



PINE BLUFF ARSENAL WORKFORCE ASSESSMENT AND SOUTHEAST ARKANSAS INDUSTRY ANALYSIS



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BACKGROUND

The completion of the chemical weapons storage and disposal missions at the Pine Bluff Arsenal (PBA) marks a time of transition for many of the workers currently employed in Southeast Arkansas. While PBA will continue to carry out missions for U.S. military clients and remain a strong employer for the area, roughly 980 workers will be displaced as a result of the completed mission, creating a need for the workforce system to help reallocate the displaced workers. The regional economy will have difficulty absorbing these workers, and risks losing a highly-skilled portion of its workforce to other regions. Classifying and describing the displaced workers according to their capabilities and career opportunities is a necessary step in assisting this already-transitioning regional economy.

The Southeast Arkansas Growth Initiative (SGI) leads the planning and implementation of economic and workforce development efforts for the region. The analysis contained in this report provides a tool for SEAGI and its partners to synchronize the coordination of worker services delivery processes. Successful, comprehensive service delivery ensures worker access to job, training, and educational opportunities. It also enables the expansion of a regional workforce that is future-looking, with high skills and aptitude, and matches and drives future innovation and opportunities. This pursuit positions Southeast Arkansas to be highly competitive on national and global scales.

EXECUTIVE SUMMARY

For many years, the economy of Southeast Arkansas has been dominated by certain staple industries, including agriculture, manufacturing and, of course, the Pine Bluff Arsenal (PBA). But the economic landscape of this area is beginning to change.

The massive job losses occurring with the completion of the PBA chemical weapons disassembly mission will put the region's economic and workforce development personnel to the test. As some of the region's most highly-skilled, high-wage workers will lose their main source of income, the challenge will be to reposition these workers to another form of employment quickly and effectively—or risk losing the economic benefits of their labor and income to another region.

Thus, the purpose of this study is threefold:

- To address the short-term, immediate need of the economy by describing the occupations and skill sets of the PBA workforce;
- To identify and describe industry groups that can be leveraged to transition PBA's dislocated workers, can leverage other existing regional assets (*e.g.*, buildings, equipment, infrastructure, etc.), show high levels of demand, and show strong potential for growth;
- To address the talent pipeline for each target industry group to determine whether enough workers are being trained for positions integral to the success of these industries. This issue is relevant even outside the context of the PBA layoffs because this will help workforce development and educational institutions design education and training that is relevant to all workers within the region.

The PBA layoffs will amount to 986 job losses across 84 occupational categories.¹ In classifying these occupations by standard occupation classification (SOC) codes, we are able to identify new career opportunities that utilize the same strengths and capabilities that these workers already have.²

¹ Although the initial announcement stated that 1,100 workers would be affected the number has changed several times over the past couple of months and now stands at 986. The number 986 is accurate as of November 3rd, 2010.

² In determining how to characterize workers by SOC code we relied on work completed by staff at the URS Corporation. Data received from URS and the Pine Bluff Arsenal indicated the number of workers who will be laid-off, classified by job title and in some cases by military occupational sectors, and a recommendation as to where that occupation would likely be classified in the SOC code system. EMSI was responsible for the final step in this process, which was ensuring that the SOC codes selected by URS aligned with the published labor market data for Jefferson County.

Table I.1 below displays some of the top career transition options for the PBA workers, broken down by major occupational categories. The best option for each worker is dependent upon multiple factors, most notably the worker’s area of expertise, educational level, and whether the worker’s particular knowledge and skills are easily transferable to other industries. A fuller treatment of each of each worker’s options is addressed in the body of this report. Here we will outline some of the more critical career transition opportunities.

