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**An Economic and Workforce  
Evaluation of Targeted Industry  
Sectors in the  
Virginia Growth Alliance**

**April 2013**



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## Executive Summary

The Virginia Growth Alliance is a regional economic development organization serving the needs of the counties of Brunswick, Charlotte, Greensville, Lunenburg, Mecklenburg, and Nottoway, and the City of Emporia. In 2012, the Virginia Growth Alliance contracted with Mangum Economics to develop a regional profile and workforce development assessment for five targeted industry sectors – *Advanced Manufacturing; Forestry and Wood Products; Information Technology; Logistics and Distribution; and Tourism*. The principal findings from that assessment are as follows:

### 1) Recent regional economic trends:

- The Virginia Growth Alliance entered the 2007 recession earlier than Virginia as a whole, was harder hit by the recession than the state as a whole, and has yet to truly emerge from it.
- In addition, although the Alliance has experienced recent positive employment trends in certain high wage sectors such as *Professional and Technical Services* and *Information*, several major employment sectors, most notably *Manufacturing, Retail Trade, Construction, and Transportation and Warehousing*, continue to experience significant employment losses.

### 2) Targeted industry sectors:

- The largest subsectors within these five targeted sectors are: 1) *Wood Product Manufacturing* (994 jobs); 2) *Forestry and Logging* (425 jobs); 3) *Truck Transportation* (679 jobs); 4) *Warehousing and Storage* (553 jobs); 5) *Food Services and Drinking Places* (2,493 jobs); and 6) *Accommodation* (421 jobs).
- Based on recent and projected growth in establishments, employment, and wages, the highest performing subsectors within these five targeted industry sectors are: 1) *Support Activities for Agriculture and Forestry*; 2) *Forestry and Logging*; 3) *Plastics and Rubber Products Manufacturing*; 4) *Textile Mills*; 5) *Wood Products Manufacturing*; and 6) *Amusement, Gambling, and Recreation Industries*.

### 3) Workforce pipeline:

- Our evaluation of the current pipeline of trained workers that feed these five targeted industry sectors has shown that the largest gaps between the region's demand for, and supply of, trained workers tend to be in middle-skill occupations – those jobs that require some training beyond high school, but less than a baccalaureate degree.

- More specifically, the largest gaps appear to be in those programs that feed the occupations Auto Service Technician; Carpenter; Electrician; Industrial Machinery Mechanic; and Maintenance and Repair Worker.
- In addition, should the CCAM initiative meet its projected targets for future employment growth in aerospace, automotive, and heavy machinery manufacturing, there will also be a substantial increase in the need for programs that feed the occupations Computer Controlled Machine Tool Operators; Machinists; Machinery Maintenance Workers; Mobile Heavy Equipment Mechanics; Numerical Tool and Process Control Programmers; and Welders.

## Introduction

The Virginia Growth Alliance is a regional economic development organization serving the needs of the counties of Brunswick, Charlotte, Greenville, Lunenburg, Mecklenburg, and Nottoway, and the City of Emporia. The goal of the Alliance is to create an economic development brand for the region, promote its unique assets, and serve as a partner in the expansion of key industry clusters, workforce development, and fostering an entrepreneurial climate.



In mid 2012, the Virginia Growth Alliance contracted with Mangu Economics to develop a regional profile and workforce development assessment for four targeted industry sectors – *Advanced Manufacturing*; *Forestry and Wood Products*; *Information Technology*; and *Logistics and Distribution*. Based on subsequent feedback from the Virginia Department of Housing and Community Development, the *Tourism* sector was added to that list late in the year. This report presents the findings from our analysis of those five targeted industry sectors.

The remainder of the report is divided into five sections. The *Economic Profile* section provides a general profile of recent economic trends in the seven localities that comprise the Virginia Growth Alliance, and a more narrowly focused analysis of regional economic conditions within the five targeted industry sectors. The *Workforce Analysis* section provides an evaluation of the current pipeline of trained workers that feed these targeted industry sectors and compares that pipeline to current occupational demand, and

the potential increase in occupational demand that may be associated with on-going development of the Commonwealth Center for Advanced Manufacturing in Prince George County.

In addition to the quantitative data presented in the two previous sections, the *Focus Groups* section summarizes qualitative input received through several focus groups held across the region in which the preliminary findings of the empirical analysis were presented. While the *Workforce Development Plan* section provides recommendations for addressing apparent gaps in the supply of trained workers that were identified through the workforce analysis and supplemental focus groups. Finally, the *Conclusion* section provides a brief summary and concluding comments.

This report was commissioned by the Virginia Growth Alliance, and produced by Mangum Economics, LLC.

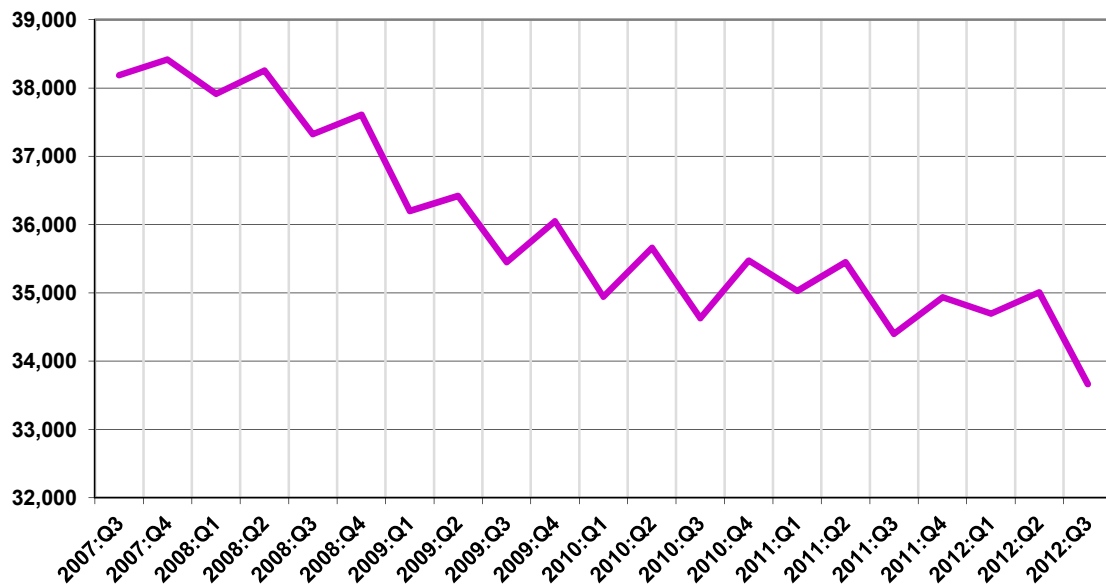
## **Economic Profile**

### Regional Economic Trends

In this portion of the section, we provide a context for the analysis to follow by profiling general economic trends within the seven localities that comprise the Virginia Growth Alliance.

#### *Total Employment*

Figure 1 depicts the trend in total employment in the Virginia Growth Alliance for the five-year period encompassing the third quarter of 2007 through the third quarter of 2012. As this graph shows, employment trends throughout this period were generally negative, although the largest employment losses occurred between late 2008 and late 2009 during the worst of the 2007 recession. Overall, between the third quarter of 2007 and the third quarter of 2012, the Virginia Growth Alliance experienced a loss of 4,522 jobs or an 11.8 percent decline in total employment. By way of comparison, over the same period at the statewide level, Virginia experienced a loss of 52,560 jobs or a 1.4 percent decline in total employment.

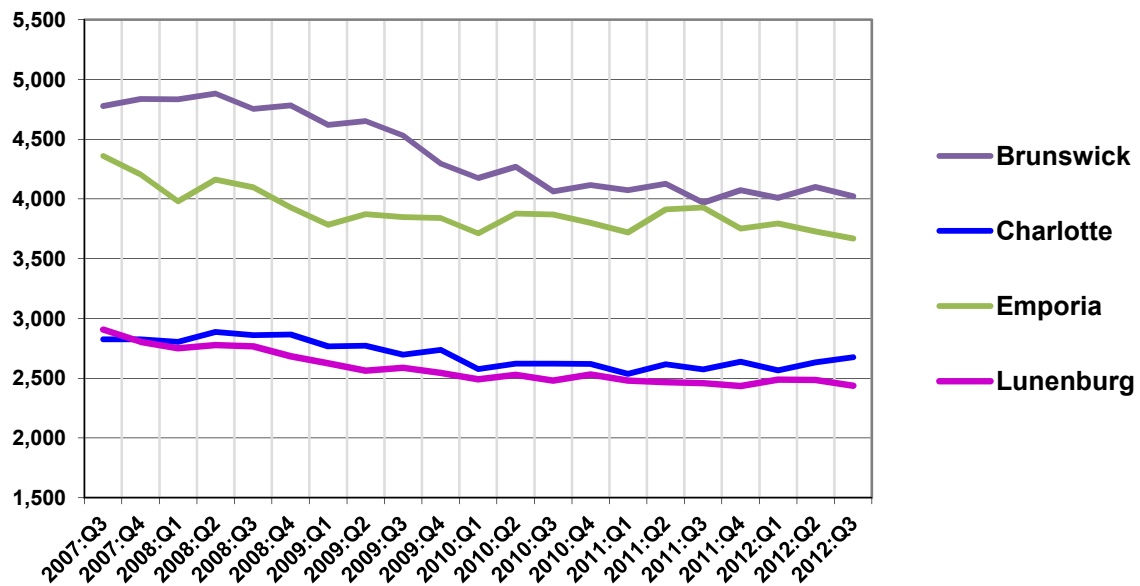


**Figure 1: Virginia Growth Alliance Total Employment – 2007:Q3 to 2012:Q3<sup>1</sup>**

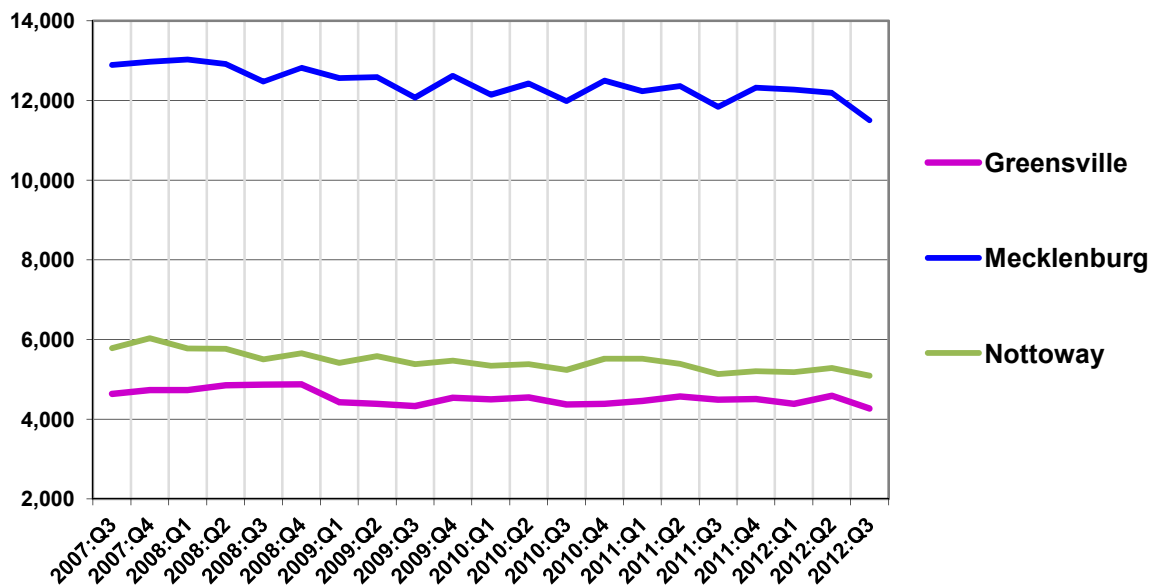
Figures 2A and 2B provide similar trend data for each of the seven localities that comprise the Virginia Growth Alliance. As these data show, consistent with the regional trend, each of these localities also experienced an overall decline in total employment over the period. The largest absolute job losses occurred in Mecklenburg County (down 1,389 jobs), Brunswick County (down 756 jobs), and the City of Emporia (down 690 jobs). While the largest proportional job losses occurred in Lunenburg County (down 16.1 percent of total employment), Brunswick County (down 15.8 percent of total employment), and the City of Emporia (down 15.8 percent of total employment).

<sup>1</sup> *Data Source:* Virginia Employment Commission. The Virginia growth Alliance is comprised of the counties of Brunswick, Charlotte, Greenville, Lunenburg, Mecklenburg, and Nottoway, and the City of Emporia.





**Figure 2A: Total Employment – 2007:Q3 to 2012:Q3<sup>2</sup>**



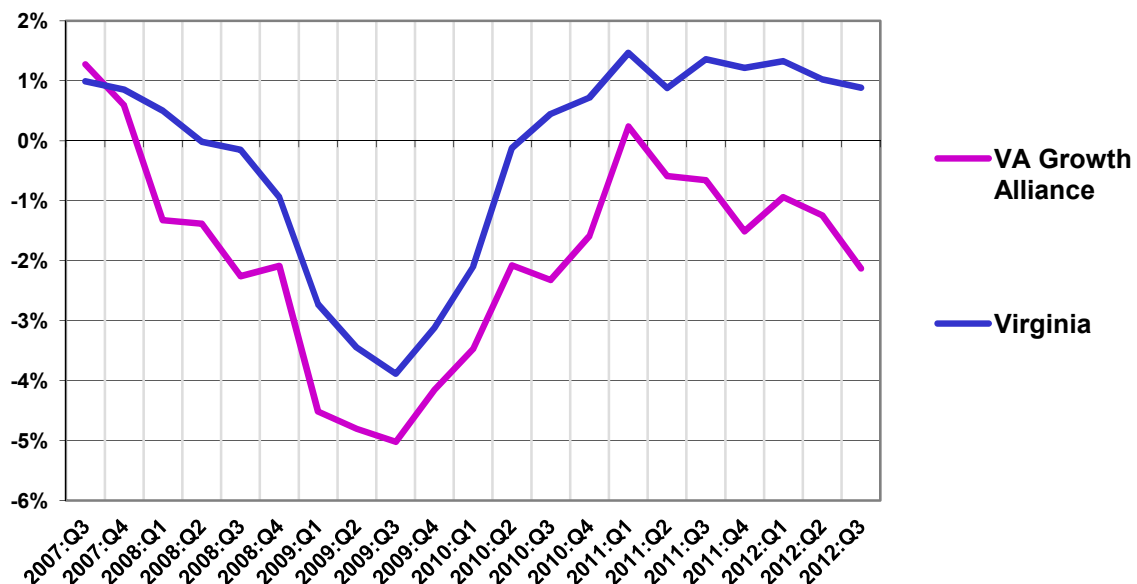
**Figure 2B: Total Employment – 2007:Q3 to 2012:Q3<sup>3</sup>**

<sup>2</sup> Data Source: Virginia Employment Commission.

<sup>3</sup> Data Source: Virginia Employment Commission.

To control for seasonality and provide a point of reference, Figure 3 compares the year-over-year change in total employment in the Virginia Growth Alliance to that of the state of Virginia as a whole over the same five year period depicted in Figure 1 (*i.e.*, the third quarter of 2007 through the third quarter of 2012). Any observation above the zero line indicates positive year-over-year employment growth, while any observation below the zero line indicates a year-over-year decline in employment.

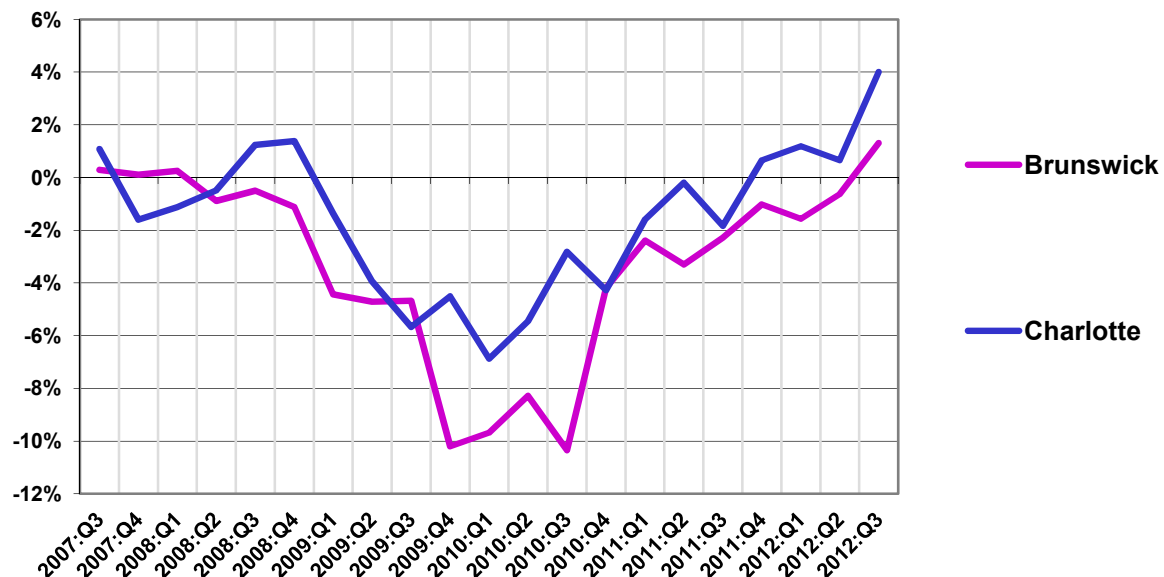
The data shown in Figure 3 reveal three important characteristics. First, the Virginia Growth Alliance entered the recession sooner than the state of Virginia as a whole, experiencing year-over-year job losses as early as the first quarter of 2008. Second, the Virginia Growth Alliance was harder hit by the recession than the state as a whole, with year-over-year employment losses hitting 5.0 percent in the third quarter of 2009 as compared to 3.9 percent statewide. Third, where the state as a whole emerged from the recession and began to experience positive year-over-year changes in employment by third quarter of 2010, employment trends in the Virginia Growth Alliance have generally remained negative. Moreover, since the second quarter of 2011 these data have displayed further deterioration.



**Figure 3: Year-Over-Year Change in Employment – 2007:Q3 to 2012:Q3<sup>4</sup>**

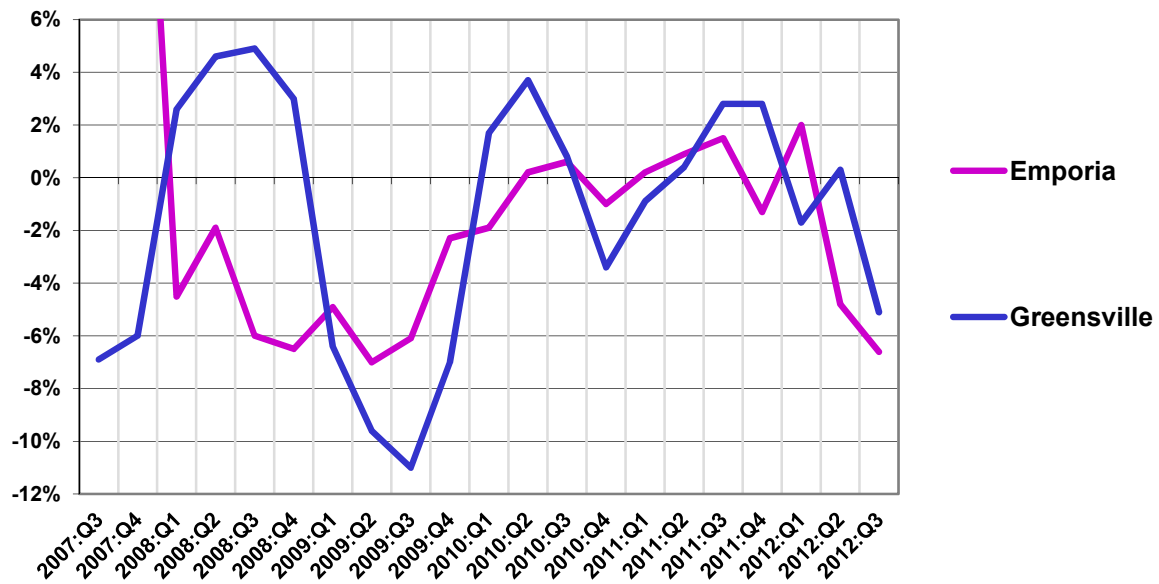
<sup>4</sup> Data Source: Virginia Employment Commission.

As before, Figures 4A, 4B, and 4C provide a drill down of these data for the seven localities that comprise the Virginia Growth Alliance. As these charts indicate, the three localities that experienced the largest year-over-year employment declines over this period were Greenville County (11.0 percent decline in the third quarter of 2009), Brunswick County (10.3 percent decline in the third quarter of 2010), and the City of Emporia (7.0 percent decline in the second quarter of 2009). As of the third quarter of 2012, the most recent quarter for which data are available, all but two of the seven localities within the Virginia Growth Alliance were experiencing year-over-year declines in employment. The largest of those losses were in the City of Emporia (down 6.6 percent from the previous year) and Greenville County (down 5.1 from the previous year) percent. The two localities that experienced year-over-year employment gains in the third quarter of 2012 were Charlotte County (up 4.0 percent from the previous year) and Brunswick County (up 1.3 percent from the previous year).

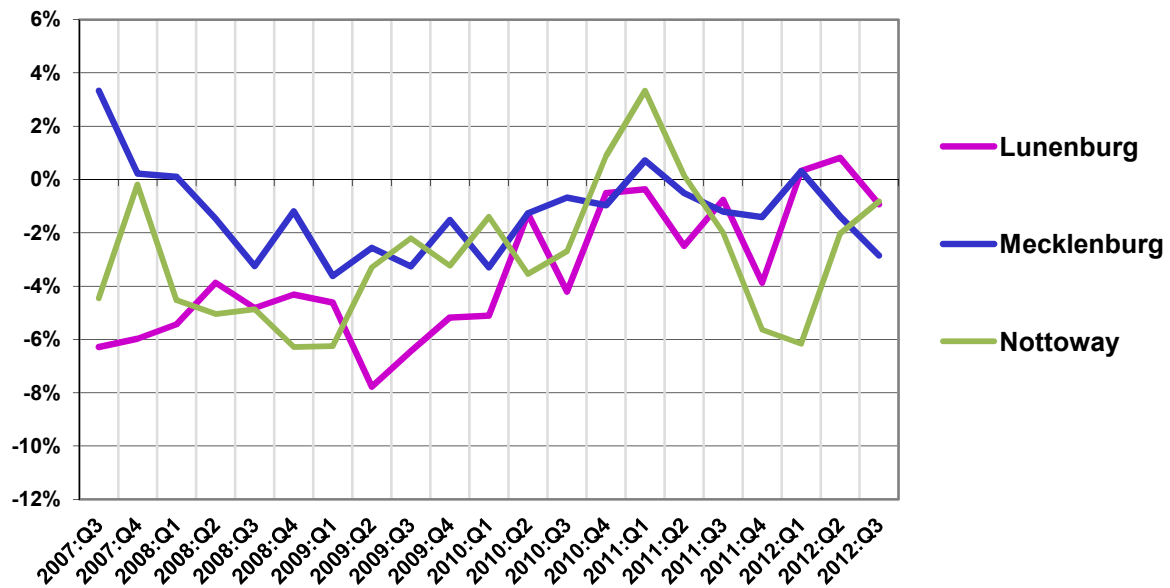


**Figure 4A: Year-Over-Year Change in Employment – 2007:Q3 to 2012:Q3<sup>5</sup>**

<sup>5</sup> Data Source: Virginia Employment Commission.



**Figure 4B: Year-Over-Year Change in Employment – 2007:Q3 to 2012:Q3<sup>6</sup>**



**Figure 4C: Year-Over-Year Change in Employment – 2007:Q3 to 2012:Q3<sup>7</sup>**

<sup>6</sup> Data Source: Virginia Employment Commission.

<sup>7</sup> Data Source: Virginia Employment Commission.

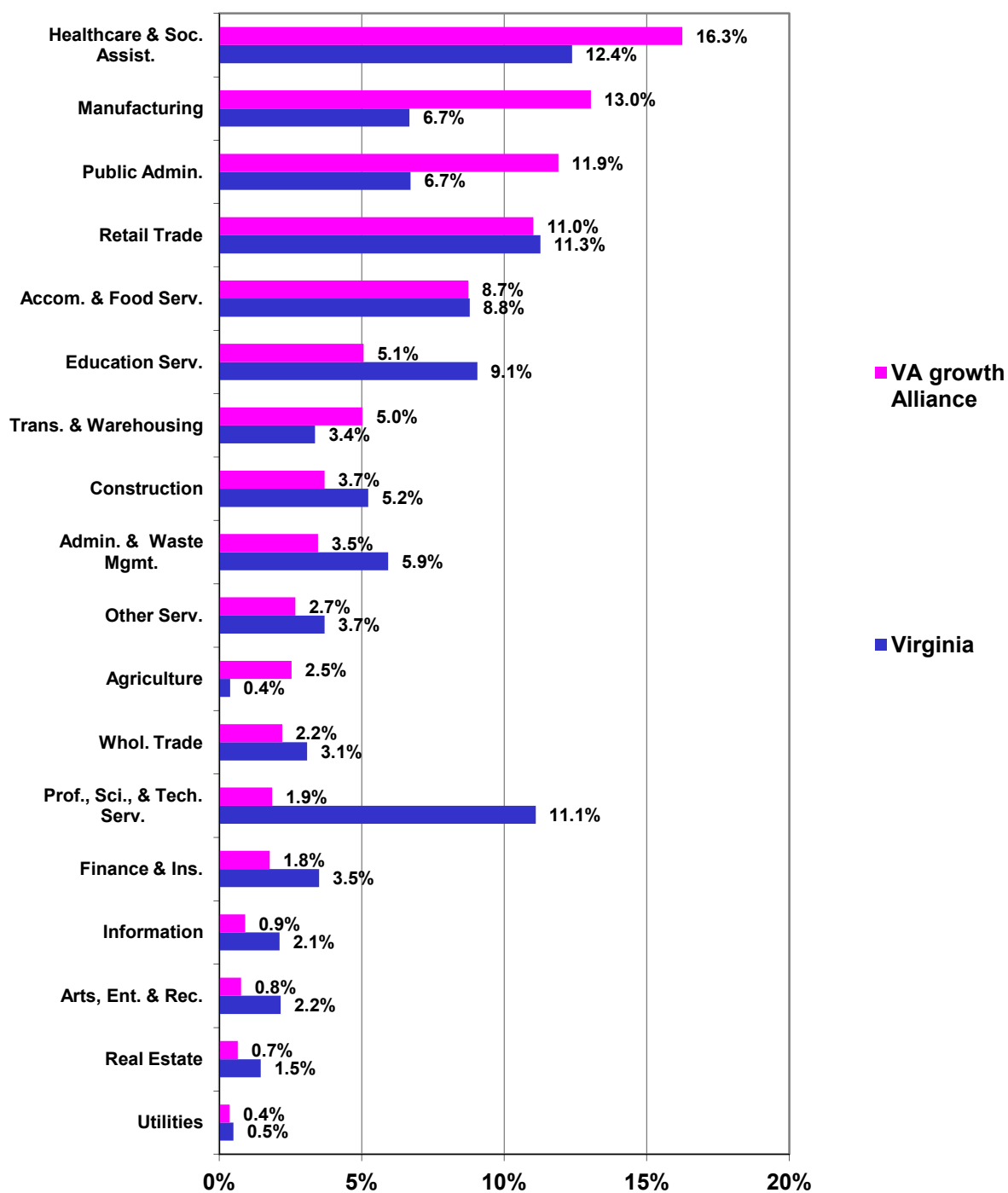
## *Employment and Wages by Major Industry Sector*

To provide a better understanding of the underlying factors motivating the total employment trends depicted in Figures 1 and 3, Figures 5 through 7 profile recent conditions in the Virginia Growth Alliance's major industry sectors (for a local drill down of these data *see* Tables A1 through A21 in the Appendix).

Figure 5 provides an indication of the distribution of employment across major industry sectors in the Virginia Growth Alliance by ranking each sector according to its proportion of total employment in the third quarter of 2012 and comparing that proportion to the statewide norm. As this graph demonstrates, *Healthcare and Social Assistance* was the largest employment sector in the region, accounting for 16.3 percent of total employment in the third quarter of 2012 (compared to 12.4 percent statewide). *Manufacturing* ranked second and accounted for 13.0 percent of total employment (compared to 6.7 percent statewide). While *Public Administration* ranked third and accounted for 11.9 percent of total employment (compared to 6.7 percent statewide).

