

Identifying Industry Clusters in Washington State Workforce Regions

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Overview

- Description of Approach
- Brief Discussion of Data
- Summary Findings for Workforce Regions
- Additional Work to be Done

Approach

- The Workforce Board defined their desired approach to this project
- Use detailed industry data to define regional specialties
- Use input-output models to define linkages
- Develop maps of industry clusters
- Prioritize clusters for regional development purposes

Identifying Industry Concentrations

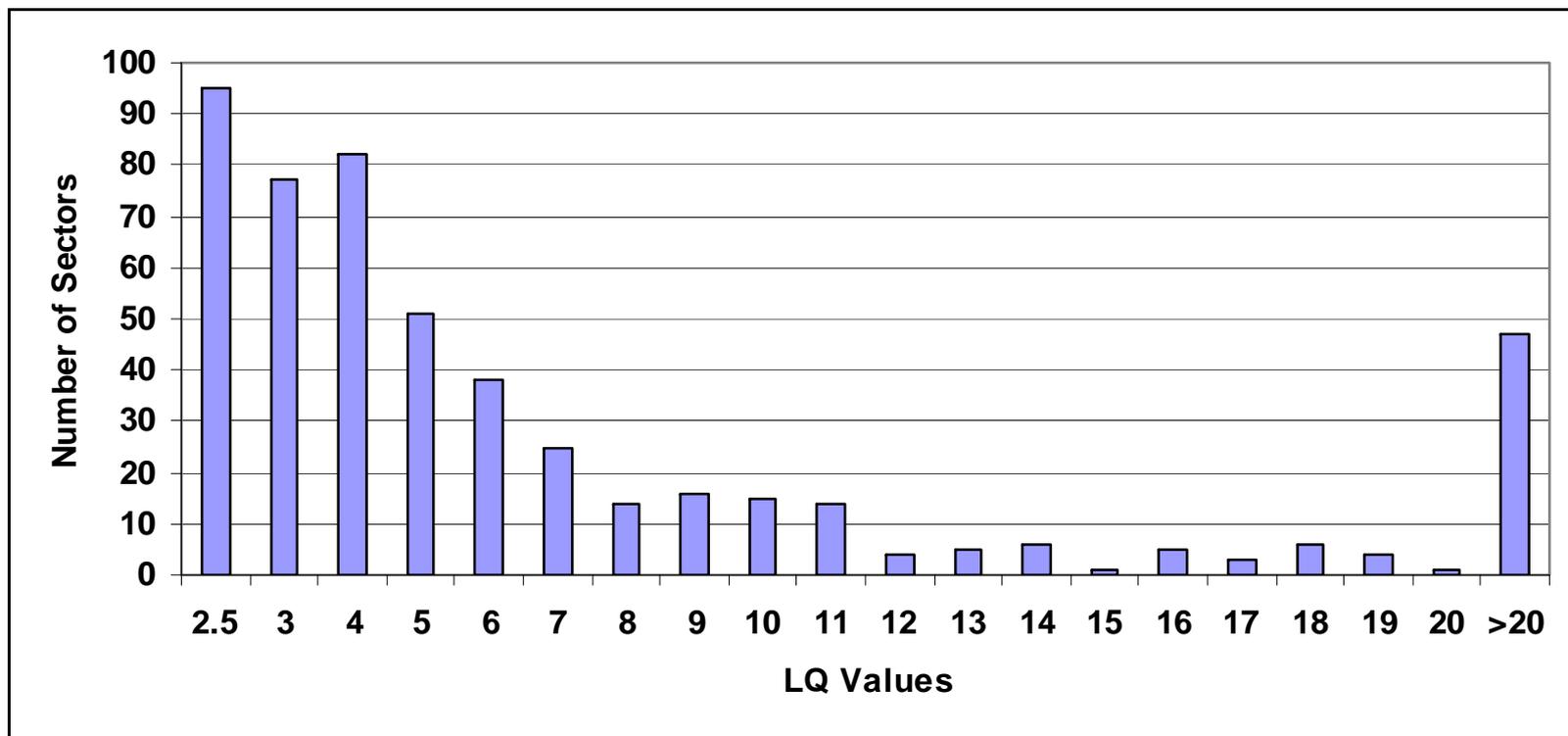
- “Location quotients” as a measure of concentration – comparing the importance of an industry in a region to its importance in a benchmark region (in this analysis the U.S.)
- Location quotients greater than 1.0 indicate regional concentration, and are likely industries engaged in exporting their output to other regions
- Location quotient values less than 1.0 are indicative of industries in which there are likely imports to satisfy regional demand

Data Sources

- IMPLAN – An input-output model system that creates tables for any combination of counties
- It is based on the Benchmark U.S. input-output tables, with approximately 500 sectors (the Washington I/O model has only 50 sectors)
- The IMPLAN software creates regional models with approximately 300 sectors, most of which are at least at a 4 digit NAICS code basis
- Transactions tables were converted to coefficients to identify forward and backward linkages of sectors with strong location quotients
- Employment Security Department also provided data

Location Quotients Have a Skewed Distribution

- 80% of the IMPLAN sectors have Location quotients of 1.0 or less; 12% have values between 1 and 2.5
- 8.5% have values of 2.5 or greater
- We used a threshold that covered about 5% of the extreme L.Q.'s in each Workforce Region



Input-Output Tables also have skewed coefficients

Up to .00001	26760
.00001 to 0.0001	7046
.0001 to 0.001	7843
.001 to 0.01	4723
0.01 to 0.02	584
.02 to 0.03	219
0.03 to 0.04	111
0.04 to 0.05	51
0.05 to 0.06	51
0.06 to 0.07	22
0.07 to 0.08	21
0.08 to 0.09	14
0.09 to 0.1	11
Over .1	68

Example: Sales Coefficients for region 8

We also calculated purchases coefficients

We focused on cases where the forward or backward Linkage was at least .05

Similar distributions were calculated for all 12 regions.

IMPLAN & ESD Data used for each Region

- To calculate Location Quotients for multiple measures
- To calculate average earnings by sector
- To calculate employment
- To calculate change in employment
- To map the distribution of the clusters
- To recommend clusters that are priority for economic development programs

Typical Location Quotients from IMPLAN

(Data here for Region 8, Location Quotient Values)

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*
1 Oilseed farming	0.06	0.08	0.12	0.02
2 Grain farming	8.52	9.36	13.46	2.17
3 Vegetable and melon farming	34.93	21.96	45.35	11.37
4 Tree nut farming	0.05	0.11	0.11	0.02
5 Fruit farming	82.62	75.82	118.12	34.15
6 Greenhouse and nursery proc	0.88	0.72	1.56	0.24
7 Tobacco farming	0.00	0.00	0.00	0.00
8 Cotton farming	0.00	0.00	0.00	0.00
9 Sugarcane and sugar beet far	0.00	0.00	0.00	0.00
10 All other crop farming	34.17	19.25	43.06	8.95
11 Cattle ranching and farming	5.79	3.69	7.87	1.31
12 Poultry and egg production	0.38	0.21	1.00	0.06
13 Animal production- except ca	1.15	1.50	2.32	0.23
14 Logging	3.27	2.12	4.73	1.54



Similar data for about another 275 industries

Examination of Linkage Data

- For each region we calculated sales coefficients
- For each region we calculated purchases coefficients
- We estimated linkage cutoff values
- We produced diagrams of industry concentration and linkages
- In general, there are few significant linkages

S. Central Purchases LQ > 4, coefficient > .05, Sales in Red

Fruit **Other Crops** **Extract Mfg.** **LQ > 10 Red Text**

Vegetables **Ag. & Forest Services** **Commodity Contracts** **Cattle** **Manufactured/Mobile Homes**

Logging **Sawmills** **Frozen Food** **Dry Dairy Mfg.** **Slaughterhouses** **Asphalt Mfg.**

Other Millwork **Wholesale** **Pesticides** **Fertilizer** **Plastic Packaging Machinery**

Residential Construction **Fruit & Veg. Canning** **Wine** **Industrial Control Mfg.** **Plastic Pipe Mfg.**

Primary Aluminum **Local Govt. Electricity** **Other Aluminum Rolling & Drawing**

Motor Home Mfg.