Table I.1: Summary of PBA Occupational Categories

Occupational Category	Best Industry Transition Potential	Available Workers
Hazardous Materials Specialists	Biotech or Chemical Manufacturing	179
Executives & Managers	Various Manufacturing or Business & Professional Services	169
Machine Operators & Mechanics	Food Manufacturing, Timber & Wood Products, or TDL	125
Clerks	Business & Professional Services, Various Manufacturing	70
Engineers	Metals & Machinery Manufacturing, Food Manufacturing, Chemical & Chemical Product Manufacturing	62
Scientific Technicians	Metals & Machinery Manufacturing, Food Manufacturing, Chemical & Chemical Product Manufacturing	62
Business Operations Specialists	Business & Professional Services, Various Manufacturing	56
All Other Workers	TDL, Sustainable Ag., or Biotech	170
Environmental Specialists	Biotech, Sustainable Ag., Other Government	49
Medical Specialists	Healthcare	25
Public Relations Workers	Business & Professional Services	12
Computer Specialists	Information, Education, Business & Professional Services	7
		986

Other highlights from Chapter 1 include the following:

- The hazardous materials specialists category will bear some of the largest layoffs. These workers would be well suited for employment in two of the region’s target industry groups: biotechnology or chemical and chemical product manufacturing.
- Industrial machinery mechanics have a wide array of options due their broad base of knowledge. They could be reemployed in virtually any type of manufacturing, though they are more likely to find opportunities in industries with highly automated procedures such as metals and machinery manufacturing or food manufacturing.
- By far the largest number of workers laid off in the engineers category are industrial engineers. A small number of industrial engineers are needed in every manufacturing industry, but particularly those that are highly automated, such as machinery manufacturing and food processing.
- Environmental specialists represent a small but crucial group of PBA workers. Based on national averages, the largest number of these workers is employed in government, consulting services, and research and development. None of these options are particularly strong in the area, though a handful of these workers would be able to find employment in a research and development capacity within either the biotechnology or sustainable agriculture industries.

- An estimated 135 security guards will be displaced. There may be potential to transition these workers into entry-level positions in both the healthcare industry group and the transportation, storage and distribution industry group.
- Of the 19 chemists at the PBA, there may be some opportunity for them to transfer into sustainable agriculture and biotechnology, but at this point the number of positions is fairly limited.
- With strong growth projected in the healthcare industry, most of 25 medical specialists that will be laid off should not have trouble finding reemployment at a hospital or other healthcare provider.

The layoffs at the Pine Bluff Arsenal are only one side of the story for Southeast Arkansas. In order for the region to offer enticing employment options, the region must have an economic development strategy that is innovative, aggressive, and realistic. There is no foolproof solution to such a challenge. Each of the industries detailed in Chapter 2: Industry Group Summaries (beginning on page 23) offer their own particular strengths that make them worthy of inclusion in the economic development strategy. Information on their various strengths, weaknesses, and labor requirements is thoroughly outlined in these sections, but Table I.2 offers a brief overview.

Table I.2: Overview of Southeast Arkansas Target Industry Groups

Target Industry Group	2010 Jobs	10-'15 Growth	10-'15 % Growth	2010 LQ	Median Earnings Per Worker	Average Job Multiplier	Average Regional Integration	Overall Growth Potential
Healthcare & Social Assistance	36,977	3,703	10%	1.45	\$49,130	1.7	91%	Excellent
Entrepreneurial Businesses	21,235	2,023	10%	0.64	\$52,970	2.3	63%	Strong
Chemical and Chemical Product Manufacturing	3,251	345	11%	1.02	\$62,194	2.5	80%	Uncertain
Transportation, Distribution & Logistics	8,056	178	2%	2.49	\$55,578	2.0	87%	Uncertain
Biotechnology	621	114	18%	0.35	\$56,847	2.5	35%	Strong
Metal and Machinery Manufacturing	6,118	34	1%	1.75	\$52,169	2.1	80%	Uncertain
Sustainable Agriculture and Food Processing*	13,847	(415)	(3%)	1.81	\$40,899	2.7	85%	Strong
Timber & Wood Products Manufacturing	10,151	(407)	(4%)	2.65	\$56,659	2.7	75%	Declining
Regional Average	n/a	n/a	5%	n/a	\$42,660	2.0	41%	n/a

**Employment in this industry is probably much higher than indicated here due to suppressed data at universities and government research offices*

The backgrounds and talents of the displaced workforce potentially overlap well with the labor and management needs of the target industry groups. In some cases, there are nearly exact matches of existing worker skills with industry group needs, but in most cases additional strategic, targeted education will be needed. Creating a system of education around these target industries will be vital to long-term economic growth in the region, and integrated workforce, education, and economic development partnerships are critical to carrying these plans out.

