

## Trends, 1990 – 2000

Industry employment was 11,900 in 1990, dropped to 10,800 in 1992, but then climbed steadily to a peak of 14,500 in 2000. The net gain was 2,600 jobs (+22 percent). Nationally, fabricated metals employment rose by 8 percent over the same period.



Real average annual wages began the decade at \$32,100, changed little through 1996, and then jumped to \$34,000 over the next two years. Wages have drifted downward since then, but preliminary 2001 data show another increase. The median hourly wage moved only a penny, from \$14.41 to \$14.40, with small increases at the lower end of the wage scale and declines at the upper end.

Employment by size of employer changed during the 1990s. The industry has relatively more small and mid-sized firms than manufacturing as a whole.

<b>PERCENT OF INDUSTRY EMPLOYMENT BY SIZE OF FIRM</b>			
<b># Employees</b>	<b>1990</b>	<b>2000</b>	<b>All of Manufacturing</b>
<b>1-9</b>	10%	9%	5%
<b>10-19</b>	10%	10%	5%
<b>20-49</b>	24%	21%	9%
<b>50-99</b>	14%	17%	10%
<b>100-249</b>	25%	28%	16%
<b>250+</b>	17%	15%	55%
Average Size	22.9	24.5	44.1

### **Geographic Detail**

The decade was marked by the growth of metal fabrication employment in most urban counties, with the glaring exception of King County. King dropped from 52 percent to 38 percent of statewide industry employment.

<b>METAL FABRICATION EMPLOYMENT BY COUNTY</b>					
<b>County</b>	<b>1990</b>	<b>2000</b>	<b>Pct. of 2000</b>	<b>Change</b>	<b>Growth</b>
State	11,878	14,502	100%	2,624	22%
King	6,227	5,462	38%	-765	-12%
Snohomish	1,361	1,912	13%	551	40%
Pierce	1,017	1,637	11%	620	61%
Spokane	1,077	1,540	11%	463	43%
Clark	542	1,350	9%	808	149%
Yakima	360	862	6%	502	139%
Whatcom	84	392	3%	308	367%
Thurston	306	258	2%	-48	-16%
Skagit	21	250	2%	229	1090%
Rest of State	883	839	6%	-44	-5%

### **Segment Detail**

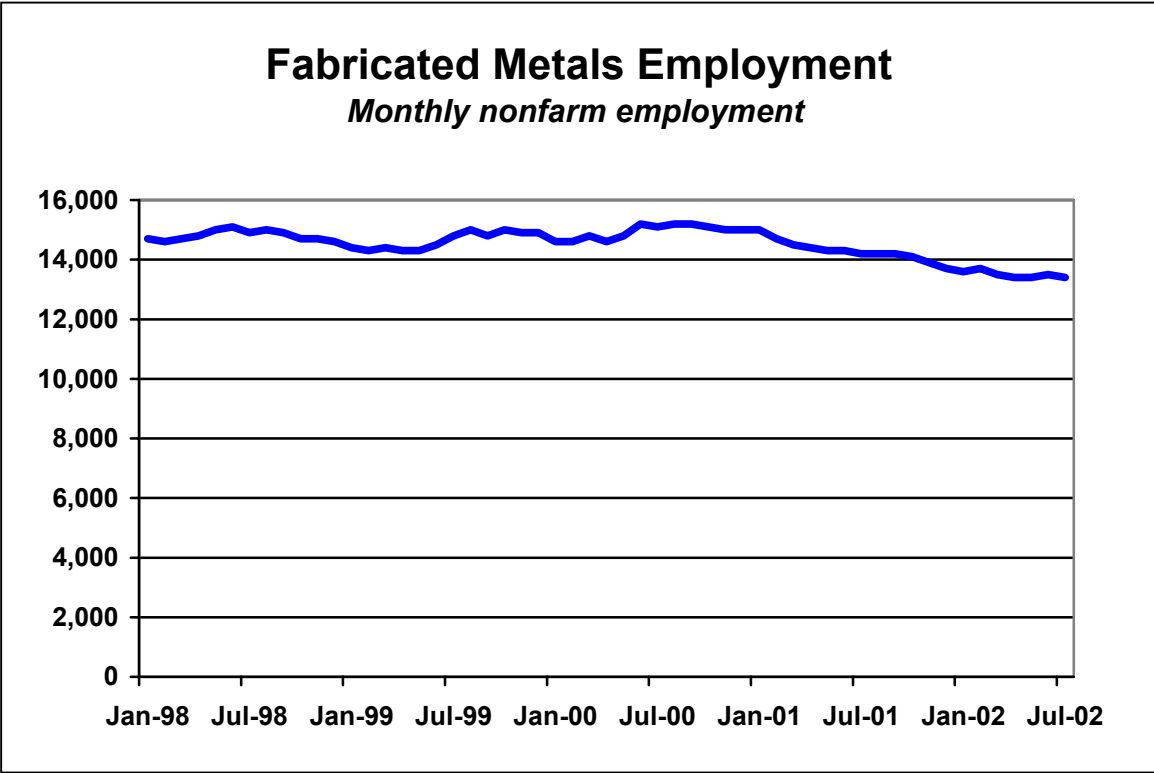
While metal fabrication as a whole enjoyed a 22 percent increase in employment, not all product lines expanded. Metal can employment dropped by a third, as canned goods shifted to different packaging. Jobs at metal door production facilities dropped by a similar amount, as vinyl grabbed market share.

On the plus side, fabricated sheet metal producers more than doubled their workforce, adding 1,800 jobs. Architectural metal work, such as railings, and structural metalwork also expanded, as did heating equipment (which includes woodstoves), and metal services such as polishing, plating, and coating.

<b>METAL FABRICATION EMPLOYMENT GROWTH</b>					
<b>SIC</b>	<b>Industry</b>	<b>1990</b>	<b>2000</b>	<b>Change</b>	<b>Growth</b>
34	Fabricated Metal Products	11,878	14,502	2,624	22%
341	Metal cans and shipping containers	909	595	-314	-35%
3411	Metal cans	870	495	-375	-43%
342	Cutlery, hand tools, and hardware	469	588	119	25%
343	Plumbing and heating, except electric	518	839	321	62%
3433	Heating equipment, except electric	462	839	377	82%
344	Fabricated structural metal products	5,735	7,757	2,022	35%
3441	Fabricated structural metal	1,221	1,587	366	30%
3442	Metal doors, sash, and trim	1,563	1,140	-423	-27%
3443	Fabricated plate work (boiler shops)	1,040	753	-287	-28%
3444	Sheet metalwork	1,086	2,887	1,801	166%
3446	Architectural metal work	382	798	416	109%
3448	Prefabricated metal buildings	242	508	266	110%
345	Screw machine products, bolts, etc.	275	152	-123	-45%
346	Metal forgings and stampings	1,120	943	-177	-16%
3469	Misc. metal stampings	762	754	-8	-1%
347	Metal services	1,074	1,988	914	85%
3471	Plating and polishing	662	1,196	534	81%
3479	Metal coating and allied services	412	790	378	92%
348	Ordnance and accessories	62	108	46	74%
349	Misc. fabricated metal products	1,716	1,533	-183	-11%
3494	Valves and pipe fittings	543	539	-4	-1%
3496	Misc. fabricated wire products	434	431	-3	-1%
	Other fabricated metal products	1,584	1,510	-74	-5%

### Trends, 2000 – Current

After hovering around 15,000 jobs for the 1998-2000 period, fabricated metal employment began dropping in January 2001. By July 2002, payrolls were down to 13,600. Of the 1,400 jobs lost, about 500 were in Snohomish, and another 300 were in King.



## APPENDIX H: INDUSTRIAL MACHINERY & COMPUTER EQUIPMENT

Industrial machinery & computer equipment includes the production of engines and turbines; machinery for farms, construction, metalworking, industrial use, and refrigeration; computers and peripherals such as printers; and machine shops that do custom jobs.

<b>INDUSTRIAL MACHINERY &amp; COMPUTER EQUIPMENT (SIC 35) IN WASHINGTON STATE, 2000</b>					
<b>SIC</b>	<b>Industry</b>	<b># Firms</b>	<b>Jobs</b>	<b>Payroll</b>	<b>Average Wage</b>
35	Industrial Machinery & Computer Equipment	1,031	24,552	\$1,315,332,894	\$53,573
351	Engines And Turbines	NA	NA	NA	NA
352	Farm And Garden Machinery	NA	NA	NA	NA
3523	Farm Machinery And Equipment	32	612	\$23,881,076	\$39,021
353	Construction And Related Machinery	80	4,158	\$182,521,257	\$43,896
3531	Construction Machinery	38	3,501	\$156,356,266	\$44,660
354	Metalworking Machinery	97	1,843	\$73,622,894	\$39,947
3544	Special Dies, Tools, Jigs & Fixtures	56	785	\$30,746,753	\$39,168
355	Special Industry Machinery	NA	NA	NA	NA
3553	Woodworking Machinery	15	480	\$21,764,337	\$45,342
3554	Paper Industries Machinery	11	806	\$35,009,370	\$43,436
3556	Food Products Machinery	27	1,232	\$47,073,251	\$38,209
3559	Other Special Industry Machinery	36	1,179	\$48,160,312	\$40,848
356	General Industrial Machinery	58	1,419	\$64,578,664	\$45,510
357	Computer And Office Equipment	63	6,189	\$588,214,335	\$95,042
3571	Electronic Computers	27	2,519	\$326,545,722	\$129,633
3577	Computer Peripheral Equipment, Nec	29	3,538	\$253,122,569	\$71,544
358	Refrigeration And Service Machinery	46	1,285	\$44,168,525	\$34,372
	All Other Machinery	566	5,349	\$186,338,873	\$34,836