Other Aircraft Parts & Equipment

Boat Building

Example of Linkage Diagram: Similar Diagrams for all regions

Underlying Data Summary for Each Region – Example Region 7

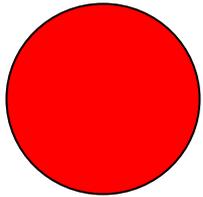
IMPLAN Region 7 Clark-Cowlitz-Wahkiakum

	LQ	Employment	Output	Employment	Wage Income	Proprietors Income	Income per Employee
(1) Forest Products Complex							
14 Logging	7.86	1106	308.613	1106	59.808	4.281	
112 Sawmills	9.95	1362	403.743	1362	76.51	0.004	
113 Wood Preserving	7.48	116	35.688	116	7.452	0	
116 Engineered Wood Products	3.47	282	50.608	282	12.959	0	
118 Cut stock resawn	5.25	142	20.897	142	5.509	0	
125 Paper and Paperboard	20.65	3216	2040.3	3216	328.189	0	
134 Sanitary Paper Mfg.	29.25	1069	751.298	1069	100.571	15.7	
		7293	3611.147	7293	590.998	19.985	83777
311 (2) Semiconductors	5.55	1727	LQ	15.86	114.526	0	66315
(3) Food Products							
70 Poultry Processing	3.46	1039	236.377	1039	36.013	0.028	
79 Other Snack Foods Mfg.	11.62	454	281.431	454	28.683	0	
		1493	517.808	1493	64.696	0.028	43352
(4) Manufacturing Specialties			LQ	5.59			
326 Lightng Fixture Mfg.	4.73	284		17.309	0		60947
336 Relay and Industry Controls	4.94	272		29.028	0		106721
262 Sawmill & Wood Industry Mach	22.64	211		14.153	0		67076
264 Paper industry Machinery	10.34	145		9.69	0		66828
269 Other Industrial Machinery (?Co	18.51	721		51.34	0		71207
273 Other Commercial and service i	5.29	363		22.916	0		63129
289 Air & Gas Compression Equipm	6.53	219		9.746	0.078		44502
288 Pump & Pumping Eq Mfg.	4.02	141		11.424	0		81021
(5) Service Specialties							
446 Scientific R&D	3.5	3575		295.298	101.319		110942
466 Other Ambulatory Health Care	2.13	2399		145.37	31.023		73528
495 Federal Electrical Utilities	71.65	1574		190.113	0		120783

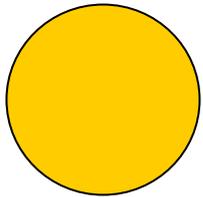
Moving Towards Summaries for each region

- Key Indicators Desired
- Key Indicators Available Now - Employment, Location Quotient, Earnings per worker, growth over the 2001-2007 time period
- Bubble charts summarizing these data for each region
- Key Indicators Needed – Maps & prioritization of clusters in each region