The layoffs set to occur will be advantageous for some of the businesses in these industries, as they will be given the first opportunity to hire highly-skilled, experienced workers. However, in order to ensure a sustainable future for each industry group, the region’s workforce development offices and colleges will need to collaborate to train the right types of workers for these industries. Each industry group has its own unique needs. For instance, biotechnology and the chemical and chemical products manufacturing industry group requires middle-skill scientific specialists such as chemical technicians and biological technicians. Alternatively, the sustainable agriculture and food processing industry group requires a large number of relatively low-skill positions such as food production workers and agricultural workers, and a steady supply of managers, farmers, and food scientists.

In addition to the information contained in this report, the people of Southeast Arkansas will be receiving access to EMSI’s Career Coach tool, which will streamline the job search process by providing job seekers with information about jobs that are available in the region and education and training opportunities that are available at local colleges and universities.

For a summary of educational programs that currently exist in the region that could serve substantial gaps in the economy, refer to Table I.3.

Table I.3: Educational Programs Required to Serve Target Industry Groups

Target Industry Group	Health of Workforce Pipeline	Recommended Programs
Metal and Machinery Manufacturing	Good	Mechanical Engineering; Mechanical Drafting
Sustainable Agriculture and Food Processing	Good	Food Scientists; Agricultural Technicians; Small Engine Mechanics
Chemical and Chemical Product Manufacturing	Good	Chemical Technicians
Biotechnology	Fair	Biotechnology Technicians
Healthcare & Social Assistance	Excellent	n/a
Transportation, Distribution & Logistics	Fair	Truck Drivers; Logisticians; Small Engine Mechanics
Timber & Wood Products Manufacturing	Good	Truck Drivers; Prepress Technicians

Other highlights from Chapter 2 are as follows:

- The talent stream for metals and machinery manufacturing appears to be adequate. However, the addition of educational programs for mechanical engineers and drafters would be beneficial.
- According to industry projections, there will be plenty of experienced workers from industries such as farm machinery and equipment manufacturing with the requisite skills to be reemployed in the near future. Workers from the PBA will face competition from these workers for some positions. The key for regional workforce developers will be preventing all of this talent from leaving the region, and directing these workers to the appropriate businesses that are hiring.
- Although an educational program exists for mechanical engineering, with only six graduates in 2009, there will not be enough of these workers in the region to serve the needs of regional businesses. This will result in some businesses having to recruit workers from outside of the region.
- Chemical and chemical product manufacturing stands to benefit from the availability of certain dislocated workers from PBA (e.g., chemical plant and system operators and chemists, among others).

- Chemical and chemical product manufacturing is clearly an industry group in which the region has a competitive advantage. The presence of companies such as Rineco, Georgia-Pacific Resins, and Stratton Chemicals shows that the region's chemical manufacturing industry group extends beyond just the PBA. To further ensure the success of this industry group, the creation of a chemical technicians program would be extremely helpful.
- The region does not currently have a huge employment base in biotechnology, but the projected growth and earnings level are very strong. Unlike many other goods and services, biotech is difficult for up-and-coming world economies such as China and India to replicate. Therefore, developing this industry group would result in new positions that are not likely to be off-shored in the near future.
- Currently, the labor needs of biotech industries are being met, but if the industry were expanded in the future, the addition of a program that specializes in training biotechnology technicians at the two-year level may be required.
- Healthcare and social assistance is one of the highest-growth industries within the region and across the nation. It stands to benefit further from the burgeoning group of retiring baby boomers, who tend to have greater healthcare needs than younger generations. According to national population data, starting in 2011 an average of 10,000 people will turn 65 years old every day, a rate that will continue for the next 19 years.³
- Some workers from the PBA will be able to find reemployment in the healthcare industry without requiring much retraining including positions such as first-line supervisors/managers of mechanics, installers, and repairers as well as emergency medical technicians and paramedics.
- As of now there are more than 2,800 truck drivers in the region, yet no public school trains directly for these workers. Likewise, there are more than 50 transportation, storage, and distribution managers, with no local training available.
- The timber and wood products industry has decreased in employment considerably in recent years, yet job losses have been lower in this region than many others in the United States, signaling that Southeast Arkansas has still maintained its competitive advantage in this industry.