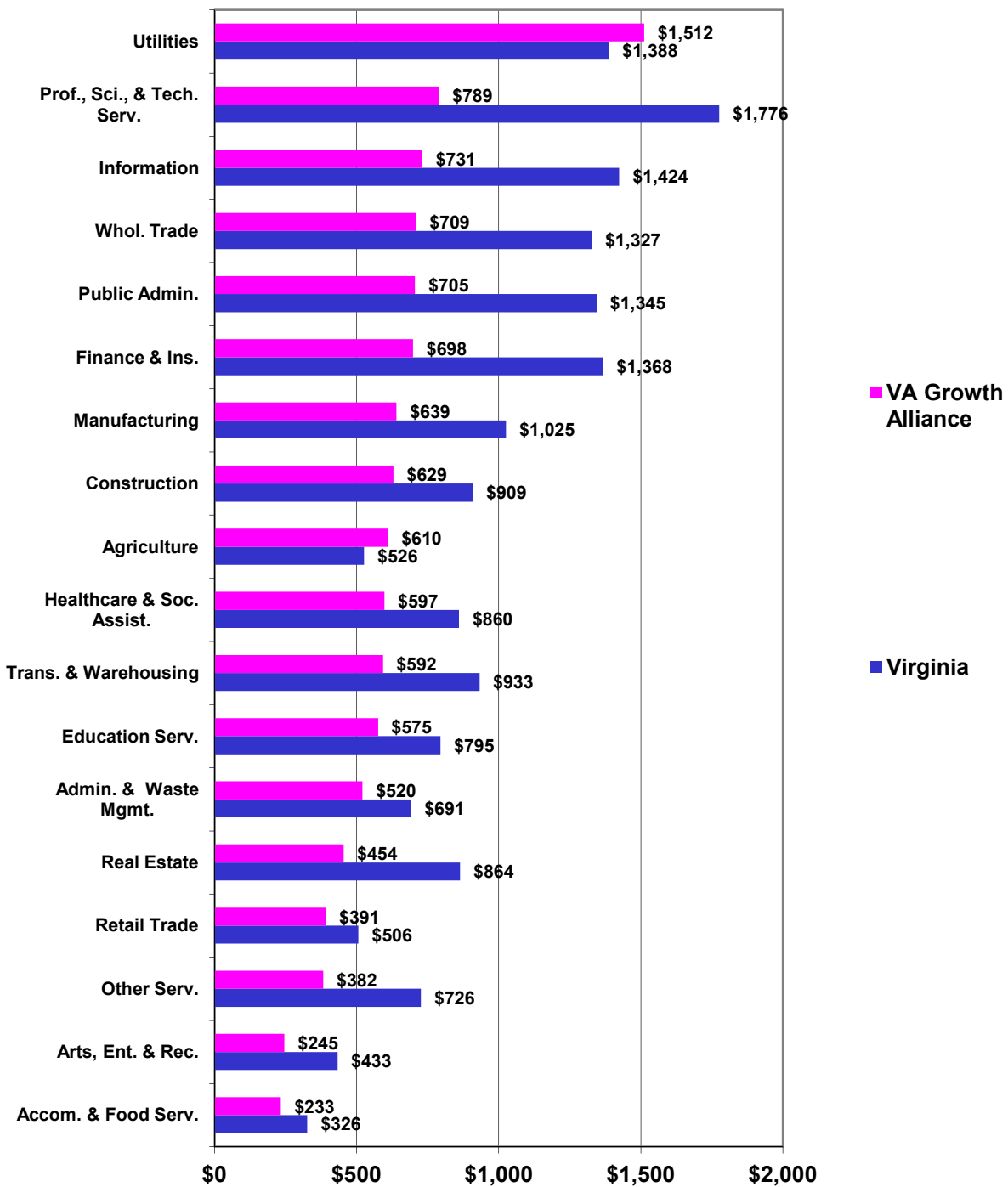
Figure 6 provides a similar ranking for average weekly wages by major industry sector in the third quarter of 2012. As these data show, *Utilities* was the Virginia Growth Alliance's highest paying industry sector that quarter, with average weekly wages of \$1,512 (compared to \$1,388 statewide), followed by *Professional and Technical Services* which paid average weekly wages of \$789 (compared to \$1,776 statewide), and *Information* which paid average weekly wages of \$731 (compared to \$1,424 statewide).

Lastly, Figure 7 details year over year changes in employment in the Virginia Growth Alliance between the third quarter of 2011 and the third quarter of 2012 by major industry sector. Overall over this period, the region saw a net decline of 712 jobs or a 2.1 percent drop in total employment. Figure 7 provides a better understanding of the factors that drove this change. As these data indicate, the largest employment gains in the region occurred in the *Accommodation and Food Services* (up 120 jobs), *Healthcare and Social Assistance* (up 79 jobs), and *Professional and Technical Services* (up 65 jobs) sectors. At the other end of the spectrum, the largest employment declines occurred in the *Transportation and Warehousing* (down 205 jobs), *Administrative and Waste Management Services* (down 162 jobs), and *Construction* (down 142 jobs) sectors.



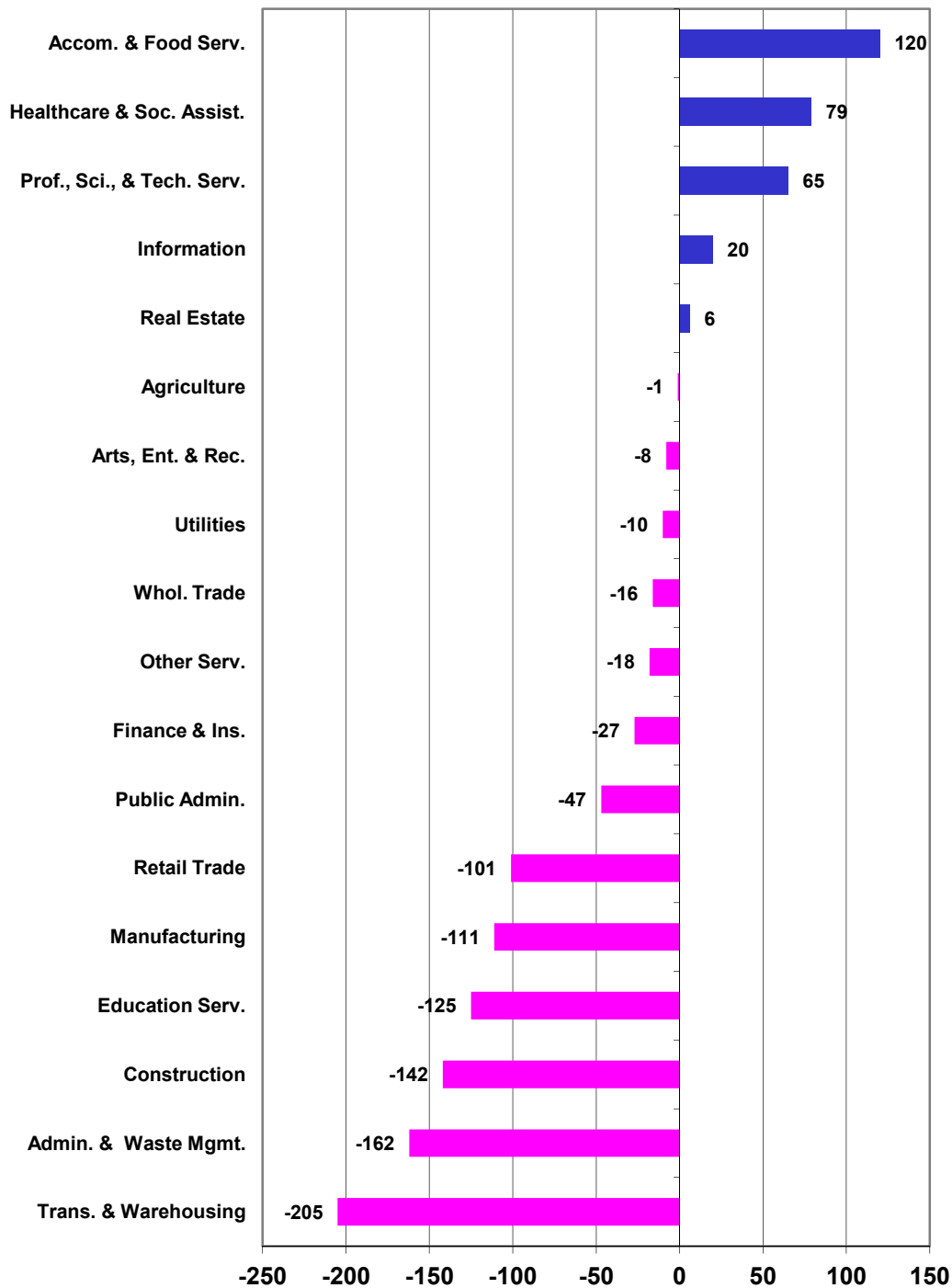
**Figure 5: Major Industry Sectors as a Percentage of Total Employment – 2012:Q3<sup>8</sup>**

<sup>8</sup> Data Source: Virginia Employment Commission.



**Figure 6: Average Weekly Wages by Major Industry Sector – 2012:Q3<sup>9</sup>**

<sup>9</sup> Data Source: Virginia Employment Commission.



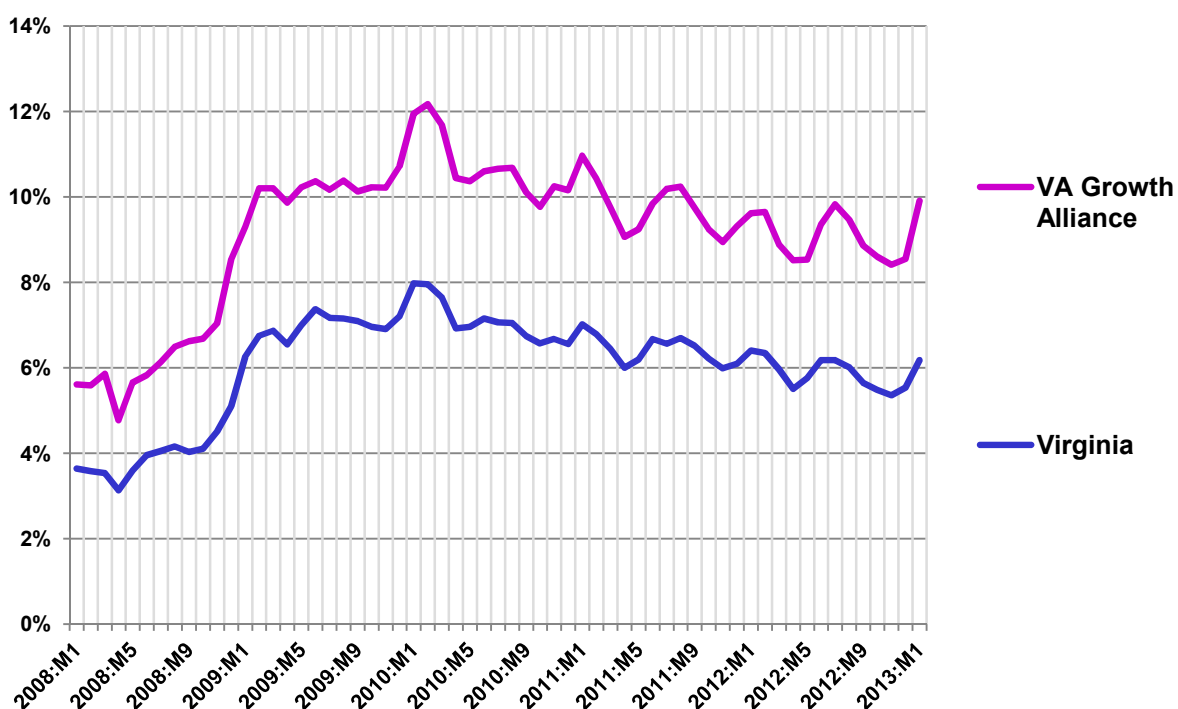
**Figure 7: Virginia Growth Alliance Change in Employment by Major Industry Sector – 2011:Q3 to 2012:Q3<sup>10</sup>**

<sup>10</sup> Data Source: Virginia Employment Commission.



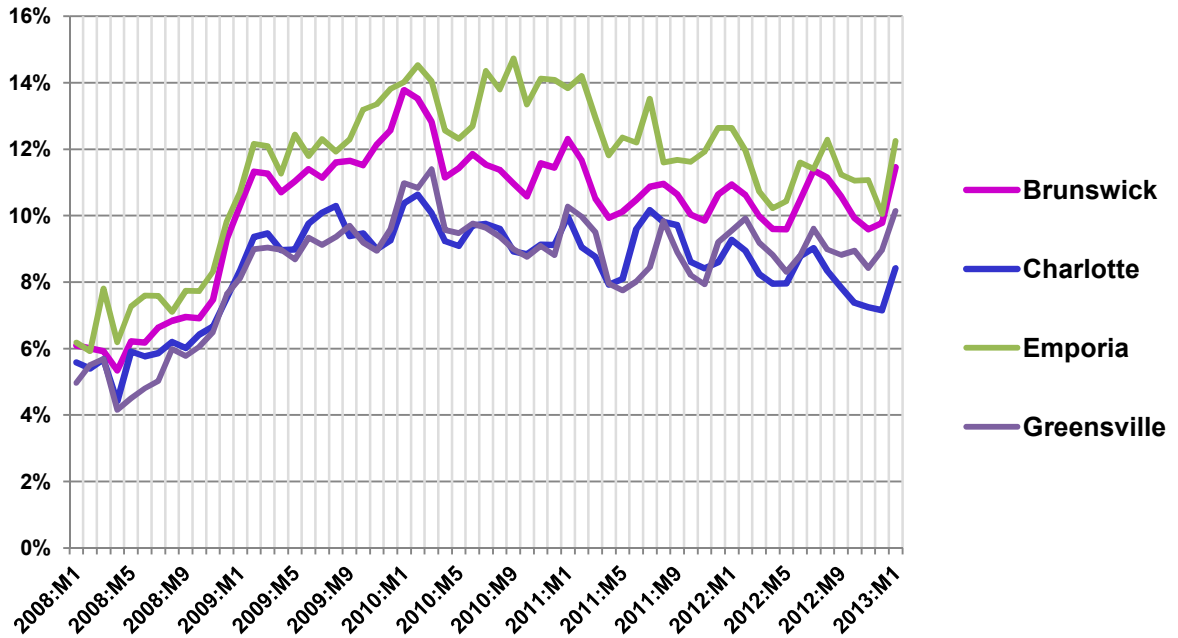
## Unemployment

Figure 8 depicts unemployment trends in the Virginia Growth Alliance for the five-year period from January of 2008 through January of 2013 and compares those trends to data for the state of Virginia as a whole. As these data show, prior to the recession unemployment in the Virginia Growth Alliance was generally about two percentage points above the statewide average. Unemployment rates in both jurisdictions began to escalate rapidly around the middle of 2008 as the 2007 recession began to take its toll, and this escalation very quickly doubled the unemployment gap between the Virginia Growth Alliance and the statewide norm to four percentage points. Unemployment peaked in February of 2010 at 12.2 percent in the Virginia Growth Alliance and 8.0 percent statewide. Unemployment rates have since grudgingly declined and, as of January 2013, stood at 9.9 percent in the Virginia Growth Alliance and 6.2 percent statewide.

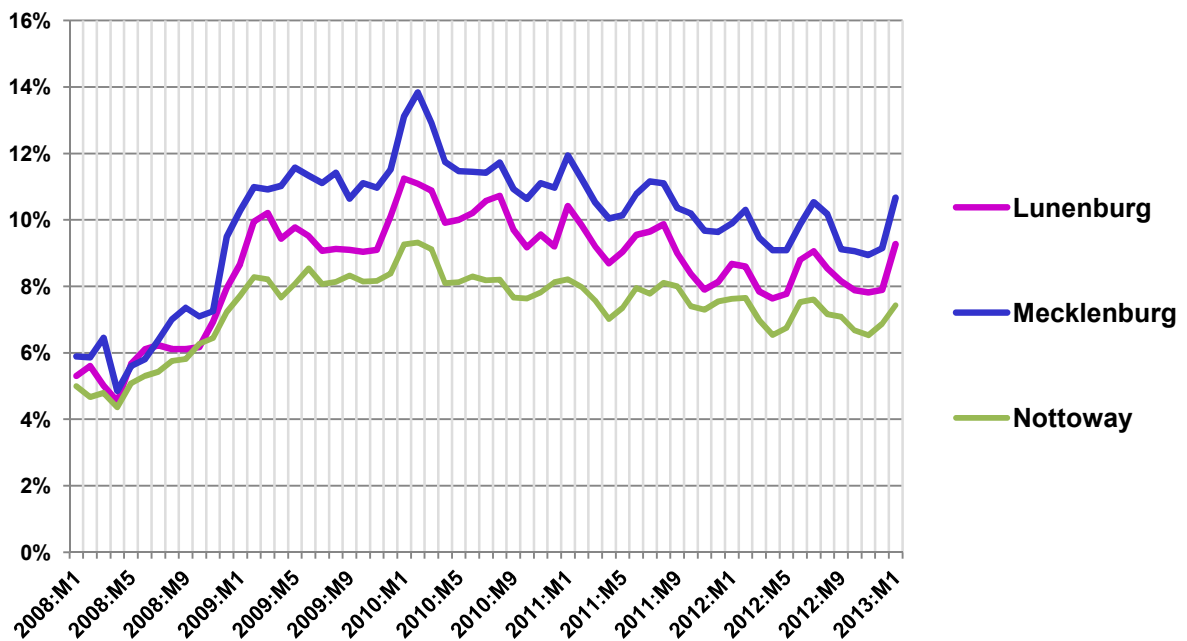


**Figure 8: Unemployment Rate – January 2008 to January 2013<sup>11</sup>**

<sup>11</sup> Data Source: Virginia Employment Commission.



**Figure 9A: Unemployment Rate – January 2008 to January 2013<sup>12</sup>**



**Figure 9B: Unemployment Rate – January 2008 to January 2013<sup>13</sup>**

<sup>12</sup> Data Source: Virginia Employment Commission.

<sup>13</sup> Data Source: Virginia Employment Commission.

Figures 9A and 9B provide similar data for the seven localities that comprise the Virginia Growth Alliance. As these data show, the City of Emporia generally suffered the highest unemployment rates over this period, followed by the counties of Mecklenburg and Brunswick respectively.

## *Review*

The data presented in this portion of the section have shown that the seven localities that comprise the Virginia Growth Alliance entered the 2007 recession earlier than Virginia as a whole, were harder hit by the recession than the state as a whole, and have yet to truly emerge from it. In addition, these data have shown that, although the region has experienced recent positive employment trends in certain high wage sectors such as *Professional and Technical Services* and *Information*, several major regional employment sectors, most notably *Manufacturing*, *Retail Trade*, *Construction*, and *Transportation and Warehousing*, continue to experience significant employment losses.

## Targeted Industry Sectors

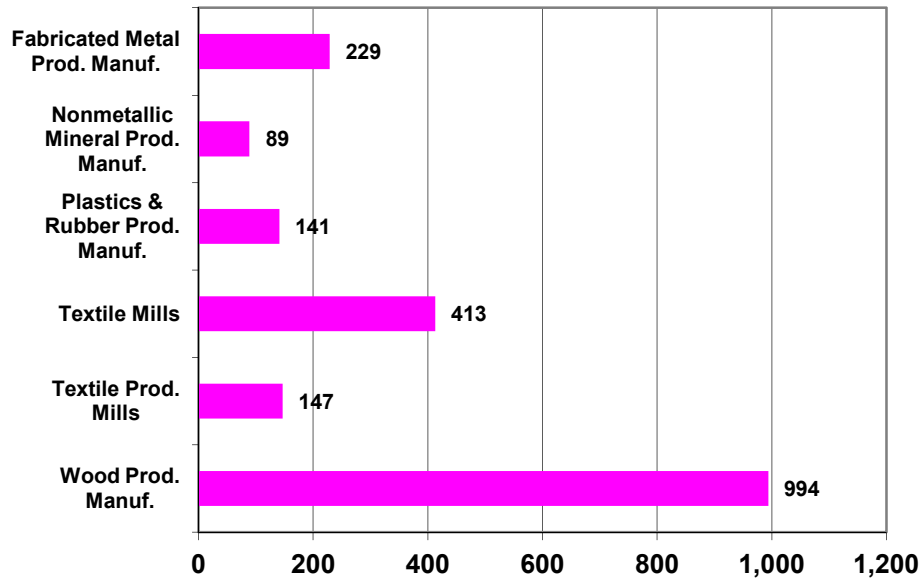
In this portion of the section, we provide a more narrowly focused analysis of regional economic conditions within the five industry sectors that the Virginia Growth Alliance has chosen to target – *Advanced Manufacturing*; *Forestry and Wood Products*; *Information Technology*; *Logistics and Distribution*; and *Tourism*.

## *Region Wide Profile – Advanced Manufacturing*

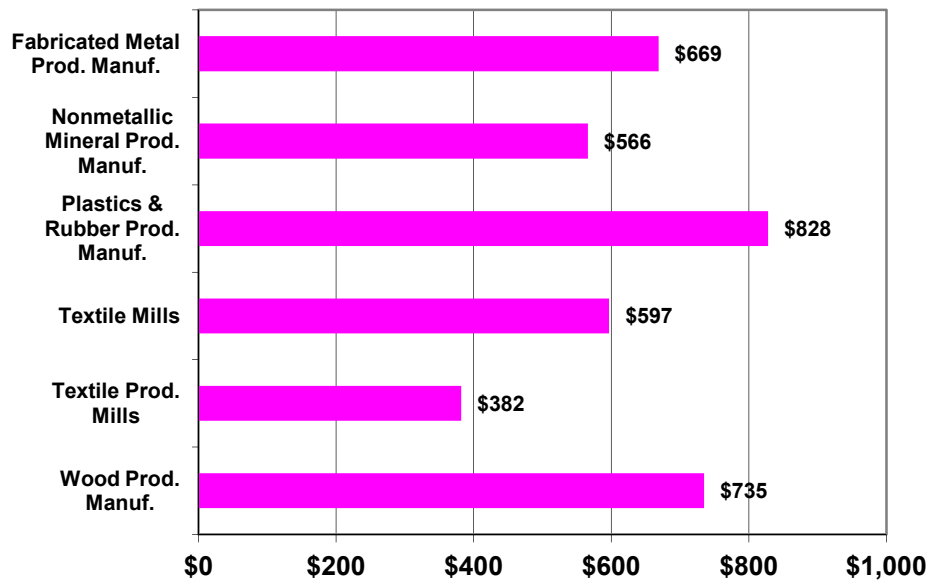
Figures 10 through 12 profile recent conditions in the Virginia Growth Alliance's *Advanced Manufacturing* sector.<sup>14</sup> As shown in Figure 10, there were six active industry subsectors in this cluster in the third quarter of 2012 in the region: *Fabricated Metal Product Manufacturing*; *Nonmetallic Mineral Product Manufacturing*; *Plastics and Rubber Product Manufacturing*; *Textile Mills*; *Textile Product Mills*; and *Wood Product Manufacturing*. Of these, *Wood Product Manufacturing* was by far the largest, with regional employment of 994 jobs. As shown in Figure 11, average wages in these industry subsectors generally compared favorably to the region-wide average of \$570 per week, and ranged from a high of \$828 in *Plastics and Rubber Product Manufacturing* to a low of \$382 per week in *Textile Product Mills*.

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<sup>14</sup> Consistent with the often heard truism that any manufacturing sector remaining in the United States today constitutes “advanced manufacturing,” in this portion of the section we profile all active manufacturing subsectors within the Virginia Growth Alliance. It is important to realize, however, that at this level of industry and geographic specificity, these data can be subject to disclosure restrictions by the Virginia Employment Commission. As a result, it is possible that some firms (and some employment) within the region may not be captured in these data.



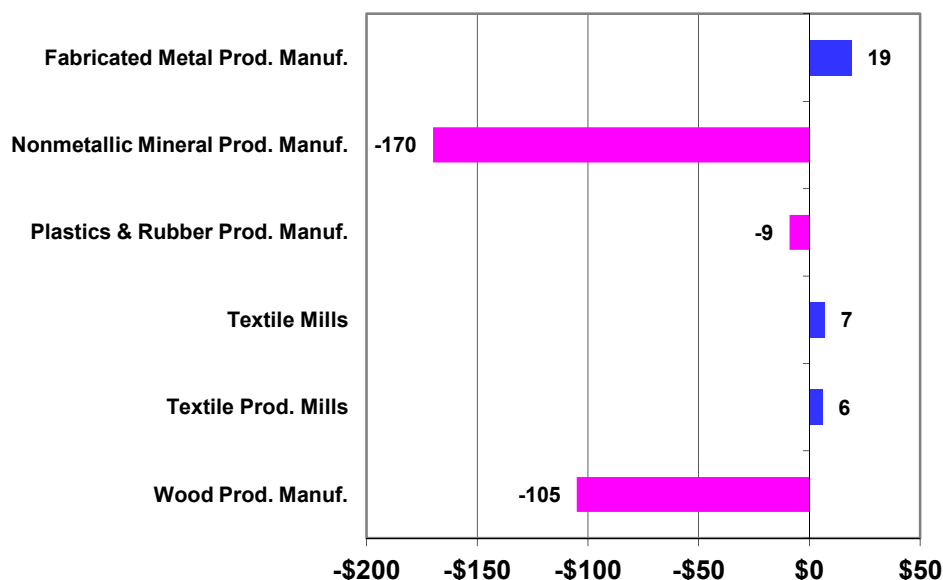
**Figure 10: Advanced Manufacturing Sector, Regional Employment – 2012:Q3<sup>15</sup>**



**Figure 11: Advanced Manufacturing Sector, Regional Wages – 2012:Q3<sup>16</sup>**

<sup>15</sup> Data Source: Virginia Employment Commission.

<sup>16</sup> Data Source: Virginia Employment Commission.



**Figure 12: Advanced Manufacturing Sector, Change in Regional Employment – 2011:Q3 to 2012:Q3<sup>17</sup>**

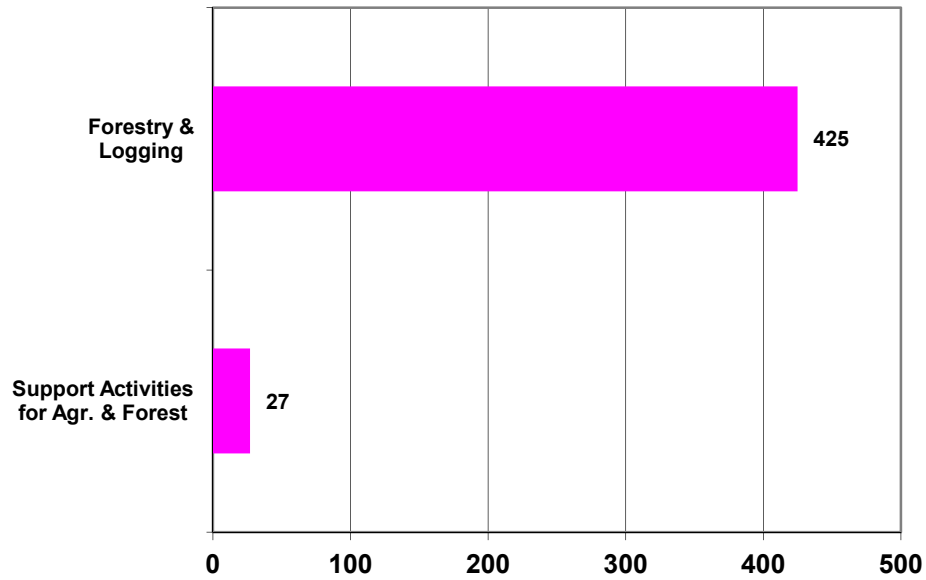
Finally, as shown in Figure 12 this targeted sector generally experienced employment losses between the third quarter of 2011 and the third quarter of 2012, with the largest declines occurring in *Nonmetallic Mineral Product Manufacturing* (down 170 jobs) and *Wood Product Manufacturing* (down 105 jobs).

### *Region Wide Profile – Forestry and Wood Products*

Figures 13 through 15 provide comparable data for the *Forestry and Wood Products* sector. As depicted in Figure 13, the region was home to two active industry subsectors in this cluster in the third quarter of 2012: *Forestry and Logging*; and *Support Activities for Agriculture and Forestry*.<sup>18</sup> Of these, *Forestry and Logging* was the largest, with regional employment of 425 jobs. As the data contained in Figure 14 indicate, average wages in these industry subsectors exceeded the region-wide average of \$570 per week, with *Forestry and Logging* paying \$711 per week and *Support Activities for Agriculture and Forestry* paying \$822 per week. Finally, as shown in Figure 15, this targeted industry sector experienced a very modest increase in employment between the third quarter of 2011 and the third quarter of 2012 (up 6 jobs).

<sup>17</sup> Data Source: Virginia Employment Commission.

<sup>18</sup> It is important to realize, however, that at this level of industry and geographic specificity, these data can be subject to disclosure restrictions by the Virginia Employment Commission. As a result, it is possible that some firms (and some employment) within the region may not be captured in these data.



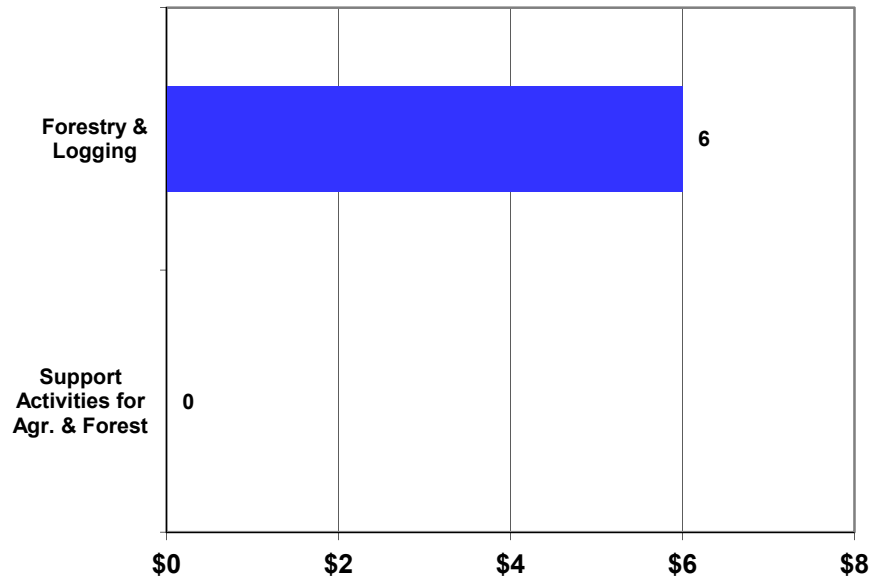
**Figure 13: Forestry and Wood Products Sector, Regional Employment – 2012:Q3<sup>19</sup>**



**Figure 14: Forestry and Wood Products Sector, Regional Wages – 2012:Q3<sup>20</sup>**

<sup>19</sup> Data Source: Virginia Employment Commission.