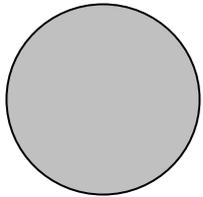
Color Scheme for Bubble Charts



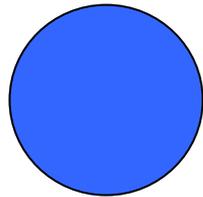
Rapid Growth



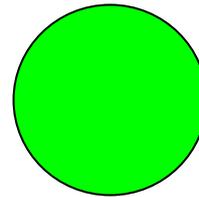
Slower Growth



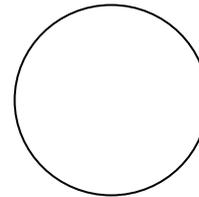
No Change



Big Decline

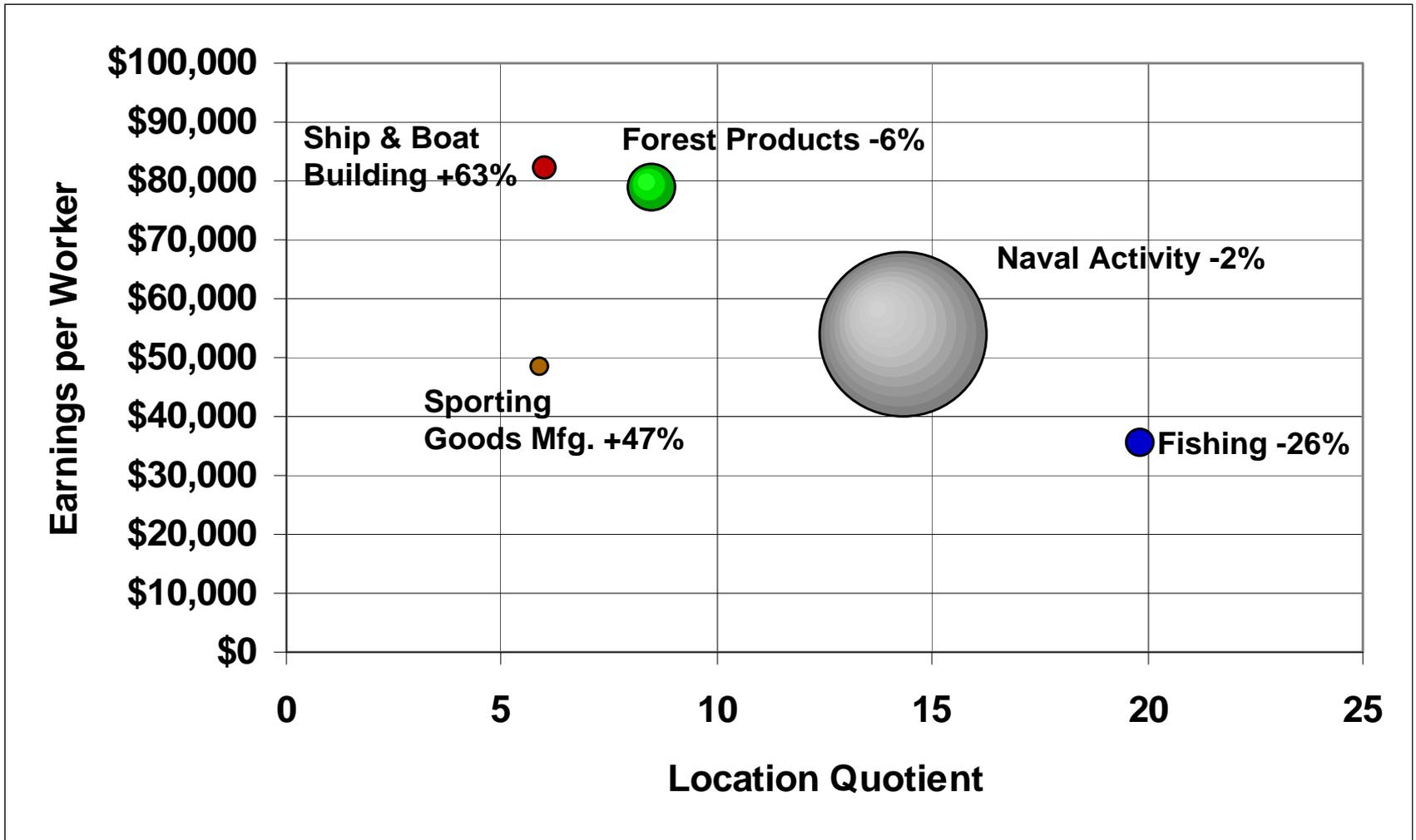


Small Decline



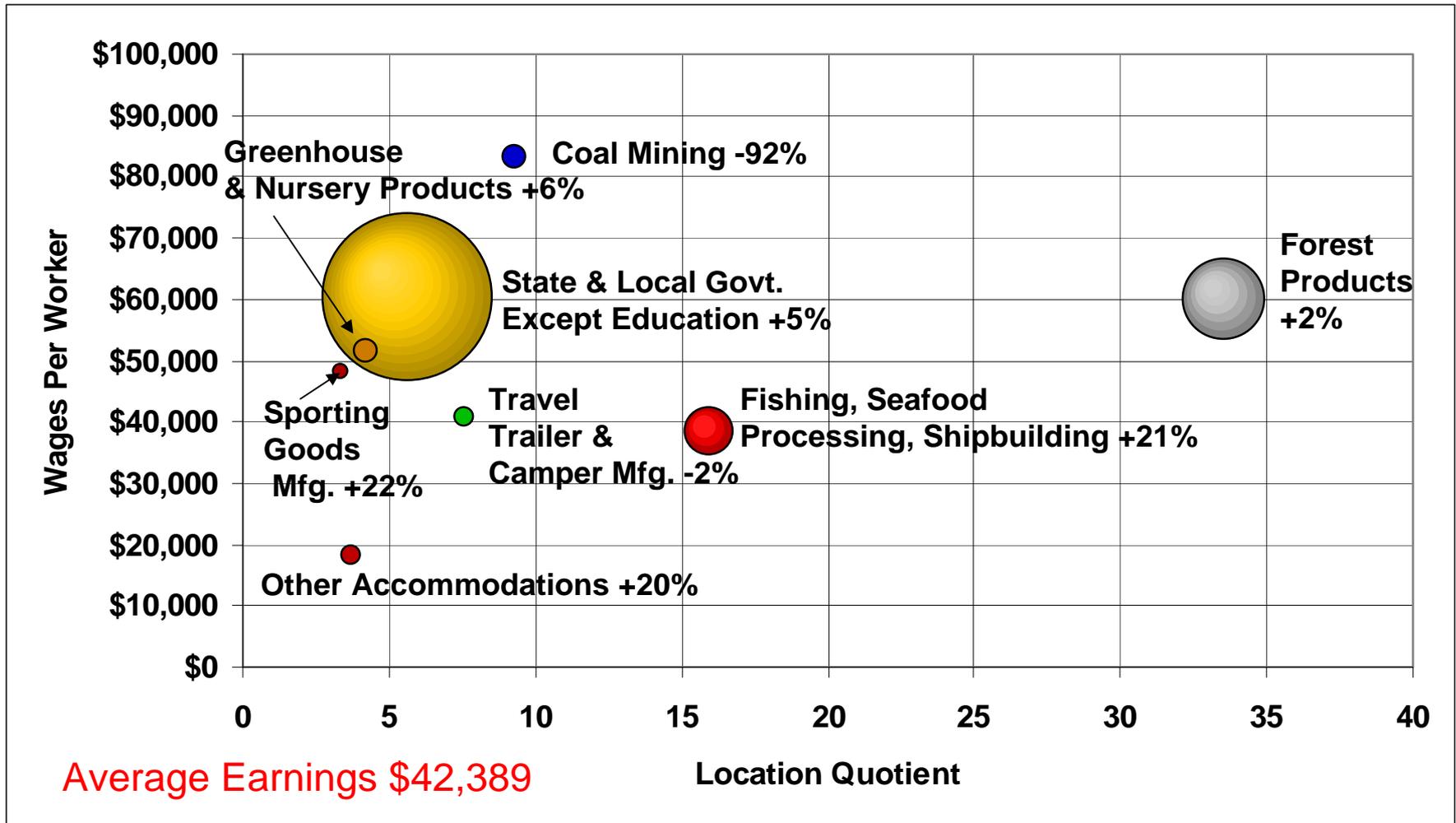