As the content of this report illustrates, Southeast Arkansas has some clear assets that can be used to propel the regional economy to greater heights. However, successfully transitioning the economy and workforce will require assistance from every corner—private industry, education, workforce development, and economic development.

³ Goodman, Ellen. "The Baby Boomers' Longevity Revolution." *Washington Post*, January 2, 2011. Accessed January 12, 2011. <http://www.washingtonpost.com/wp-dyn/content/article/2010/12/31/AR2010123102689.html>.

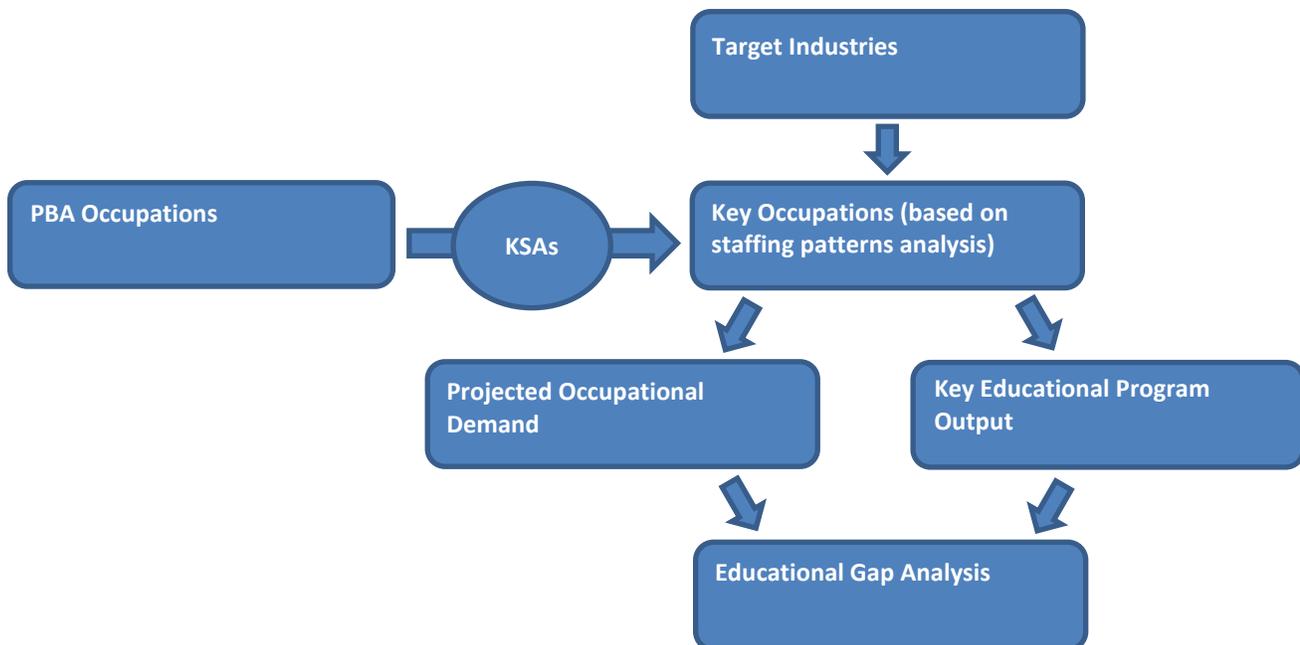
REPORT GOALS AND ORGANIZATION

The key to the workforce and industry components of this report lies in discovering ways that the currently and soon-to-be dislocated PBA workers can be reemployed into the identified focus industries. To this end, we have built several links between these components into the report. The first link will be found in the opening paragraph of each of the detailed occupational group analyses in Chapter 1. There we describe the most promising career transitions available to workers classified in each group.