NA = Confidential data

## Status 2000

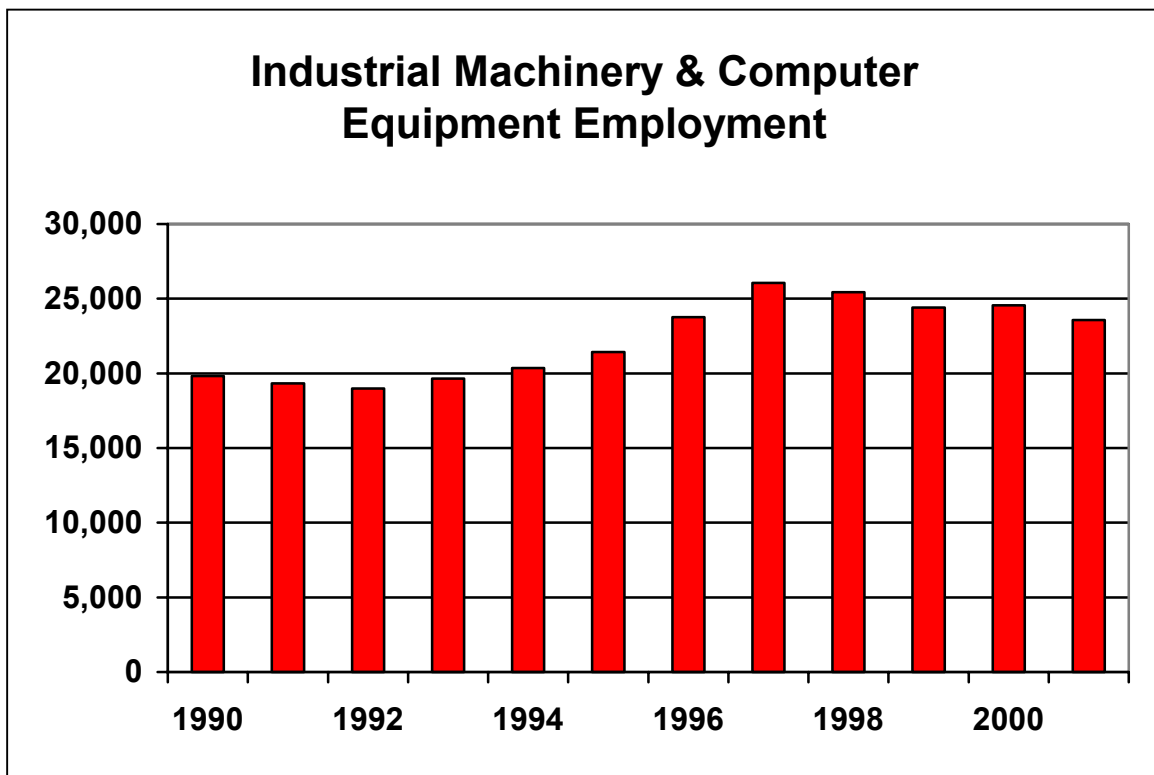
In the year 2000, the machinery & computer industry had:

- 1,030 firms, 11 percent of all manufacturing firms in the state
- 24,600 employees, 7 percent of the state total for manufacturing
- Total payroll of \$1.3 billion, 8 percent of the state total for manufacturing
- An annual average wage of \$53,600, 14 percent above the average for all of manufacturing
- A median hourly wage of \$18.36, just below the manufacturing average
- An average firm size of 26.8, far below the 44.1 for all manufacturing firms.

The industry was moderately concentrated in 2000; 22 percent of jobs were in firms with over 1,000 employees, while 17 percent were in firms with less than 20 workers.

## Trends, 1990 – 2000

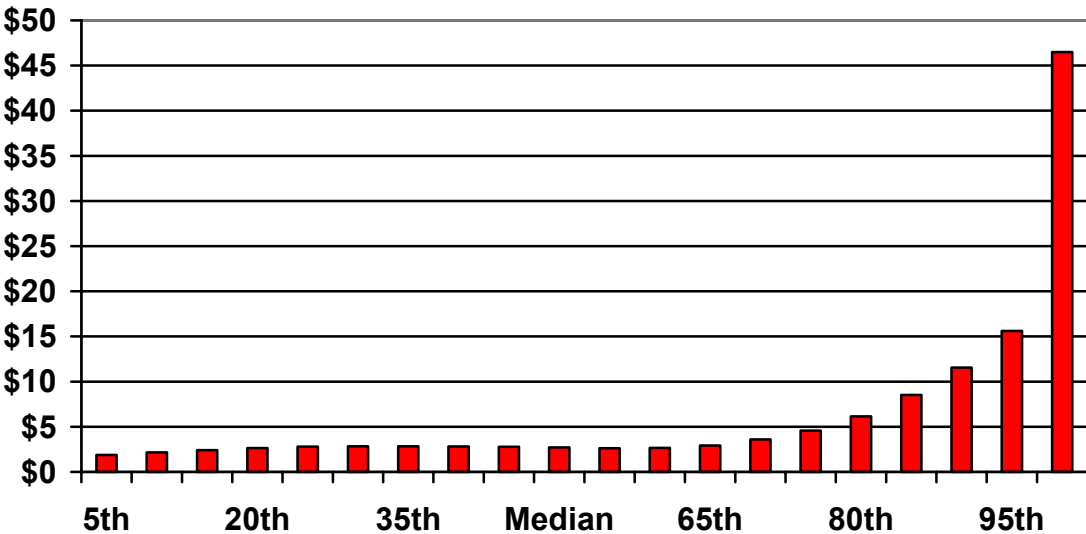
Machinery industry employment grew by 24 percent during the 1990s, increasing from 19,800 to 24,600. The state fared much better than the nation, which had only a 0.7 percent expansion. Job counts peaked at 26,000 in 1997. Much of the subsequent decline could be attributed to Hewlett-Packard's shift of printer production overseas.





The number of employers followed a similar trend, growing from 776 in 1990 to 1,031 in 2000, but peaking along the way at 1,139 in 1998. Real average wages have trended upward from \$37,100 in 1990 to \$54,600 in 2000. The median hourly wage rose substantially from \$15.65 in 1990 to \$18.36 in 2000, a gain of 17%. Employment by size of firm changed little over the decade, with the average size remaining at 27 workers.

### Change in Median Hourly Wage by Percentile of Jobs, Adjusted for Inflation



<b>PERCENT OF INDUSTRY EMPLOYMENT BY SIZE OF FIRM</b>				
<b># Employees</b>	<b>1990</b>	<b>2000</b>	<b>All of Manufacturing</b>	
<b>1-9</b>	8%	9%	5%	
<b>10-19</b>	7%	8%	5%	
<b>20-49</b>	16%	13%	9%	
<b>50-99</b>	13%	15%	10%	
<b>100-249</b>	20%	18%	16%	
<b>250+</b>	36%	37%	9%	
<b>Average Size</b>	27.4	26.8	44.1	

### **Geographic Detail**

In 2000, King County was home to more than 9,100 machinery jobs, or 37 percent of the state total. The county's industry growth rate just about matched the state for the past decade. Pierce and Clark each added more than 1,000 jobs. Spokane lost more than a third of its jobs, and Grays Harbor more than half.

<b>INDUSTRIAL MACHINERY &amp; COMPUTERS EMPLOYMENT BY COUNTY</b>					
<b>County</b>	<b>1990</b>	<b>2000</b>	<b>Pct. of 2000</b>	<b>Change</b>	<b>Growth</b>
State	19,820	24,552	100%	4,732	24%
King	7,428	9,124	37%	1,696	23%
Clark	2,174	3,420	14%	1,246	57%
Spokane	4,569	2,848	12%	-1,721	-38%
Snohomish	1,793	2,498	10%	705	39%
Pierce	1,005	2,470	10%	1,465	146%
Yakima	568	744	3%	176	31%
Walla Walla	201	603	2%	402	200%
Cowlitz	320	571	2%	251	78%
Whatcom	177	456	2%	279	158%
Skagit	244	423	2%	179	73%
Grays Harbor	670	323	1%	-347	-52%
Rest of State	671	1,072	4%	401	60%