<sup>20</sup> Data Source: Virginia Employment Commission.



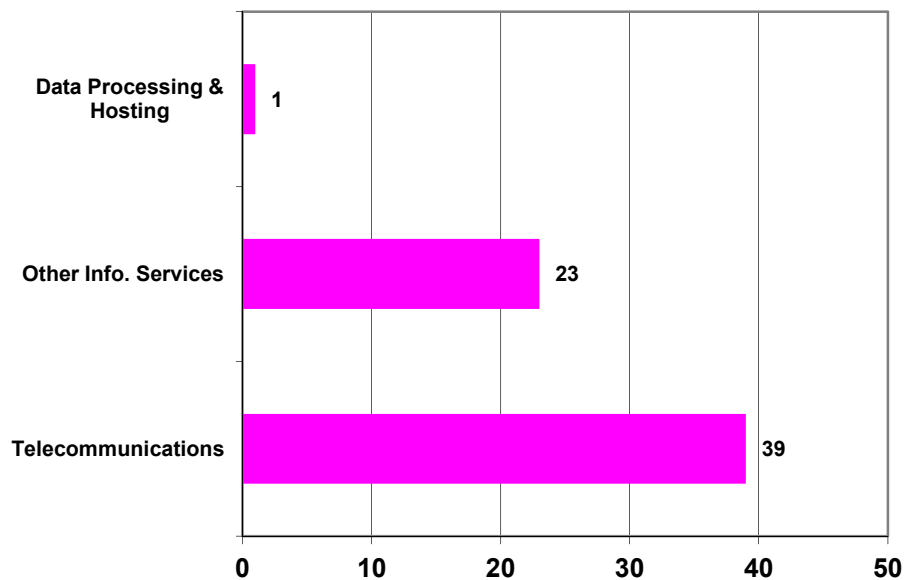
**Figure 15: Forestry and Wood Products Sector, Change in Regional Employment – 2011:Q3 to 2012:Q3<sup>21</sup>**

### *Region Wide Profile – Information Technology*

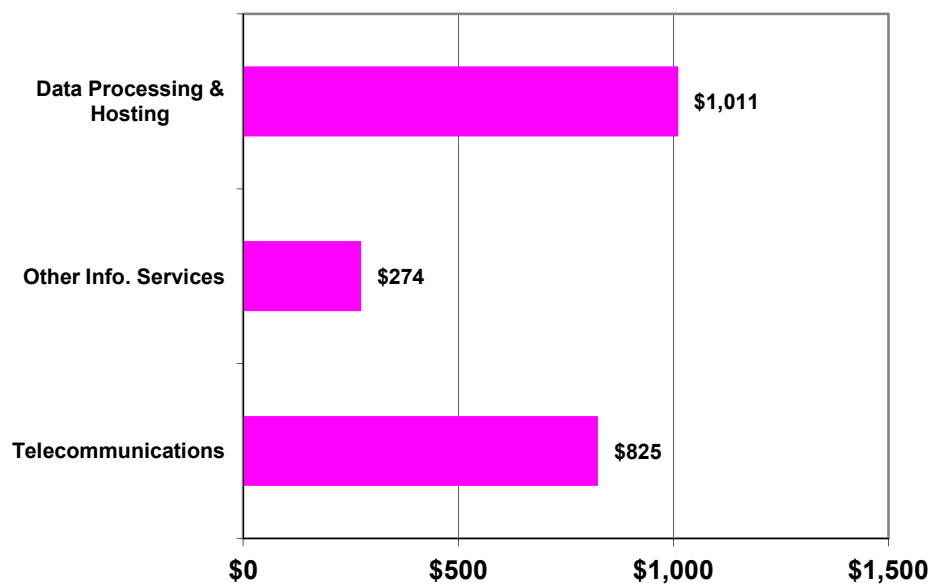
Figures 16 through 18 profile the region's *Information Technology* sector. As shown in Figure 16, in the third quarter of 2012 there were three active industry subsectors within this cluster in the region: *Data Processing and Hosting*; *Other Information Services*; and *Telecommunications*.<sup>22</sup> Of these, *Telecommunications* was the largest, with regional employment of 39 jobs. As depicted in Figure 17, average wages in these industry subsectors generally compared favorably to the region-wide average of \$570 per week, with *Data Processing and Hosting* paying \$1,011 per week, *Telecommunications* paying \$825 per week, while *Other Information Services* paid \$274 per week. As shown in Figure 18, this targeted industry sector experienced a small decline in employment between the third quarter of 2011 and the third quarter of 2012 down 16 jobs).

<sup>21</sup> *Data Source:* Virginia Employment Commission.

<sup>22</sup> It is important to realize, however, that at this level of industry and geographic specificity, these data can be subject to disclosure restrictions by the Virginia Employment Commission. As a result, it is possible that some firms (and some employment) within the region may not be captured in these data.



**Figure 16:** Information Technology Sector, Regional Employment – 2012:Q3<sup>23</sup>

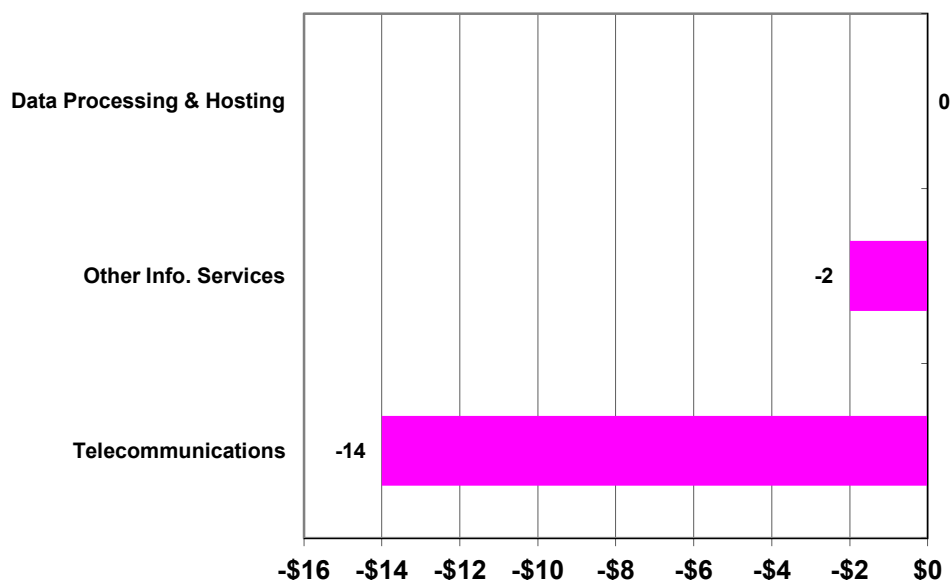


**Figure 17:** Information Technology Sector, Regional Wages – 2012:Q3<sup>24</sup>

<sup>23</sup> Data Source: Virginia Employment Commission.

<sup>24</sup> Data Source: Virginia Employment Commission.





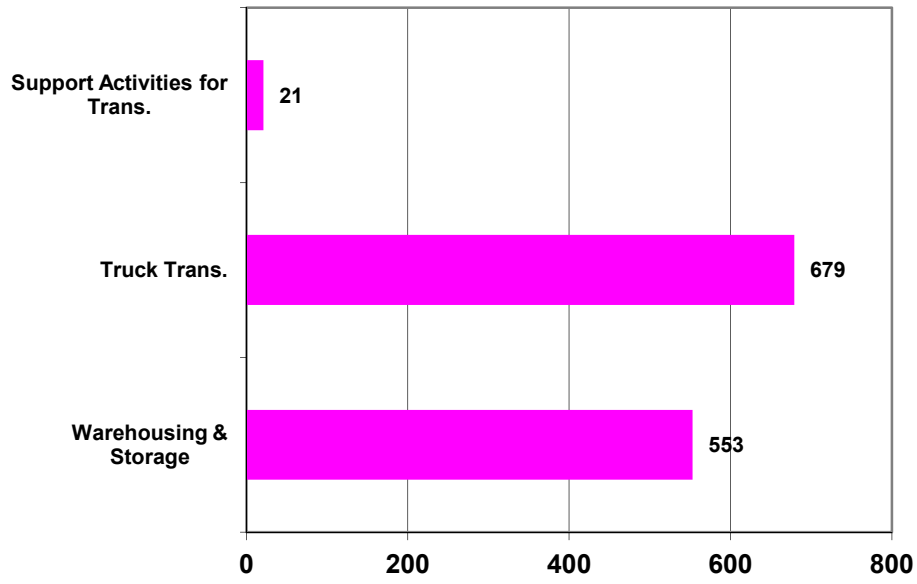
**Figure 18: Information Technology Sector, Change in Regional Employment – 2011:Q3 to 2012:Q3<sup>25</sup>**

### *Region Wide Profile – Logistics and Distribution*

Figures 19 through 21 provide data on the region's *Logistics and Distribution* sector. As the data provided in Figure 19 indicate, in the third quarter of 2012 there were three active industry subsectors within this cluster in the region: *Support Activities for Transportation*; *Truck Transportation*; and *Warehousing and Storage*.<sup>26</sup> Of these, *Truck Transportation* and *Warehousing and Storage* were the largest, with regional employment of 679 jobs and 553 jobs respectively. As shown in Figure 20, one of these subsectors paid wages that were above the region-wide average of \$570 per week (*Truck Transportation* paid \$621 per week), while two subsectors paid wages that were below the region-wide average (*Support Activities for Transportation* paid \$436 per week and *Warehousing and Storage* paid \$437 per week). As depicted in Figure 21, this targeted industry sector experienced a net increase in employment of 59 jobs between the third quarter of 2011 and the third quarter of 2012, with *Truck Transportation* serving as the driving force for that change.

<sup>25</sup> Data Source: Virginia Employment Commission.

<sup>26</sup> It is important to realize, however, that at this level of industry and geographic specificity, these data can be subject to disclosure restrictions by the Virginia Employment Commission. As a result, it is possible that some firms (and some employment) within the region may not be captured in these data.



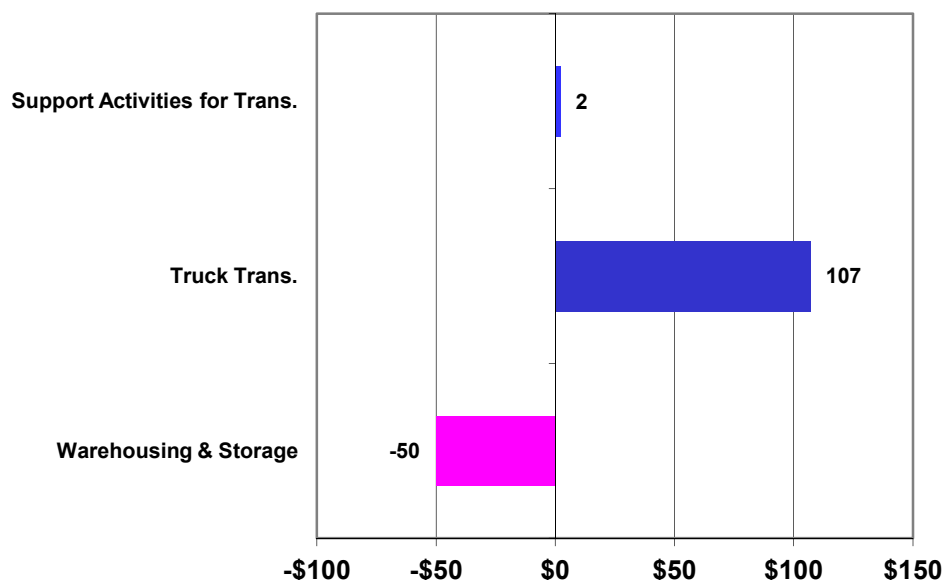
**Figure 19: Logistics and Distribution Sector, Regional Employment – 2012:Q3<sup>27</sup>**



**Figure 20: Logistics and Distribution Sector, Regional Wages – 2012:Q3<sup>28</sup>**

<sup>27</sup> Data Source: Virginia Employment Commission.

<sup>28</sup> Data Source: Virginia Employment Commission.



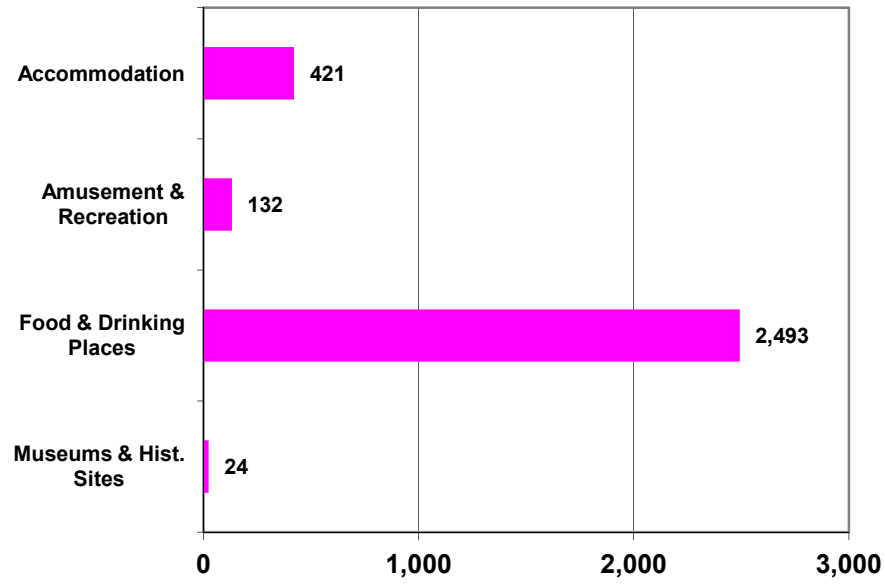
**Figure 21: Logistics and Distribution Sector, Change in Regional Employment – 2011:Q3 to 2012:Q3<sup>29</sup>**

### *Region Wide Profile – Tourism*

Finally, Figures 22 through 24 profile the region's *Tourism* sector. As shown in Figure 22, in the third quarter of 2012 there were four active regional industry subsectors within this cluster: *Accommodation*; *Amusement and Recreation*; *Food Services and Drinking Places*; and *Museums and Historical Sites*.<sup>30</sup> Of these, *Food Services and Drinking Places* was by far the largest, with regional employment of 2,493 jobs. As the data depicted in Figure 23 indicate, each of these subsectors paid weekly wages that were below the region-wide average of \$570 per week. As shown in Figure 24, between the third quarter of 2011 and the third quarter of 2012, this targeted industry sector experienced a net growth of 151 jobs, with *Food Services and Drinking Places* serving as the driving force for that change.

<sup>29</sup> *Data Source:* Virginia Employment Commission.

<sup>30</sup> It is important to realize, however, that at this level of industry and geographic specificity, these data can be subject to disclosure restrictions by the Virginia Employment Commission. As a result, it is possible that some firms (and some employment) within the region may not be captured in these data.



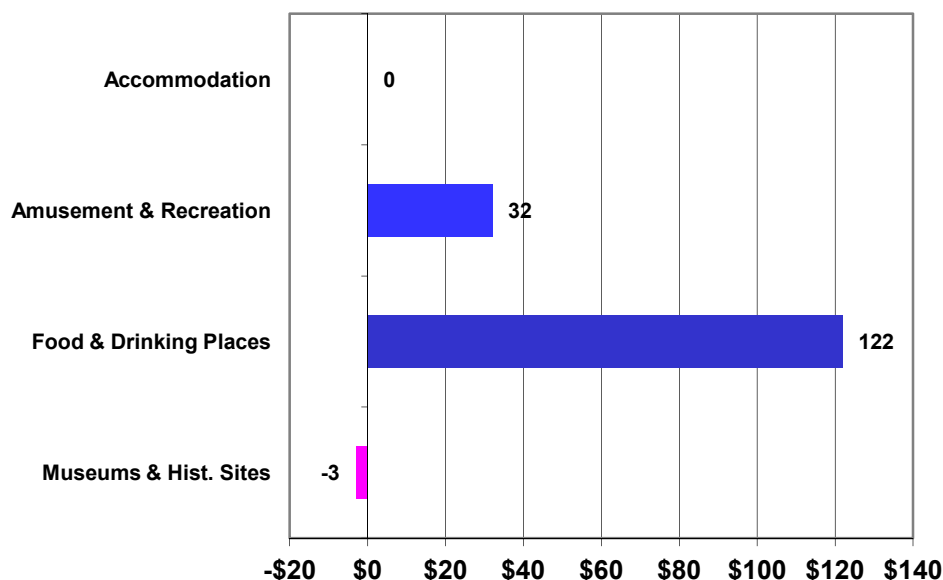
**Figure 22: Tourism Sector, Regional Employment – 2012:Q3<sup>31</sup>**



**Figure 23: Tourism Sector, Regional Wages – 2012:Q3<sup>32</sup>**

<sup>31</sup> Data Source: Virginia Employment Commission.

<sup>32</sup> Data Source: Virginia Employment Commission.



**Figure 24: Tourism Sector, Change in Regional Employment – 2011:Q3 to 2012:Q3<sup>33</sup>**

### *County/City Level Drill Down*

In Tables 1 and 2, we provide local detail on employment and wages respectively in each of the targeted industry sectors across the seven localities that comprise the Virginia Growth Alliance. As these data indicate, regional employment in the:

1. *Advanced Manufacturing* sector tends to be concentrated in Mecklenburg County (56 percent), Charlotte County (15 percent), and Nottoway County (15 percent).
2. *Forestry and Wood Products* sector tends to be concentrated in Brunswick County (58 percent) and Charlotte County (26 percent).
3. *Information Technology* sector tends to be concentrated in Mecklenburg County (62 percent) and Brunswick County (25 percent).
4. *Logistics and Distribution* sector tends to be concentrated in Mecklenburg County (55 percent) and Brunswick County (22 percent).
5. *Tourism* sector tends to be concentrated in Mecklenburg County (44 percent) and the City of Emporia (22 percent).

<sup>33</sup> Data Source: Virginia Employment Commission.

**Table 1: Targeted Industry Sector Employment by Locality – 2012:Q3<sup>34</sup>**

Industry Code (NAICS)	Industry	Brunswick	Charlotte	Emporia	Greenville	Lunenburg	Mecklenburg	Nottoway
<b>Advanced Manufacturing:</b>								
313	Textile Mills						413	
314	Textile Product Mills						147	
321	Wood Product Manufacturing	106	293		122	52	256	165
326	Plastics and Rubber Products Manufacturing							141
327	Nonmetallic Mineral Product Manufacturing						89	
332	Fabricated Metal Product Manufacturing						229	
<b>Forestry and Wood Products:</b>								
113	Forestry and Logging	202	117			47	43	16
115	Support Activities for Agriculture and Forestry	16					11	
<b>Information Technology:</b>								
517	Telecommunications						39	
518	Data Processing, Hosting and Related Services				1			
519	Other Information Services	16						7
<b>Logistics and Distribution:</b>								
484	Truck Transportation	274	145		79	58	123	
488	Support Activities for Transportation						7	14
493	Warehousing and Storage						553	

<sup>34</sup> *Data Source:* Virginia Employment Commission. It is important to realize, however, that at this level of industry and geographic specificity, these data can be subject to disclosure restrictions by the Virginia Employment Commission. As a result, it is possible that some firms (and some employment) within the region may not be captured in these data.

**Table 1: Targeted Industry Sector Employment by Locality – 2012:Q3 (cont.)<sup>35</sup>**

Industry Code (NAICS)	Industry	Brunswick	Charlotte	Emporia	Greenville	Lunenburg	Mecklenburg	Nottoway
<b>Tourism:</b>								
712	Museums, Historical Sites, and Similar Institutions						24	
713	Amusement, Gambling, and Recreation Industries	30					69	33
721	Accommodation	56		122	54		151	38
722	Food Services and Drinking Places	169	73	554	190	102	1,097	308

<sup>35</sup> *Data Source:* Virginia Employment Commission. It is important to realize, however, that at this level of industry and geographic specificity, these data can be subject to disclosure restrictions by the Virginia Employment Commission. As a result, it is possible that some firms (and some employment) within the region may not be captured in these data.

**Table 2: Targeted Industry Sector Average Weekly Wages by Locality – 2012:Q3<sup>36</sup>**

Industry Code (NAICS)	Industry	Brunswick	Charlotte	Emporia	Greenville	Lunenburg	Mecklenburg	Nottoway
<b>Advanced Manufacturing:</b>								
313	Textile Mills						\$597	
314	Textile Product Mills						\$382	
321	Wood Product Manufacturing	\$1,596	\$684		\$771	\$302	\$524	\$710
326	Plastics and Rubber Products Manufacturing							\$828
327	Nonmetallic Mineral Product Manufacturing						\$566	
332	Fabricated Metal Product Manufacturing						\$669	
<b>Forestry and Wood Products:</b>								
113	Forestry and Logging	\$819	\$574			\$683	\$708	\$448
115	Support Activities for Agriculture and Forestry	\$973					\$603	
<b>Information Technology:</b>								
517	Telecommunications						\$825	
518	Data Processing, Hosting and Related Services				\$1,011			
519	Other Information Services	\$315						\$181
<b>Logistics and Distribution:</b>								
484	Truck Transportation	\$625	\$597		\$402	\$622	\$781	
488	Support Activities for Transportation						\$127	\$591
493	Warehousing and Storage						\$437	

<sup>36</sup> *Data Source:* Virginia Employment Commission. It is important to realize, however, that at this level of industry and geographic specificity, these data can be subject to disclosure restrictions by the Virginia Employment Commission. As a result, it is possible that some firms (and some employment) within the region may not be captured in these data.



**Table 2: Targeted Industry Sector Average Weekly Wages by Locality – 2012:Q3 (cont.)<sup>37</sup>**

Industry Code (NAICS)	Industry	Brunswick	Charlotte	Emporia	Greenville	Lunenburg	Mecklenburg	Nottoway
<b>Tourism:</b>								
712	Museums, Historical Sites, and Similar Institutions						\$327	
713	Amusement, Gambling, and Recreation Industries	\$263					\$248	\$143
721	Accommodation	\$377		\$253	\$210		\$215	\$268
722	Food Services and Drinking Places	\$195	\$227	\$236	\$246	\$215	\$227	\$238

<sup>37</sup> *Data Source:* Virginia Employment Commission. It is important to realize, however, that at this level of industry and geographic specificity, these data can be subject to disclosure restrictions by the Virginia Employment Commission. As a result, it is possible that some firms (and some employment) within the region may not be captured in these data.

## *Region Wide Profile – Performance*

To provide a more comprehensive picture of past and likely future trends in these five targeted industry sectors, in this portion of the section we present a broader assessment of economic performance. That assessment is based on an aggregate performance index that was first introduced by Hill and Brennan.<sup>38</sup> Our comprehensive evaluation of each targeted industry sector is based on the following nine performance metrics:

1. *Establishment Location Quotient (LQ Establishments)*: Measures the degree to which the Virginia Growth Alliance specializes in a specific industry based on the number of local establishments relative to the statewide norm.<sup>39</sup>
2. *Employment Location Quotient (LQ Employment)*: Measures the degree to which the Virginia Growth Alliance specializes in a specific industry based on regional employment in that industry relative to the statewide norm.<sup>40</sup>
3. *Relative Earnings Ratio (REratio)*: Measures average pay within the industry relative to average economy-wide pay within the Virginia Growth Alliance.<sup>41</sup>
4. *Relative Growth in Industry Establishments (EstGratio)*: Measures growth in the number of industry establishments between 2011:Q3 and 2012:Q3 relative to growth in the total number of region-wide establishments.<sup>42</sup>

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<sup>38</sup> Edward W. Hill and John F. Brennan, “A Methodology for Identifying the Drivers of Industrial Clusters: The Foundation of Regional Competitive Advantage,” *Economic Development Quarterly*, February 2000, vol.14, no.1, pp.65-96.

<sup>39</sup> More specifically, this metric is calculated as  $((\text{Regional sub-sector establishments in 2012:Q3})/(\text{Total regional establishments in 2012:Q3})) / ((\text{Statewide sub-sector establishments in 2012:Q3})/(\text{Total statewide establishments in 2012:Q3}))$ . A statistic over one indicates the Virginia Growth Alliance has a higher concentration of establishments in that industry subsector than one would expect based on the statewide norm, while a statistic of less than one indicates the opposite. *Data Source*: Virginia Employment Commission.

<sup>40</sup> More specifically, this metric is calculated as  $((\text{Regional sub-sector employment in 2012:Q3})/(\text{Total regional employment in 2012:Q3})) / ((\text{Statewide sub-sector employment in 2012:Q3})/(\text{Total statewide employment in 2012:Q3}))$ . A statistic over one indicates the Virginia Growth Alliance has a higher concentration of employment in that industry subsector than one would expect based on the statewide norm, while a statistic of less than one indicates the opposite. *Data Source*: Virginia Employment Commission.

<sup>41</sup> More specifically, this metric is calculated as  $(\text{Regional sub-sector wage in 2012:Q3})/(\text{Regional economy-wide wage in 2012:Q3})$ . A statistic over one indicates the industry subsector paid a wage in 2012:Q3 that was above the economy wide average for the Virginia growth Alliance, while a statistic of less than one indicates the opposite. *Data Source*: Virginia Employment Commission.

<sup>42</sup> More specifically, this metric is calculated as  $(\text{Regional \% increase in sub-sector establishments between 2011:Q3 and 2012:Q3})/(\text{Regional \% increase total establishments between 2011:Q3 and 2012:Q3})$ . A statistic over one indicates that the number of establishments in the industry subsector grew at a faster rate

5. *Relative Growth in Industry Employment (EmpGratio)*: Measures growth in industry employment between 2011:Q3 and 2012:Q3 relative to growth in region-wide employment.<sup>43</sup>
6. *Relative Growth in Industry Wages (WageGratio)*: Measures growth in industry wages between 2011:Q3 and 2012:Q3 relative to growth in region-wide wages.<sup>44</sup>
7. *Regional Employment Growth Ratio ( $\Delta$  Reg. Emp)*: The industry's regionally projected annual employment growth between 2010 and 2020 as a proportion of projected total annual employment growth.<sup>45</sup>
8. *National Employment Growth Ratio ( $\Delta$  Nat. Emp)*: The industry's nationally projected annual employment growth between 2010 and 2020 as a proportion of projected total annual employment growth.<sup>46</sup>

These eight components are then averaged to create an aggregate measure of overall economic performance.

9. *Aggregate Performance Index (Perf Index)*: The average of the 8 prior economic performance metrics.<sup>47</sup>

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than the economy wide average for the Virginia Growth Alliance between 2011:Q3 and 2012:Q3, while a statistic of less than one indicates the opposite. *Data Source*: Virginia Employment Commission.

<sup>43</sup> More specifically, this metric is calculated as (Regional % increase in sub-sector employment between 2011:Q3 and 2012:Q3)/(Regional % increase total employment between 2011:Q3 and 2012:Q3). A statistic over one indicates that employment in the industry subsector grew at a faster rate than economy wide employment in the Virginia Growth Alliance between 2011:Q3 and 2012:Q3, while a statistic of less than one indicates the opposite. *Data Source*: Virginia Employment Commission.

<sup>44</sup> More specifically, this metric is calculated as (Regional % increase in sub-sector wages between 2011:Q3 and 2012:Q3)/(Regional % increase total wages between 2011:Q3 and 2012:Q3). A statistic over one indicates that average wages in the industry subsector grew at a faster rate than economy wide average wages in the Virginia Growth Alliance between 2011:Q3 and 2012:Q3, while a statistic of less than one indicates the opposite. *Data Source*: Virginia Employment Commission.

<sup>45</sup> More specifically, this metric is calculated as ((Projected growth in sub-sector employment regionally between 2010 and 2020)/( Projected growth in total regional employment between 2010 and 2020)). A statistic over one indicates that regional employment in the industry sub-sector is projected to grow at a faster rate than total regional employment between 2010 and 2020, while a statistic of less than one indicates the opposite. *Data Source*: Virginia Employment Commission.

<sup>46</sup> More specifically, this metric is calculated as ((Projected growth in sub-sector employment nationally between 2010 and 2020)/( Projected growth in total national employment between 2010 and 2020)). A statistic over one indicates that national employment in the industry sub-sector is projected to grow at a faster rate than total national employment between 2010 and 2020, while a statistic of less than one indicates the opposite. *Data Source*: U.S. Department of Labor, Bureau of Labor Statistics.

<sup>47</sup> Averages the performance statistics from the previously specified eight economic performance metrics. The larger this aggregate statistic, the greater the historic and projected performance of the industry subsector in terms of regional specialization; relative wage; relative establishment, employment and wage growth; and projected relative increases in regional and national employment.