The second linkage will be found in Chapter 2 within the occupational overview tables. These tables display the top occupations required for the successful operation of each industry group. Incidentally, some of the occupations most important to the focus industry groups are the same as those of the occupations held by the PBA workers. When an exact match is found between what will be made available from the PBA and what is required in the industry group, it will be marked in these tables with bold and italicized font.

In Chapter 1, we start by evaluating the PBA workforce according to its respective SOC code job titles and its respective competencies (*i.e.*, knowledge, skills, and abilities). In the next section of the report, Chapter 2, we display information on each of the focus industry groups including data on jobs, projected job growth, overall growth potential, and the key occupations for each industry group. This builds upon the target industry analysis that EMSI has previously presented to the Southeast Arkansas Sustainable Growth Initiative Leadership Group. The third purpose of this report—exploring the educational needs of each target industry group—also is addressed in the Industry Group Summaries, under the section titled “Educational Program Overview.” If the number of college graduates and completers is too low to serve the projected future demand, we deem it to be an “educational gap.” It is the responsibility of the region’s economic and workforce development system and colleges to address these gaps. The flowchart in Figure I.1 illustrates the relationship between each component of this report.

Figure I.1— Report Process & Goals



COMPETENCY DATA BACKGROUND

USING O*NET TO DETERMINE COMPETENCIES

In order to develop competency profiles for the current and soon-to-be displaced workers, EMSI used the O*NET database. The O*NET project is a source of occupational data and information developed by the U.S. Department of Labor/Employment and Training Administration. It is the most commonly utilized system in the United States for experts in various professions including workforce development, education, and human resources. The system provides both qualitative and quantitative descriptions of over 800 occupation classifications. The information collected is based on real-world data and collected through ongoing surveys of an occupation's worker population, employers, and occupation experts. O*NET data are used to identify key competencies that exist among the displaced workers so that they can be quickly reemployed by capitalizing on the knowledge and skills that they already possess.

To develop a competency model, EMSI utilized a specific portion of the O*NET system called the O*NET Content Model (<http://www.onetcenter.org/content.html>). The Content Model provides a framework for quantifying the various areas of knowledge and skills that are required to perform occupational duties. The group of knowledge competencies contains 33 separate sub-categories, each of which comprises an organized set of principles and facts that can be applied in numerous ways by different individuals in different occupations. For instance, the knowledge category includes components such as engineering, management, and geography. The group of skill competencies contains 35 separate sub-categories, which are developed capacities that facilitate learning, including basic skills, social skills, and technical skills.

Between the knowledge and skill competencies, there are 68 competency areas in which each has its own aptitude score. A complete list of the competencies referred to in this report, along with their O*NET definitions, are listed in Appendix B: O*NET Competency Definitions.

UNDERSTANDING COMPETENCIES

Understanding competency types and their function in describing an occupation can be somewhat challenging. To put competencies in context, the following analogy of the Frisbee-catching dog is helpful:

There are certain competencies that a dog must possess in order to effectively execute the catching of a Frisbee. Particular skill components are required, such as the ability to jump to the appropriate height, jumping at the right time and, of course, catching Frisbee with its mouth. Knowledge components are also necessary, include the dog being cognitively aware that a Frisbee is an item that ought to be chased, retrieved, and brought back to the thrower. The combination of these different elements of aptitude is similar to the notion of overall competency, which the O*NET attempts to do for over 800 different types of occupations.⁴

⁴ Analogy paraphrased from a report published by the Regional Workforce Alliance on May 22, 2009 entitled "Competency Study Report: Quick Hit."

The competency structure for each of these occupations is different. Workers in some occupations must excel in multiple competency categories and, in other occupations, they must excel in just a few competency categories; but all workers should have just the right blend of knowledge, skills, and abilities to perform their occupational duties. O*NET has a built-in scale for determining the level of any competency value in verbal terms. All competencies with a level score under 25 are labeled “Basic.” Those with a score between 25 and 49 are considered “Intermediate,” and those with a score above 50 are thought to be “Advanced.” Appendix B provides the definition for each of the competencies, along with the benchmark values, and aptitude descriptions for each of these benchmark values.