### **Segment Detail**

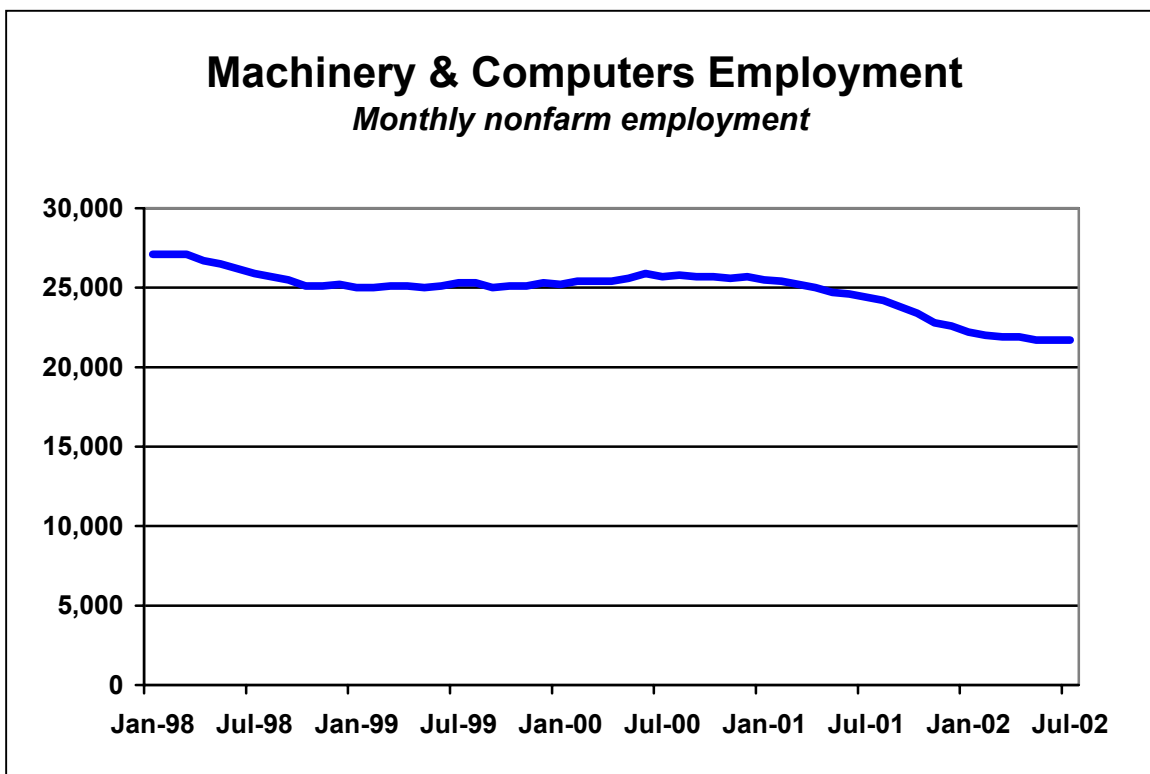
Most segment of the machinery industry grew rapidly during the 1990s. The exceptions were machinery related to the timber industry, and the volatile computer peripherals line. Farm & garden machinery is composed of 30+ number of small employers. This segment expanded rapidly through a combination of new firms and expansions. Construction machinery nearly doubled in size over the decade. Much of the growth was driven by one firm, and most of the new jobs were in King County. Metalworking machinery's expansion was more modest, and more diversified. Most of the segment's new jobs were in King and Spokane. Woodworking

and paper industries machinery both declined with the retrenchments in their respective client industries. Food products machinery expanded, however, in part due to the relocation of Key Technology from northeast Oregon across the border to Walla Walla. General industrial machinery, such as pumps, compressors, fans, and so on, grew by half, mostly through expansions of existing small firms. Intel's new plan in DuPont helped push employment in electronic computers up by 700 jobs, or almost 40 percent. Computer peripherals was the most volatile segment, climbing by 1,400 jobs before falling by 2,000 after 1996. The rise and fall of Hewlett-Packard's domestic printer production strategy, and the decline of Keytronics, were the dominant developments. Finally, service industry machinery vendors more than doubled their employment. Part of the impetus came from the relocation of Landa Industries, makers of carwash equipment, from Portland to Vancouver.

<b>INDUSTRIAL MACHINERY &amp; COMPUTERS (SIC 35) EMPLOYMENT GROWTH</b>					
<b>SIC</b>	<b>Industry</b>	<b>1990</b>	<b>2000</b>	<b>Change</b>	<b>Growth</b>
35	Industrial Machinery & Computer Equipment	19,820	24,552	4,732	24%
351	Engines And Turbines	NA	NA	NA	NA
352	Farm And Garden Machinery	NA	NA	NA	NA
3523	Farm Machinery And Equipment	474	612	138	29%
353	Construction And Related Machinery	2,892	4,158	1,266	44%
3531	Construction Machinery	1,934	3501	1,567	81%
354	Metalworking Machinery	1,441	1,843	402	28%
3544	Special Dies, Tools, Jigs & Fixtures	579	785	206	36%
355	Special Industry Machinery	NA	NA	NA	NA
3553	Woodworking Machinery	734	480	-254	-35%
3554	Paper Industries Machinery	1049	806	-243	-23%
3556	Food Products Machinery	529	1232	703	133%
3559	Other Special Industry Machinery	645	1179	534	83%
356	General Industrial Machinery	951	1,419	468	49%
357	Computer And Office Equipment	6,358	6,189	-169	-3%
3571	Electronic Computers	1819	2519	700	38%
3577	Computer Peripheral Equipment	4319	3538	-781	-18%
358	Refrigeration And Service Machinery	617	1,285	668	108%
	All Other Machinery	4,130	5,349	1,219	30%
NA = Confidential data.					

## Trends, 2000 – Current

Anticipating the recession, machinery employment began to decline in June 2000, and by July 2002 had dropped by 4,300 jobs to an estimated 21,600—the lowest since April 1995. King, Spokane, and Clark appear to be the counties hit the hardest. About 500 of those jobs were in the computer and office equipment segment. Nationally, employment decreased by about the same percentage. Preliminary data for 2001 indicate that the average annual wage, which jumped by nearly \$6,000 in 2000, fell by almost that amount in 2001.



## APPENDIX I: ELECTRONIC EQUIPMENT

### Description

Companies in the electronic equipment industry make a wide variety of goods, ranging from electrical motors to appliances, lights, audio/video products, telecom equipment, and electronic components such as semiconductors.

### Status 2000

In the year 2000, the electronics industry had:

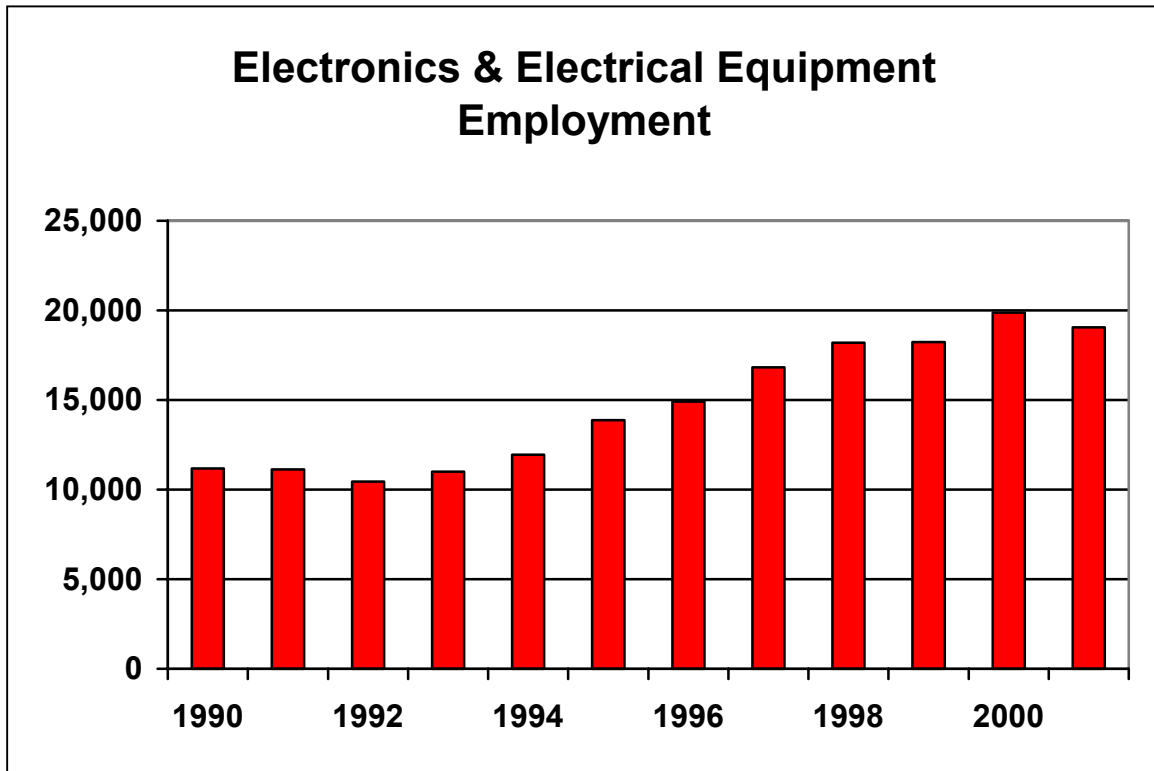
- 349 electronics firms, 4 percent of the state total for manufacturing
- 19,900 jobs, 6 percent of the state total
- Total payroll of \$858,112,774, 5 percent of the state total
- An average annual wages of \$43,200, 8 percent below the average for all of manufacturing, and 95 percent of the U.S. industry average
- Median hourly wage of \$13.98, 25 percent below the manufacturing median
- Average size of firms with employment: 60.1, versus 44.1 for all of manufacturing

The industry was quite concentrated in 2000; 20 percent of jobs were in firms with over 1,000 employees, while only 6 percent were in firms with less than 20 workers.