The results from this analysis are presented in Table 3. A review of these results shows that there are six industry subsectors that demonstrated aggregate performance measures above one, which means that, on average across all eight performance metrics, their economic performance exceeds regional and national benchmarks. Those six industry subsectors are:

1. *Support Activities for Agriculture and Forestry* in the *Forestry and Wood Products* targeted industry sector (aggregate performance index of 4.27)
2. *Forestry and Logging* in the *Forestry and Wood Products* targeted industry sector (aggregate performance index of 3.70)
3. *Plastics and Rubber Products Manufacturing* in the *Advanced Manufacturing* targeted industry sector (aggregate performance index of 3.43)
4. *Textile Mills* in the *Advanced Manufacturing* targeted industry sector (aggregate performance index of 2.58)
5. *Wood Products Manufacturing* in the *Advanced Manufacturing* targeted industry sector (aggregate performance index of 2.09)
6. *Amusement, Gambling, and Recreation Industries* in the *Tourism* targeted industry sector (aggregate performance index of 1.96)

**Table 3: Targeted Industry Sector Performance Measures**

Industry Code (NAICS)	Industry	LQ Est.	LQ Emp.	RERatio	EstGRatio	EmpGRatio
<b>Advanced Manufacturing:</b>						
313	Textile Mills	6.83	1.04	1.05	0.00	0.83
314	Textile Product Mills	1.63	1.06	0.67	0.00	2.05
321	Wood Product Manufacturing	6.27	0.92	1.29	0.80	-4.61
326	Plastics and Rubber Products Manufacturing	1.40	0.96	1.45	0.00	-2.90
327	Nonmetallic Mineral Product Manufacturing	1.33	0.35	0.99	-11.58	-31.69
332	Fabricated Metal Product Manufacturing	0.33	1.11	1.17	0.00	4.37
<b>Forestry and Wood Products:</b>						
113	Forestry and Logging	12.87	1.04	1.25	-0.44	0.69
115	Support Activities for Agriculture and Forestry	1.83	1.02	1.44	-3.18	0.00
<b>Information Technology:</b>						
517	Telecommunications	0.39	0.75	1.45	-14.86	-12.75
518	Data Processing, Hosting and Related Services	0.13	1.02	1.77	0.00	0.00
519	Other Information Services	0.24	0.94	0.48	0.00	-3.86
<b>Logistics and Distribution:</b>						
484	Truck Transportation	2.99	1.21	1.09	2.12	9.03
488	Support Activities for Transportation	0.45	1.13	0.77	0.00	5.08
493	Warehousing and Storage	1.30	0.94	0.77	-10.19	-4.00
<b>Tourism:</b>						
712	Museums, Historical Sites, and Similar Institutions	0.30	0.91	0.57	0.00	-5.36
713	Amusement, Gambling, and Recreation Industries	0.60	1.35	0.40	7.64	15.45
721	Accommodation	1.43	1.02	0.44	0.00	0.00
722	Food Services and Drinking Places	0.81	1.07	0.40	0.38	2.48

**Table 3: Targeted Industry Sector Performance Measures (cont.)**

Industry Code (NAICS)	Industry	WageGRatio	Δ Reg. Emp	Δ Nat. Emp	Perf. Index
<b>Advanced Manufacturing:</b>					
313	Textile Mills	9.38	N/A	-1.08	<b>2.58</b>
314	Textile Product Mills	-2.63	N/A	-0.87	<b>0.27</b>
321	Wood Product Manufacturing	8.69	1.65	1.69	<b>2.09</b>
326	Plastics and Rubber Products Manufacturing	24.29	1.13	1.08	<b>3.43</b>
327	Nonmetallic Mineral Product Manufacturing	-38.79	1.54	1.15	<b>-9.59</b>
332	Fabricated Metal Product Manufacturing	-1.94	0.96	0.85	<b>0.86</b>
<b>Forestry and Wood Products:</b>					
113	Forestry and Logging	11.91	0.19	2.08	<b>3.70</b>
115	Support Activities for Agriculture and Forestry	29.37	N/A	-0.62	<b>4.27</b>
<b>Information Technology:</b>					
517	Telecommunications	-28.05	0.54	0.62	<b>-6.49</b>
518	Data Processing, Hosting and Related Services	-2.76	N/A	0.62	<b>0.11</b>
519	Other Information Services	-8.37	N/A	0.62	<b>-1.42</b>
<b>Logistics and Distribution:</b>					
484	Truck Transportation	-17.61	1.49	0.23	<b>0.07</b>
488	Support Activities for Transportation	-31.09	1.36	1.54	<b>-2.60</b>
493	Warehousing and Storage	-16.55	1.81	1.85	<b>-3.01</b>
<b>Tourism:</b>					
712	Museums, Historical Sites, and Similar Institutions	-1.02	N/A	1.31	<b>-0.47</b>
713	Amusement, Gambling, and Recreation Industries	-12.26	1.30	1.23	<b>1.96</b>
721	Accommodation	-8.76	0.54	0.62	<b>-0.59</b>
722	Food Services and Drinking Places	-1.72	1.02	0.69	<b>0.64</b>

## Review

The data presented in this portion of the section have shown that the largest subsectors within the five industry sectors that the Virginia Growth Alliance has chosen to target are: 1) *Advanced Manufacturing* sector – *Wood Product Manufacturing* (994 jobs); 2) *Forestry and Wood Products* sector – *Forestry and Logging* (425 jobs); 3) *Logistics and Distribution* sector – *Truck Transportation* (679 jobs) and *Warehousing and Storage* (553 jobs); and 4) *Tourism* sector – *Food Services and Drinking Places* (2,493 jobs) and *Accommodation* (421 jobs). In addition, the data presented in this section indicate that, with the exception of the *Forestry and Wood Products* sector where the largest concentration of employment is in Brunswick County, employment in the other four targeted sectors tend to be largely concentrated in Mecklenburg County. Finally, our analysis has shown that, based on recent and projected growth in establishments, employment, and wages, the highest performing subsectors are: 1) *Support Activities for Agriculture and Forestry*; 2) *Forestry and Logging*; 3) *Plastics and Rubber Products Manufacturing*; 4) *Textile Mills*; 5) *Wood Products Manufacturing*; and 6) *Amusement, Gambling, and Recreation Industries*.

## Workforce Analysis

In this section of the report, we provide an evaluation of the demand for trained workers in the five targeted industry sectors previously profiled (both in terms of current occupational demand, and potential demand associated with Commonwealth Center for Advanced Manufacturing), and the adequacy of the region's existing workforce pipeline to meet that demand. The method used to perform this "gap" analysis is not new and has been successfully employed in earlier studies conducted in several states.<sup>48</sup>

### Regional Demand for Trained Workers

In the first step of the analysis we use a staffing matrix created by the Virginia Employment Commission (VEC) to identify the full range of occupations employed within the Virginia Growth Alliance's five targeted industry sectors. That process identified 52 occupations with regional employment in the *Advanced Manufacturing* sector, 2 in the *Forestry and Wood Products* sector, 29 in the *Information Technology* sector, 33 in the *Logistics and Distribution* sector, and 34 in the *Tourism* sector. Then, to estimate the likely demand for trained workers in those occupations, we employ

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<sup>48</sup> For an excellent exposition of this method see, William J. Drummond and Jan L Youtie, "Occupational Employment, Demand for College Graduates, and Migration: A Statewide View," a report to the Board of Regents, University System of Georgia, 1999. For an example of how this method has been used previously see, A. Fletcher Mangum, "System-Wide Needs Assessment for Virginia Education," State Council of Higher Education for Virginia, March 28, 2002, p.90.

projections of average annual openings from the VEC's 2010 to 2020 sub-state occupational forecasts. Because VEC's sub-state occupational forecasts are only done for Workforce Investment Areas WIAs, these data necessarily include forecasts for both South Central (WIA VIII) and the Crater Area (WIA XV), the two WIAs that overlap the seven localities included in the Virginia Growth Alliance.<sup>49</sup>

### Regional Supply of Trained Workers

To estimate the likely regional supply of trained workers for occupations within the Virginia Growth Alliance's five targeted industry sectors, we first use a crosswalk developed by the National Crosswalk Service Center to map occupations into the prerequisite education and training program(s) necessary for entry into each occupation.<sup>50</sup> That analysis indicated that 35 of the 52 occupations identified in the *Advanced Manufacturing* sector, 2 of the 2 occupations identified in the *Forestry and Wood Products* sector, 27 of the 29 occupations identified in the *Information Technology* sector, 22 of the 33 occupations identified in the *Logistics and Distribution* sector, and 16 of the 34 occupations identified in the *Tourism* sector were linked to some postsecondary education program. Once those education and training programs were identified, we then employed completions data from the U.S. Department of Education's *Integrated Postsecondary Education Data System* (IPEDS) to quantify the regional pipeline of trained workers associated with each occupation. These data consist of the number of individuals who graduated from degree or certificate programs during the 2011-2012 academic year from any college or university located within the Virginia Growth Alliance.<sup>51</sup> A degree program includes any undergraduate or graduate program (e.g., Associate's, Bachelor's, Master's, or higher degree), while a certificate program typically includes any one-year or two-year college program that awards a postsecondary education certificate (e.g., welding, licensed practical nursing).

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<sup>49</sup> The South Central WIA encompasses the Virginia Growth Alliance counties of Brunswick, Charlotte, Lunenburg, Mecklenburg, and Nottoway, as well as the counties of Amelia, Buckingham, Cumberland, Halifax, and Prince Edward. The Crater Area WIA encompasses the Virginia Growth Alliance localities of Greenville County and the City of Emporia, as well as the counties of Dinwiddie, Prince George, Surry, and Sussex, and the cities of Colonial Heights, Hopewell, and Petersburg.

<sup>50</sup> The National Crosswalk Service Center (NCSC) is funded by the U.S. Department of Labor, Employment and Training Administration. The specific NCSC crosswalk used in this analysis is the *2010 Standard Occupational Classification Crosswalk to 2010 Classification of Instructional Programs*. This crosswalk identifies the prerequisite instructional programs (classified according to the National Center for Educational Statistics' *2010 Classification of Instructional Program*, or *CIP*, code) necessary for employment in specific occupations (classified according to the Bureau of Labor Statistics' *2010 Standard Occupational Classification*, or *SOC*, code). Often, there are many-to-many relationships where a given instructional program can serve as an avenue into one of many jobs, or one of several instructional programs can serve as a prerequisite for a given job.

<sup>51</sup> That list of institutions was comprised of Saint Paul's College and Southside Virginia Community College.



## GAP Analysis

The “gap” is defined as the difference between the likely annual supply of trained graduates associated with each occupation and the projected average annual openings for each occupation. In the tables that follow, the gap is presented in a summary form where projected average annual openings are compared to the aggregated sum of all completers from all associated postsecondary programs within the region. The number of completers presented for each occupation is a “distributed” number, which takes into account the many-to-many relationship between occupations and educational programs, where graduates from one academic program often qualify for employment in more than one occupation, and more than one occupation can be associated with a single academic program.

## Findings

A full listing of the findings from the gap analysis for each of the targeted industry sectors and the CCAM initiative are presented in Tables 4 through 9 (in addition, a crosswalk between all occupations within the targeted industry sectors and their associated postsecondary education programs is presented in Table A1 of the Appendix). In these tables, a negative number in the GAP column indicates that the projected regional demand for trained workers exceeds the likely supply of trained graduates from regional certificate and degree programs. As these data indicate:

- Advanced Manufacturing: The largest estimated gaps in this sector tend to be in middle-skill occupations, those jobs that require some training beyond high school, but less than a baccalaureate degree. For example, Truck Drivers, Maintenance and Repair Workers, Bookkeeping Clerks, Industrial Machinery Mechanics, and Electricians. In addition, there were also apparent gaps at the baccalaureate level for Accountants, Electrical Engineers, and Logisticians.
- Forestry and Wood Products: This industry sector involves the smallest number of occupations. The most significant estimated gap is for Logging Equipment Operators, a middle skill occupation.
- Information Technology: The largest estimated gaps tend to be in middle-skill occupations and particularly those involved in office and clerical work. For example, Customer Service Representatives, Office and Administrative Support Staff, and Bookkeeping Clerks. While at the baccalaureate level, there are significant gaps for Accountants and Logisticians.
- Logistics and Distribution: The largest estimated gaps in this sector also tend to be in middle-skill occupations. For example, Truck Drivers, Maintenance and Repair Workers, Automotive Service Technicians, Bookkeeping Clerks,

Customer Service Representatives, and Administrative Support Staff. While at the baccalaureate level, there are significant gaps for Accountants.

- Tourism: The largest estimated gaps in this sector again tend to be in middle-skill occupations. For example, Office Clerks, Receptionists, Maintenance and Repair Workers, Bookkeeping Clerks, and Customer Service Representatives.
- CCAM: Based on projections of occupational demand produced for CCAM by Boston Consulting, the largest estimated gaps associated with the CCAM initiative will also be in middle-skill occupations. Specifically, Welders, Machinists, and Industrial Mechanics.

**Table 4: Gap Analysis – Advanced Manufacturing Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Office Clerks, General	HS	\$23,912	114					0	(114)	0%
Truck Drivers, Heavy and Tractor-Trailer	HS	\$33,222	113					0	(113)	0%
First-Line Supervisors/Managers of Office and Administrative	HS	\$43,830	47					0	(47)	0%
Maintenance and Repair Workers, General	HS	\$32,266	41					0	(41)	0%
Bookkeeping, Accounting, and Auditing Clerks	HS	\$30,885	37					0	(37)	0%
Truck Drivers, Light or Delivery Services	HS	\$27,288	35					0	(35)	0%
Customer Service Representatives	HS	\$27,966	29					0	(29)	0%
Industrial Machinery Mechanics	HS	\$39,478	25					0	(25)	0%
Electricians	HS	\$37,150	29	2	4			6	(23)	21%
Carpenters	HS	\$32,010	22	2				2	(20)	9%

**Table 4: Gap Analysis – Advanced Manufacturing Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
First-Line Supervisors/Managers of Mechanics, Installers, and	HS	\$55,106	18					0	(18)	0%
Executive Secretaries and Administrative Assistants	HS	\$40,818	16					0	(16)	0%
Sales Representatives, Wholesale and Manufacturing, Except T	HS	\$49,375	14					0	(14)	0%
Inspectors, Testers, Sorters, Samplers, and Weighers	HS	\$31,591	13					0	(13)	0%
Purchasing Agents, Except Wholesale, Retail, and Farm Product	HS	\$42,465	12					0	(12)	0%
Dispatchers, Except Police, Fire, and Ambulance	HS	\$33,840	4					0	(4)	0%
Production, Planning, and Expediting Clerks	HS	\$34,819	4					0	(4)	0%

**Table 4: Gap Analysis – Advanced Manufacturing Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Cutting, Punching, and Press Machine Setters, Operators, and	HS	\$25,729	1					0	(1)	0%
Welders, Cutters, Solderers, and Brazers	HS	\$39,268	12	34				34	22	100%
Bus and Truck Mechanics and Diesel Engine Specialists	HS	\$36,131	10	41				41	31	100%
First-Line Supervisors/Managers of Production and Operating	Certificate	\$43,913	15					0	(15)	0%
General and Operations Managers	Assoc	\$84,943	30				32	32	2	100%
Logisticians	BA	N/A	18					0	(18)	0%
Accountants and Auditors	BA	\$60,289	17				2	2	(15)	12%
Financial Managers	BA	\$81,726	5					0	(5)	0%
Electrical Engineers	BA	\$80,123	3					0	(3)	0%
Cost Estimators	BA	\$51,062	6				6	6	0	100%
Management Analysts	BA	\$84,419	22				24	24	2	100%

**Table 4: Gap Analysis – Advanced Manufacturing Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Network and computer systems architects and administrators	BA	\$62,582	3	8	2	7		18	15	100%
Computer Systems Analysts	BA	\$94,620	4	11	3	10		23	19	100%

**Table 5: Gap Analysis – Forestry and Wood Products Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Office Clerks, General	HS	\$23,912	114					0	(114)	0%
Logging Equipment Operators	HS	\$30,371	16					0	(16)	0%

**Table 6: Gap Analysis – Information Technology Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Office Clerks, General	HS	\$23,912	114					0	(114)	0%
First-Line Supervisors/Managers of Retail Sales Workers	HS	\$35,940	59					0	(59)	0%
First-Line Supervisors/Managers of Office and Administrative	HS	\$43,830	47					0	(47)	0%
Bookkeeping, Accounting, and Auditing Clerks	HS	\$30,885	37					0	(37)	0%
Customer Service Representatives	HS	\$27,966	29					0	(29)	0%
First-Line Supervisors/Managers of Mechanics, Installers, and	HS	\$55,106	18					0	(18)	0%
Executive Secretaries and Administrative Assistants	HS	\$40,818	16					0	(16)	0%
Sales Representatives, Wholesale and Manufacturing, Except T	HS	\$49,375	14					0	(14)	0%

**Table 6: Gap Analysis – Information Technology Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Purchasing Agents, Except Wholesale, Retail, and Farm Produc	HS	\$42,465	12					0	(12)	0%
Sales Representatives, Services, All Other	HS	\$72,095	5					0	(5)	0%
Dispatchers, Except Police, Fire, and Ambulance	HS	\$33,840	4					0	(4)	0%
Production, Planning, and Expediting Clerks	HS	\$34,819	4					0	(4)	0%
Managers, All Other	HS	\$60,876	12			32	18	50	38	100%
General and Operations Managers	Assoc	\$84,943	30				32	32	2	100%
Logisticians	BA	N/A	18					0	(18)	0%
Accountants and Auditors	BA	\$60,289	17				2	2	(15)	12%
Financial Managers	BA	\$81,726	5					0	(5)	0%
Training and Development Specialists	BA	\$47,173	4					0	(4)	0%
Management Analysts	BA	\$84,419	22				24	24	2	100%



**Table 6: Gap Analysis – Information Technology Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Network and computer systems architects and administrators	BA	\$62,582	3	8	2	7		18	15	100%
Computer Systems Analysts	BA	\$94,620	4	11	3	10		23	19	100%
Lawyers	Doctoral	\$78,435	5					0	(5)	0%

**Table 7: Gap Analysis – Logistics and Distribution Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
matoccttl	Education	mean	SumOfaopent	Certificate < 1 yr.	Certificate > 1 < 2 yr.	Associates	BA	Sum	GAP	% Need met
Office Clerks, General	HS	\$23,912	114					0	(114)	0%
Truck Drivers, Heavy and Tractor-Trailer	HS	\$33,222	113					0	(113)	0%
First-Line Supervisors/Managers of Office and Administrative	HS	\$43,830	47					0	(47)	0%

**Table 7: Gap Analysis – Logistics and Distribution Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Automotive Service Technicians and Mechanics	HS	\$30,371	53	7	3			10	(43)	19%
Maintenance and Repair Workers, General	HS	\$32,266	41					0	(41)	0%
Bookkeeping, Accounting, and Auditing Clerks	HS	\$30,885	37					0	(37)	0%
Truck Drivers, Light or Delivery Services	HS	\$27,288	35					0	(35)	0%
Customer Service Representatives	HS	\$27,966	29					0	(29)	0%
First-Line Supervisors/Managers of Mechanics, Installers, and	HS	\$55,106	18					0	(18)	0%
Secretaries, Except Legal, Medical, and Executive	HS	\$29,358	18					0	(18)	0%
Sales Representatives, Wholesale and Manufacturing, Except T	HS	\$49,375	14					0	(14)	0%

**Table 7: Gap Analysis – Logistics and Distribution Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Inspectors, Testers, Sorters, Samplers, and Weighers	HS	\$31,591	13					0	(13)	0%
First-Line Supervisors/Managers of Transportation and Material	HS	\$46,654	9					0	(9)	0%
Sales Representatives, Services, All Other	HS	\$72,095	5					0	(5)	0%
Dispatchers, Except Police, Fire, and Ambulance	HS	\$33,840	4					0	(4)	0%
Production, Planning, and Expediting Clerks	HS	\$34,819	4					0	(4)	0%
Bus and Truck Mechanics and Diesel Engine Specialists	HS	\$36,131	10	41				41	31	100%
First-Line Supervisors/Managers of Production and Operating	Certificate	\$43,913	15					0	(15)	0%
General and Operations Managers	Assoc	\$84,943	30				32	32	2	100%

**Table 7: Gap Analysis – Logistics and Distribution Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Accountants and Auditors	BA	\$60,289	17				2	2	(15)	12%
Cost Estimators	BA	\$51,062	6				6	6	0	100%

**Table 8: Gap Analysis – Tourism Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Cooks, Institution and Cafeteria	Less than high school	\$19,532	16					0	(16)	0%
Cooks, Restaurant	Less than high school	\$19,684	14	4				4	(10)	29%
Bartenders	Less than high school	\$20,622	9					0	(9)	0%
Office Clerks, General	High school diploma or equivalent	\$23,912	114					0	(114)	0%
First-Line Supervisors/Managers of Office and Administrative	High school diploma or equivalent	\$43,830	47					0	(47)	0%

**Table 8: Gap Analysis – Tourism Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Receptionists and Information Clerks	High school diploma or equivalent	\$22,436	44					0	(44)	0%
Maintenance and Repair Workers, General	High school diploma or equivalent	\$32,266	41					0	(41)	0%
Bookkeeping, Accounting, and Auditing Clerks	High school diploma or equivalent	\$30,885	37					0	(37)	0%
Customer Service Representatives	High school diploma or equivalent	\$27,966	29					0	(29)	0%
Coaches and Scouts	High school diploma or equivalent	\$26,917	14					0	(14)	0%
Inspectors, Testers, Sorters, Samplers, and Weighers	High school diploma or equivalent	\$31,591	13					0	(13)	0%
First-Line Supervisors/Managers of Landscaping, Lawn Service	High school diploma or equivalent	\$38,013	7					0	(7)	0%

**Table 8: Gap Analysis – Tourism Sector**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Fitness Trainers and Aerobics Instructors	High school diploma or equivalent	\$32,859	7					0	(7)	0%
Sales Representatives, Services, All Other	High school diploma or equivalent	\$72,095	5					0	(5)	0%
First-Line Supervisors/Managers of Personal Service Workers	High school diploma or equivalent	\$38,812	3					0	(3)	0%
General and Operations Managers	Associate's degree	\$84,943	30				32	32	2	100%

**Table 9: Gap Analysis – CCAM**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Welders, cutters, solderers, and brazers	HS	\$39,268	116	34				34	(82)	29%

**Table 9: Gap Analysis – CCAM**

Occupation	Degree Required	Annual Salary	Average Annual Demand	Certif <1 yr.	Certif. >1 <2 yr	Assoc.	BA	Total Average Annual Supply	GAP	% Need Met
Computer controlled machine tool operators, metal and plastic	HS		61					0	(61)	0%
Numerical tool and process control programmers	HS		61					0	(61)	0%
Machinists	HS		61					0	(61)	0%
Industrial machinery mechanics	HS	\$39,478	51					0	(51)	0%
Mobile heavy equipment mechanics, except engines	HS		26					0	(26)	0%
Maintenance workers, machinery	HS		26					0	(26)	0%

## Focus Groups

To augment the information obtained from our empirical analysis, we also held three focus groups within the Virginia Growth Alliance. One in Victoria for the counties of Charlotte, Lunenburg, and Nottoway, one in South Hill the counties of Brunswick and Mecklenburg, and one in Greenville for Greenville/Emporia. The input received from those meetings was generally very consistent with the findings from the empirical portion of the study.

For example:

- Employers expressed difficulty in filling and retaining certain occupations, and in particular industrial mechanics and welders.
- Employers also expressed concern with the soft skills of current applicants (*e.g.*, ability to take direction, communication skills, leadership skills, and team-working skills).
- In addition, employers expressed concern that population losses within the region were negatively impacting their ability to fill open positions.
- Participants voiced concern that residents of the Virginia Growth Alliance, and particularly younger people, were not sufficiently aware of existing career opportunities within the region and the specific education and training necessary to qualify for those jobs. Some participants also pointed to the need for “a tool” that would better facilitate career planning and placement within the region.
- Participants pointed to the prevalence of dual enrollment courses within the region as a mechanism for both transitioning secondary school students into post-secondary education and for better positioning students for existing jobs within the region.
- Participants also pointed to the need for better coordination and communication between education institutions within the region, employers, and the Virginia Employment Commission.

## Workforce Development Plan

As the empirical findings from the workforce analysis showed, the most significant “gaps” between the current occupational driven demand for workers in the five targeted industry clusters and the current pipeline of completers from regional educational and training programs pertain to middle skill occupations, those jobs that require some



training beyond high school, but less than a baccalaureate degree. This means that most of the programs required to fill these gaps would typically be provided by a community college, or more specifically in this instance – Southside Virginia Community College (SVCC), which is not only the only community college serving the communities of the Virginia Growth Alliance, but also the largest provider of postsecondary education services within the region.

The more significant gaps identified by the workforce analysis generally fall into four categories.

1. More apparent than real: Some of the gaps identified in the workforce analysis appear to be the result of a disconnect between the completers that SVCC produces and how those completers are coded in the U.S. Department of Education's IPEDS database. The most obvious of instance of this issue pertains to truck drivers. Although SVCC is home to one of the largest truck driving schools in Virginia, completers from that program do not appear in the IPEDS database. As a result, the large gaps shown in the workforce analysis between the demand for truck drivers and the supply of completers from programs associated with that occupation may well be more apparent than real.
2. Potentially insufficient number of completers: In some cases, even though the necessary programs are offered within the region to meet the demand for specific occupations, the pipeline of completers from those programs appears insufficient to meet current occupational demand. In particular, this appears to be the case with those regional programs that feed the occupations Auto Service Technicians and Mechanics; Carpenters; and Electricians.
3. Necessary programs are not offered in the region: In other instances, it appears that postsecondary programs for which there is an existing occupational need are simply not offered within the region. Specifically, this appears to be the case in regard to those postsecondary programs that feed the occupations Industrial Machinery Mechanic; and Maintenance and Repair Workers.
4. Potential shortages attributable to CCAM: Finally, should the CCAM initiative meet its projected targets for future employment growth in aerospace, automotive, and heavy machinery manufacturing, postsecondary education intuitions with the Virginia Growth Alliance will be called upon to substantially increase their commitments and program offerings in certain key areas. Specifically, even though programs the feed the occupation Welders are currently offered in the region and do appear to be producing a sufficient number of completers to meet current demand, that demand is likely escalate significantly if CCAM is successful in recruiting new manufacturers to the region. In addition, there would also be significant demand for programs that are not currently offered in the region. Specifically, those that feed the occupations Computer Controlled Machine Tool

Operators; Machinists; Machinery Maintenance Workers; Mobile Heavy Equipment Mechanics; and Numerical Tool and Process Control Programmers.

## Conclusion

In mid 2012, the Virginia Growth Alliance contracted with Mangum Economics to develop a regional profile and workforce development assessment for four targeted industry sectors – *Advanced Manufacturing, Forestry and Wood Products, Information Technology, and Logistics and Distribution*. Based on subsequent feedback from the Virginia Department of Housing and Community Development, the *Tourism* sector was added to that list late in the year. This report has presented the findings from our analysis of those five targeted industry sectors.

With regard to general economic conditions within the Virginia Growth Alliance, that analysis has shown that the seven localities that comprise the Alliance entered the 2007 recession earlier than Virginia as a whole, were harder hit by the recession than the state as a whole, and have yet to truly emerge from it. In addition, our analysis has shown that, although the region has experienced recent positive employment trends in certain high wage sectors such as *Professional and Technical Services* and *Information*, several major employment sectors, most notably *Manufacturing, Retail Trade, Construction, and Transportation and Warehousing*, continue to experience significant employment losses.

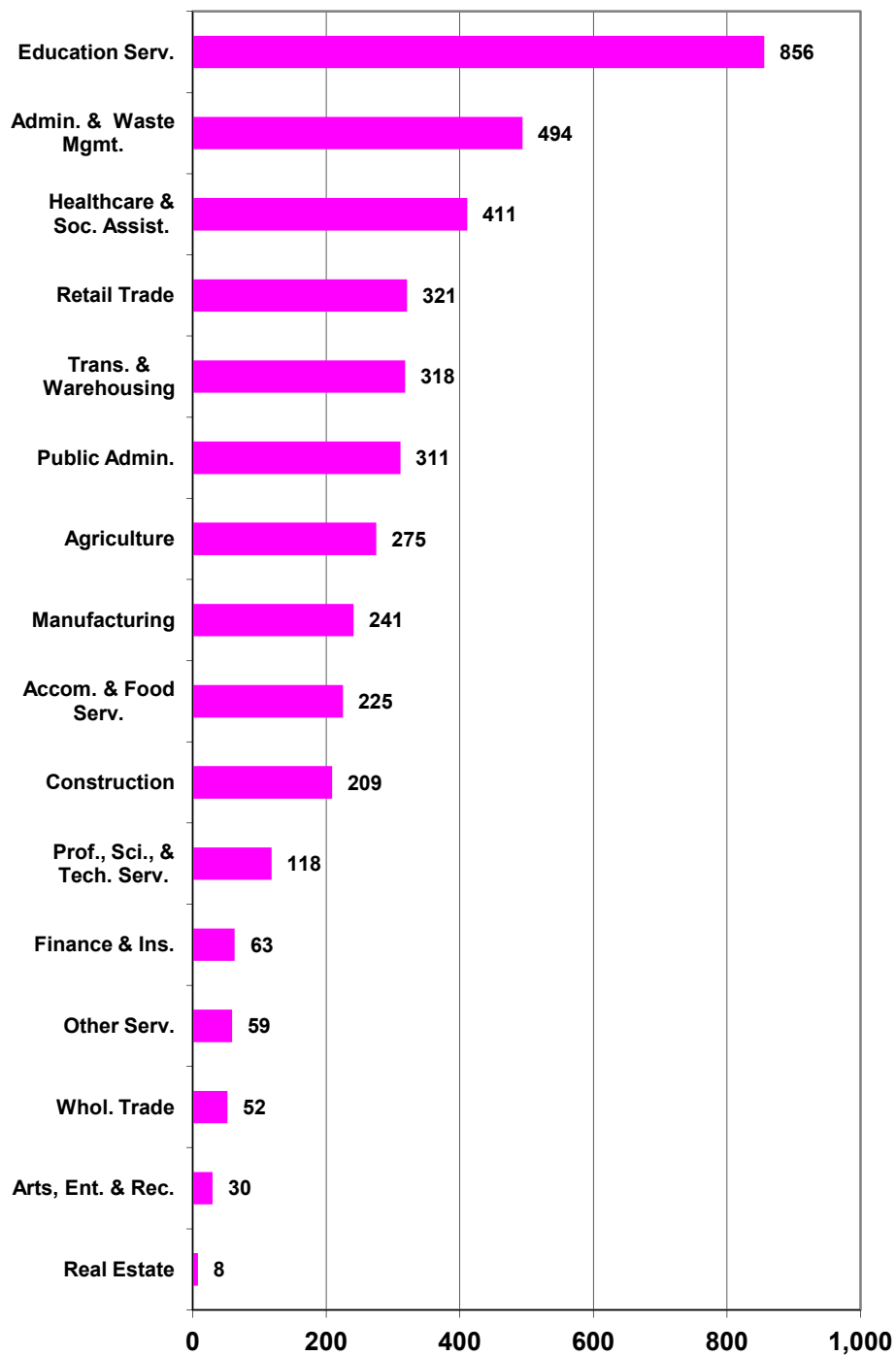
Focusing more specifically on the Virginia Growth Alliance's five targeted industry sectors, our analysis indicates that, in terms of employment, the largest subsectors within these sectors are: 1) *Wood Product Manufacturing* (994 jobs); 2) *Forestry and Logging* (425 jobs); 3) *Truck Transportation* (679 jobs); 4) *Warehousing and Storage* (553 jobs); 5) *Food Services and Drinking Places* (2,493 jobs); and 6) *Accommodation* (421 jobs). In addition, our analysis of recent and projected growth in establishments, employment, and wages shows that the highest performing subsectors within these five targeted industry sectors are: 1) *Support Activities for Agriculture and Forestry*; 2) *Forestry and Logging*; 3) *Plastics and Rubber Products Manufacturing*; 4) *Textile Mills*; 5) *Wood Products Manufacturing*; and 6) *Amusement, Gambling, and Recreation Industries*.