No Data on change

WDA1 Kitsap, Jefferson & Clallam

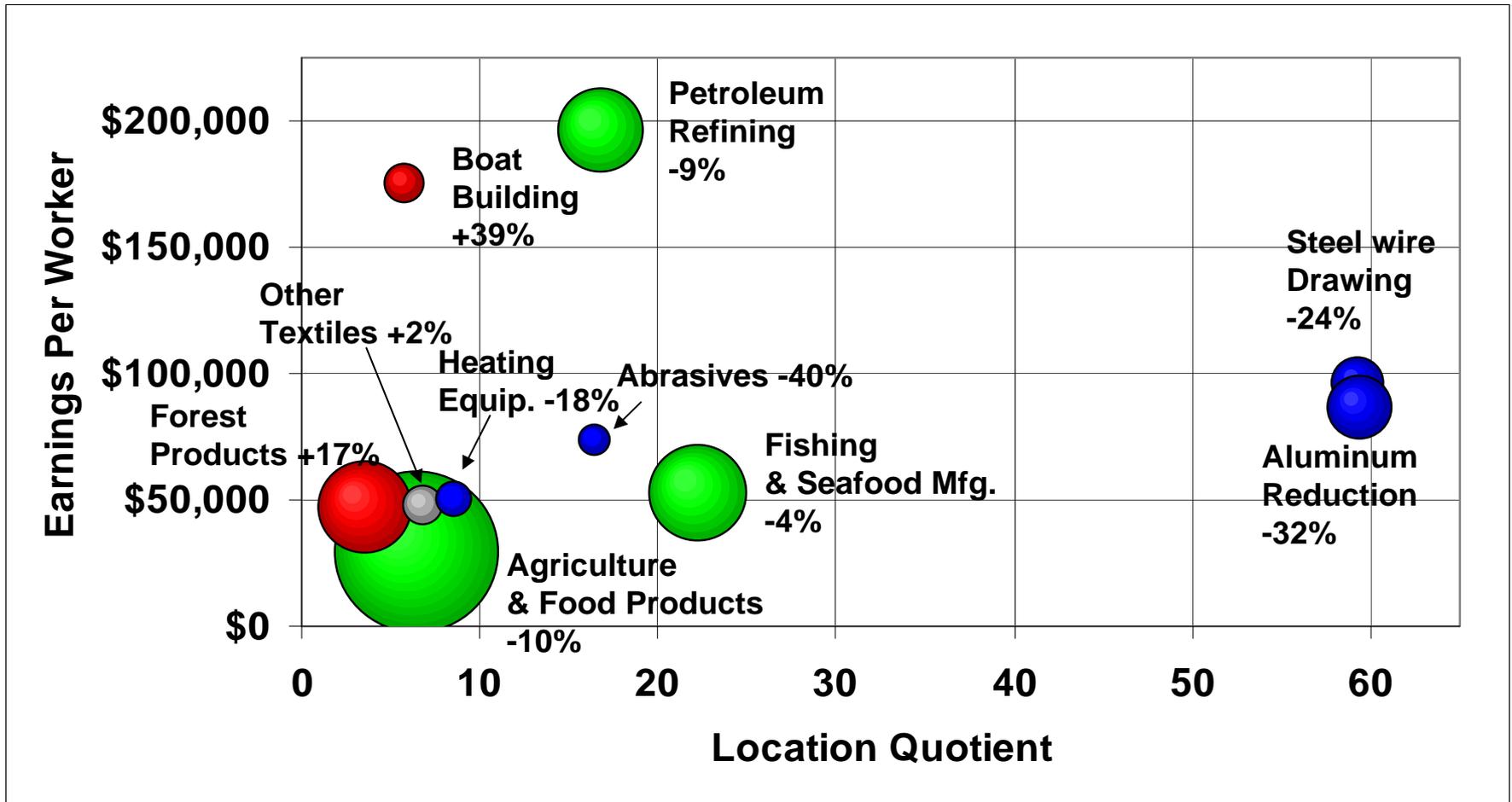


Average Earnings \$39,879

WDA2 – Grays Harbor, Lewis, Mason, Pacific & Thurston

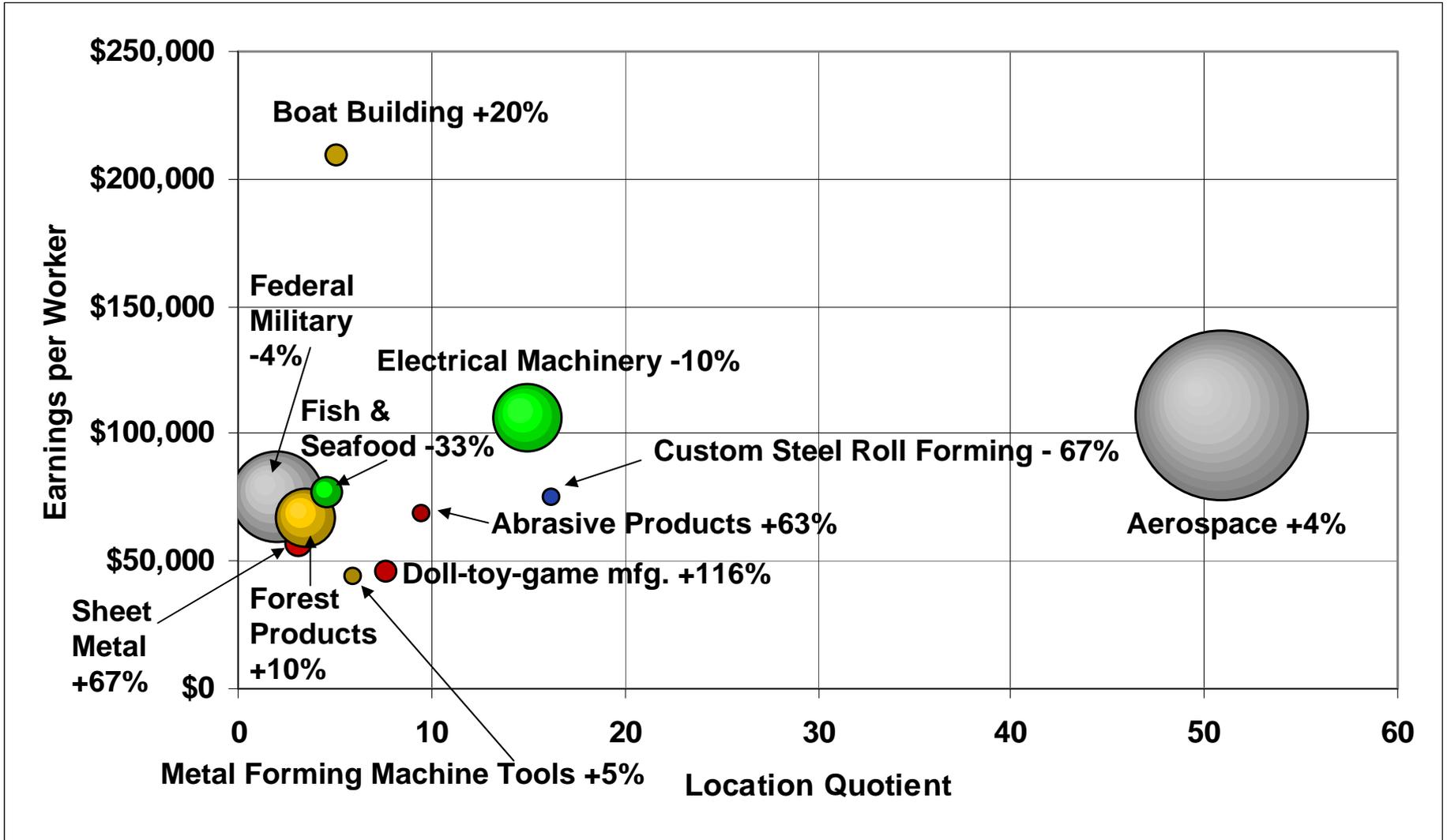


WDA 3 – Island, San Juan, Whatcom & Skagit



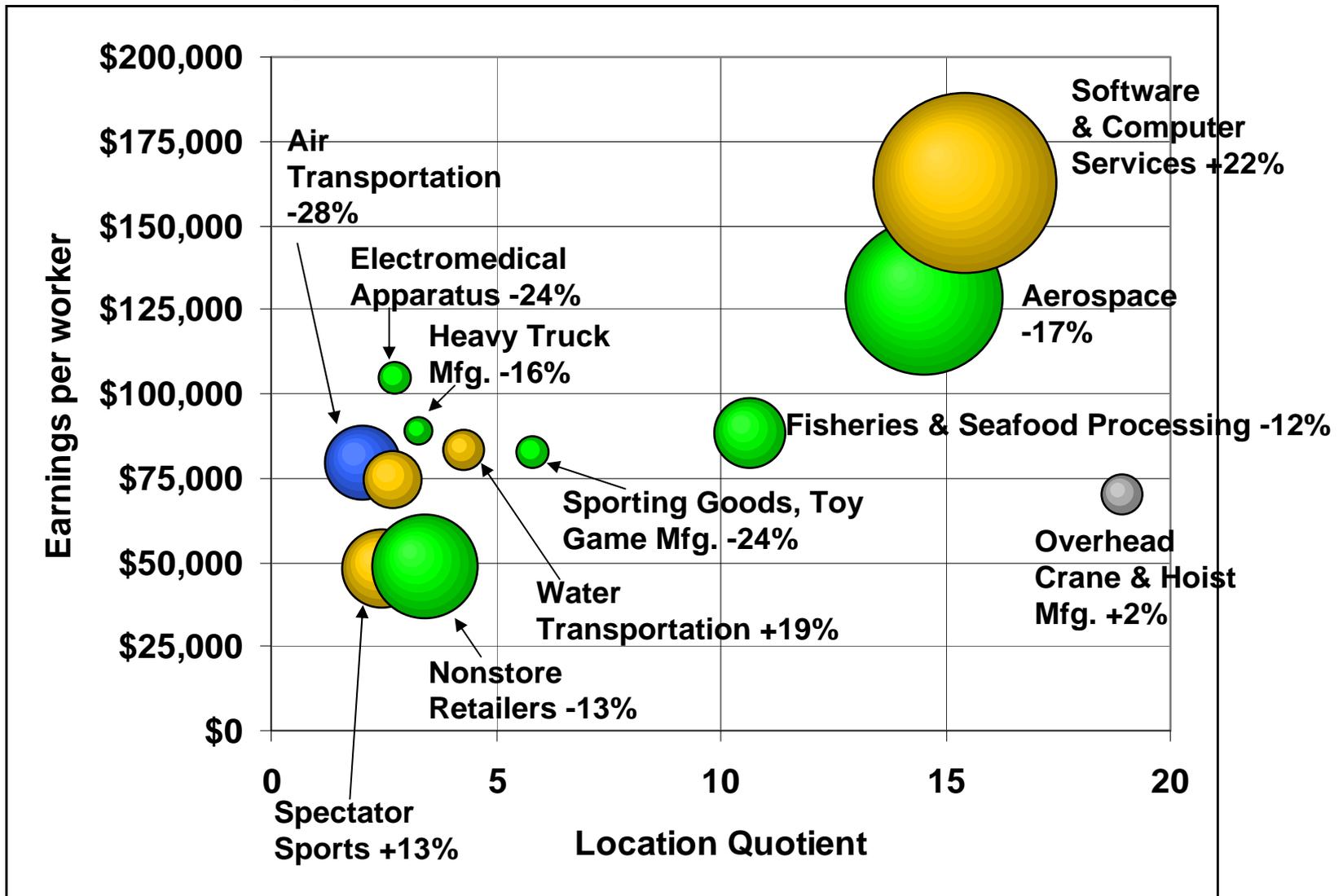
Average Earnings - \$40,551