MAKING THE COMPETENCY ANALYSIS USABLE

Workers from 82 distinct SOC categories will be let go from the Pine Bluff Arsenal. Each of these SOC codes has its own unique competency profile, which includes scores in 68 different categories (33 knowledge areas and 35 skill areas). If all of these data were included in this report, the information would quickly become overwhelming. Therefore, we have taken multiple steps to pare these data down to an appropriate level that allows for ease of use while still providing the most necessary data components.

The first step was categorizing the occupations. The 82 occupations have been divided into 12 categories, including one “all other” category. These categories are summarized in Table I.4: Summary of Occupational Categories. This distinction helps us create accurate and simple categories that separate the workforce according to common responsibilities and competencies. The second step was limiting the amount of competencies shown to only those which are most integral to that group of occupations. To achieve this, the competency attributes have been limited to the top five from each competency category, (*i.e.*, the top five knowledge categories and the top five skill categories), making 10 key competencies in all.

In order to portray this information in a reasonable space, we have employed a graph called a “box and whisker plot.” This graph displays the average, quartile range, and minimum and maximum of knowledge, skill, and ability (KSA) attributes for each group. (The first and third quartiles represent the 25th and 75th percentile of values, respectively). The objective of using this chart is to show the competencies with the highest median averages, along with the normal and abnormal range of values for the dataset. For reference, see Figure 1.1: Distribution of Top 10 Competency Values for Hazardous Materials Specialists on page 10. The boxes represent the lower and upper range of competency scores for the occupation group. The number displayed in the middle of the box indicates the average score for that competency, while the number at the end of each of the lines, or “whiskers,” indicates the highest and lowest values for that competency within the group, respectively.⁵

For example, looking at Figure 1.1, the average value for public safety and security is 42, with the lower range limit of 41 and an upper range limit of 54. As a result, the box stretches from a value of 41 to a value of 54. The whiskers represent those occupations that lay outside of the common value range.

⁵ Please note that in cases where there is not enough space to fit the median value along with the highest and lowest values, the highest and lowest values have been excluded. However, these values can still be estimated by looking at the endpoint at each end of the line.

As a rule of thumb in interpretation, if the boxes and whiskers are relatively long, then the occupations have wider extremes for that competency; if the whiskers are relatively short, then the occupations have more closely clustered values for that competency. For example, mechanical knowledge has a very small box and very short whiskers, indicating that every occupation in this group requires a relatively high level of knowledge in mechanics, and that the competency scores are all clustered closely around the median score of 57. On the other hand, customer and personal service, which also has a relatively high median score of 55, comes with a wide deviation of scores (63 to 32) and a wide range (59 to 40). This illustrates that customer and personal service is very important to the function of some jobs in this group, namely septic tank services and sewer pipe cleaners, but much less so with others such as hazardous materials removal workers. These basic principles should be used to interpret which competencies are essential across all occupations in the group, and which ones are integral to only one or a few of the occupations.

SUMMARY OF THE PINE BLUFF ARSENAL OCCUPATIONAL GROUPS

Table I.4 below summarizes some of most important information contained in the Pine Bluff Arsenal Worker Profiles section, including the title of each occupational group, the range of average educational levels, and the number of workers that will be laid off (or, in other words, the region’s “available workers”). The table is ranked in order from the highest to lowest priority for regional workforce boards in helping these workers find new jobs.⁶ If detailed data on the group are not shown here, it can be found in Appendix A: Full List of Pine Bluff Arsenal Layoffs.

Table I.4- Summary of Occupational Categories

Occupational Category	Range of Average Educational Levels	Available Workers
Hazardous Materials Specialists	MT OJT - LT OJT	179
Executives & Managers	Exp. in field - Deg. + exp.	169
Machine Operators & Mechanics	ST OJT - LT OJT	125
Clerks	ST OJT - MT OJT	70
Engineers	Bachelor's	62
Scientific Technicians	Associate's	62
Business Operations Specialists	Exp. in field - Bachelor's*	56
All Other Workers	ST OJT - Bachelor's	170
Environmental Specialists	LT OJT - Master's	49
Medical Specialists	PSV Award - Bachelor's*	25
Public Relations Workers	Bachelor's - Deg. + exp.	12
Computer Specialists	Associate's - Bachelor's	7
		986
*Note: Most occupations in this group fit within this educational level range but there is one occupation in this group that requires a Master's degree.		