ELECTRONIC EQUIPMENT (SIC 36) IN WASHINGTON STATE, 2000					
SIC	Industry	# Firms	Jobs	Payroll	Average Wage
36	Electronic & Electrical Equipment	349	19,867	\$858,112,774	\$43,193
361	Electric Distribution Equipment	16	279	\$11,898,887	\$42,648
3612	Transformers, Except Electronic	5	114	\$5,427,807	\$47,612
3613	Switchgear And Switchboard Apparatus	11	165	\$6,471,080	\$39,219
362	Electrical Industrial Apparatus	NA	NA	NA	NA
3629	Electrical Industrial Apparatus	13	1,279	\$54,888,241	\$42,915
363	Household Appliances	NA	NA	NA	NA
3634	Electric Housewares And Fans	6	738	\$43,893,006	\$59,476
364	Electric Lighting And Wiring Equipment	31	1,077	\$31,545,576	\$29,290
365	Household Audio And Video Equipment	40	1,740	\$55,861,932	\$32,105
3651	Household Audio And Video Equipment	26	1,636	\$51,944,388	\$31,751
366	Communications Equipment	54	3,849	\$198,165,989	\$51,485
3661	Telephone And Telegraph Apparatus	21	1,849	\$80,970,178	\$43,791
3663	Radio & TV Communications Equipment	23	1,737	\$105,201,717	\$60,565
367	Electronic Components	116	9,620	\$413,264,730	\$42,959
3672	Printed Circuit Boards	34	2,287	\$82,548,153	\$36,095
3674	Semiconductors	28	3,717	\$208,446,169	\$56,079
3679	Other Electronic Components	42	2,230	\$87,076,949	\$39,048
	All Other Electronic Equipment	73	1,285	\$48,594,413	\$37,817
NA = Confidential data					

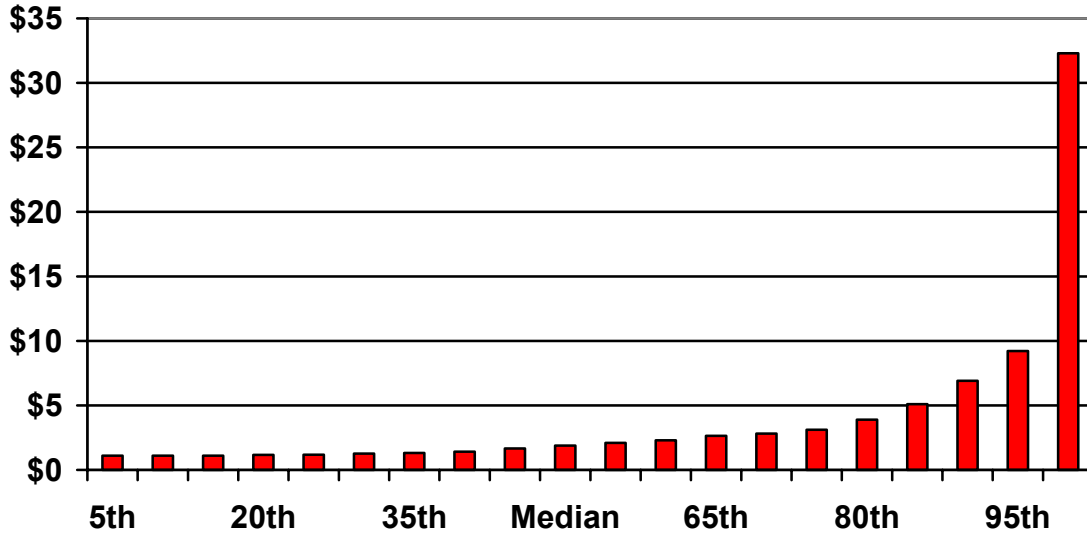
## Trends, 1990 – 2000

Electronics employment expanded by 78 percent during the 1990s, easily the fastest growth rate among manufacturing industries, and far greater than the national rate of 2 percent. Employment statewide rose from 11,200 to 19,900. Electronic components, especially semiconductors, and telecom equipment accounted for a majority of the new jobs. The number of employers increased at a slower rate, moving from 314 to 349.

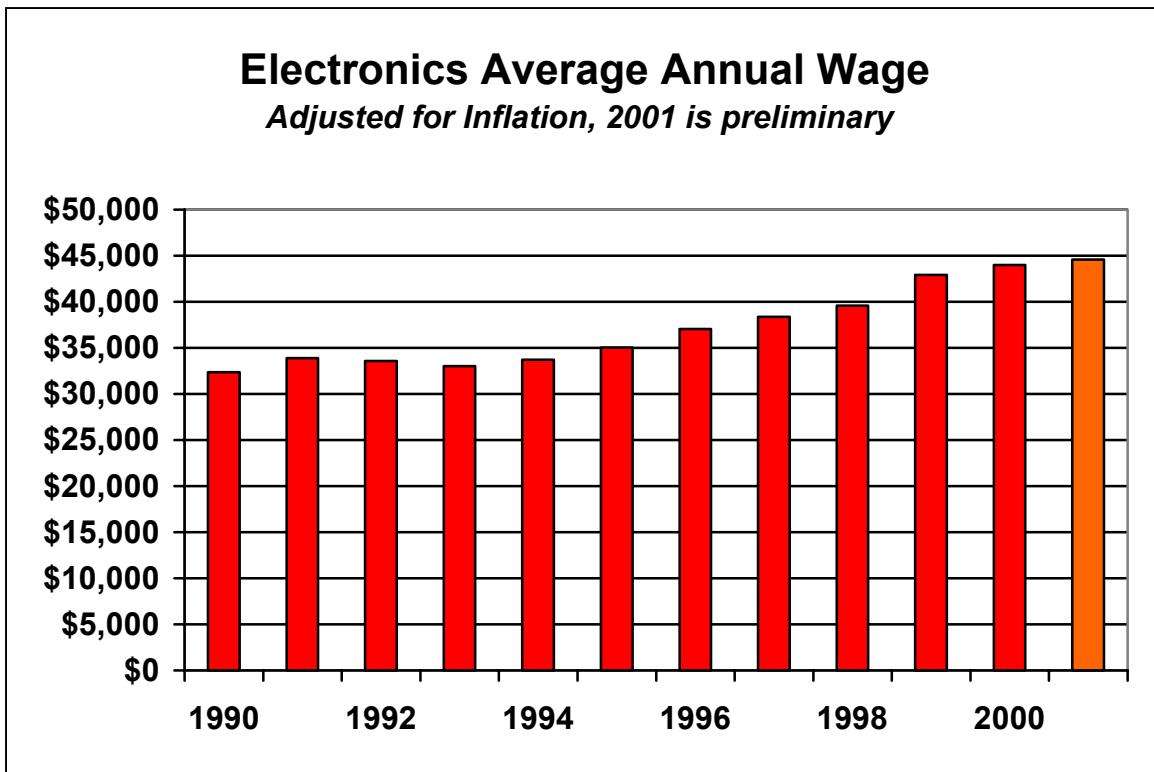


After stagnating early in the decade, real average wages accelerated, growing by 36 percent from \$31,800 to \$43,200. The median hourly wage gained 16 percent, rising from \$12.09 in 1990 to \$13.98 in 2000, but still lagged the median for all of manufacturing. Wage gains were roughly equal for the lower-paid 80 percent of workers, but were substantially higher for the better-paid 20 percent.

## Change in Median Hourly Wage by Percentile of Jobs, Adjusted for Inflation



## Electronics Average Annual Wage *Adjusted for Inflation, 2001 is preliminary*



Employment by size of firm shifted markedly towards larger establishments, with average size increasing from 38 to 60 workers.

<b>PERCENT OF INDUSTRY EMPLOYMENT BY SIZE OF FIRM</b>			
<b># Employees</b>	<b>1990</b>	<b>2000</b>	<b>All of Manufacturing</b>
<b>1-9</b>	5%	3%	5%
<b>10-19</b>	4%	3%	5%
<b>20-49</b>	10%	8%	9%
<b>50-99</b>	17%	10%	10%
<b>100-249</b>	23%	20%	16%
<b>250-499</b>	19%	13%	9%
<b>500+</b>	22%	43%	47%
<b>Average Size</b>	38.7	60.1	44.1

### **Geographic Detail**

The electronics industry is concentrated in a handful of counties; four of them contained almost 90 percent of electronics jobs in 2000.

<b>ELECTRONICS EMPLOYMENT BY COUNTY</b>					
<b>County</b>	<b>1990</b>	<b>2000</b>	<b>Pct. of 2000</b>	<b>Change</b>	<b>Growth</b>
State	11,178	19,867	100%	8,689	78%
King	4,863	7,501	38%	2,638	54%
Clark	2,402	4,956	25%	2,554	106%
Spokane	1,057	3,009	15%	1,952	185%
Snohomish	1,013	2,238	11%	1,225	121%
Whatcom	486	354	2%	-132	-27%
Rest of State	1,357	1,809	9%	452	33%

### **Segment Detail**

Growth rates among segments in the electronics industry varied wildly during the 1990s. Because many segments of the industry are dominated by one or two larger firms, not much detail can be publicly released.

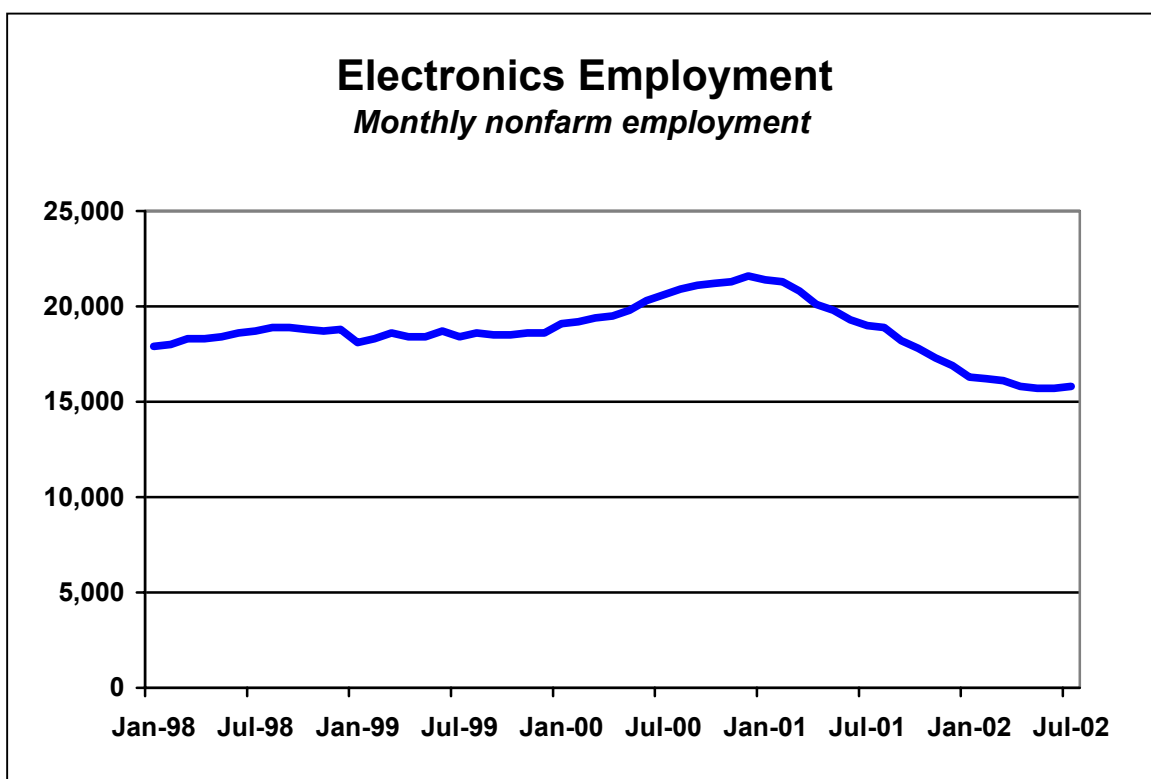
Electronic components added the most jobs of any segment during the 1990s. Sixty percent of new jobs—2,200 out of 3,700—occurred in Clark County, as production of silicon wafers, semiconductors, and components expanded at firms like SHE, Wafertech, and AVX/Kyocera. Communication equipment was the other large source of employment gains. Just over a third of the new jobs were located in King County. Employment in electric distribution equipment was largely unchanged over the decade. Miscellaneous industrial apparatus doubled its payrolls, adding nearly 700 jobs, while electric housewares & fans expanded by almost 600 jobs. Growth