WDA 4 - Snohomish



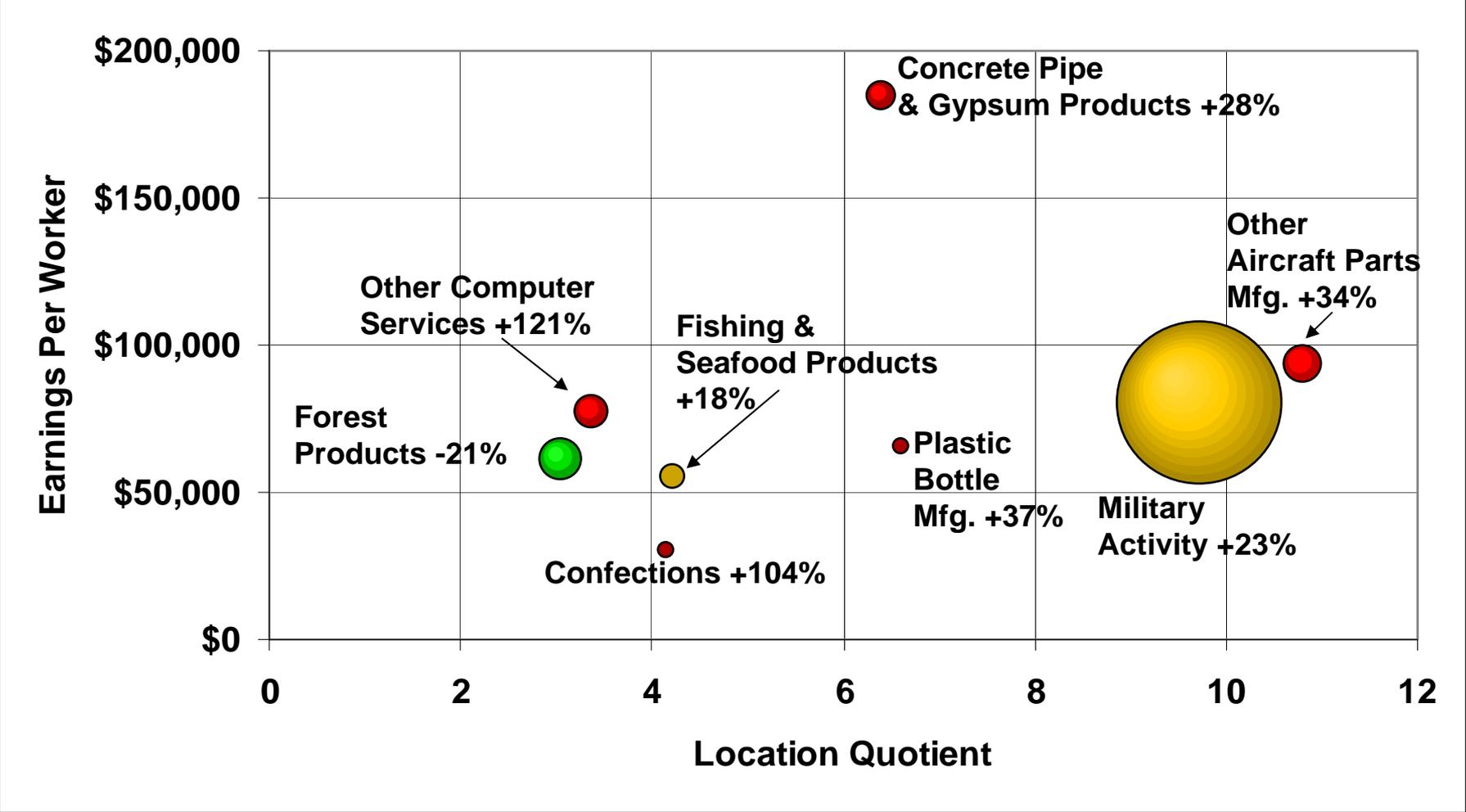
Average Earnings \$50,836

King County – WDA5



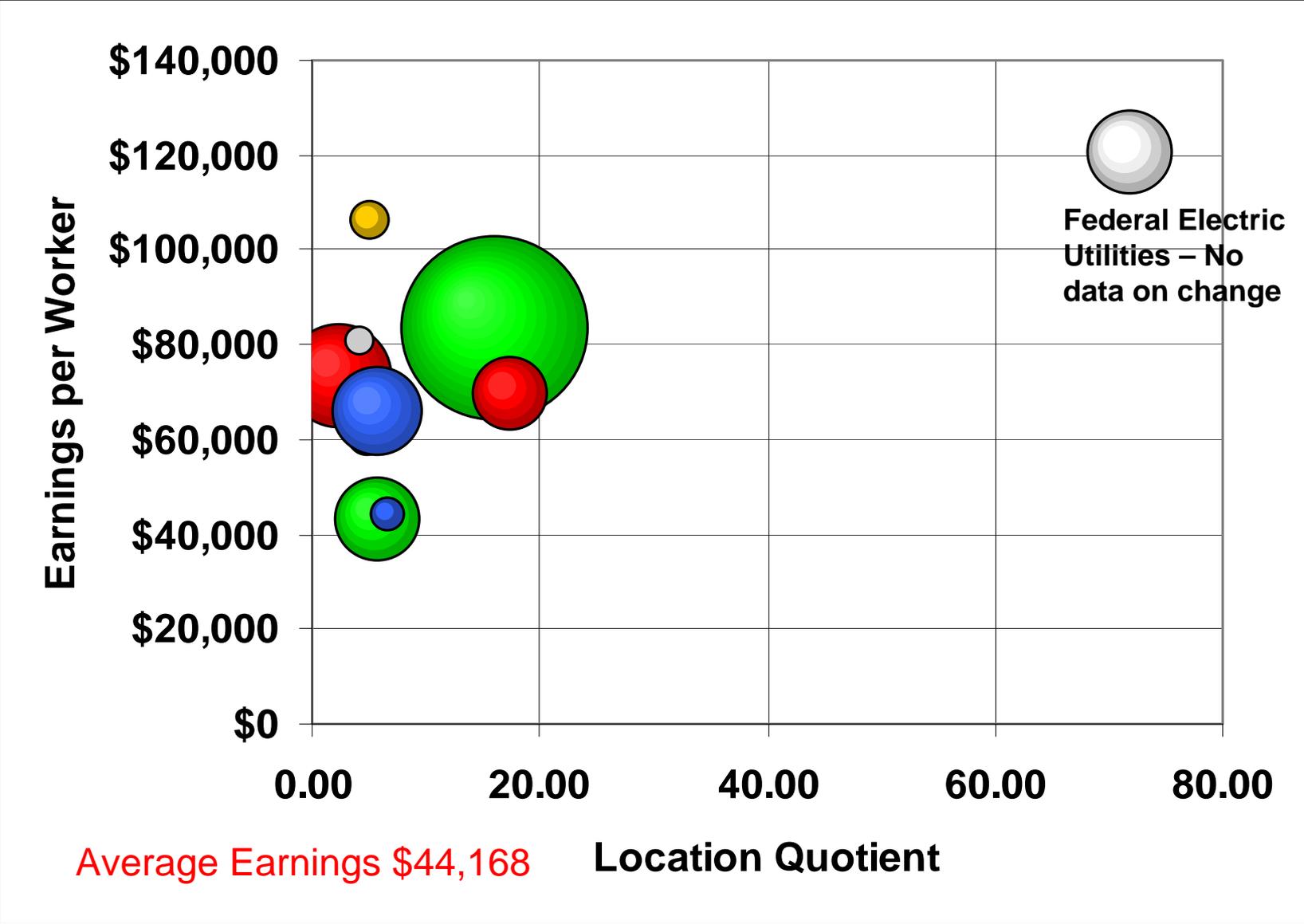
Average Earnings \$60,256

Pierce

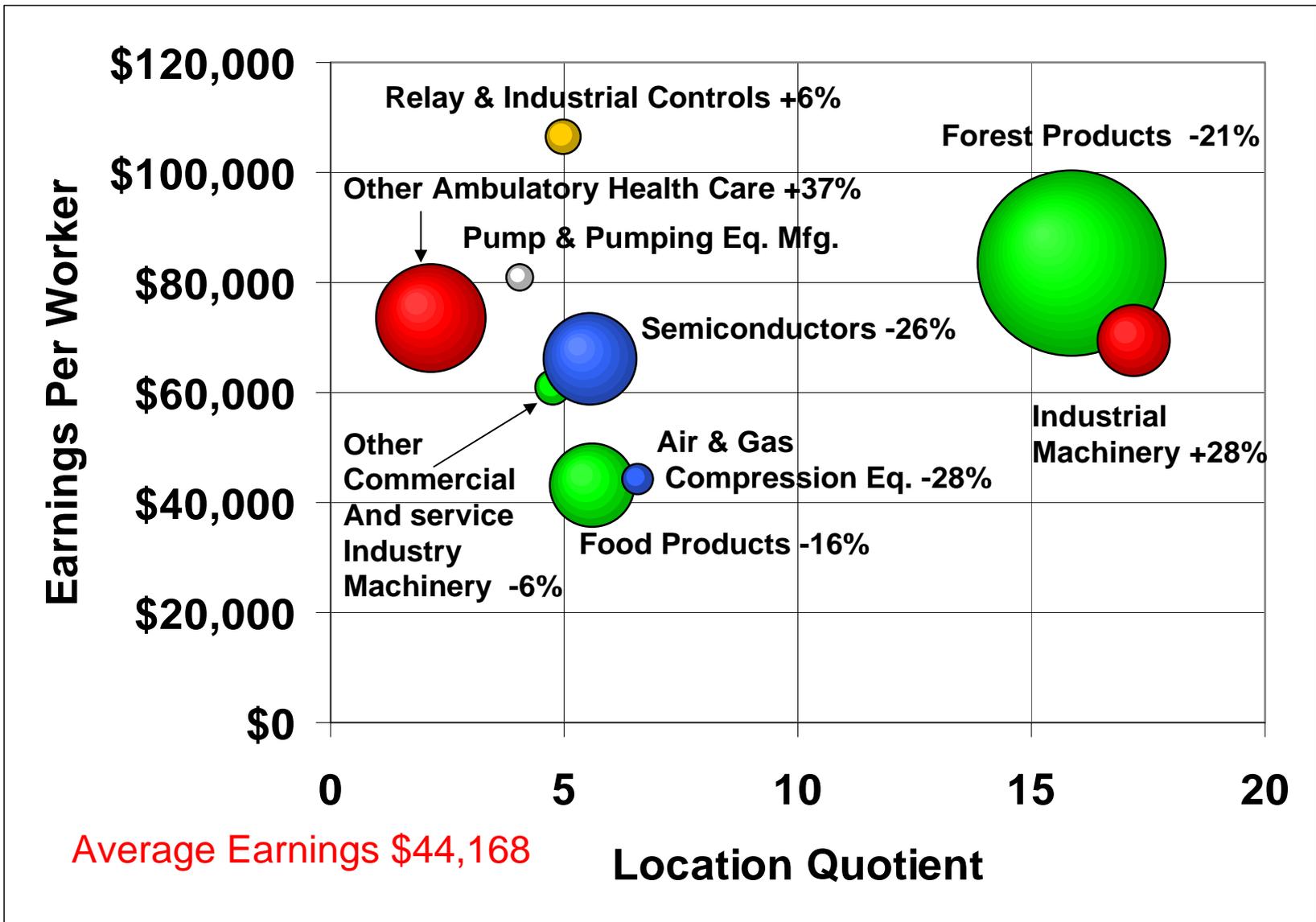


Average Earnings \$46,930

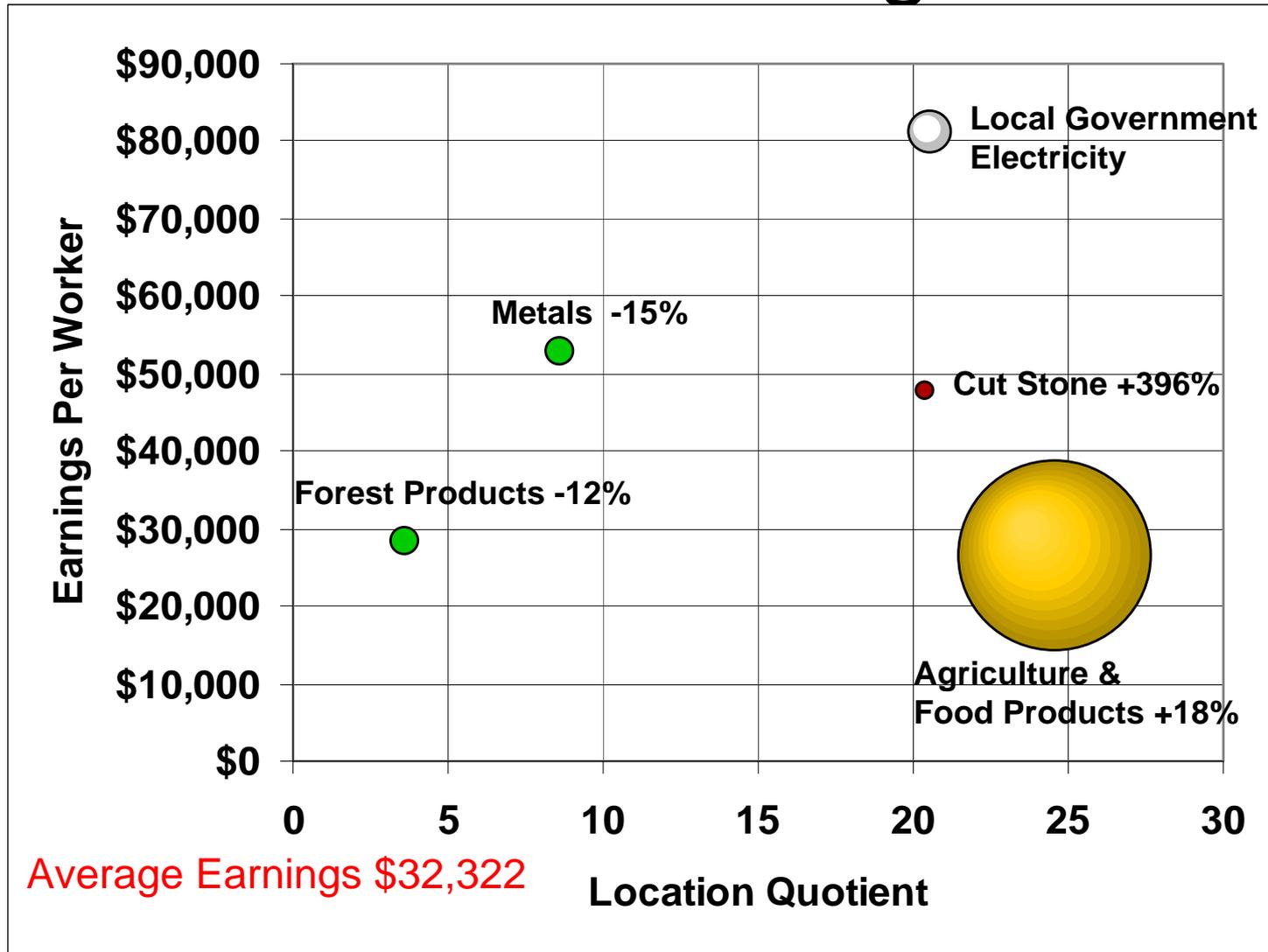
WDA 7 – Clark, Cowlitz, Skamania & Wahkiakum