Finally, our evaluation of the current pipeline of trained workers that feed these five targeted industry sectors has shown that the largest gaps between the region's demand for, and supply of, trained workers tend to be in middle-skill occupations – those jobs that require some training beyond high school, but less than a baccalaureate degree. More specifically, in those programs that feed the occupations Auto Service Technician; Carpenter; Electrician; Industrial Machinery Mechanic; and Maintenance and Repair Worker. In addition, should the CCAM initiative meet its projected targets for future employment growth in aerospace, automotive, and heavy machinery manufacturing, there

will also be a substantial increase in the need for programs that feed the occupations Computer Controlled Machine Tool Operators; Machinists; Machinery Maintenance Workers; Mobile Heavy Equipment Mechanics; Numerical Tool and Process Control Programmers; and Welders.

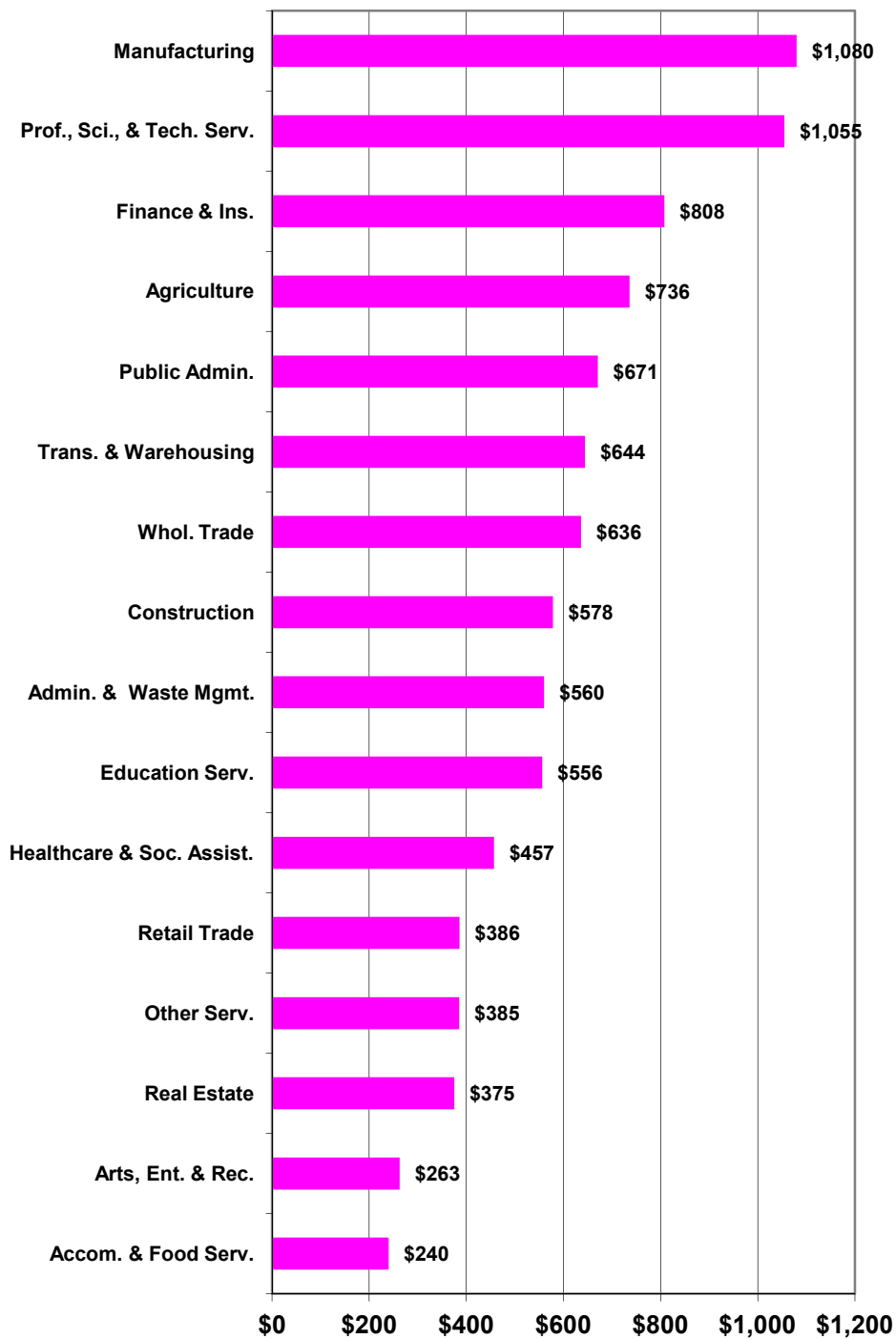
## Appendix

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**Figure A1: Brunswick County Major Industry Sector Employment – 2012:Q3<sup>52</sup>**

<sup>52</sup> Data Source: Virginia Employment Commission.



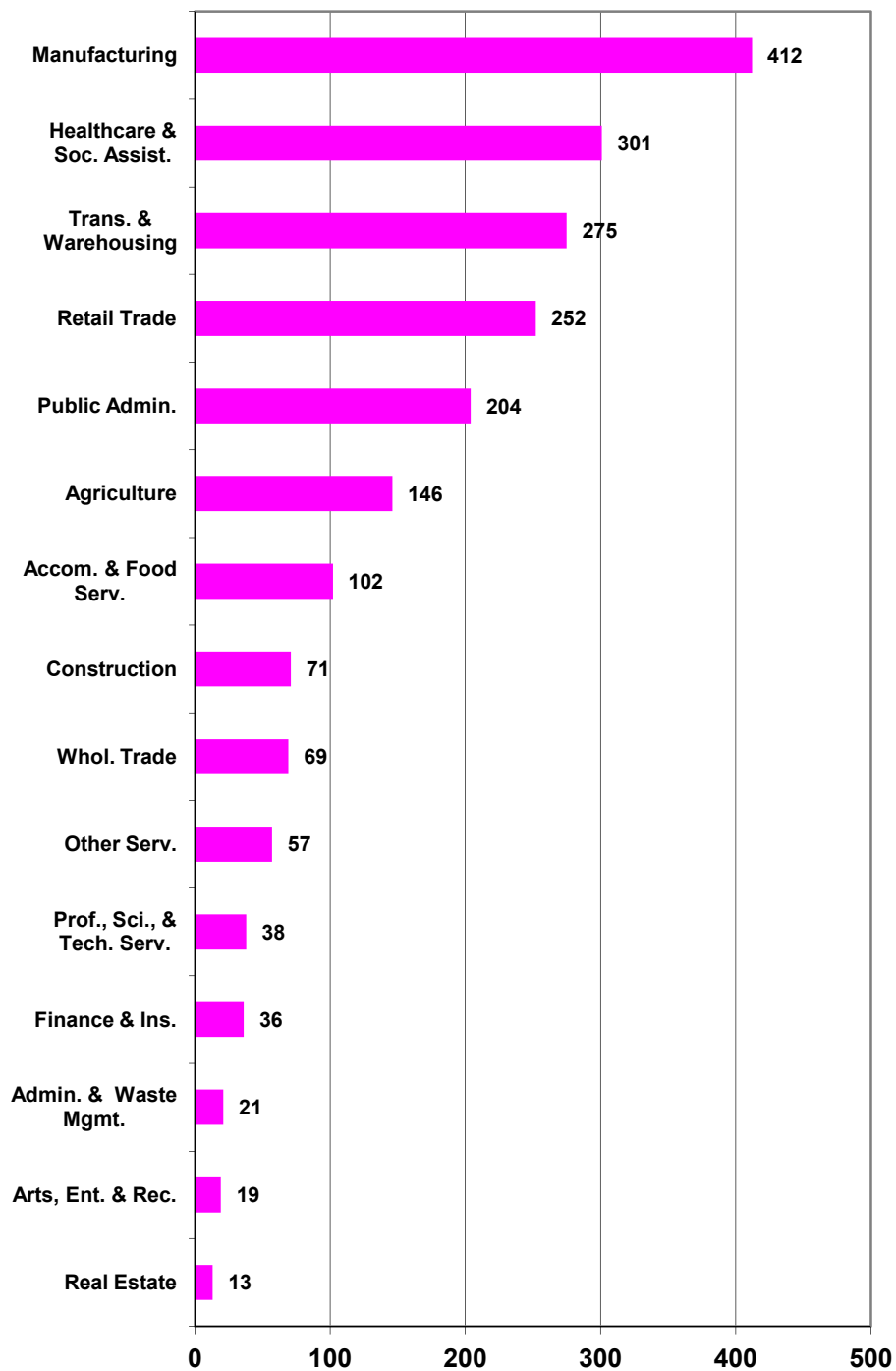
**Figure A2: Brunswick County Average Weekly Wages by Major Industry Sector – 2012:Q3<sup>53</sup>**

<sup>53</sup> Data Source: Virginia Employment Commission.



**Figure A3: Brunswick County Change in Employment by Major Industry Sector – 2011:Q3 to 2012:Q3<sup>54</sup>**

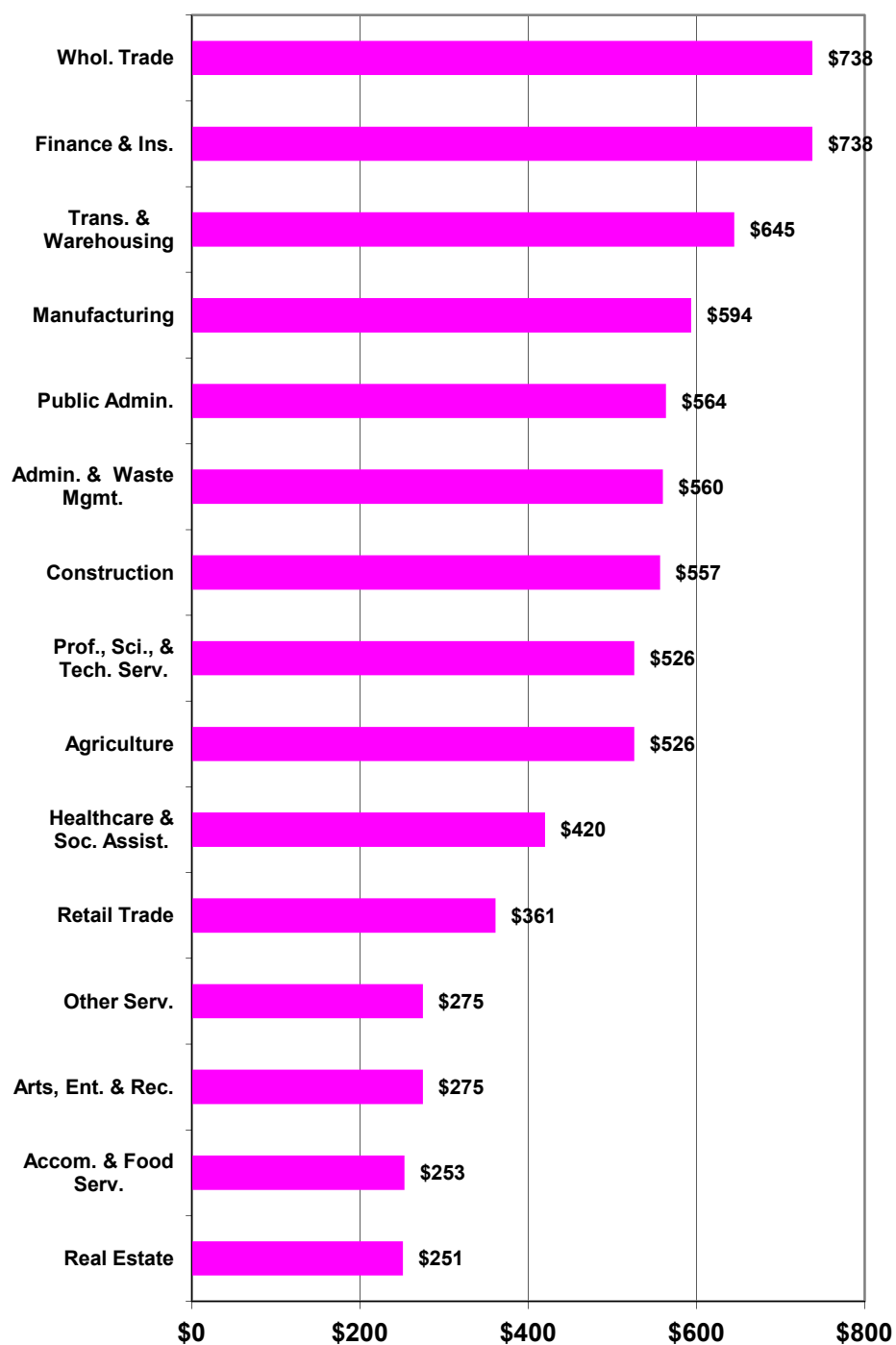
<sup>54</sup> Data Source: Virginia Employment Commission.



**Figure A4: Charlotte County Major Industry Sector Employment – 2012:Q3<sup>55</sup>**

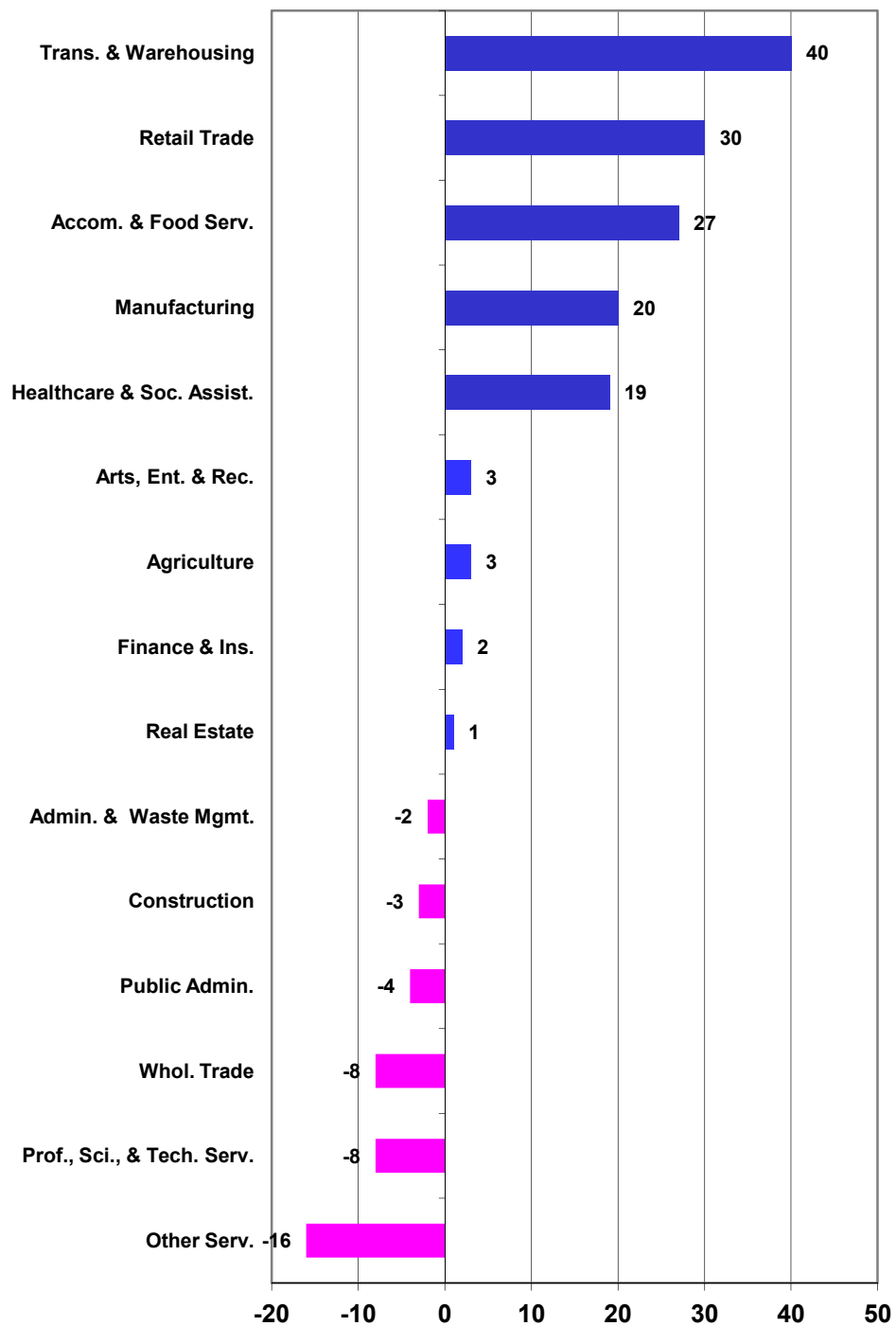
<sup>55</sup> Data Source: Virginia Employment Commission.





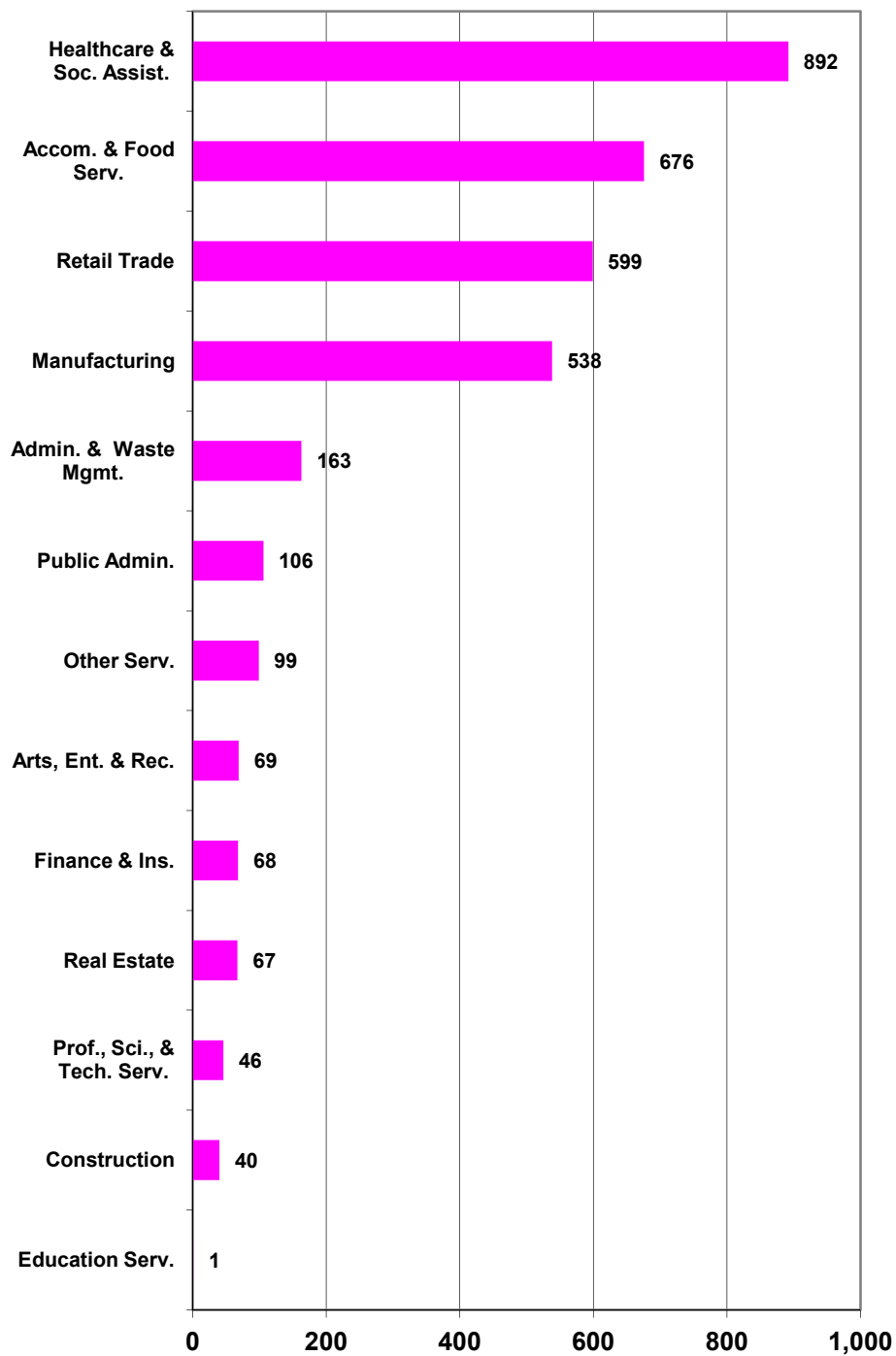
**Figure A5: Charlotte County Average Weekly Wages by Major Industry Sector – 2012:Q3<sup>56</sup>**

<sup>56</sup> Data Source: Virginia Employment Commission.



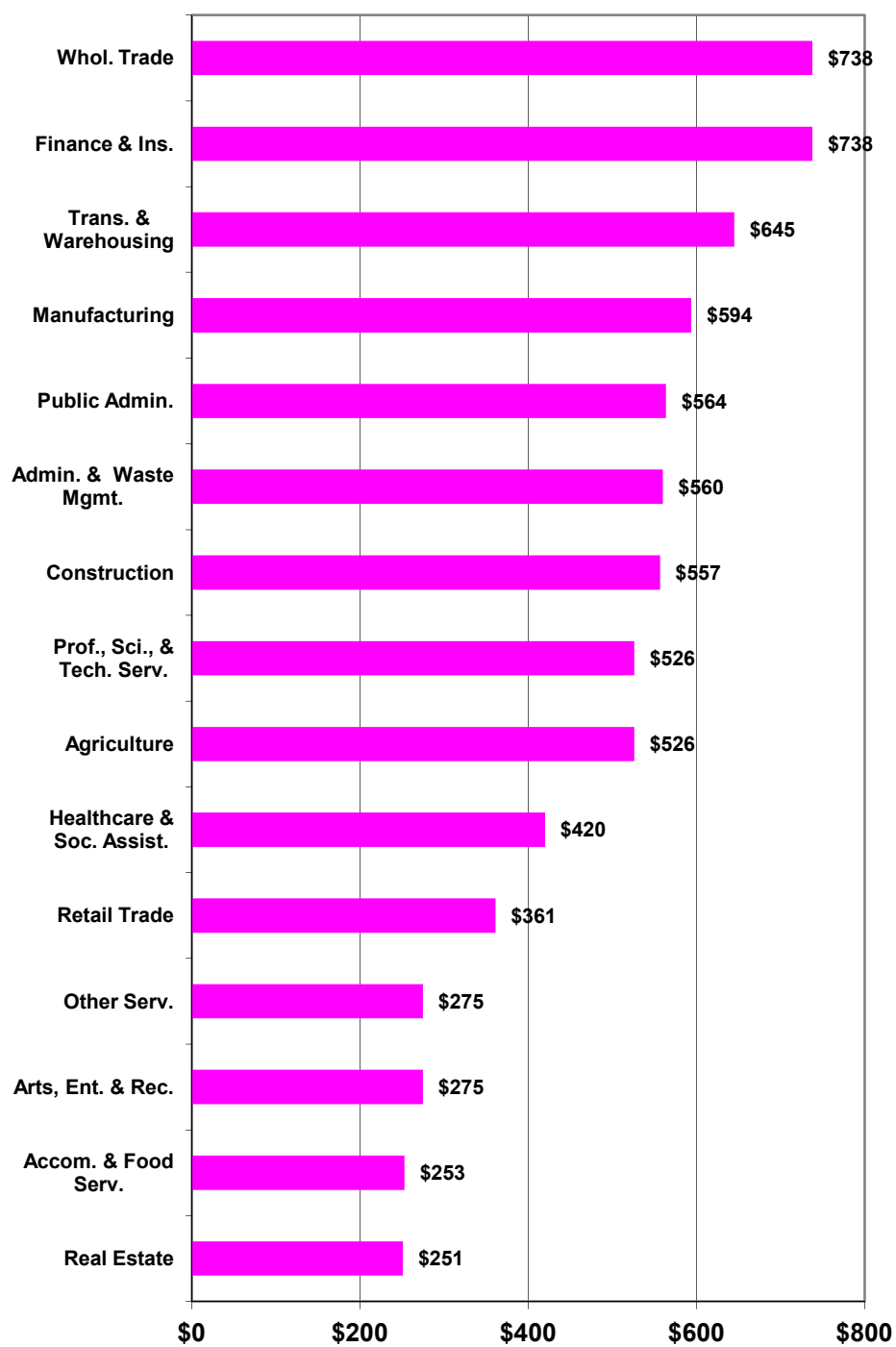
**Figure A6: Charlotte County Change in Employment by Major Industry Sector – 2011:Q3 to 2012:Q3<sup>57</sup>**

<sup>57</sup> Data Source: Virginia Employment Commission.



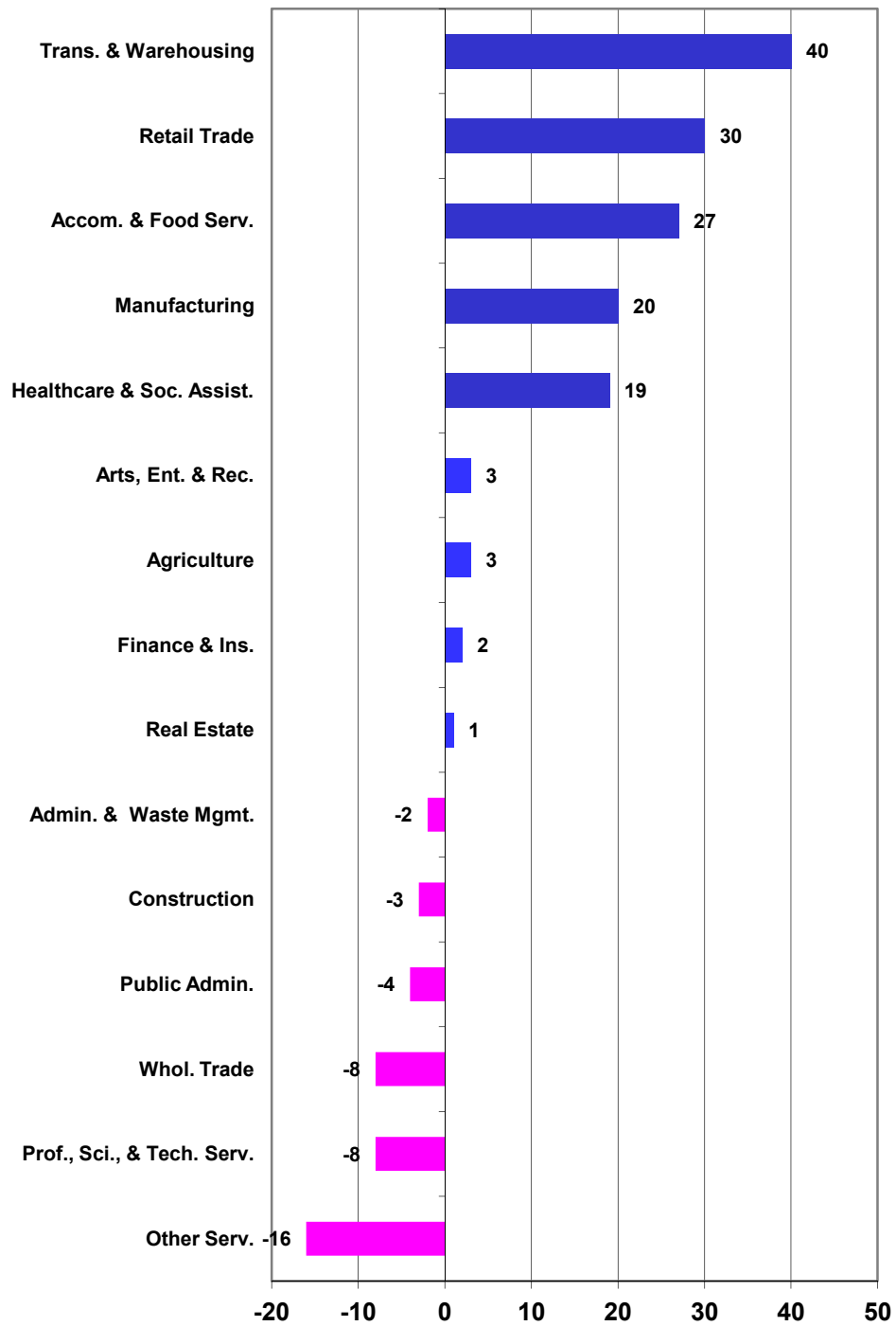
**Figure A7: City of Emporia Major Industry Sector Employment – 2012:Q3<sup>58</sup>**

<sup>58</sup> Data Source: Virginia Employment Commission.