was much more modest in electric lighting & wiring equipment. Employment in household audio and video equipment rose by 700 jobs or 70 percent, however

<b>INDUSTRIAL MACHINERY &amp; COMPUTERS (SIC 36) EMPLOYMENT GROWTH</b>					
<b>SIC</b>	<b>Industry</b>	<b>1990</b>	<b>2000</b>	<b>Change</b>	<b>Growth</b>
36	Electronic & Electrical Equipment	11,178	19,867	8,689	78%
361	Electric Distribution Equipment	285	279	-6	-2%
3612	Transformers, Except Electronic	93	114	21	23%
3613	Switchgear And Switchboard Apparatus	192	165	-27	-14%
362	Electrical Industrial Apparatus	NA	NA	NA	NA
3629	Misc. Electrical Industrial Apparatus	611	1,279	668	109%
363	Household Appliances	NA	NA	NA	NA
3634	Electric Housewares And Fans	165	738	573	347%
364	Electric Lighting And Wiring Equipment	985	1,077	92	9%
365	Household Audio And Video Equipment	1015	1,740	725	71%
3651	Household Audio And Video Equipment	982	1,636	654	67%
366	Communications Equipment	1328	3,849	2,521	190%
3661	Telephone And Telegraph Apparatus	863	1,849	986	114%
3663	Radio & TV Communications Equipment	346	1,737	1,391	402%
367	Electronic Components	5958	9,620	3,662	61%
3672	Printed Circuit Boards	1540	2,287	747	49%
3674	Semiconductors	2627	3,717	1,090	41%
3679	Other Electronic Components	1172	2,230	1,058	90%
	All Other Electronic Equipment	831	1,285	454	55%
NA = Confidential data.					

## Trends, 2000 – Current

Electronics employment in the state of Washington peaked in December 2000, at 21,600, and has fallen by 5,800 jobs since then, or 27 percent. The percentage drop nationally has been considerable but a bit less at 19 percent, as a global slump in high tech has slammed the semiconductor industry. Clark County has lost 1,900 jobs, with one large closure at 800 jobs, while King County has lost 1,300 and Snohomish 400. Current estimates are not available for Spokane County, but it is likely that the decline there has been over 1,000 jobs.



## APPENDIX J: TRANSPORTATION EQUIPMENT

### Description

Companies in the transportation equipment industry make a wide variety of goods, ranging from electrical motors to appliances, lights, audio/video products, telecom equipment, and electronic components such as semiconductors.

### Status 2000

In the year 2000, the transportation equipment industry had:

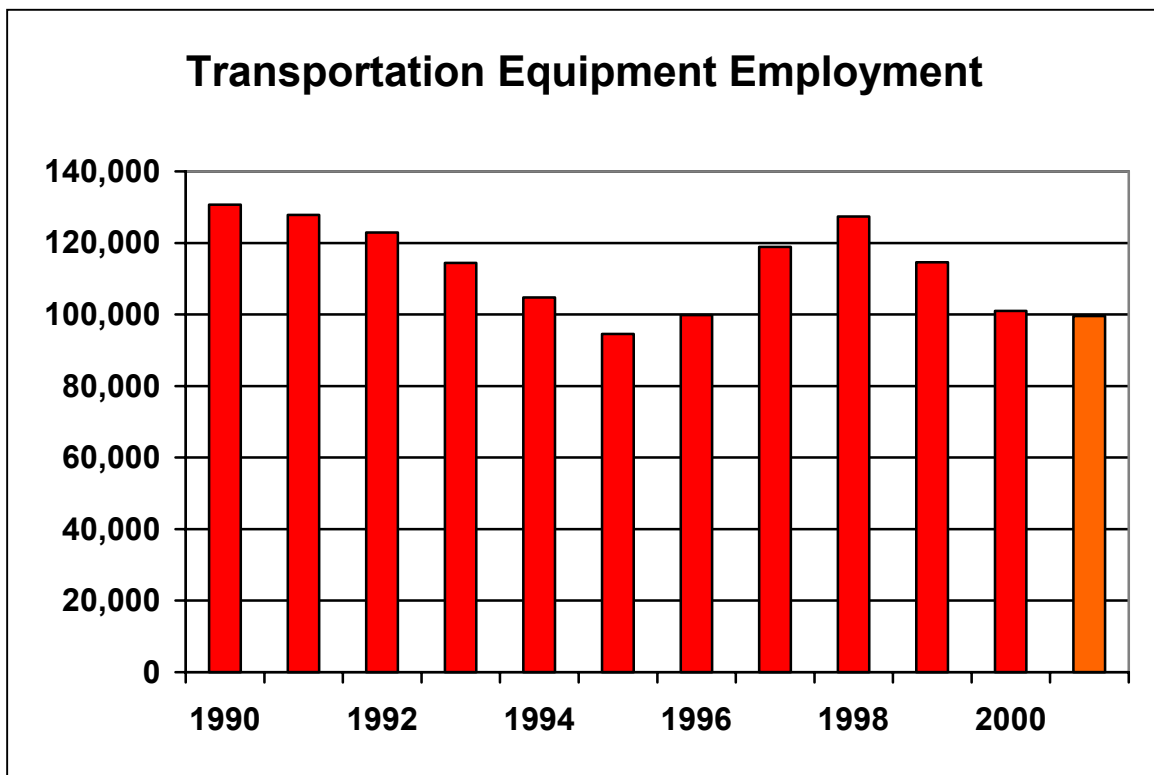
- 679 firms, 7 percent of the state total for manufacturing
- 101,000 jobs, 29 percent of the state total
- Total payroll of \$5.9 billion, 37 percent of the state total
- An average annual wages of \$58,900, 25 percent above the average for all of manufacturing, and 18 percent above the U.S. industry average
- Median hourly wage of \$26.96, 45 percent above the manufacturing median
- Average size of firms with employment: 169.6, versus 44.1 for all of manufacturing

<b>TRANSPORTATION EQUIPMENT (SIC 37) IN WASHINGTON STATE, 2000</b>					
SIC	Industry	# Firms	Jobs	Payroll	Average Wage
37	Transportation Equipment	679	101,026	\$5,949,036,570	\$58,886
371	Motor Vehicles and Equipment	NA	NA	NA	NA
3711	Motor vehicles and car bodies	11	2,648	\$152,151,135	\$57,459
3714	Motor vehicle parts and accessories	68	2,049	\$65,479,692	\$31,957
372	Aircraft and Parts	213	86,153	\$5,358,525,309	\$62,198
373	Ship and Boat Building and Repairing	300	7,225	\$263,196,493	\$36,429
3731	Ship building and repairing	54	2,662	\$114,464,133	\$42,999
3732	Boat building and repairing	246	4,593	\$149,728,620	\$32,599
374	Railroad Equipment	7	198	\$6,742,267	\$34,052
375	Motorcycles, Bicycles, and Parts	15	416	\$13,097,233	\$31,484
376	Guided Missiles, Space Vehicles, Parts	NA	NA	NA	NA
379	Miscellaneous Transportation Equipment	32	987	\$22,553,513	\$22,851
3792	Travel trailers and campers	8	673	\$14,688,200	\$21,825
	All Other	33	1,350	\$67,290,928	\$49,845
NA = Confidential data					