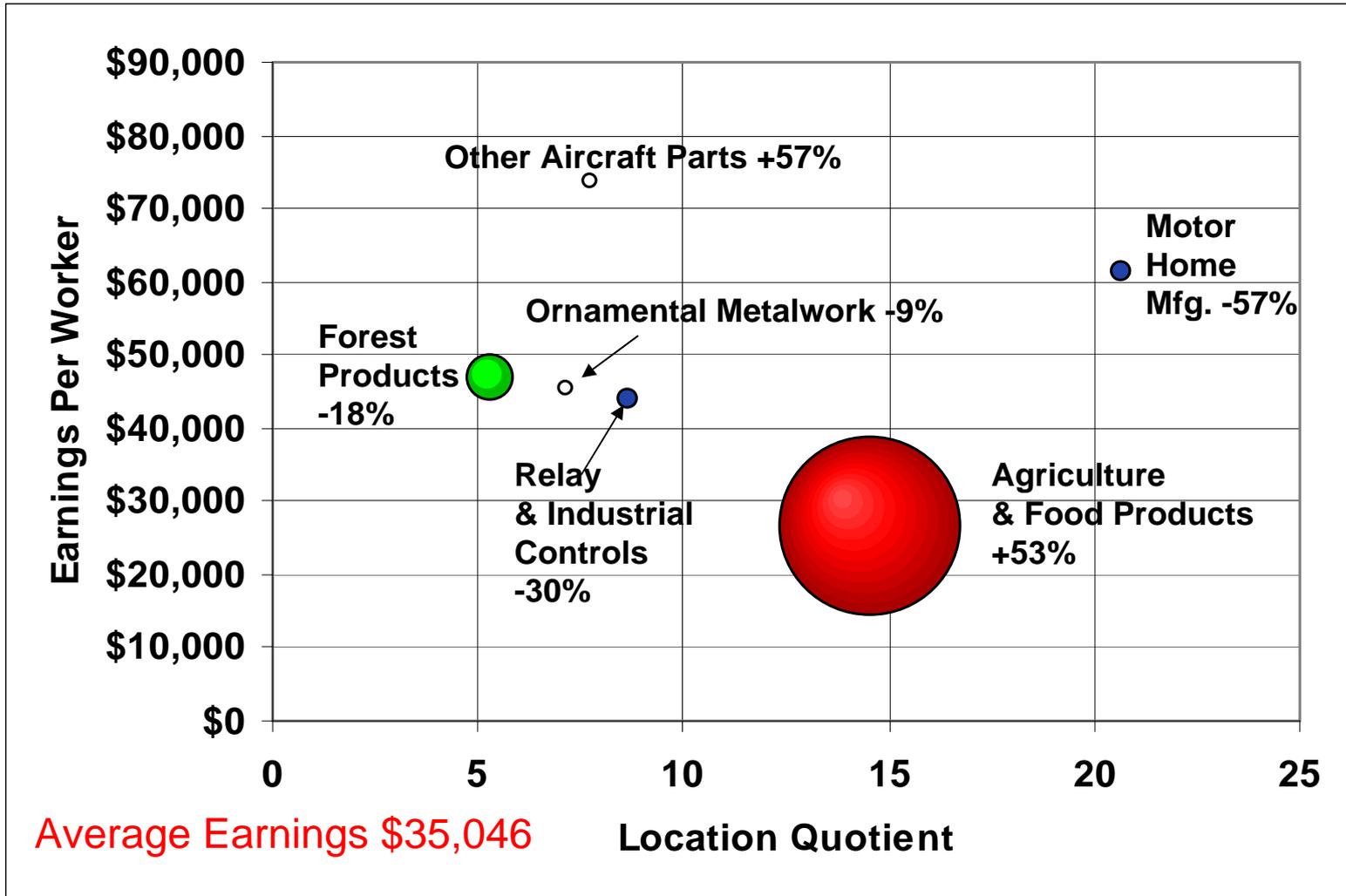
WDA7 Except Federal Electric Utilities



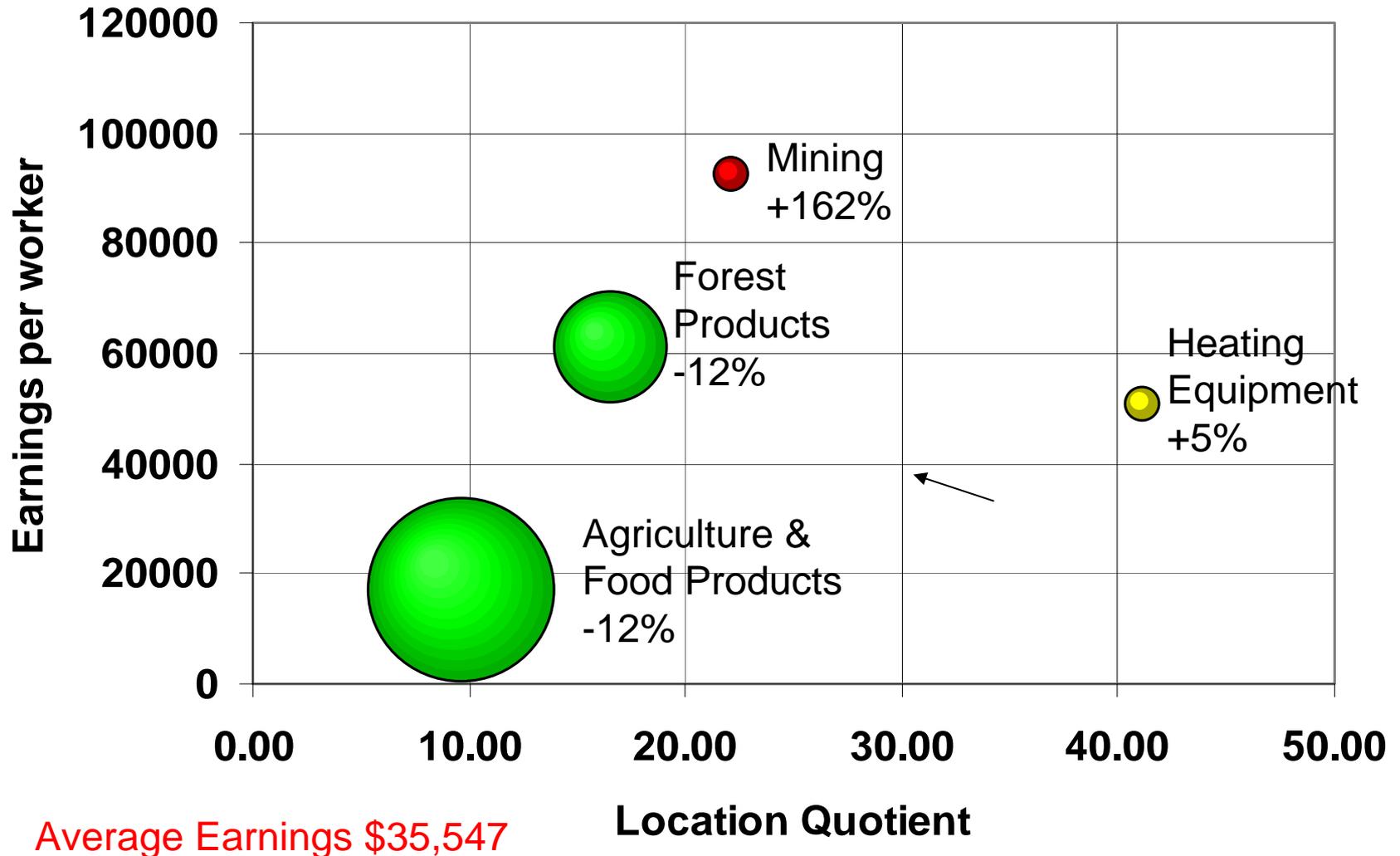
WDA 8 – Adams, Chelan, Douglas, Grant & Okanogan