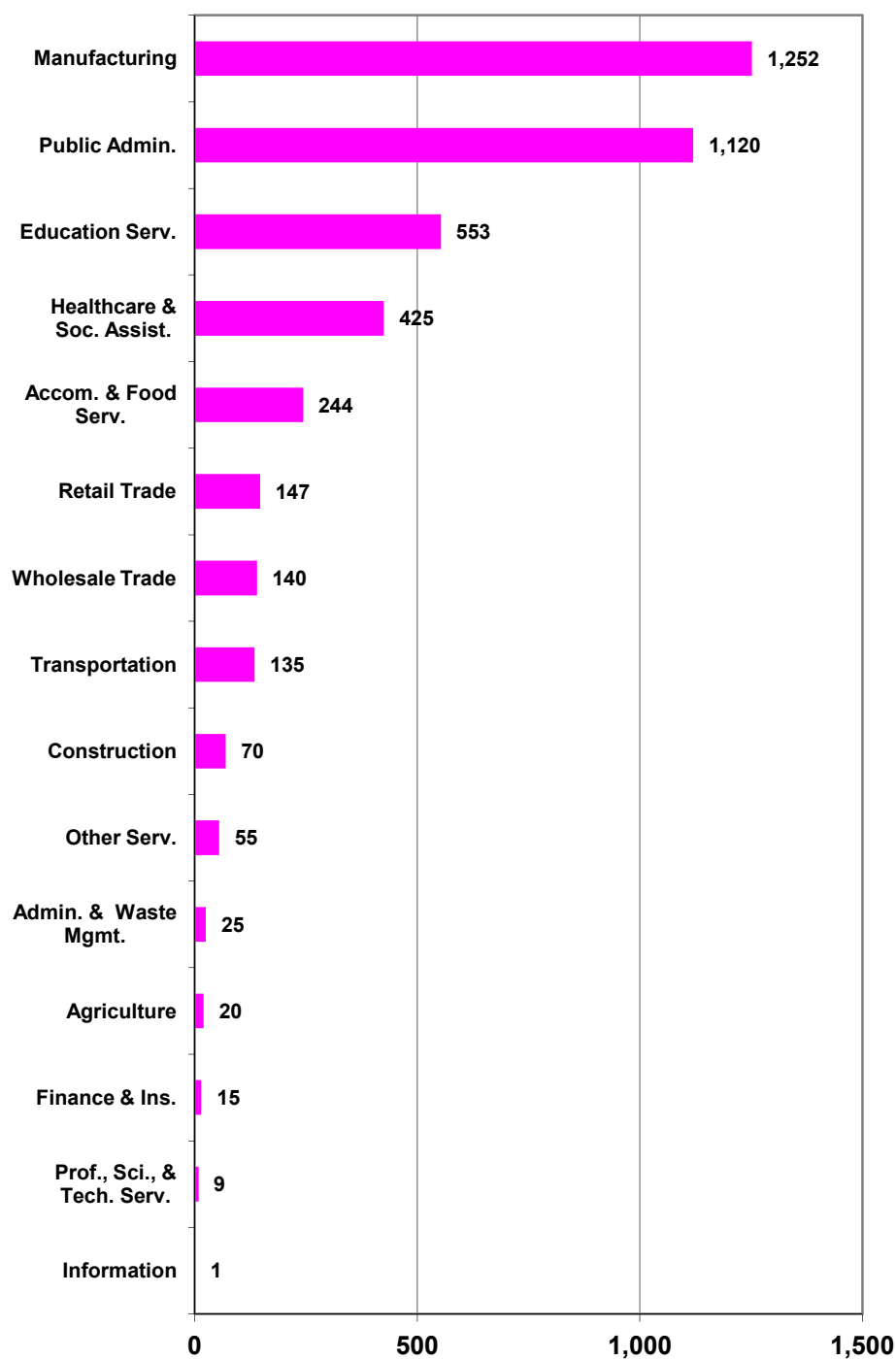
**Figure A8: City of Emporia Average Weekly Wages by Major Industry Sector – 2012:Q3<sup>59</sup>**

<sup>59</sup> Data Source: Virginia Employment Commission.



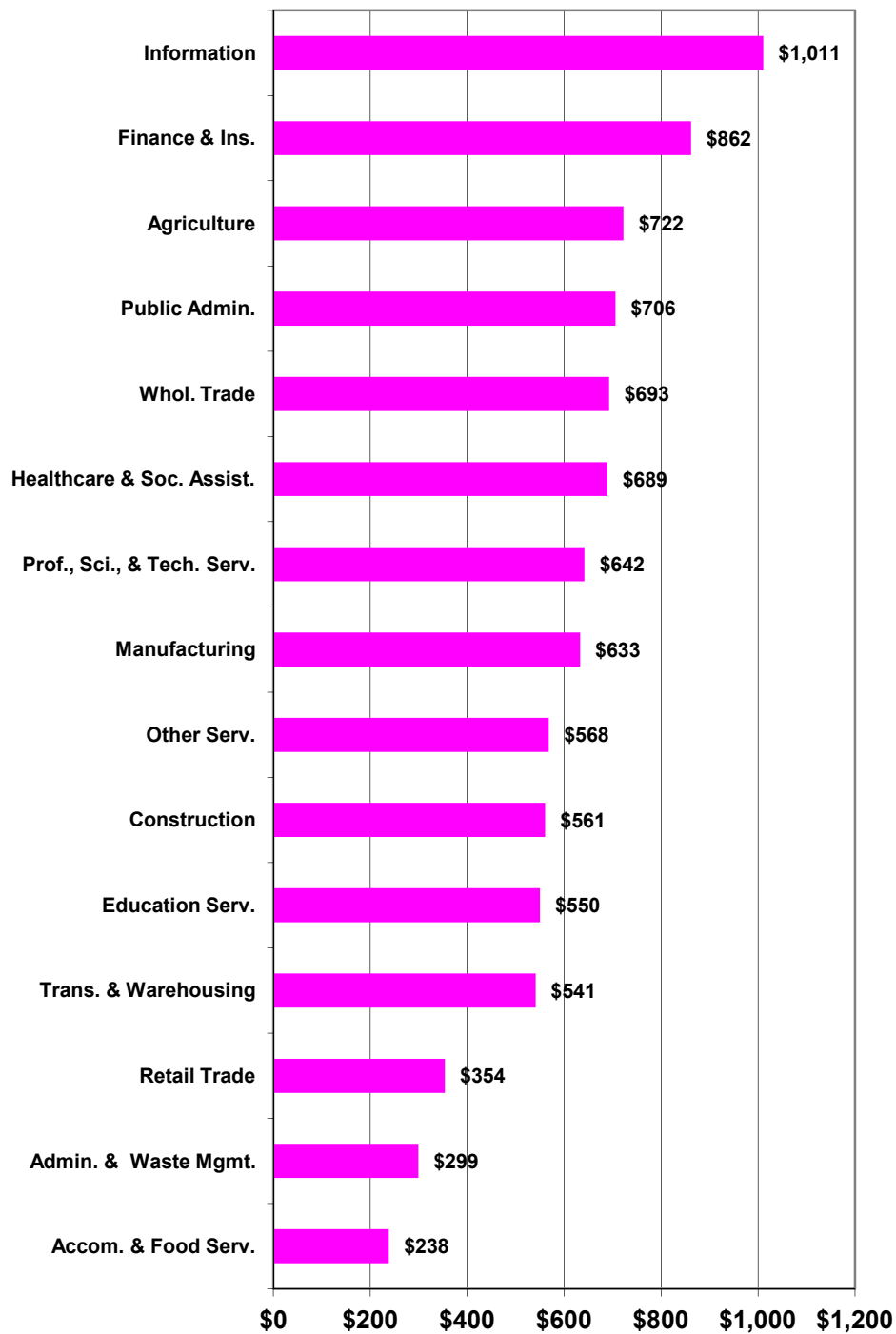
**Figure A9: City of Emporia Change in Employment by Major Industry Sector – 2011:Q3 to 2012:Q3<sup>60</sup>**

<sup>60</sup> Data Source: Virginia Employment Commission.



**Figure A10: Greenville County Major Industry Sector Employment – 2012:Q3<sup>61</sup>**

<sup>61</sup> Data Source: Virginia Employment Commission.



**Figure A11: Greensville County Average Weekly Wages by Major Industry Sector – 2012:Q3<sup>62</sup>**

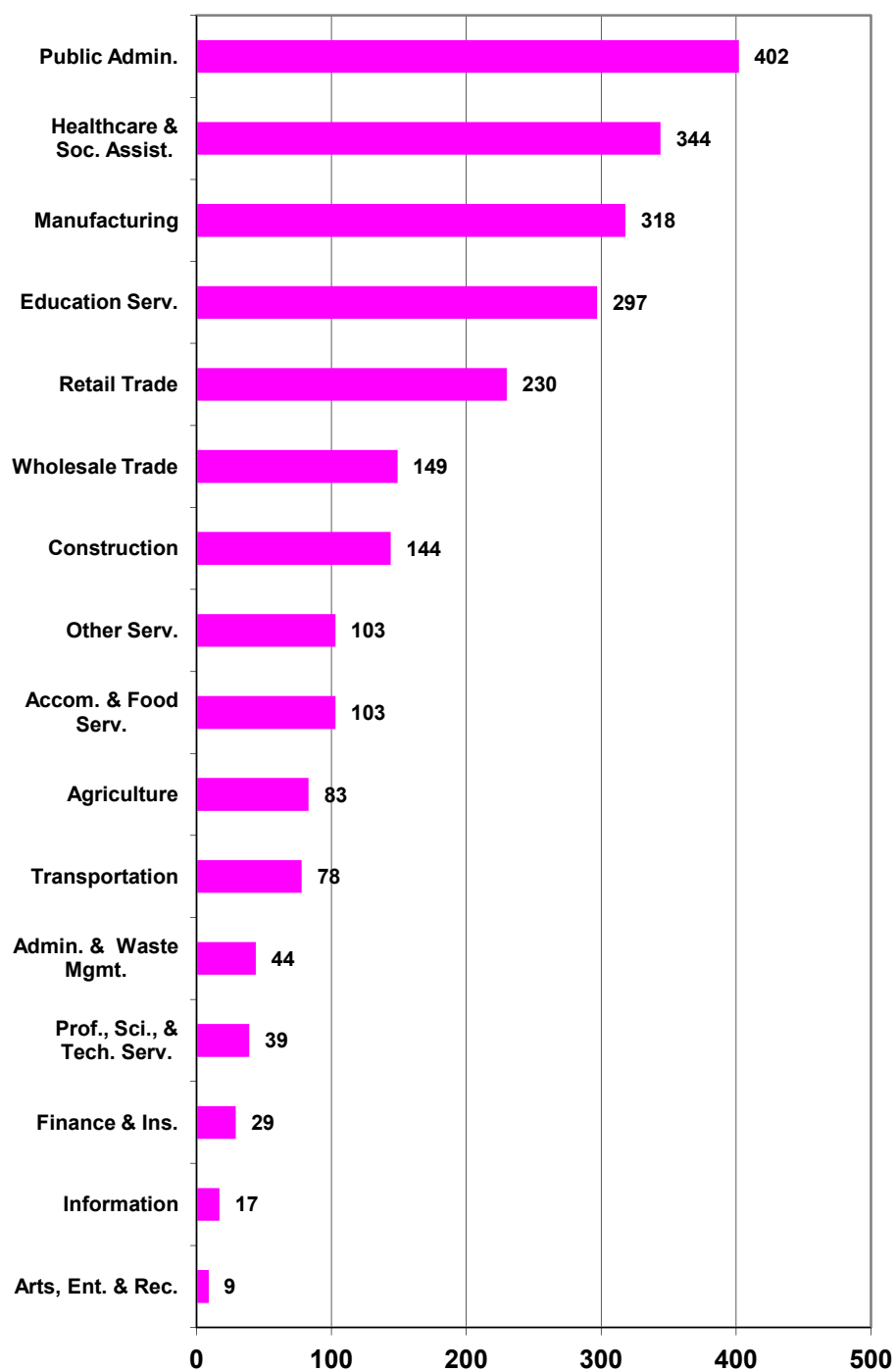
<sup>62</sup> Data Source: Virginia Employment Commission.



**Figure A12: Greenville County Change in Employment by Major Industry Sector – 2011:Q3 to 2012:Q3<sup>63</sup>**

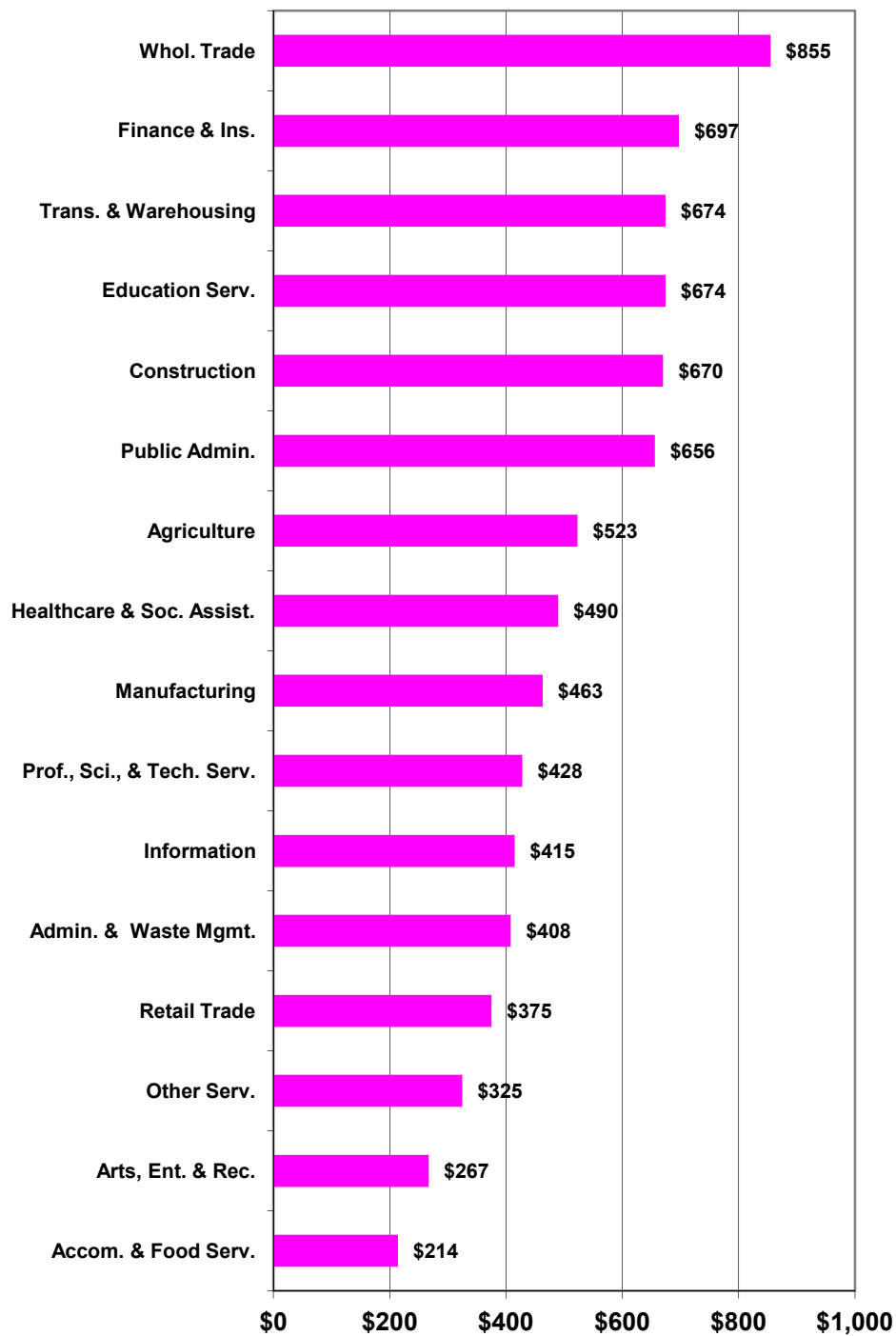
<sup>63</sup> Data Source: Virginia Employment Commission.





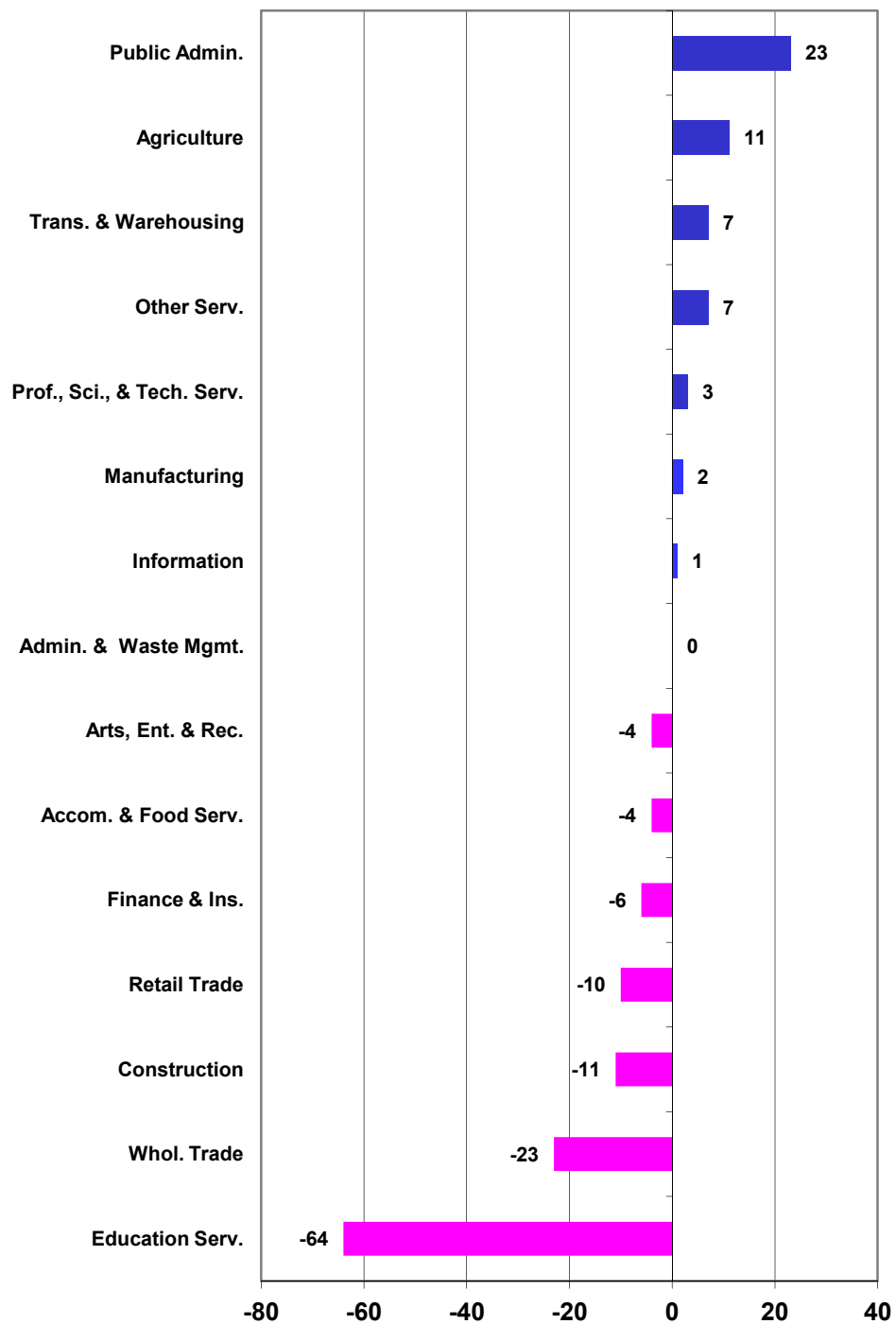
**Figure A13: Lunenburg County Major Industry Sector Employment – 2012:Q3<sup>64</sup>**

<sup>64</sup> Data Source: Virginia Employment Commission.



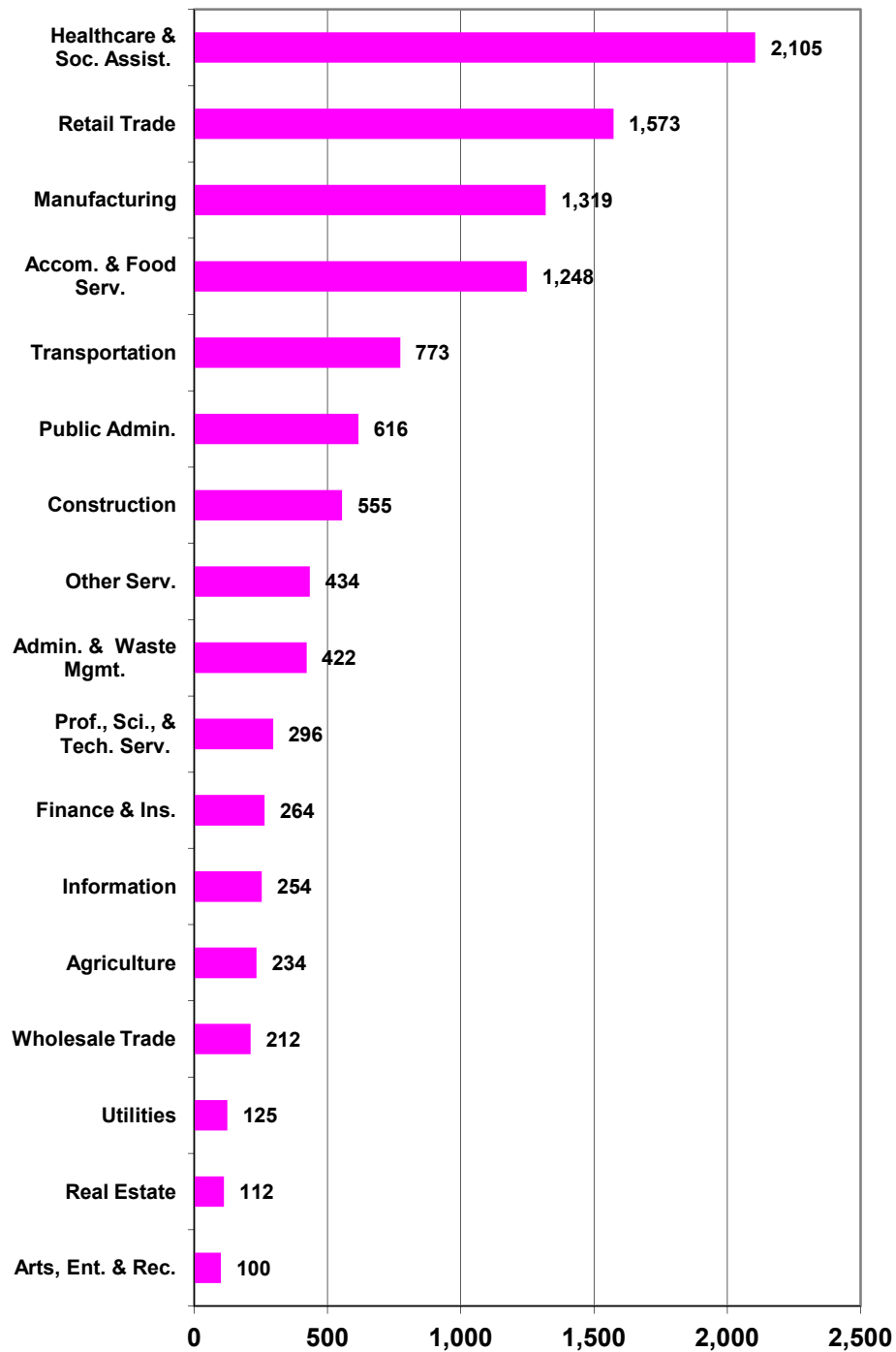
**Figure A14: Lunenburg County Average Weekly Wages by Major Industry Sector – 2012:Q3<sup>65</sup>**

<sup>65</sup> Data Source: Virginia Employment Commission.



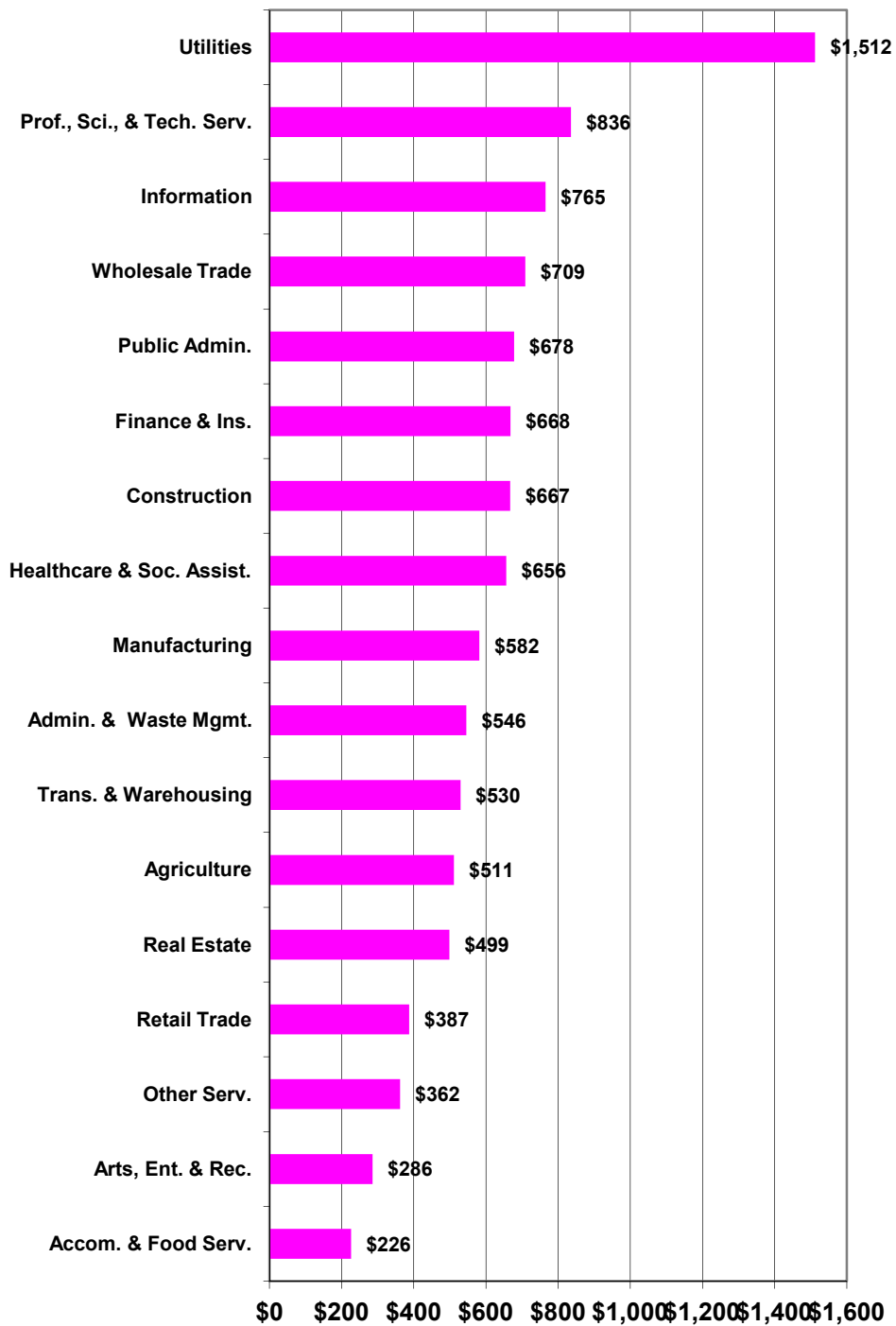
**Figure A15: Lunenburg County Change in Employment by Major Industry Sector – 2011:Q3 to 2012:Q3<sup>66</sup>**

<sup>66</sup> Data Source: Virginia Employment Commission.



**Figure A16: Mecklenburg County Major Industry Sector Employment – 2012:Q3<sup>67</sup>**

<sup>67</sup> Data Source: Virginia Employment Commission.