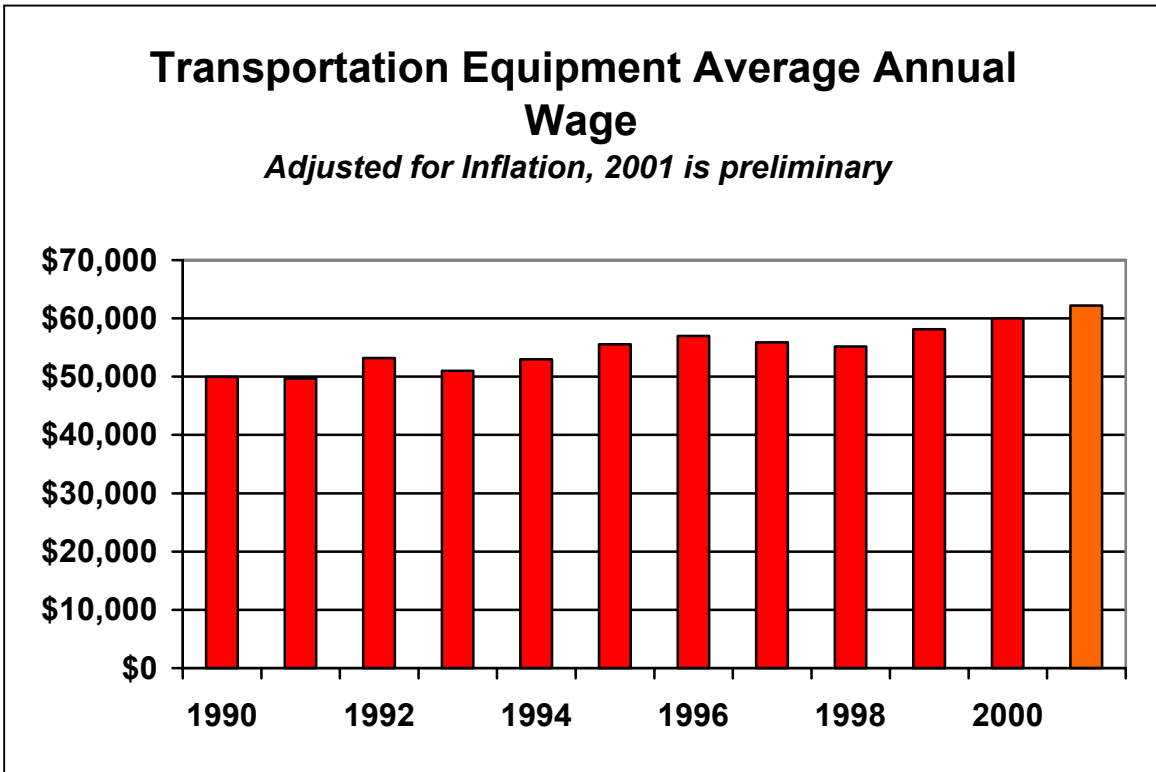
The industry is dominated by Boeing. The five largest employers, all with more than 1,000 workers, encompassed 81 percent of the industry.

### Trends, 1990 – 2000

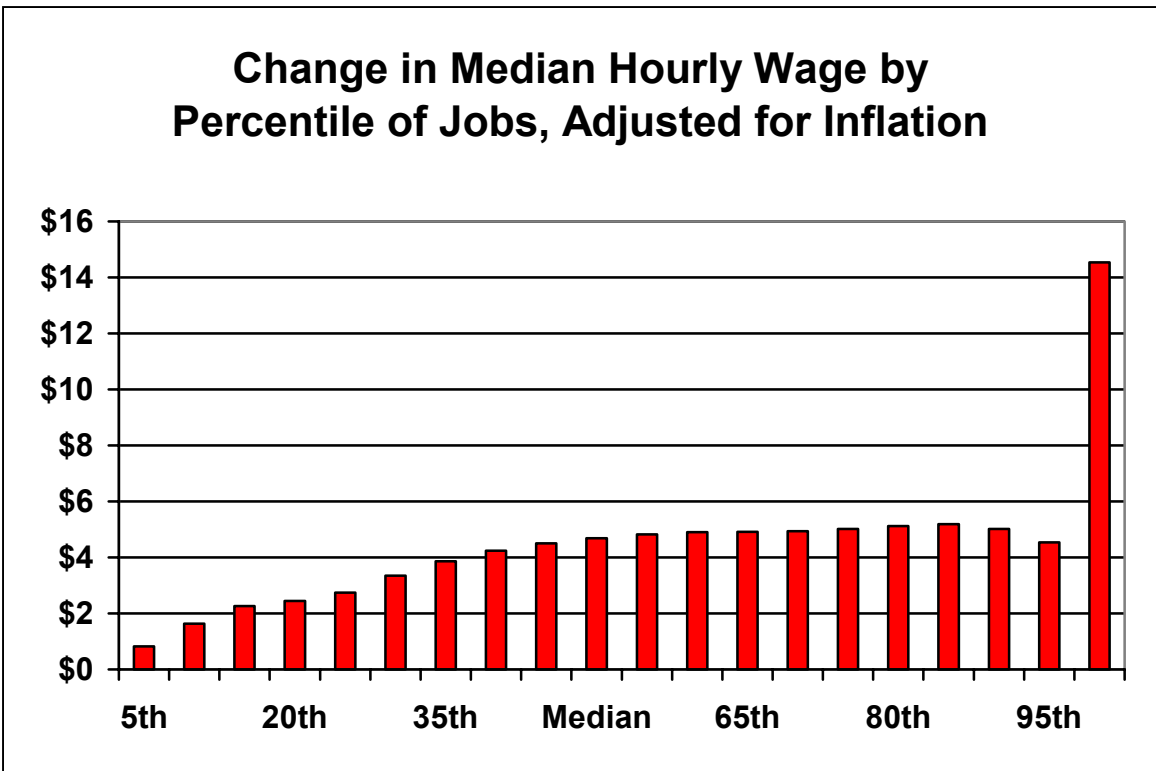
Transportation equipment employment followed the aircraft industry cycle, peaking in 1990 at 130,700, declining through 1995 to 94,500, peaking again in 1998 at 127,400, and falling since then, dipping below 100,000 in 2001. From peak in 1990 to the downward slope of 2000, the industry lost 23 percent of its employment, compared with minus 6 percent of state manufacturing and -7 percent at the national level (where the job mix is heavily tilted towards automobiles). The number of employers increased by 8 percent, from 628 to 679.



Real average wages climbed by 20 percent over the decade, from \$49,000 to \$58,900. The median hourly wage gained 21 percent, rising from \$22.27 in 1990 to \$26.96 in 2000, almost half again the median for all of manufacturing. On a percentage basis, wage gains were highest around the median; few of the lower wage jobs which saw a smaller increase were in highly unionized segments such as trucking and aircraft.



Employment reductions at Boeing pushed the average firm size down from 231 workers to 170.



<b>PERCENT OF INDUSTRY EMPLOYMENT BY SIZE OF FIRM</b>			
<b># Employees</b>	<b>1990</b>	<b>2000</b>	<b>All of Manufacturing</b>
<b>1-9</b>	1%	1%	5%
<b>10-19</b>	1%	1%	5%
<b>20-49</b>	2%	3%	9%
<b>50-99</b>	2%	3%	10%
<b>100-249</b>	4%	5%	16%
<b>250-499</b>	3%	3%	9%
<b>500-999</b>	0%	3%	11%
<b>1000+</b>	87%	81%	36%
<b>Average Size</b>	231.2	169.6	44.1

### **Geographic Detail**

King and Snohomish counties had 90 percent of industry employment in 2000—down from 95 percent in 1990. While King lost transportation equipment jobs, Pierce, Spokane, Skagit, and Whatcom all had rapid growth.

<b>TRANSPORTATION EQUIPMENT EMPLOYMENT BY COUNTY</b>					
<b>County</b>	<b>1990</b>	<b>2000</b>	<b>Pct. of 2000</b>	<b>Change</b>	<b>Growth</b>
State	130,741	101,026	100%	-29,715	-23%
King	94,015	59,897	59%	-34,118	-36%
Snohomish	29,852	31,501	31%	1,649	6%
Pierce	1,714	2,230	2%	516	30%
Spokane	1,000	1,501	1%	501	50%
Yakima	946	1,047	1%	101	11%
Skagit	518	904	1%	386	75%
Whatcom	393	884	1%	491	125%
Rest of State	2,303	3,062	3%	759	33%

### **Segment Detail**

Aircraft, and its loss of 30,000 jobs over the decade, dominated the industry. Non-aircraft segments as a group increased employment slightly over the decade.

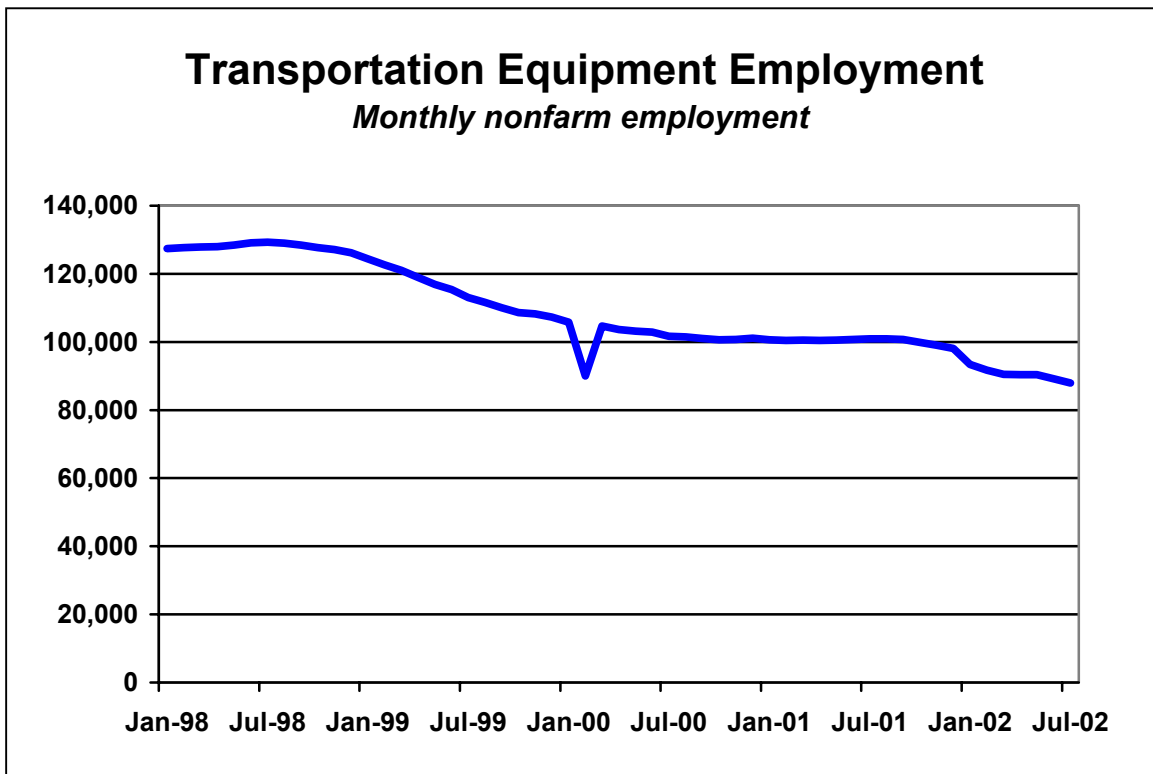
Within motor vehicles and equipment, motor vehicles and parts both enjoyed substantial growth. Motor vehicles, dominated by truck manufacturers such as PACCAR and Kenworth, added nearly 500 jobs (21 percent), while motor vehicle parts, with a diverse mix of smaller and larger companies, nearly doubled in size, going from 1,100 to 2,000 jobs. Two thirds of the segment—3,200 jobs—is in King County, while Spokane had a smaller but growing share, doubling its stake. Shipbuilding & repair, beset by foreign competition, lost nearly half its employment, dropping from 4,700 to 2,600, with most of the decline in King and Pierce shipyards. Boat building & repair began the decade bleeding from the effects of a federal luxury tax. With