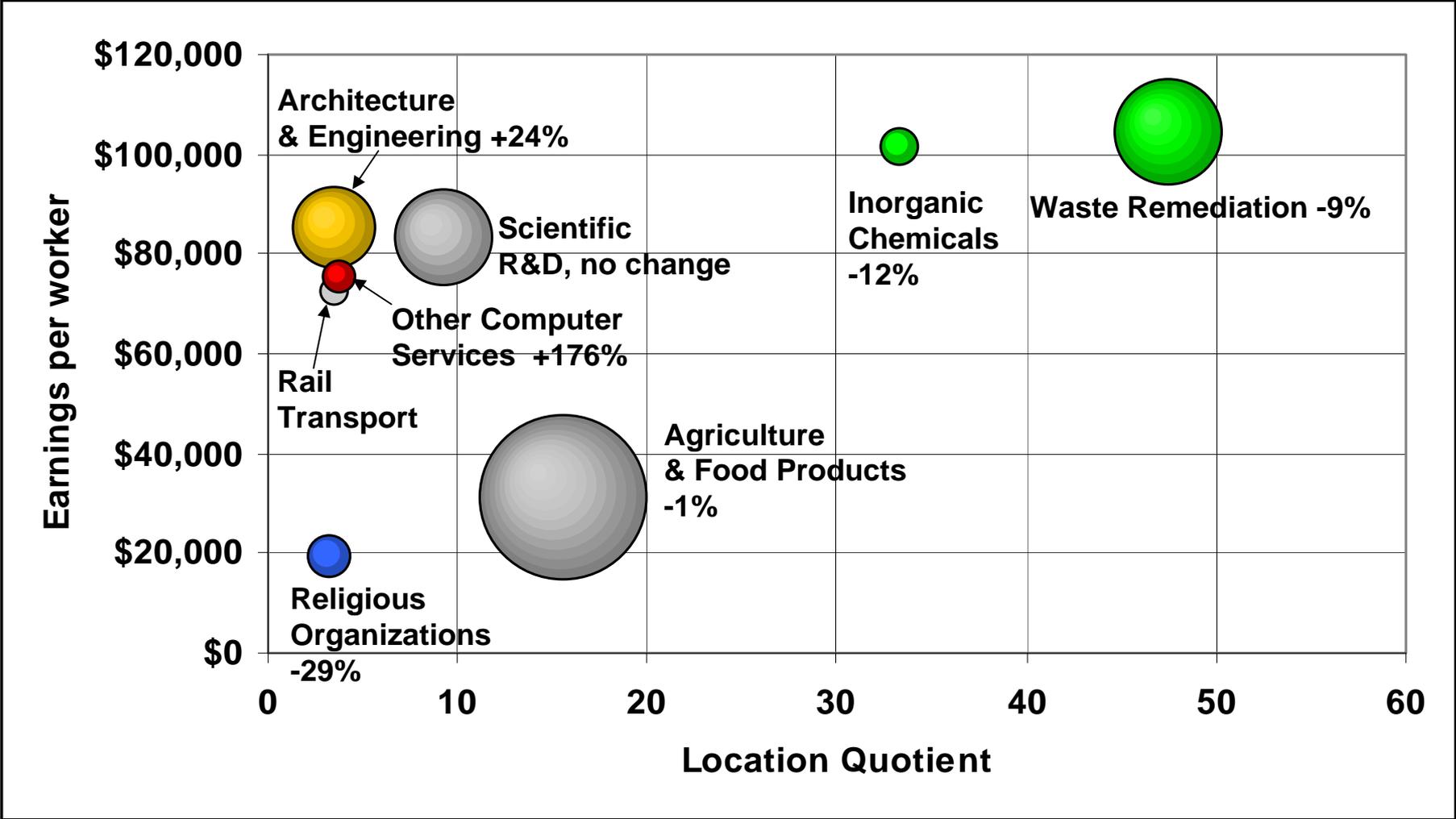
WDA 9 – Kittitas, Yakima & Klickitat



WDA 10 – Asotin, Columbia, Ferry, Garfield, Lincoln, Pend Orielle, Stevens, Walla Walla, Whitman

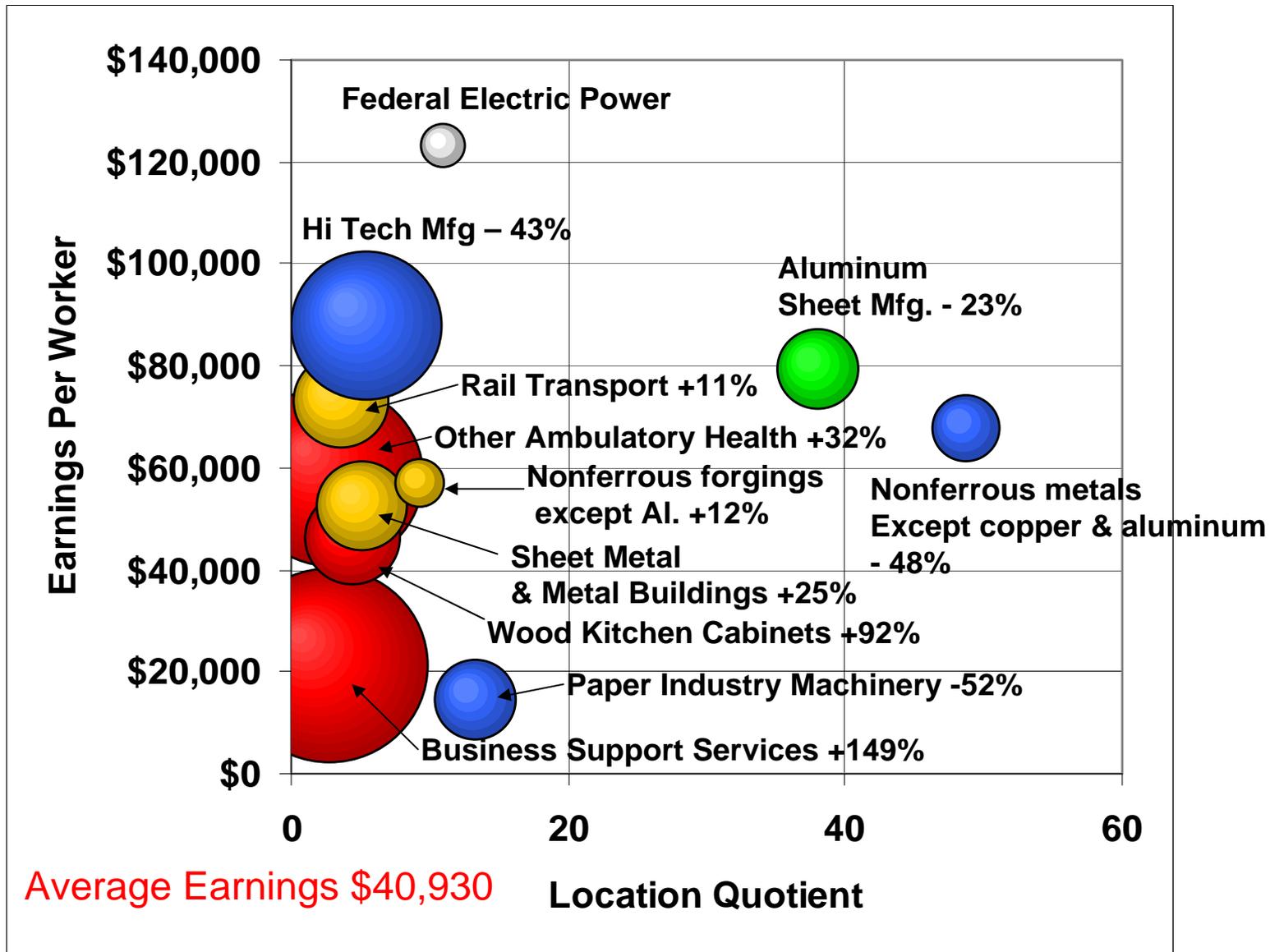


WDA 11 Benton & Franklin



Average Earnings \$44,052

WDA 12 Spokane



Maps of Clusters

- We requested geocoded data from the Employment Security Department for all establishments in the detailed clusters in all Workforce regions
- We did NOT ask for these data for the selected sectors in regions where the concentration did not cross our threshold
- We have mapped 3 sectors of significance in many workforce regions
- We will prepare maps of other industrial specialties in each workforce region, if there are enough establishments in the sector