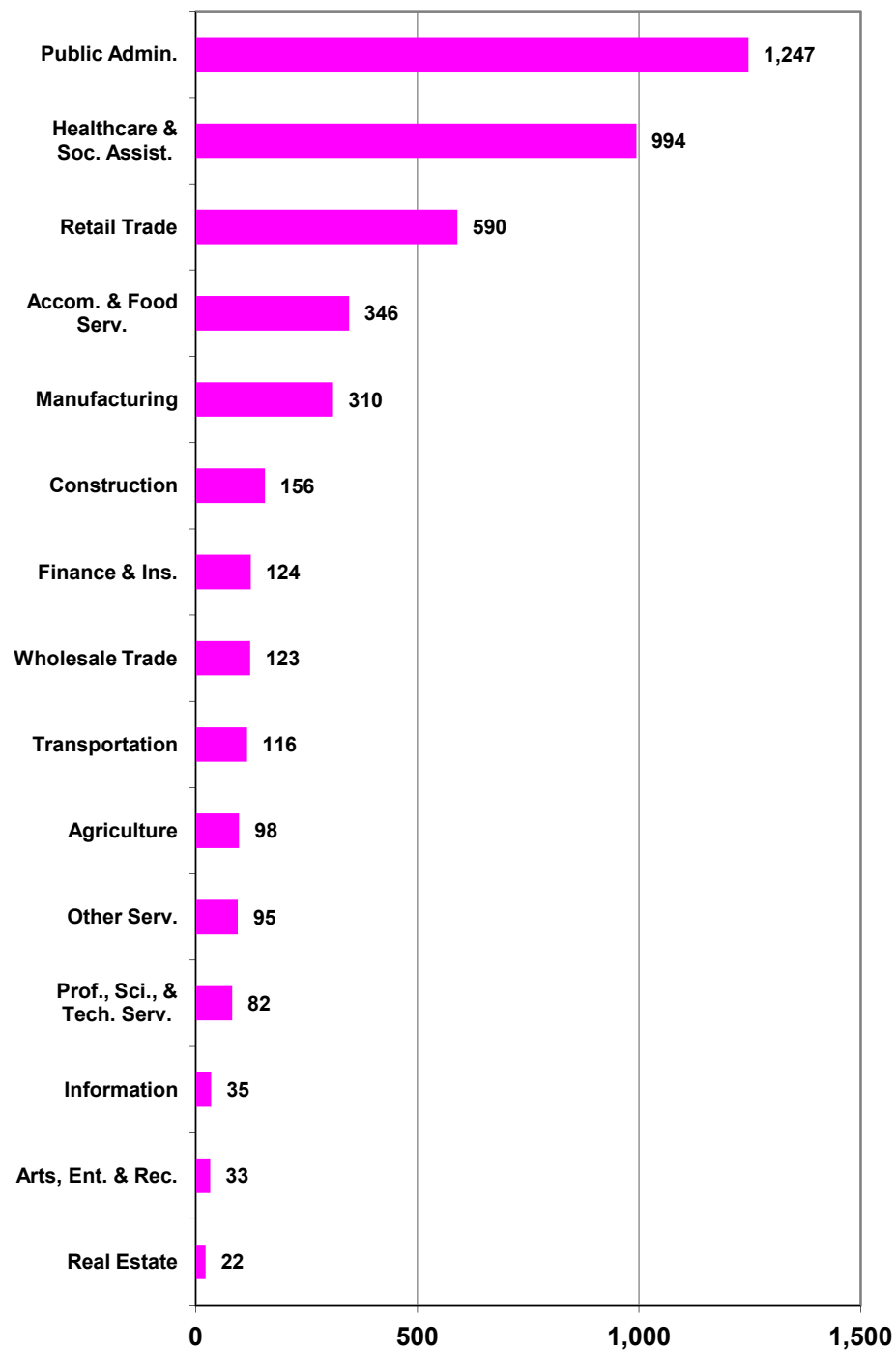
**Figure A17: Mecklenburg County Average Weekly Wages by Major Industry Sector – 2012:Q3<sup>68</sup>**

<sup>68</sup> Data Source: Virginia Employment Commission.



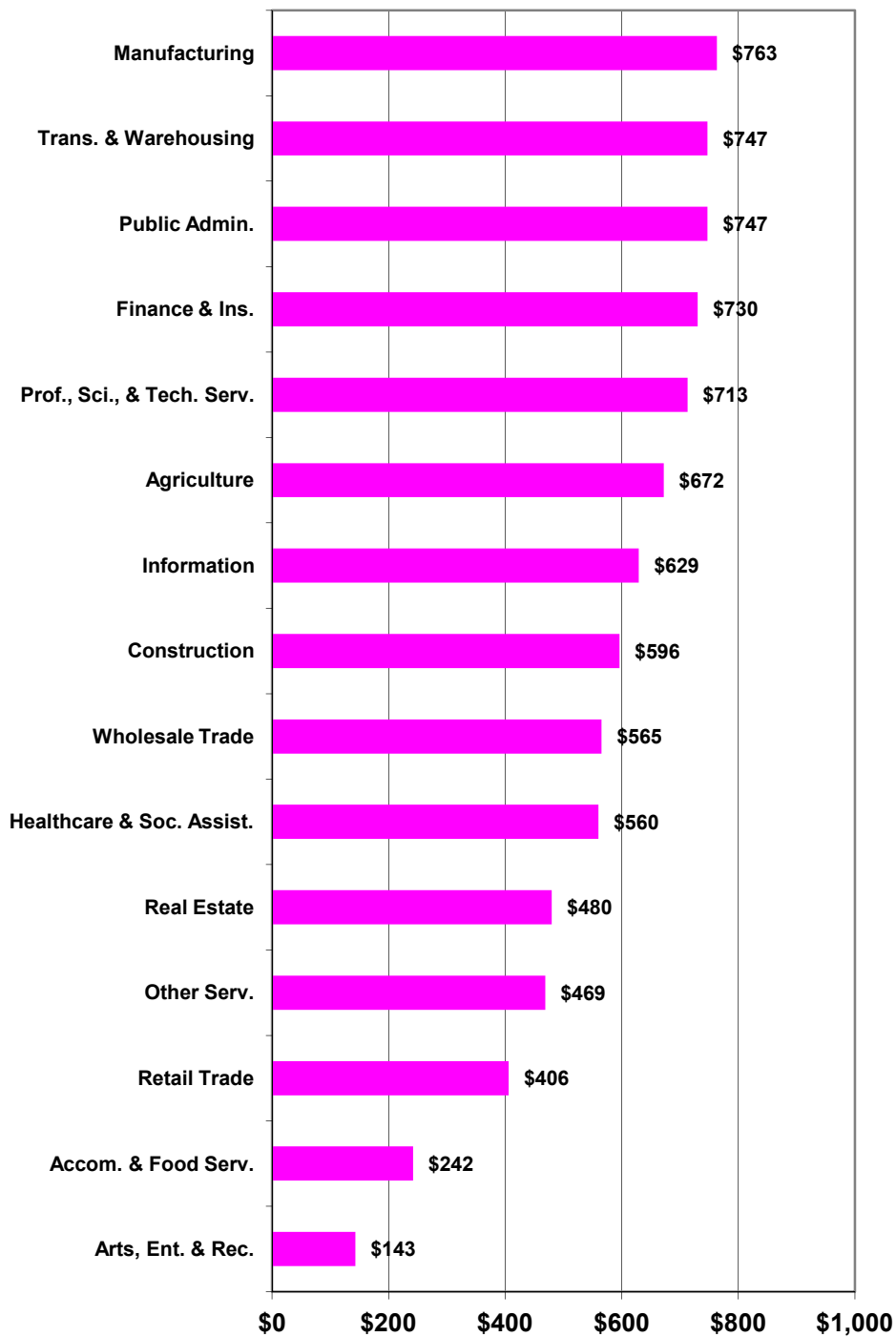
**Figure A18: Mecklenburg County Change in Employment by Major Industry Sector – 2011:Q3 to 2012:Q3<sup>69</sup>**

<sup>69</sup> Data Source: Virginia Employment Commission.



**Figure A19: Nottoway County Major Industry Sector Employment – 2012:Q3<sup>70</sup>**

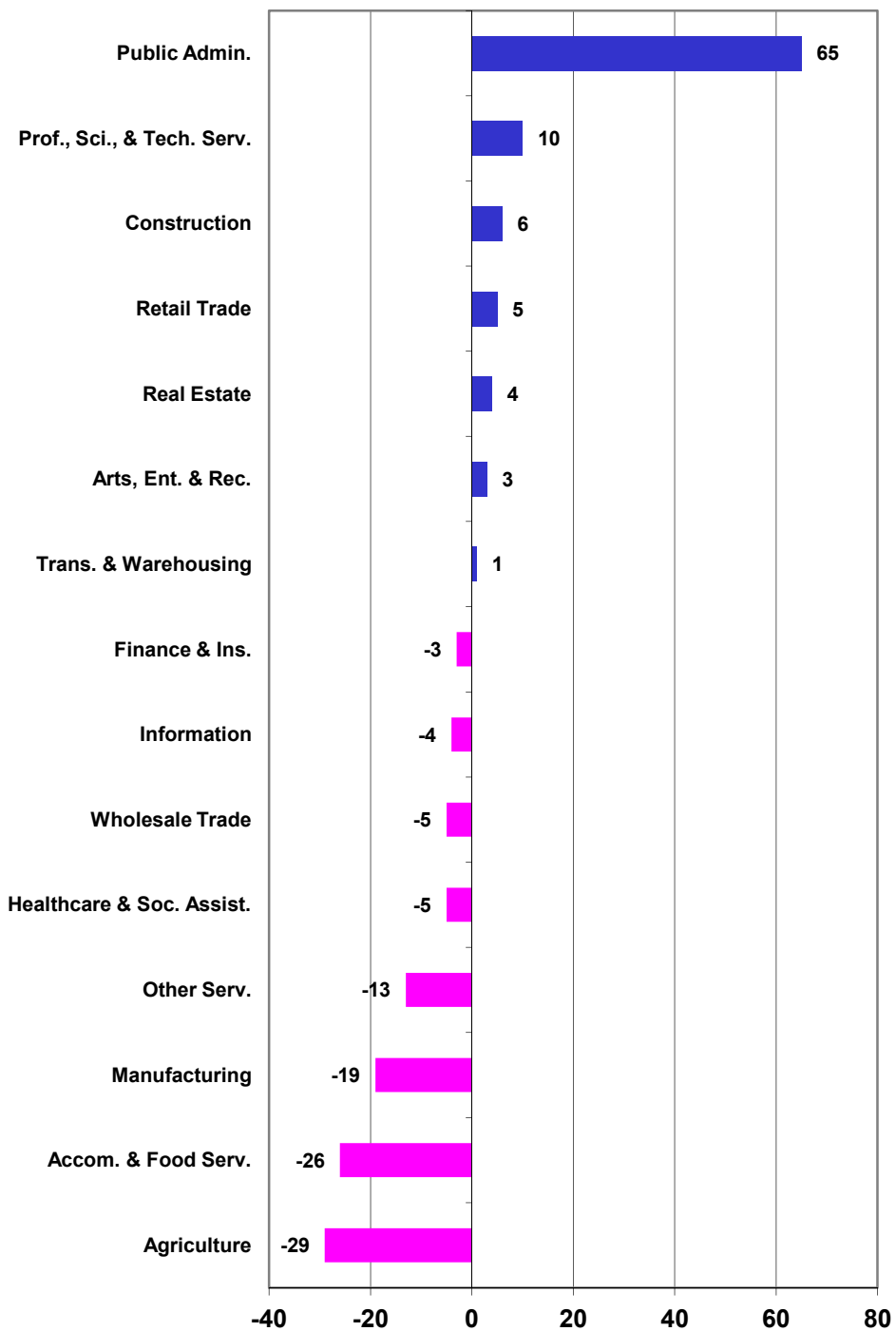
<sup>70</sup> Data Source: Virginia Employment Commission.



**Figure A20: Nottoway County Average Weekly Wages by Major Industry Sector – 2012:Q3<sup>71</sup>**

<sup>71</sup> Data Source: Virginia Employment Commission.





**Figure A21: Nottoway County Change in Employment by Major Industry Sector – 2011:Q3 to 2012:Q3<sup>72</sup>**

<sup>72</sup> Data Source: Virginia Employment Commission.

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
111021	General and Operations Managers	310399	Parks, Recreation and Leisure Facilities Management, Other.	na	na	na
111021	General and Operations Managers	440401	Public Administration.	na	na	na
111021	General and Operations Managers	520101	Business/Commerce, General.	St. Pauls College	BA	73
111021	General and Operations Managers	520201	Business Administration and Management, General.	St. Pauls College	BA	8
111021	General and Operations Managers	520212	Retail Management.	na	na	na
111021	General and Operations Managers	520701	Entrepreneurship/Entrepreneurial Studies.	na	na	na
111021	General and Operations Managers	520801	Finance, General.	na	na	na
111021	General and Operations Managers	521101	International Business/Trade/Commerce.	na	na	na
111021	General and Operations Managers	521301	Management Science.	na	na	na
112021	Marketing Managers	190203	Consumer Merchandising/Retailing Management.	na	na	na
112021	Marketing Managers	190905	Apparel and Textile Marketing Management.	na	na	na
112021	Marketing Managers	512011	Pharmaceutical Marketing and Management.	na	na	na
112021	Marketing Managers	521401	Marketing/Marketing Management, General.	na	na	na
112021	Marketing Managers	521402	Marketing Research.	na	na	na
112021	Marketing Managers	521403	International Marketing.	na	na	na
112021	Marketing Managers	521499	Marketing, Other.	na	na	na
112022	Sales Managers	190203	Consumer Merchandising/Retailing Management.	na	na	na
112022	Sales Managers	512011	Pharmaceutical Marketing and Management.	na	na	na
112022	Sales Managers	520101	Business/Commerce, General.	St. Pauls College	BA	73
112022	Sales Managers	520201	Business Administration and Management, General.	St. Pauls College	BA	8
112022	Sales Managers	521401	Marketing/Marketing Management, General.	na	na	na
113021	Computer and Information Systems Managers	110101	Computer and Information Sciences, General.	SVCC	Certificate <1 yr.	19
113021	Computer and Information Systems Managers	110101	Computer and Information Sciences, General.	SVCC	Certificate >1 yr. and <2 yr.	5
113021	Computer and Information Systems Managers	110101	Computer and Information Sciences, General.	SVCC	Associates	17
113021	Computer and Information Systems Managers	110103	Information Technology.	na	na	na
113021	Computer and Information Systems Managers	110401	Information Science/Studies.	na	na	na
113021	Computer and Information Systems Managers	110701	Computer Science.	St. Pauls College	BA	2
113021	Computer and Information Systems Managers	111001	Network and System Administration/Administrator.	na	na	na
113021	Computer and Information Systems Managers	111003	Computer and Information Systems Security/Information Assurance.	na	na	na
113021	Computer and Information Systems Managers	111005	Information Technology Project Management.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
113021	Computer and Information Systems Managers	520205	Operations Management and Supervision.	na	na	na
113021	Computer and Information Systems Managers	521201	Management Information Systems, General.	St. Pauls College	BA	0
113021	Computer and Information Systems Managers	521206	Information Resources Management.	na	na	na
113021	Computer and Information Systems Managers	521207	Knowledge Management.	na	na	na
113031	Financial Managers	520304	Accounting and Finance.	na	na	na
113031	Financial Managers	520305	Accounting and Business/Management.	na	na	na
113031	Financial Managers	520801	Finance, General.	na	na	na
113031	Financial Managers	520806	International Finance.	na	na	na
113031	Financial Managers	520808	Public Finance.	na	na	na
113031	Financial Managers	520809	Credit Management.	na	na	na
113031	Financial Managers	520899	Finance and Financial Management Services, Other.	na	na	na
113071	Transportation, Storage, and Distribution Managers	440401	Public Administration.	na	na	na
113071	Transportation, Storage, and Distribution Managers	490101	Aeronautics/Aviation/Aerospace Science and Technology, General.	na	na	na
113071	Transportation, Storage, and Distribution Managers	490104	Aviation/Airway Management and Operations.	na	na	na
113071	Transportation, Storage, and Distribution Managers	520101	Business/Commerce, General.	St. Pauls College	BA	73
113071	Transportation, Storage, and Distribution Managers	520201	Business Administration and Management, General.	St. Pauls College	BA	8
113071	Transportation, Storage, and Distribution Managers	520203	Logistics, Materials, and Supply Chain Management.	na	na	na
113071	Transportation, Storage, and Distribution Managers	520209	Transportation/Mobility Management.	na	na	na
119041	Architectural and Engineering Managers	040201	Architecture.	na	na	na
119041	Architectural and Engineering Managers	040301	City/Urban, Community and Regional Planning.	na	na	na
119041	Architectural and Engineering Managers	040401	Environmental Design/Architecture.	na	na	na
119041	Architectural and Engineering Managers	040501	Interior Architecture.	na	na	na
119041	Architectural and Engineering Managers	040601	Landscape Architecture.	na	na	na
119041	Architectural and Engineering Managers	040902	Architectural and Building Sciences/Technology.	na	na	na
119041	Architectural and Engineering Managers	140101	Engineering, General.	na	na	na
119041	Architectural and Engineering Managers	140201	Aerospace, Aeronautical and Astronautical/Space Engineering.	na	na	na
119041	Architectural and Engineering Managers	140301	Agricultural Engineering.	na	na	na
119041	Architectural and Engineering Managers	140401	Architectural Engineering.	na	na	na
119041	Architectural and Engineering Managers	140501	Bioengineering and Biomedical Engineering.	na	na	na
119041	Architectural and Engineering Managers	140601	Ceramic Sciences and Engineering.	na	na	na
119041	Architectural and Engineering Managers	140701	Chemical Engineering.	na	na	na
119041	Architectural and Engineering Managers	140702	Chemical and Biomolecular Engineering.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
119041	Architectural and Engineering Managers	140799	Chemical Engineering, Other.	na	na	na
119041	Architectural and Engineering Managers	140801	Civil Engineering, General.	na	na	na
119041	Architectural and Engineering Managers	140802	Geotechnical and Geoenvironmental Engineering.	na	na	na
119041	Architectural and Engineering Managers	140803	Structural Engineering.	na	na	na
119041	Architectural and Engineering Managers	140804	Transportation and Highway Engineering.	na	na	na
119041	Architectural and Engineering Managers	140805	Water Resources Engineering.	na	na	na
119041	Architectural and Engineering Managers	140899	Civil Engineering, Other.	na	na	na
119041	Architectural and Engineering Managers	140901	Computer Engineering, General.	na	na	na
119041	Architectural and Engineering Managers	140902	Computer Hardware Engineering.	na	na	na
119041	Architectural and Engineering Managers	140903	Computer Software Engineering.	na	na	na
119041	Architectural and Engineering Managers	140999	Computer Engineering, Other.	na	na	na
119041	Architectural and Engineering Managers	141001	Electrical and Electronics Engineering	na	na	na
119041	Architectural and Engineering Managers	141003	Laser and Optical Engineering.	na	na	na
119041	Architectural and Engineering Managers	141004	Telecommunications Engineering.	na	na	na
119041	Architectural and Engineering Managers	141099	Electrical, Electronics and Communications Engineering, Other.	na	na	na
119041	Architectural and Engineering Managers	141101	Engineering Mechanics.	na	na	na
119041	Architectural and Engineering Managers	141201	Engineering Physics/Applied Physics.	na	na	na
119041	Architectural and Engineering Managers	141301	Engineering Science.	na	na	na
119041	Architectural and Engineering Managers	141401	Environmental/Environmental Health Engineering.	na	na	na
119041	Architectural and Engineering Managers	141801	Materials Engineering.	na	na	na
119041	Architectural and Engineering Managers	141901	Mechanical Engineering.	na	na	na
119041	Architectural and Engineering Managers	142001	Metallurgical Engineering.	na	na	na
119041	Architectural and Engineering Managers	142101	Mining and Mineral Engineering.	na	na	na
119041	Architectural and Engineering Managers	142201	Naval Architecture and Marine Engineering.	na	na	na
119041	Architectural and Engineering Managers	142301	Nuclear Engineering.	na	na	na
119041	Architectural and Engineering Managers	142401	Ocean Engineering.	na	na	na
119041	Architectural and Engineering Managers	142501	Petroleum Engineering.	na	na	na
119041	Architectural and Engineering Managers	142701	Systems Engineering.	na	na	na
119041	Architectural and Engineering Managers	142801	Textile Sciences and Engineering.	na	na	na
119041	Architectural and Engineering Managers	143201	Polymer/Plastics Engineering.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
119041	Architectural and Engineering Managers	143301	Construction Engineering.	na	na	na
119041	Architectural and Engineering Managers	143401	Forest Engineering.	na	na	na
119041	Architectural and Engineering Managers	143501	Industrial Engineering.	na	na	na
119041	Architectural and Engineering Managers	143601	Manufacturing Engineering.	na	na	na
119041	Architectural and Engineering Managers	143801	Surveying Engineering.	na	na	na
119041	Architectural and Engineering Managers	143901	Geological/Geophysical Engineering.	na	na	na
119041	Architectural and Engineering Managers	144001	Paper Science and Engineering.	na	na	na
119041	Architectural and Engineering Managers	144101	Electromechanical Engineering.	na	na	na
119041	Architectural and Engineering Managers	144201	Mechatronics, Robotics, and Automation Engineering.	na	na	na
119041	Architectural and Engineering Managers	144301	Biochemical Engineering.	na	na	na
119041	Architectural and Engineering Managers	144401	Engineering Chemistry.	na	na	na
119041	Architectural and Engineering Managers	144501	Biological/Biosystems Engineering.	na	na	na
119041	Architectural and Engineering Managers	149999	Engineering, Other.	na	na	na
119041	Architectural and Engineering Managers	151501	Engineering/Industrial Management.	na	na	na
119041	Architectural and Engineering Managers	151502	Engineering Design.	na	na	na
119041	Architectural and Engineering Managers	151503	Packaging Science.	na	na	na
119041	Architectural and Engineering Managers	401001	Materials Science.	na	na	na
119051	Food Service Managers	120504	Restaurant, Culinary, and Catering Management/Manager.	na	na	na
119051	Food Service Managers	120509	Culinary Science/Culinology.	na	na	na
119051	Food Service Managers	120510	Wine Steward/Sommelier.	na	na	na
119051	Food Service Managers	190505	Foodservice Systems Administration/Management.	na	na	na
119051	Food Service Managers	520901	Hospitality Administration/Management, General.	na	na	na
119051	Food Service Managers	520904	Hotel/Motel Administration/Management.	na	na	na
119051	Food Service Managers	520905	Restaurant/Food Services Management.	na	na	na
119051	Food Service Managers	520909	Hotel, Motel, and Restaurant Management.	na	na	na
119081	Lodging Managers	520901	Hospitality Administration/Management, General.	na	na	na
119081	Lodging Managers	520904	Hotel/Motel Administration/Management.	na	na	na
119081	Lodging Managers	520905	Restaurant/Food Services Management.	na	na	na
119081	Lodging Managers	520906	Resort Management.	na	na	na
119081	Lodging Managers	520909	Hotel, Motel, and Restaurant Management.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
119081	Lodging Managers	521910	Hospitality and Recreation Marketing Operations.	na	na	na
119199	Managers, All Other	030207	Natural Resource Recreation and Tourism.	na	na	na
119199	Managers, All Other	090702	Digital Communication and Media/Multimedia.	na	na	na
119199	Managers, All Other	111005	Information Technology Project Management.	na	na	na
119199	Managers, All Other	250101	Library and Information Science.	na	na	na
119199	Managers, All Other	250103	Archives/Archival Administration.	na	na	na
119199	Managers, All Other	310302	Golf Course Operation and Grounds Management.	na	na	na
119199	Managers, All Other	310399	Parks, Recreation and Leisure Facilities Management, Other.	na	na	na
119199	Managers, All Other	420101	Psychology, General.	na	na	na
119199	Managers, All Other	422701	Cognitive Psychology and Psycholinguistics.	na	na	na
119199	Managers, All Other	422702	Comparative Psychology.	na	na	na
119199	Managers, All Other	422703	Developmental and Child Psychology.	na	na	na
119199	Managers, All Other	422704	Experimental Psychology.	na	na	na
119199	Managers, All Other	422705	Personality Psychology.	na	na	na
119199	Managers, All Other	422706	Physiological Psychology/Psychobiology.	na	na	na
119199	Managers, All Other	422707	Social Psychology.	na	na	na
119199	Managers, All Other	422708	Psychometrics and Quantitative Psychology.	na	na	na
119199	Managers, All Other	422709	Psychopharmacology.	na	na	na
119199	Managers, All Other	422799	Research and Experimental Psychology, Other.	na	na	na
119199	Managers, All Other	422801	Clinical Psychology.	na	na	na
119199	Managers, All Other	422802	Community Psychology.	na	na	na
119199	Managers, All Other	422803	Counseling Psychology.	na	na	na
119199	Managers, All Other	422804	Industrial and Organizational Psychology.	na	na	na
119199	Managers, All Other	422805	School Psychology.	na	na	na
119199	Managers, All Other	422806	Educational Psychology.	na	na	na
119199	Managers, All Other	422807	Clinical Child Psychology.	na	na	na
119199	Managers, All Other	422808	Environmental Psychology.	na	na	na
119199	Managers, All Other	422809	Geropsychology.	na	na	na
119199	Managers, All Other	422810	Health/Medical Psychology.	na	na	na
119199	Managers, All Other	422811	Family Psychology.	na	na	na
119199	Managers, All Other	422812	Forensic Psychology.	na	na	na
119199	Managers, All Other	422813	Applied Psychology.	na	na	na
119199	Managers, All Other	422814	Applied Behavior Analysis.	na	na	na
119199	Managers, All Other	422899	Clinical, Counseling and Applied Psychology, Other.	na	na	na
119199	Managers, All Other	429999	Psychology, Other.	na	na	na
119199	Managers, All Other	430103	Criminal Justice/Law Enforcement Administration.	SVCC	Associates	32
119199	Managers, All Other	430115	Law Enforcement Record-Keeping and Evidence Management.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
119199	Managers, All Other	430202	Fire Services Administration.	na	na	na
119199	Managers, All Other	430301	Homeland Security.	na	na	na
119199	Managers, All Other	430302	Crisis/Emergency/Disaster Management.	na	na	na
119199	Managers, All Other	430303	Critical Infrastructure Protection.	na	na	na
119199	Managers, All Other	430304	Terrorism and Counterterrorism Operations.	na	na	na
119199	Managers, All Other	440401	Public Administration.	na	na	na
119199	Managers, All Other	450101	Social Sciences, General.	St. Pauls College	BA	2
119199	Managers, All Other	450102	Research Methodology and Quantitative Methods.	na	na	na
119199	Managers, All Other	450201	Anthropology.	na	na	na
119199	Managers, All Other	450202	Physical and Biological Anthropology.	na	na	na
119199	Managers, All Other	450203	Medical Anthropology.	na	na	na
119199	Managers, All Other	450204	Cultural Anthropology.	na	na	na
119199	Managers, All Other	450299	Anthropology, Other.	na	na	na
119199	Managers, All Other	450301	Archeology.	na	na	na
119199	Managers, All Other	450401	Criminology.	na	na	na
119199	Managers, All Other	450501	Demography and Population Studies.	na	na	na
119199	Managers, All Other	450601	Economics, General.	na	na	na
119199	Managers, All Other	450602	Applied Economics.	na	na	na
119199	Managers, All Other	450603	Econometrics and Quantitative Economics.	na	na	na
119199	Managers, All Other	450604	Development Economics and International Development.	na	na	na
119199	Managers, All Other	450605	International Economics.	na	na	na
119199	Managers, All Other	450699	Economics, Other.	na	na	na
119199	Managers, All Other	450701	Geography.	na	na	na
119199	Managers, All Other	450702	Geographic Information Science and Cartography.	na	na	na
119199	Managers, All Other	450799	Geography, Other.	na	na	na
119199	Managers, All Other	450901	International Relations and Affairs.	St. Pauls College	BA	1
119199	Managers, All Other	450902	National Security Policy Studies.	na	na	na
119199	Managers, All Other	450999	International Relations and National Security Studies, Other.	na	na	na
119199	Managers, All Other	451001	Political Science and Government, General.	St. Pauls College	BA	4
119199	Managers, All Other	451002	American Government and Politics (United States).	na	na	na
119199	Managers, All Other	451003	Canadian Government and Politics.	na	na	na
119199	Managers, All Other	451004	Political Economy.	na	na	na
119199	Managers, All Other	451099	Political Science and Government, Other.	na	na	na
119199	Managers, All Other	451101	Sociology.	St. Pauls College	BA	0
119199	Managers, All Other	451201	Urban Studies/Affairs.	na	na	na
119199	Managers, All Other	451301	Sociology and Anthropology.	na	na	na
119199	Managers, All Other	451401	Rural Sociology.	na	na	na
119199	Managers, All Other	459999	Social Sciences, Other.	St. Pauls College	BA	0



**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
119199	Managers, All Other	501001	Arts, Entertainment, and Media Management, General.	na	na	na
119199	Managers, All Other	501002	Fine and Studio Arts Management.	na	na	na
119199	Managers, All Other	501004	Theatre/Theatre Arts Management.	na	na	na
119199	Managers, All Other	501099	Arts, Entertainment, and Media Management, Other.	na	na	na
119199	Managers, All Other	510719	Clinical Research Coordinator.	na	na	na
119199	Managers, All Other	520101	Business/Commerce, General.	St. Pauls College	BA	73
119199	Managers, All Other	520201	Business Administration and Management, General.	St. Pauls College	BA	8
119199	Managers, All Other	520206	Non-Profit/Public/Organizational Management.	na	na	na
119199	Managers, All Other	520210	Research and Development Management.	na	na	na
119199	Managers, All Other	520211	Project Management.	na	na	na
119199	Managers, All Other	520701	Entrepreneurship/Entrepreneurial Studies.	na	na	na
119199	Managers, All Other	520702	Franchising and Franchise Operations.	na	na	na
119199	Managers, All Other	520703	Small Business Administration/Management.	na	na	na
119199	Managers, All Other	520903	Tourism and Travel Services Management.	na	na	na
119199	Managers, All Other	520999	Hospitality Administration/Management, Other.	na	na	na
119199	Managers, All Other	522101	Telecommunications Management.	na	na	na
119199	Managers, All Other	540101	History, General.	na	na	na
119199	Managers, All Other	540102	American History (United States).	na	na	na
119199	Managers, All Other	540103	European History.	na	na	na
119199	Managers, All Other	540104	History and Philosophy of Science and Technology.	na	na	na
119199	Managers, All Other	540105	Public/Applied History.	na	na	na
119199	Managers, All Other	540106	Asian History.	na	na	na
119199	Managers, All Other	540107	Canadian History.	na	na	na
119199	Managers, All Other	540108	Military History.	na	na	na
119199	Managers, All Other	540199	History, Other.	na	na	na
131011	Agents and Business Managers of Artists, Performers, and Athletes	090906	Sports Communication.	na	na	na
131011	Agents and Business Managers of Artists, Performers, and Athletes	501001	Arts, Entertainment, and Media Management, General.	na	na	na
131011	Agents and Business Managers of Artists, Performers, and Athletes	501002	Fine and Studio Arts Management.	na	na	na
131011	Agents and Business Managers of Artists, Performers, and Athletes	501099	Arts, Entertainment, and Media Management, Other.	na	na	na
131011	Agents and Business Managers of Artists, Performers, and Athletes	520202	Purchasing, Procurement/Acquisitions and Contracts Management.	na	na	na
131023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	521801	Sales, Distribution, and Marketing Operations, General.	na	na	na