demand for yachts plummeting, the industry suffered layoffs and closures and the loss of 1,000 jobs (-25 percent) from 1990 to 1995. The explosion of new wealth in the latter part of the decade led to a recovery, and a net increase of 400 jobs (10 percent) for the decade. Employment in motorcycles, bicycles, and parts soared along with the popularity of mountain bikes, rising from 200 to 400. Recreation also boosted demand for travel trailers and campers; employment in their production grew by 300 jobs or 94 percent.

<b>TRANSPORTATION EQUIPMENT (SIC 37) EMPLOYMENT GROWTH</b>					
<b>SIC</b>	<b>Industry</b>	<b>1990</b>	<b>2000</b>	<b>Change</b>	<b>Growth</b>
37	Transportation Equipment	130,741	101,026	-29,715	-23%
371	Motor Vehicles and Equipment	NA	NA	NA	NA
3711	Motor vehicles and car bodies	2,192	2,648	456	21%
3714	Motor vehicle parts and accessories	1,059	2,048	989	93%
372	Aircraft and Parts	116,278	86,153	-30,125	-26%
373	Ship and Boat Building and Repairing	8,852	7,225	-1,627	-18%
3731	Ship building and repairing	4,682	2,634	-2,048	-44%
3732	Boat building and repairing	4,170	4,591	421	10%
374	Railroad Equipment	NA	NA	NA	NA
375	Motorcycles, Bicycles, and Parts	182	416	234	129%
376	Guided Missiles, Space Vehicles, Parts	NA	NA	NA	NA
379	Miscellaneous Transportation Equipment	607	987	380	63%
3792	Travel trailers and campers	347	673	326	94%
3799	All Other	1,571	1,549	-22	-1%
NA = Confidential data.					

## Trends, 2000 – Current

Aircraft employment was stable for much of (post-strike) 2000 and 2001, maintaining a workforce of about 87,000. After 9-11, with the airline industry in disarray, layoffs began in earnest. The latest reported estimate, for July 2002, put employment at 74,800, for a loss of 13,000 jobs. Ship and boat building/repair peaked at 7,800 early in 2000, dipped as low as 6,500 in ensuing months, before gaining 400 jobs since March 2002. The remainder of the industry declined steadily from a high of 9,000 jobs in mid-1999 to a low of 5,800 jobs in October 2001. Truck manufacturers and vehicle parts sustained significant losses during this period. A modest recovery pushed employment to 6,600 in June of 2002.



## APPENDIX K: INSTRUMENTS

The instruments industry includes production of search and navigation equipment, measuring and controlling devices, medical instruments and supplies, ophthalmic goods (related to the care of eyes), photographic equipment and supplies, and watches and clocks.

### Status 2000

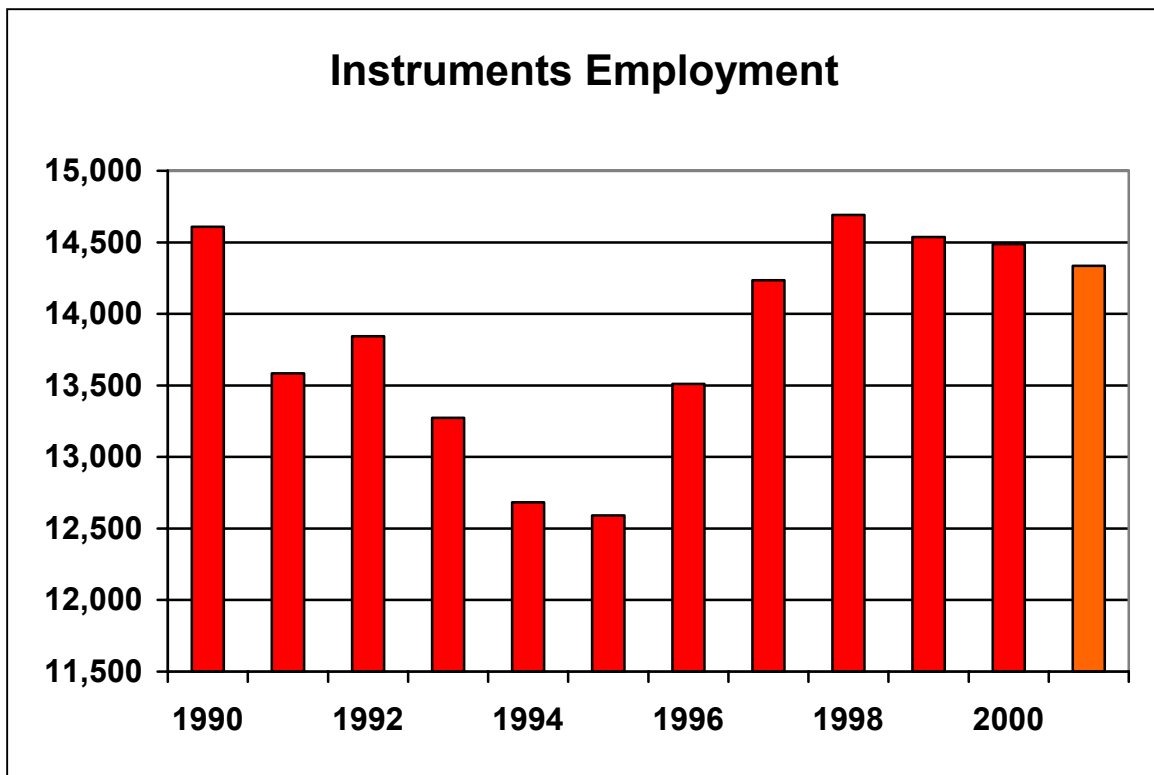
In the year 2000, the instruments industry had:

- 307 firms, 3 percent of the state total for manufacturing
- 14,500 jobs, 4 percent of the state total
- Total payroll of \$830 million, 5 percent of the state total
- An average annual wages of \$57,600, 22 percent above the average for all of manufacturing, and 13 percent above the U.S. industry average
- Median hourly wage of \$20.87, 12 percent above the manufacturing median
- Average size of firms with employment: 51.1, versus 44.1 for all of manufacturing

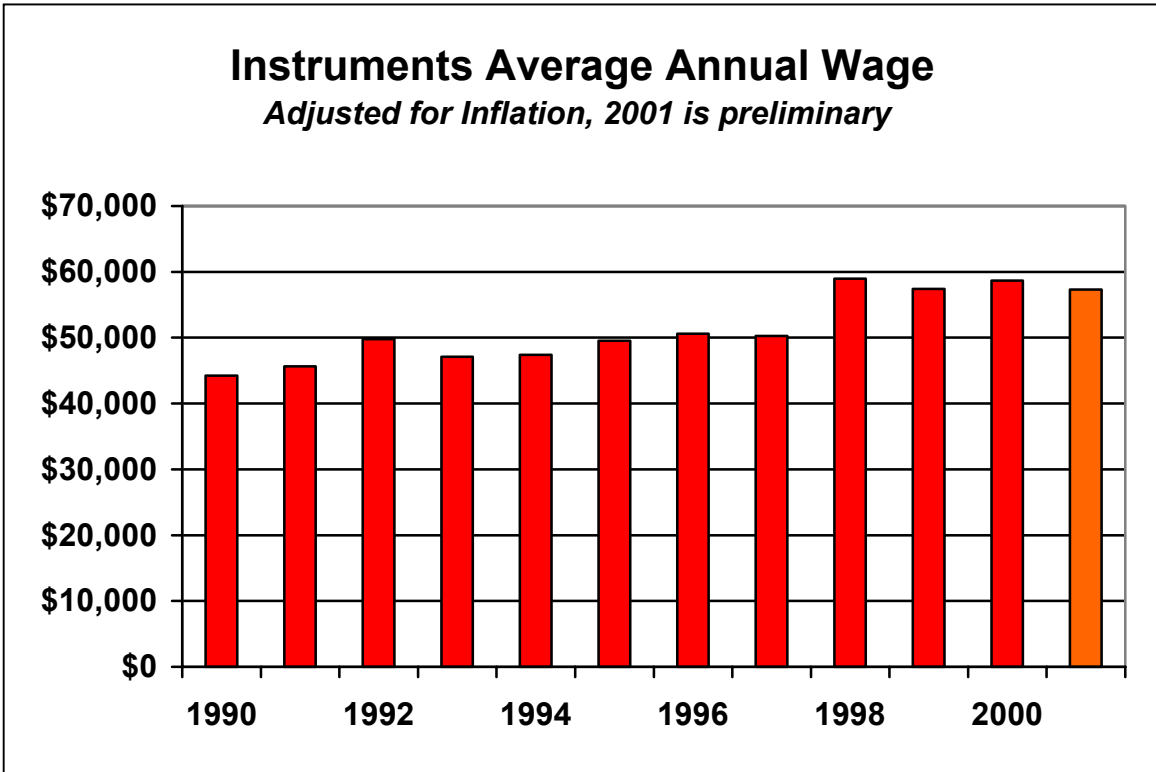
<b>INSTRUMENTS (SIC 38) IN WASHINGTON STATE, 2000</b>					
<b>SIC</b>	<b>Industry</b>	<b># Firms</b>	<b>Jobs</b>	<b>Payroll</b>	<b>Average Wage</b>
38	Instruments & Related Products	14,609	14,480	-129	-1%
381	Search and Navigation Equipment	3,803	2,607	-1,196	-31%
382	Measuring and Controlling Devices	6,352	5,472	-880	-14%
3823	Process control instruments	397	839	442	111%
3825	Instruments to measure electricity	5,049	3,070	-1,979	-39%
384	Medical Instruments and Supplies	3,922	6,019	2,097	53%
3841	Surgical and medical instruments	2,454	479	-1,975	-80%
3842	Surgical appliances and supplies	264	746	482	183%
3845	Electromedical equipment	1,055	4,602	3,547	336%
385	Ophthalmic Goods	337	275	-62	-18%
386	Photographic Equipment and Supplies	170	86	-84	-49%
387	Watches, Clocks, Watchcases & Parts	25	29	4	16%
	Other Instruments	1,080	1,776	696	64%
NA = Confidential data					