Fishing & Seafood Processing

Establishments by
Employment Size,
2007

Processing

AVG

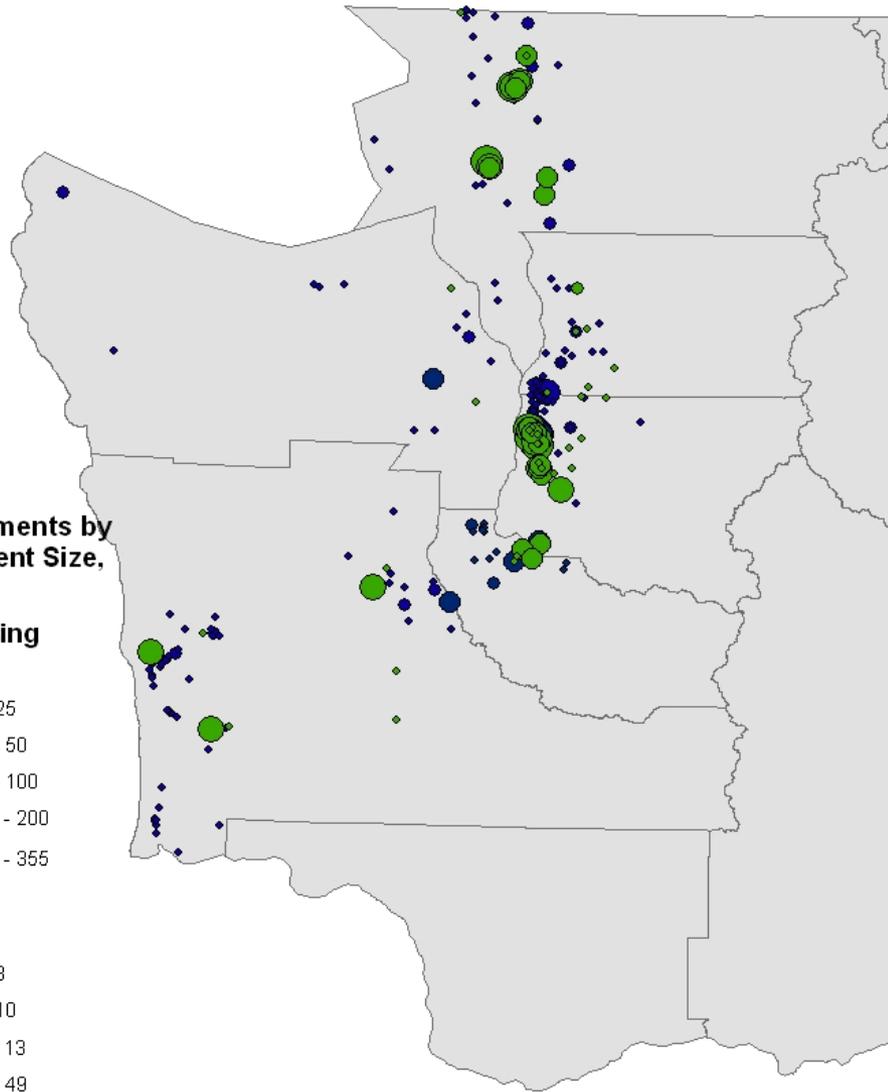
- 0 - 25
- 26 - 50
- 51 - 100
- 101 - 200
- 201 - 355

Fishing

AVG

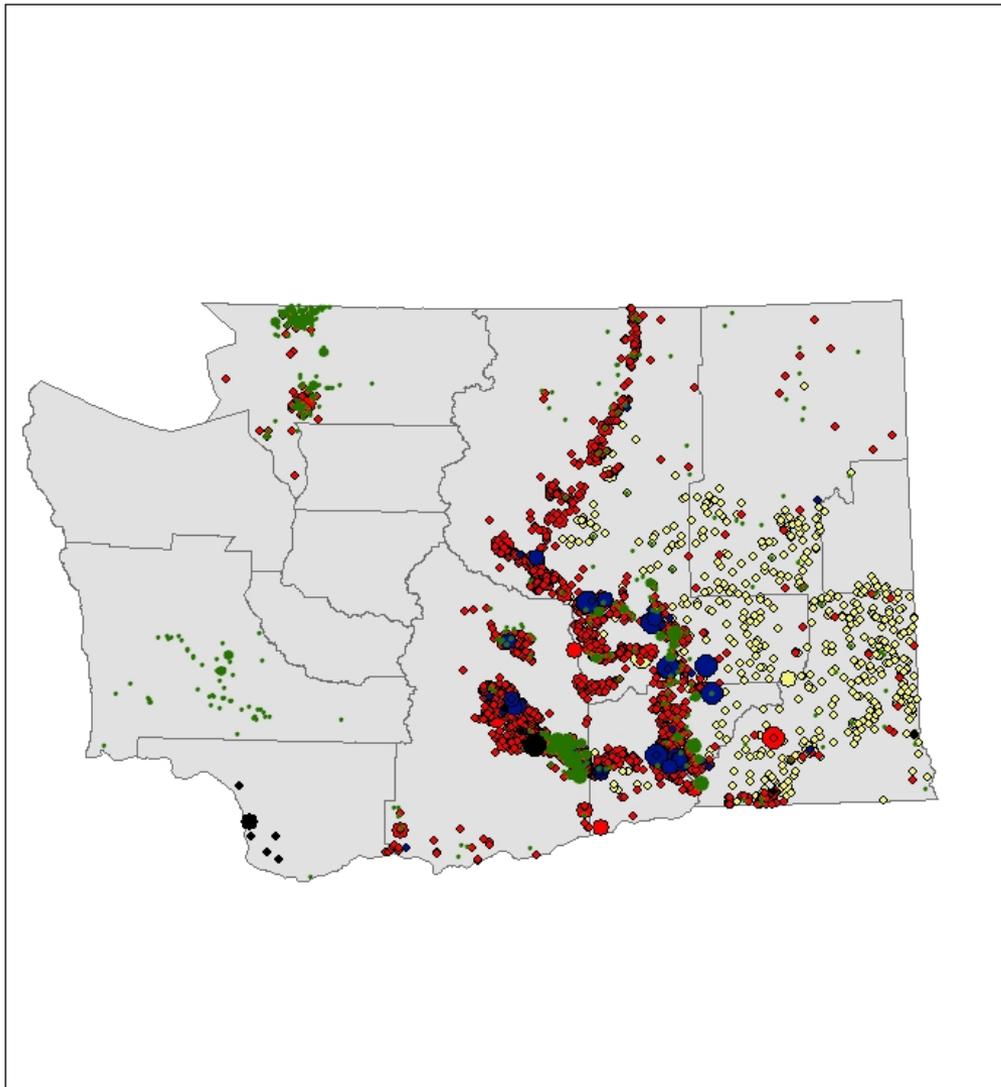
- 0 - 3
- 4 - 10
- 11 - 13
- 14 - 49
- 50 - 288

WDA Regions



Agriculture & Food Products

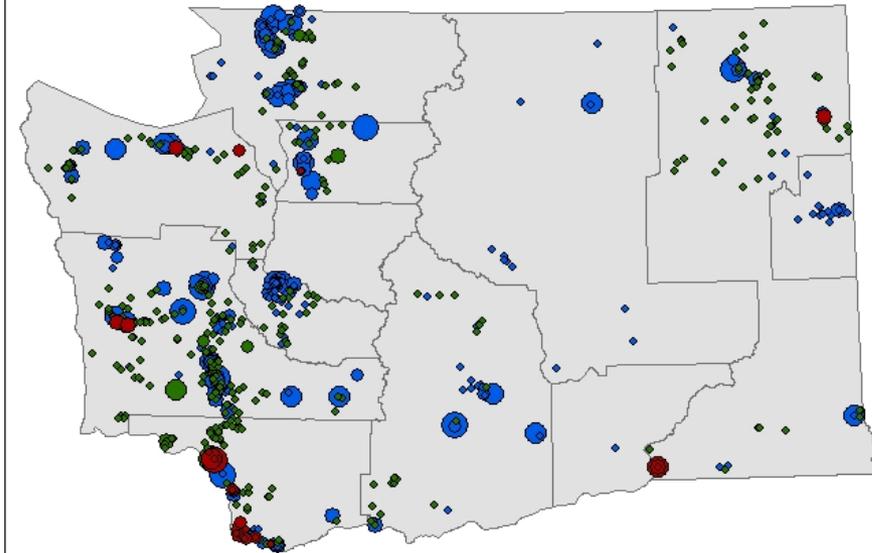
(Cattle, vegetables, fruit, & grain farms)
(Poultry & Animal Processing, Frozen Food, Canning & Preserving)



Legend

Poultry/Animal AVG	Cattle AVG	Frozen Food & Canning AVG	Vegetables, Fruit AVG	Grain Farms AVG
◆ 0 - 10	● 0 - 15	◆ 0 - 100	◆ 0 - 100	◇ 0 - 10
● 11 - 100	● 16 - 47	● 101 - 300	● 101 - 350	◇ 11 - 20
● 101 - 1197	● 48 - 95	● 301 - 465	● 351 - 1118	◇ 21 - 30

Forest Products (Logging, Wood Products, Pulp & Paper)



Establishments by Employment, 2007

Pulp and Paper		Logging	Wood Products		
AVG		AVG		AVG	
◆	1 - 30	◆	0 - 50	◆	0 - 50
●	31 - 90	●	51 - 100	●	51 - 100
●	91 - 300	●	101 - 150	●	101 - 150
●	301 - 800	●	151 - 200	●	151 - 200
●	801 - 1570	●	201 - 300	●	201 - 381

Work Yet To Be Done

- Analysis of concentration of sectors in the Portland Metro Area with Clark County, and in Kootenai County Idaho with Spokane County
- Prioritization of Clusters in each workforce region
- Mapping of selected clusters in each workforce region

Summary Comments

- **This is a work in progress**
- **There are clear differences in industry specializations in different regions of the state, and strong natural-resource based clusters in much of the state**
- **Niche industries are present in every region, often they are “isolates,” not clusters of firms**
- **Linked industries are fewer than anticipated, but there could be labor-force synergies in many sectors not captured in this analysis**
- **The Porter model of clusters may be only one pathway to regional success – politics, niche market players, the environment, and serendipity may also lead to regional success.**