**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
131023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	521899	General Merchandising, Sales, and Related Marketing Operations, Other.	na	na	na
131051	Cost Estimators	141801	Materials Engineering.	na	na	na
131051	Cost Estimators	141901	Mechanical Engineering.	na	na	na
131051	Cost Estimators	143301	Construction Engineering.	na	na	na
131051	Cost Estimators	143601	Manufacturing Engineering.	na	na	na
131051	Cost Estimators	151001	Construction Engineering Technology/Technician.	na	na	na
131051	Cost Estimators	520101	Business/Commerce, General.	St. Pauls College	BA	73
131051	Cost Estimators	520201	Business Administration and Management, General.	St. Pauls College	BA	8
131081	Logisticians	520205	Operations Management and Supervision.	na	na	na
131111	Management Analysts	520101	Business/Commerce, General.	St. Pauls College	BA	73
131111	Management Analysts	520201	Business Administration and Management, General.	St. Pauls College	BA	8
131111	Management Analysts	520213	Organizational Leadership.	na	na	na
131121	Meeting, Convention, and Event Planners	190604	Facilities Planning and Management.	na	na	na
131121	Meeting, Convention, and Event Planners	520907	Meeting and Event Planning.	na	na	na
131151	Training and Development Specialists	521001	Human Resources Management/Personnel Administration, General.	na	na	na
131151	Training and Development Specialists	521005	Human Resources Development.	na	na	na
131161	Market Research Analysts and Marketing Specialists	190203	Consumer Merchandising/Retailing Management.	na	na	na
131161	Market Research Analysts and Marketing Specialists	450602	Applied Economics.	na	na	na
131161	Market Research Analysts and Marketing Specialists	521401	Marketing/Marketing Management, General.	na	na	na
131161	Market Research Analysts and Marketing Specialists	521402	Marketing Research.	na	na	na
131161	Market Research Analysts and Marketing Specialists	521403	International Marketing.	na	na	na
132011	Accountants and Auditors	301601	Accounting and Computer Science.	na	na	na
132011	Accountants and Auditors	430117	Financial Forensics and Fraud Investigation.	na	na	na
132011	Accountants and Auditors	520301	Accounting.	St. Pauls College	BA	2
132011	Accountants and Auditors	520303	Auditing.	na	na	na
132011	Accountants and Auditors	520304	Accounting and Finance.	na	na	na
132011	Accountants and Auditors	520305	Accounting and Business/Management.	na	na	na
132011	Accountants and Auditors	521601	Taxation.	na	na	na
132051	Financial Analysts	270305	Financial Mathematics.	na	na	na
132051	Financial Analysts	520304	Accounting and Finance.	na	na	na
132051	Financial Analysts	520305	Accounting and Business/Management.	na	na	na
132051	Financial Analysts	520801	Finance, General.	na	na	na
132051	Financial Analysts	520806	International Finance.	na	na	na
132051	Financial Analysts	520807	Investments and Securities.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
132051	Financial Analysts	520808	Public Finance.	na	na	na
151121	Computer Systems Analysts	110101	Computer and Information Sciences, General.	SVCC	Certificate <1 yr.	19
151121	Computer Systems Analysts	110101	Computer and Information Sciences, General.	SVCC	Certificate >1 yr. and <2 yr.	5
151121	Computer Systems Analysts	110101	Computer and Information Sciences, General.	SVCC	Associates	17
151121	Computer Systems Analysts	110103	Information Technology.	na	na	na
151121	Computer Systems Analysts	110501	Computer Systems Analysis/Analyst.	na	na	na
151121	Computer Systems Analysts	110901	Computer Systems Networking and Telecommunications.	na	na	na
151131	Computer Programmers	110201	Computer Programming/Programmer, General.	na	na	na
151131	Computer Programmers	110202	Computer Programming, Specific Applications.	na	na	na
151131	Computer Programmers	110203	Computer Programming, Vendor/Product Certification.	na	na	na
151131	Computer Programmers	110299	Computer Programming, Other.	na	na	na
151131	Computer Programmers	110701	Computer Science.	St. Pauls College	BA	2
151131	Computer Programmers	110803	Computer Graphics.	na	na	na
151131	Computer Programmers	110804	Modeling, Virtual Environments and Simulation.	na	na	na
151131	Computer Programmers	151204	Computer Software Technology/Technician.	na	na	na
151131	Computer Programmers	510709	Medical Office Computer Specialist/Assistant.	na	na	na
151131	Computer Programmers	521201	Management Information Systems, General.	St. Pauls College	BA	0
151132	Software Developers, Applications	110102	Artificial Intelligence.	na	na	na
151132	Software Developers, Applications	110103	Information Technology.	na	na	na
151132	Software Developers, Applications	110104	Informatics.	na	na	na
151132	Software Developers, Applications	110201	Computer Programming/Programmer, General.	na	na	na
151132	Software Developers, Applications	110202	Computer Programming, Specific Applications.	na	na	na
151132	Software Developers, Applications	110701	Computer Science.	St. Pauls College	BA	2
151132	Software Developers, Applications	110804	Modeling, Virtual Environments and Simulation.	na	na	na
151132	Software Developers, Applications	140901	Computer Engineering, General.	na	na	na
151132	Software Developers, Applications	140903	Computer Software Engineering.	na	na	na
151132	Software Developers, Applications	151204	Computer Software Technology/Technician.	na	na	na
151132	Software Developers, Applications	261103	Bioinformatics.	na	na	na
151132	Software Developers, Applications	512706	Medical Informatics.	na	na	na
151133	Software Developers, Systems Software	110102	Artificial Intelligence.	na	na	na
151133	Software Developers, Systems Software	110103	Information Technology.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
151133	Software Developers, Systems Software	110104	Informatics.	na	na	na
151133	Software Developers, Systems Software	110201	Computer Programming/Programmer, General.	na	na	na
151133	Software Developers, Systems Software	110202	Computer Programming, Specific Applications.	na	na	na
151133	Software Developers, Systems Software	110401	Information Science/Studies.	na	na	na
151133	Software Developers, Systems Software	110701	Computer Science.	St. Pauls College	BA	2
151133	Software Developers, Systems Software	140901	Computer Engineering, General.	na	na	na
151133	Software Developers, Systems Software	140903	Computer Software Engineering.	na	na	na
151133	Software Developers, Systems Software	151204	Computer Software Technology/Technician.	na	na	na
151141	Database Administrators	110101	Computer and Information Sciences, General.	SVCC	Certificate <1 yr.	19
151141	Database Administrators	110101	Computer and Information Sciences, General.	SVCC	Certificate >1 yr. and <2 yr.	5
151141	Database Administrators	110101	Computer and Information Sciences, General.	SVCC	Associates	17
151141	Database Administrators	110802	Data Modeling/Warehousing and Database Administration.	na	na	na
151141	Database Administrators	111003	Computer and Information Systems Security/Information Assurance.	na	na	na
151142	Network and Computer Systems Administrators	110101	Computer and Information Sciences, General.	SVCC	Certificate <1 yr.	19
151142	Network and Computer Systems Administrators	110101	Computer and Information Sciences, General.	SVCC	Certificate >1 yr. and <2 yr.	5
151142	Network and Computer Systems Administrators	110101	Computer and Information Sciences, General.	SVCC	Associates	17
151142	Network and Computer Systems Administrators	111001	Network and System Administration/Administrator.	na	na	na
151142	Network and Computer Systems Administrators	111003	Computer and Information Systems Security/Information Assurance.	na	na	na
172071	Electrical Engineers	141001	Electrical and Electronics Engineering	na	na	na
172071	Electrical Engineers	141099	Electrical, Electronics and Communications Engineering, Other.	na	na	na
172072	Electronics Engineers, Except Computer	141001	Electrical and Electronics Engineering	na	na	na
172072	Electronics Engineers, Except Computer	141004	Telecommunications Engineering.	na	na	na
172072	Electronics Engineers, Except Computer	141099	Electrical, Electronics and Communications Engineering, Other.	na	na	na
173023	Electrical and Electronics Engineering Technicians	150303	Electrical, Electronic and Communications Engineering Technology/Technician.	SVCC	Certificate <1 yr.	15
173023	Electrical and Electronics Engineering Technicians	150303	Electrical, Electronic and Communications Engineering Technology/Technician.	SVCC	Certificate >1 yr. and <2 yr.	1
173023	Electrical and Electronics Engineering Technicians	150305	Telecommunications Technology/Technician.	na	na	na
173023	Electrical and Electronics Engineering Technicians	150306	Integrated Circuit Design.	na	na	na
173023	Electrical and Electronics Engineering Technicians	150399	Electrical and Electronic Engineering Technologies/Technicians, Other.	na	na	na
173023	Electrical and Electronics Engineering Technicians	150616	Semiconductor Manufacturing Technology.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
173023	Electrical and Electronics Engineering Technicians	151201	Computer Engineering Technology/Technician.	na	na	na
173023	Electrical and Electronics Engineering Technicians	151202	Computer Technology/Computer Systems Technology.	na	na	na
231011	Lawyers	220101	Law.	na	na	na
231011	Lawyers	220201	Advanced Legal Research/Studies, General.	na	na	na
231011	Lawyers	220202	Programs for Foreign Lawyers.	na	na	na
231011	Lawyers	220203	American/U.S. Law/Legal Studies/Jurisprudence.	na	na	na
231011	Lawyers	220204	Canadian Law/Legal Studies/Jurisprudence.	na	na	na
231011	Lawyers	220205	Banking, Corporate, Finance, and Securities Law.	na	na	na
231011	Lawyers	220206	Comparative Law.	na	na	na
231011	Lawyers	220207	Energy, Environment, and Natural Resources Law.	na	na	na
231011	Lawyers	220208	Health Law.	na	na	na
231011	Lawyers	220209	International Law and Legal Studies.	na	na	na
231011	Lawyers	220210	International Business, Trade, and Tax Law.	na	na	na
231011	Lawyers	220211	Tax Law/Taxation.	na	na	na
231011	Lawyers	220212	Intellectual Property Law.	na	na	na
231011	Lawyers	220299	Legal Research and Advanced Professional Studies, Other.	na	na	na
254012	Curators	301401	Museology/Museum Studies.	na	na	na
254012	Curators	500703	Art History, Criticism and Conservation.	na	na	na
254012	Curators	540105	Public/Applied History.	na	na	na
271013	Fine Artists, Including Painters, Sculptors, and Illustrators	500101	Visual and Performing Arts, General.	na	na	na
271013	Fine Artists, Including Painters, Sculptors, and Illustrators	500701	Art/Art Studies, General.	na	na	na
271013	Fine Artists, Including Painters, Sculptors, and Illustrators	500702	Fine/Studio Arts, General.	na	na	na
271013	Fine Artists, Including Painters, Sculptors, and Illustrators	500705	Drawing.	na	na	na
271013	Fine Artists, Including Painters, Sculptors, and Illustrators	500706	Intermedia/Multimedia.	na	na	na
271013	Fine Artists, Including Painters, Sculptors, and Illustrators	500708	Painting.	na	na	na
271013	Fine Artists, Including Painters, Sculptors, and Illustrators	500709	Sculpture.	na	na	na
271013	Fine Artists, Including Painters, Sculptors, and Illustrators	500710	Printmaking.	na	na	na
271013	Fine Artists, Including Painters, Sculptors, and Illustrators	500711	Ceramic Arts and Ceramics.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
271013	Fine Artists, Including Painters, Sculptors, and Illustrators	500799	Fine Arts and Art Studies, Other.	na	na	na
271013	Fine Artists, Including Painters, Sculptors, and Illustrators	512703	Medical Illustration/Medical Illustrator.	na	na	na
272011	Actors	500501	Drama and Dramatics/Theatre Arts, General.	na	na	na
272011	Actors	500506	Acting.	na	na	na
272011	Actors	500507	Directing and Theatrical Production.	na	na	na
272011	Actors	500509	Musical Theatre.	na	na	na
272011	Actors	500599	Dramatic/Theatre Arts and Stagecraft, Other.	na	na	na
272012	Producers and Directors	090701	Radio and Television.	na	na	na
272012	Producers and Directors	500501	Drama and Dramatics/Theatre Arts, General.	na	na	na
272012	Producers and Directors	500507	Directing and Theatrical Production.	na	na	na
272012	Producers and Directors	500509	Musical Theatre.	na	na	na
272012	Producers and Directors	500599	Dramatic/Theatre Arts and Stagecraft, Other.	na	na	na
272012	Producers and Directors	500601	Film/Cinema/Video Studies.	na	na	na
272012	Producers and Directors	500602	Cinematography and Film/Video Production.	na	na	na
272012	Producers and Directors	500607	Documentary Production.	na	na	na
272012	Producers and Directors	501004	Theatre/Theatre Arts Management.	na	na	na
272021	Athletes and Sports Competitors	310501	Health and Physical Education/Fitness, General.	na	na	na
272022	Coaches and Scouts	131314	Physical Education Teaching and Coaching.	na	na	na
272022	Coaches and Scouts	310501	Health and Physical Education/Fitness, General.	na	na	na
272022	Coaches and Scouts	310504	Sport and Fitness Administration/Management.	na	na	na
273041	Editors	090102	Mass Communication/Media Studies.	na	na	na
273041	Editors	090401	Journalism.	na	na	na
273041	Editors	090402	Broadcast Journalism.	na	na	na
273041	Editors	090908	Technical and Scientific Communication.	na	na	na
273041	Editors	091001	Publishing.	na	na	na
273041	Editors	099999	Communication, Journalism, and Related Programs, Other.	na	na	na
273041	Editors	231301	Writing, General.	na	na	na
273041	Editors	231302	Creative Writing.	na	na	na
273041	Editors	231303	Professional, Technical, Business, and Scientific Writing.	na	na	na
273041	Editors	231304	Rhetoric and Composition.	na	na	na
273041	Editors	231399	Rhetoric and Composition/Writing Studies, Other.	na	na	na
273041	Editors	231401	General Literature.	na	na	na
273041	Editors	231405	Children's and Adolescent Literature.	na	na	na
273041	Editors	231499	Literature, Other.	na	na	na
273041	Editors	520501	Business/Corporate Communications.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
273043	Writers and Authors	090101	Speech Communication and Rhetoric.	na	na	na
273043	Writers and Authors	090102	Mass Communication/Media Studies.	na	na	na
273043	Writers and Authors	090401	Journalism.	na	na	na
273043	Writers and Authors	090402	Broadcast Journalism.	na	na	na
273043	Writers and Authors	099999	Communication, Journalism, and Related Programs, Other.	na	na	na
273043	Writers and Authors	190202	Family and Consumer Sciences/Human Sciences Communication.	na	na	na
273043	Writers and Authors	231301	Writing, General.	na	na	na
273043	Writers and Authors	231302	Creative Writing.	na	na	na
273043	Writers and Authors	231303	Professional, Technical, Business, and Scientific Writing.	na	na	na
273043	Writers and Authors	231304	Rhetoric and Composition.	na	na	na
273043	Writers and Authors	231399	Rhetoric and Composition/Writing Studies, Other.	na	na	na
273043	Writers and Authors	231401	General Literature.	na	na	na
273043	Writers and Authors	231405	Children's and Adolescent Literature.	na	na	na
273043	Writers and Authors	231499	Literature, Other.	na	na	na
273043	Writers and Authors	500504	Playwriting and Screenwriting.	na	na	na
273043	Writers and Authors	520501	Business/Corporate Communications.	na	na	na
274011	Audio and Video Equipment Technicians	010802	Agricultural Communication/Journalism.	na	na	na
274011	Audio and Video Equipment Technicians	100201	Photographic and Film/Video Technology/Technician and Assistant.	na	na	na
274011	Audio and Video Equipment Technicians	100203	Recording Arts Technology/Technician.	na	na	na
319011	Massage Therapists	513501	Massage Therapy/Therapeutic Massage.	SVCC	Certificate <1 yr.	1
319011	Massage Therapists	513502	Asian Bodywork Therapy.	na	na	na
319011	Massage Therapists	513503	Somatic Bodywork.	na	na	na
331099	First-Line Supervisors of Protective Service Workers, All Other	430112	Securities Services Administration/Management.	na	na	na
331099	First-Line Supervisors of Protective Service Workers, All Other	430399	Homeland Security, Other.	na	na	na
351011	Chefs and Head Cooks	120501	Baking and Pastry Arts/Baker/Pastry Chef.	na	na	na
351011	Chefs and Head Cooks	120503	Culinary Arts/Chef Training.	SVCC	Certificate <1 yr.	4
351011	Chefs and Head Cooks	120504	Restaurant, Culinary, and Catering Management/Manager.	na	na	na
351011	Chefs and Head Cooks	120509	Culinary Science/Culinology.	na	na	na
351012	First-Line Supervisors of Food Preparation and Serving Workers	120503	Culinary Arts/Chef Training.	SVCC	Certificate <1 yr.	4
351012	First-Line Supervisors of Food Preparation and Serving Workers	120504	Restaurant, Culinary, and Catering Management/Manager.	na	na	na
351012	First-Line Supervisors of Food Preparation and Serving Workers	120507	Food Service, Waiter/Waitress, and Dining Room Management/Manager.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
351012	First-Line Supervisors of Food Preparation and Serving Workers	190505	Foodservice Systems Administration/Management.	na	na	na
352012	Cooks, Institution and Cafeteria	120505	Food Preparation/Professional Cooking/Kitchen Assistant.	na	na	na
352012	Cooks, Institution and Cafeteria	120508	Institutional Food Workers.	na	na	na
352012	Cooks, Institution and Cafeteria	190505	Foodservice Systems Administration/Management.	na	na	na
352014	Cooks, Restaurant	120503	Culinary Arts/Chef Training.	SVCC	Certificate <1 yr.	4
353011	Bartenders	120502	Bartending/Bartender.	na	na	na
371012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	010601	Applied Horticulture/Horticulture Operations, General.	na	na	na
371012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	010603	Ornamental Horticulture.	na	na	na
371012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	010604	Greenhouse Operations and Management.	na	na	na
371012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	010605	Landscaping and Groundskeeping.	na	na	na
371012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	010606	Plant Nursery Operations and Management.	na	na	na
371012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	010607	Turf and Turfgrass Management.	na	na	na
371012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	310302	Golf Course Operation and Grounds Management.	na	na	na
391021	First-Line Supervisors of Personal Service Workers	120412	Salon/Beauty Salon Management/Manager.	na	na	na
392021	Nonfarm Animal Caretakers	010504	Dog/Pet/Animal Grooming.	na	na	na
399031	Fitness Trainers and Aerobics Instructors	131314	Physical Education Teaching and Coaching.	na	na	na
399031	Fitness Trainers and Aerobics Instructors	310501	Health and Physical Education/Fitness, General.	na	na	na
399031	Fitness Trainers and Aerobics Instructors	310504	Sport and Fitness Administration/Management.	na	na	na
399031	Fitness Trainers and Aerobics Instructors	310507	Physical Fitness Technician.	na	na	na
399031	Fitness Trainers and Aerobics Instructors	513602	Yoga Teacher Training/Yoga Therapy.	na	na	na
411011	First-Line Supervisors of Retail Sales Workers	010608	Floriculture/Floristry Operations and Management.	na	na	na
411011	First-Line Supervisors of Retail Sales Workers	190203	Consumer Merchandising/Retailing Management.	na	na	na
411011	First-Line Supervisors of Retail Sales Workers	520208	E-Commerce/Electronic Commerce.	na	na	na
411011	First-Line Supervisors of Retail Sales Workers	520212	Retail Management.	na	na	na



**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
411011	First-Line Supervisors of Retail Sales Workers	521803	Retailing and Retail Operations.	na	na	na
411011	First-Line Supervisors of Retail Sales Workers	521804	Selling Skills and Sales Operations.	na	na	na
411011	First-Line Supervisors of Retail Sales Workers	521899	General Merchandising, Sales, and Related Marketing Operations, Other.	na	na	na
411011	First-Line Supervisors of Retail Sales Workers	521909	Special Products Marketing Operations.	na	na	na
411012	First-Line Supervisors of Non-Retail Sales Workers	521804	Selling Skills and Sales Operations.	na	na	na
411012	First-Line Supervisors of Non-Retail Sales Workers	521899	General Merchandising, Sales, and Related Marketing Operations, Other.	na	na	na
411012	First-Line Supervisors of Non-Retail Sales Workers	521909	Special Products Marketing Operations.	na	na	na
413011	Advertising Sales Agents	521804	Selling Skills and Sales Operations.	na	na	na
413099	Sales Representatives, Services, All Other	521803	Retailing and Retail Operations.	na	na	na
413099	Sales Representatives, Services, All Other	521804	Selling Skills and Sales Operations.	na	na	na
414011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	521804	Selling Skills and Sales Operations.	na	na	na
414012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	521801	Sales, Distribution, and Marketing Operations, General.	na	na	na
414012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	521899	General Merchandising, Sales, and Related Marketing Operations, Other.	na	na	na
414012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	521902	Fashion Merchandising.	na	na	na
414012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	521904	Apparel and Accessories Marketing Operations.	na	na	na
414012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	521909	Special Products Marketing Operations.	na	na	na
431011	First-Line Supervisors of Office and Administrative Support Workers	010106	Agricultural Business Technology.	na	na	na
431011	First-Line Supervisors of Office and Administrative Support Workers	510705	Medical Office Management/Administration.	na	na	na
431011	First-Line Supervisors of Office and Administrative Support Workers	510711	Medical/Health Management and Clinical Assistant/Specialist.	na	na	na
431011	First-Line Supervisors of Office and Administrative Support Workers	520204	Office Management and Supervision.	na	na	na



**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
431011	First-Line Supervisors of Office and Administrative Support Workers	520207	Customer Service Management.	na	na	na
431011	First-Line Supervisors of Office and Administrative Support Workers	520208	E-Commerce/Electronic Commerce.	na	na	na
433031	Bookkeeping, Accounting, and Auditing Clerks	520302	Accounting Technology/Technician and Bookkeeping.	na	na	na
434051	Customer Service Representatives	520406	Receptionist.	na	na	na
434051	Customer Service Representatives	520411	Customer Service Support/Call Center/Teleservice Operation.	na	na	na
434171	Receptionists and Information Clerks	520406	Receptionist.	na	na	na
435011	Cargo and Freight Agents	520408	General Office Occupations and Clerical Services.	na	na	na
435011	Cargo and Freight Agents	520410	Traffic, Customs, and Transportation Clerk/Technician.	na	na	na
435032	Dispatchers, Except Police, Fire, and Ambulance	520410	Traffic, Customs, and Transportation Clerk/Technician.	na	na	na
435061	Production, Planning, and Expediting Clerks	520409	Parts, Warehousing, and Inventory Management Operations.	na	na	na
436011	Executive Secretaries and Executive Administrative Assistants	520401	Administrative Assistant and Secretarial Science, General.	na	na	na
436011	Executive Secretaries and Executive Administrative Assistants	520402	Executive Assistant/Executive Secretary.	na	na	na
436014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	520401	Administrative Assistant and Secretarial Science, General.	na	na	na
436014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	520402	Executive Assistant/Executive Secretary.	na	na	na
439021	Data Entry Keyers	100305	Graphic and Printing Equipment Operator, General Production.	na	na	na
439021	Data Entry Keyers	110601	Data Entry/Microcomputer Applications, General.	na	na	na
439021	Data Entry Keyers	520407	Business/Office Automation/Technology/Data Entry.	na	na	na
439061	Office Clerks, General	520408	General Office Occupations and Clerical Services.	na	na	na
454022	Logging Equipment Operators	490202	Construction/Heavy Equipment/Earthmoving Equipment Operation.	na	na	na
472031	Carpenters	460201	Carpentry/Carpenter.	SVCC	Certificate <1 yr.	4
472111	Electricians	460302	Electrician.	SVCC	Certificate <1 yr.	4
472111	Electricians	460302	Electrician.	SVCC	Certificate >1 yr. and <2 yr.	7
491011	First-Line Supervisors of Mechanics, Installers, and Repairers	460301	Electrical and Power Transmission Installation/Installer, General.	na	na	na
491011	First-Line Supervisors of Mechanics, Installers, and Repairers	460303	Lineworker.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
491011	First-Line Supervisors of Mechanics, Installers, and Repairers	470617	High Performance and Custom Engine Technician/Mechanic.	na	na	na
491011	First-Line Supervisors of Mechanics, Installers, and Repairers	470618	Recreation Vehicle (RV) Service Technician.	na	na	na
491011	First-Line Supervisors of Mechanics, Installers, and Repairers	520205	Operations Management and Supervision.	na	na	na
493011	Aircraft Mechanics and Service Technicians	010205	Agricultural Mechanics and Equipment/Machine Technology.	na	na	na
493011	Aircraft Mechanics and Service Technicians	470607	Airframe Mechanics and Aircraft Maintenance Technology/Technician.	na	na	na
493011	Aircraft Mechanics and Service Technicians	470608	Aircraft Powerplant Technology/Technician.	na	na	na
493023	Automotive Service Technicians and Mechanics	150803	Automotive Engineering Technology/Technician.	na	na	na
493023	Automotive Service Technicians and Mechanics	470604	Automobile/Automotive Mechanics Technology/Technician.	SVCC	Certificate <1 yr.	7
493023	Automotive Service Technicians and Mechanics	470604	Automobile/Automotive Mechanics Technology/Technician.	SVCC	Certificate >1 yr. and <2 yr.	3
493023	Automotive Service Technicians and Mechanics	470612	Vehicle Emissions Inspection and Maintenance Technology/Technician.	na	na	na
493023	Automotive Service Technicians and Mechanics	470613	Medium/Heavy Vehicle and Truck Technology/Technician.	na	na	na
493023	Automotive Service Technicians and Mechanics	470614	Alternative Fuel Vehicle Technology/Technician.	na	na	na
493023	Automotive Service Technicians and Mechanics	470617	High Performance and Custom Engine Technician/Mechanic.	na	na	na
493031	Bus and Truck Mechanics and Diesel Engine Specialists	470605	Diesel Mechanics Technology/Technician.	SVCC	Certificate <1 yr.	41
493031	Bus and Truck Mechanics and Diesel Engine Specialists	470613	Medium/Heavy Vehicle and Truck Technology/Technician.	na	na	na
493042	Mobile Heavy Equipment Mechanics, Except Engines	010205	Agricultural Mechanics and Equipment/Machine Technology.	na	na	na
493042	Mobile Heavy Equipment Mechanics, Except Engines	470302	Heavy Equipment Maintenance Technology/Technician.	na	na	na
499041	Industrial Machinery Mechanics	470303	Industrial Mechanics and Maintenance Technology.	na	na	na
499043	Maintenance Workers, Machinery	470303	Industrial Mechanics and Maintenance Technology.	na	na	na
499052	Telecommunications Line Installers and Repairers	470103	Communications Systems Installation and Repair Technology.	na	na	na
499071	Maintenance and Repair Workers, General	460401	Building/Property Maintenance.	na	na	na
511011	First-Line Supervisors of Production and Operating Workers	520205	Operations Management and Supervision.	na	na	na
513011	Bakers	120501	Baking and Pastry Arts/Baker/Pastry Chef.	na	na	na
514011	Computer-Controlled Machine Tool Operators, Metal and Plastic	480503	Machine Shop Technology/Assistant.	na	na	na
514011	Computer-Controlled Machine Tool Operators, Metal and Plastic	480510	Computer Numerically Controlled (CNC) Machinist Technology/CNC Machinist.	na	na	na

**Table A1: Targeted Industry Sector Occupations and Associated Postsecondary Education Programs**

SOC Code	SOC Title	CIP Code	CIP Title	Institution	Award	Grads
514012	Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	480510	Computer Numerically Controlled (CNC) Machinist Technology/CNC Machinist.	na	na	na
514031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	480501	Machine Tool Technology/Machinist.	na	na	na
514031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	480506	Sheet Metal Technology/Sheetworking.	na	na	na
514041	Machinists	480501	Machine Tool Technology/Machinist.	na	na	na
514041	Machinists	480503	Machine Shop Technology/Assistant.	na	na	na
514121	Welders, Cutters, Solderers, and Brazers	150614	Welding Engineering Technology/Technician.	na	na	na
514121	Welders, Cutters, Solderers, and Brazers	480508	Welding Technology/Welder.	SVCC	Certificate <1 yr.	34
514122	Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	480508	Welding Technology/Welder.	SVCC	Certificate <1 yr.	34
519061	Inspectors, Testers, Sorters, Samplers, and Weighers	150702	Quality Control Technology/Technician.	na	na	na
531031	First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	490208	Railroad and Railway Transportation.	na	na	na
532012	Commercial Pilots	490102	Airline/Commercial/Professional Pilot and Flight Crew.	na	na	na
532012	Commercial Pilots	490108	Flight Instructor.	na	na	na
533032	Heavy and Tractor-Trailer Truck Drivers	490205	Truck and Bus Driver/Commercial Vehicle Operator and Instructor.	na	na	na
533033	Light Truck or Delivery Services Drivers	490205	Truck and Bus Driver/Commercial Vehicle Operator and Instructor.	na	na	na
535021	Captains, Mates, and Pilots of Water Vessels	490303	Commercial Fishing.	na	na	na
535021	Captains, Mates, and Pilots of Water Vessels	490309	Marine Science/Merchant Marine Officer.	na	na	na
537021	Crane and Tower Operators	490202	Construction/Heavy Equipment/Earthmoving Equipment Operation.	na	na	na
537021	Crane and Tower Operators	490206	Mobil Crane Operation/Operator.	na	na	na