⁶ The level of priority is determined mostly by the number of workers in the category but it also considers other factors such as the likelihood that these workers will find another position on their own. Generally speaking, highly educated workers, and workers in high growth fields such as healthcare, are not considered in detail because it is assumed that they will have less trouble finding reemployment.

OTHER CONTEXTUAL INFORMATION

EDUCATIONAL LEVELS

The US Census Bureau has determined the average educational level for workers at their initial hiring. These educational levels are referenced often throughout the report. The key below indicates how these average educational levels are translated into the abbreviations contained in the report.

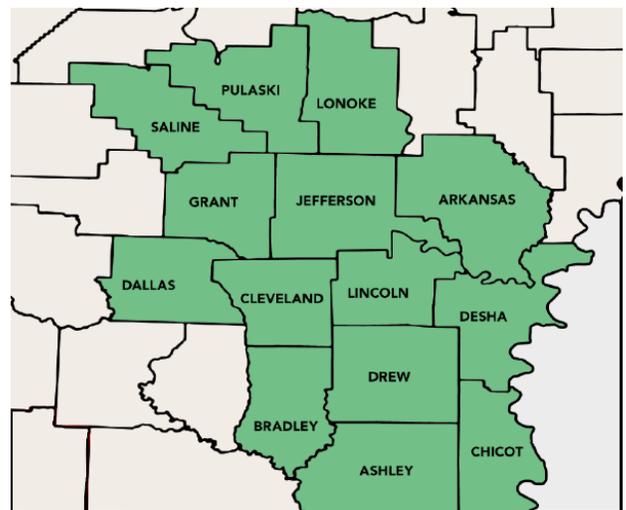
Table 1.5- Educational Level Key

Average Educational Level	Abbreviation
Short-term on-the-job training	ST OJT
Moderate-term on-the-job training	MT OJT
Long-term on-the-job training	LT OJT
Work experience in a related field	Exp. in field
Postsecondary vocational award	PSV Award
Associate's degree	Associate's
Bachelor's degree	Bachelor's
Master's degree	Master's
Doctoral degree	Doctoral
Degree plus work experience*	Deg. + exp.

*Note: This category means that the job requires some form of college degree between an associate's and a postgraduate degree, in addition to some on-the-job experience.

REGION

The 14-county region that this study focuses on includes the counties of Arkansas, Ashley, Bradley, Chicot, Cleveland, Dallas, Desha, Drew, Grant, Jefferson, Lincoln, Lonoke, Saline, and the southern portion of Pulaski County. The inclusion of Pulaski County was limited to the area south of I-30, which skirts the southern portion of Little Rock. Limiting Pulaski County in this way was necessary in order to prevent the economic data from being obscured by the influence of Little Rock.



TIMEFRAME

This report uses historic employment data from as far back as 2002 up to EMSI's most current employment data, which is 3rd quarter, 2010. Employment is projected out to 2015, in accordance with industry projections developed by the Arkansas Department of Workforce Services, and augmented by EMSI to account for workers who are not covered by unemployment insurance.

CHAPTER 1: PINE BLUFF ARSENAL WORKER PROFILES

HAZARDOUS MATERIAL SPECIALISTS

This group of occupations is dominated by explosives workers and chemical plant and systems operators. Each of the four occupations in this group has unique and specific tasks, which initially would appear to make career transitions difficult for these workers. But the competency data reveal that these workers possess certain high-demand skills that are easily transferable across many industries and professions. For example, Figure 1.1 shows that each of these occupations requires workers who excel in mechanical knowledge and equipment maintenance, both competencies that are almost universally needed in manufacturing. In addition, these workers' expertise in unique categories such as public safety and security and chemistry will allow workers to transfer into either the biotechnology or chemical manufacturing industry groups.