## Trends, 1990 – 2000

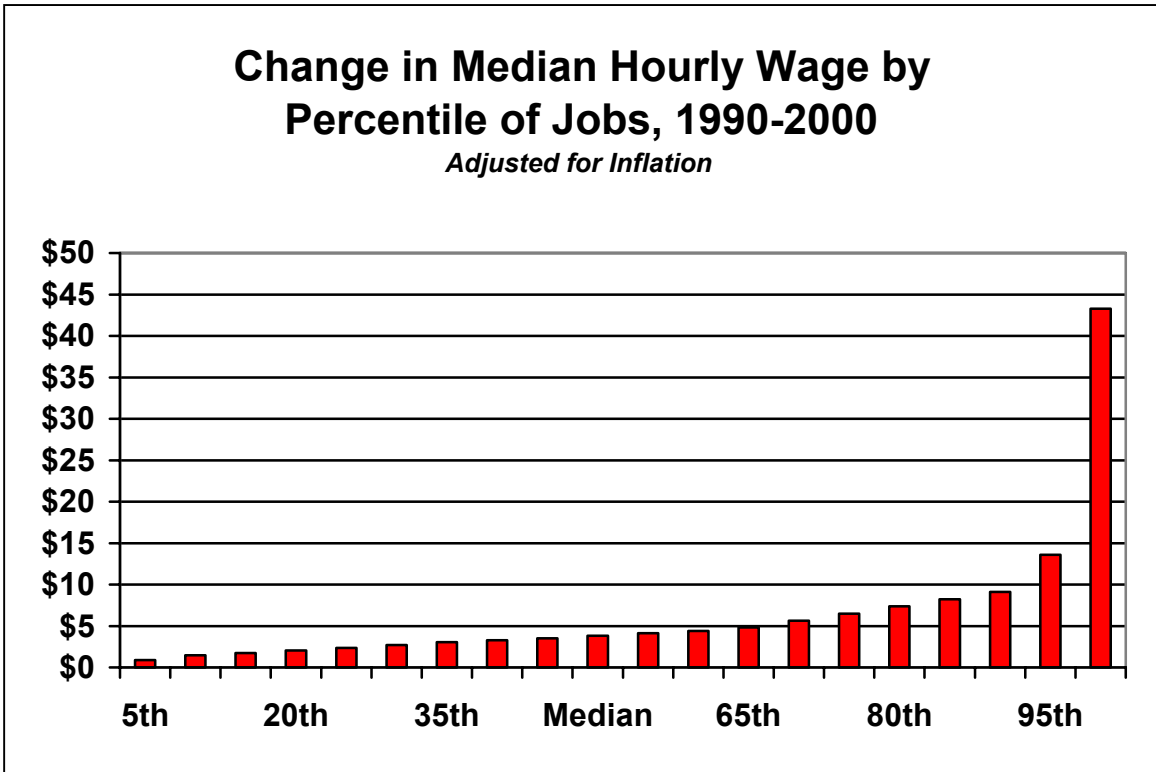
Industry employment was 14,600 in 1990, but dropped to 12,600 in 1995, in part due to the closure of Tektronix in 1990. Payrolls rebounded to 14,700 in 1998. Since then, employment has trickled downward, reaching 14,500 in 2000. The total loss over the decade came to 100 jobs, less than a percentage point. Nationally, instruments employment declined by 16 percent over the same period.



Though employment didn't change much, the number of employers jumped from 232 to 307. Real average wages shot up from \$43,400 in 1990 to \$57,600 in 2000, an increase of 33 percent. The median hourly wage rose by a smaller percentage (22 percent), from \$17.04 in 1990 to \$20.87 in 2000. Wage gains were smaller in absolute and percentage terms for lower-wage workers, and larger for higher-wage workers, especially for the upper ten percent of jobs.



Employment in the industry shifted to smaller firms over the decade; companies with over 1,000 statewide collectively lost 1,500 jobs.



<b>PERCENT OF INDUSTRY EMPLOYMENT BY SIZE OF FIRM</b>			
<b># Employees</b>	<b>1990</b>	<b>2000</b>	<b>All of Manufacturing</b>
<b>1-9</b>	3%	4%	5%
<b>10-19</b>	3%	3%	5%
<b>20-49</b>	7%	11%	9%
<b>50-99</b>	7%	12%	10%
<b>100-249</b>	6%	14%	16%
<b>250-999</b>	11%	20%	20%
<b>1000+</b>	46%	36%	36%
<b>Average Size</b>	68.3	51.1	44.1

### Geographic Detail

King, Snohomish, and Spokane were home to 90 percent of all instruments employment in 2000. Half was in King County, another 30 percent in Snohomish, and 10 percent was in Spokane. Snohomish was alone among counties in terms of a substantial decline.

<b>INSTRUMENTS EMPLOYMENT BY COUNTY</b>					
<b>County</b>	<b>1990</b>	<b>2000</b>	<b>Pct. of 2000</b>	<b>Change</b>	<b>Growth</b>
State	14,609	14,480	100%	-129	-1%
King	6,236*	7,137	49%	901	14%
Snohomish	5,404*	4,413	30%	-991	-18%
Spokane	NA	1,474	10%	NA	NA
Clark	NA	285	2%	NA	NA
Kitsap	58	277	2%	219	378%
Whatcom	92	204	1%	112	122%
Benton	207	193	1%	-14	-7%
Pierce	44	118	1%	74	168%
Skagit	19	94	1%	75	395%
Rest of State	2,549	2,044*	14%	-505	-20%

*1990 data for King & Snohomish adjusted for a non-economic code change (i.e. a miscoded employer). Rest of State for 2000 does not include Spokane and Clark data.*

### Segment Detail

When analyzing employment by industry detail, it's always important to keep in mind that sometimes the change from one year to the next may be due to industry reclassification. An individual company may be recoded, either because of an incorrect previous coding or a change in product mix; and acquisitions can sometimes play havoc with a time series, if a firm in one industry is absorbed by a firm in another industry.

Search and navigation equipment fell by 1,200 jobs over the decade, dropping from 3,800 to 2,600. A major closure and an employment reduction at another large employer accounted for most of the loss. Half of the decline came in King County. Measuring and controlling devices

suffered a decline of 900 jobs or 14 percent, due to a major closure early in the decade and two large contractions. The apparent job increase in process control instruments was due to coding issues. On the plus side, medical instruments and supplies added 2,100 jobs, expanding by 53 percent. Most of the gain was due to startups, which grew to between 50 and 500 employees. Several large employers were recoded from SIC 3841 to 3845 during the decade, accounting for the apparent loss in the former and offsetting gain in the latter. Ophthalmic goods, photographic equipment, and watches & clocks all had small changes in employment, with the first two declining and the latter adding jobs.

<b>INSTRUMENTS (SIC 38) EMPLOYMENT GROWTH</b>					
<b>SIC</b>	<b>Industry</b>	<b>1990</b>	<b>2000</b>	<b>Change</b>	<b>Growth</b>
38	Instruments & Related Products	14,609	14,480	-129	-1%
381	Search and Navigation Equipment	3,803	2,607	-1,196	-31%
382	Measuring and Controlling Devices	6,352	5,472	-880	-14%
3823	Process control instruments	397	839	442	111%
3825	Instruments to measure electricity	5,049	3,070	-1,979	-39%
384	Medical Instruments and Supplies	3,922	6,019	2,097	53%
3841	Surgical and medical instruments	2,454	479	-1,975	-80%
3842	Surgical appliances and supplies	264	746	482	183%
3845	Electromedical equipment	1,055	4,602	3,547	336%
385	Ophthalmic Goods	337	275	-62	-18%
386	Photographic Equipment and Supplies	170	86	-84	-49%
387	Watches, Clocks, Watchcases & Parts	25	29	4	16%
	Other Instruments	1,080	1,776	696	64%

## Trends, 2000 – Current

Instruments employment had been trickling downward from 1998 up to 9/11, when it began dropping in earnest, from 14,600 down to 13,800. Much of the decline was in electrical measuring and electromedical instruments, and most of the loss came in the Seattle metro area.