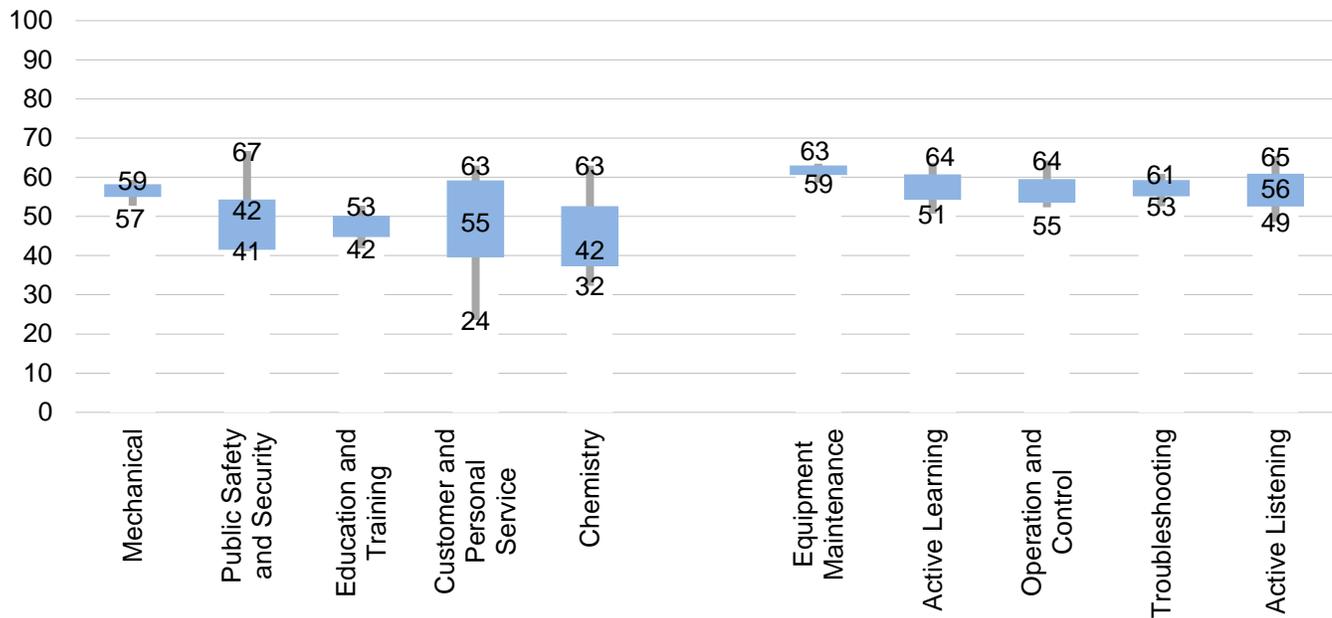
Table 1.1- Occupations in Group

SOC	Title	Avg. Educational Level	Available Workers
51-8091	Chemical plant and system operators	LT OJT	83
47-5031	Explosives workers, ordnance handling experts, and blasters	MT OJT	59
47-4071	Septic tank servicers and sewer pipe cleaners	MT OJT	34
47-4041	Hazardous materials removal workers	MT OJT	3
Total Available Workers			179

Table 1.2- Top 10 Competency Categories

Knowledge	Skills
Mechanical	Equipment Maintenance
Public Safety and Security	Active Learning
Education and Training	Operation and Control
Customer and Personal Service	Troubleshooting
Chemistry	Active Listening

Figure 1.1 – Distribution of Top 10 Competency Values for Hazardous Material Specialists



EXECUTIVES & MANAGERS

The executives and managers occupation group is composed of occupations that require knowledge and skills of personnel and material management, as well as a strong inclination toward customer service. Nearly all of these occupations require either a bachelor’s degree plus some work experience, or a long tenure of on-the-job experience. Some of these occupations are geared predominantly toward manufacturing (such as supervisors of production workers and industrial production workers etc.), but are more common in non-manufacturing settings. The latter group would fit well into the business and professional industries group (not outlined in this report), though there will certainly be a decent number of positions available in the other focus industry groups as well. Those occupations that are manufacturing-specific could be reemployed in any of the manufacturing-based focus industry groups outlined here. Nearly all of the occupation overview tables in each industry group summaries reference these two occupations.

Table 1.3- Occupations in Group

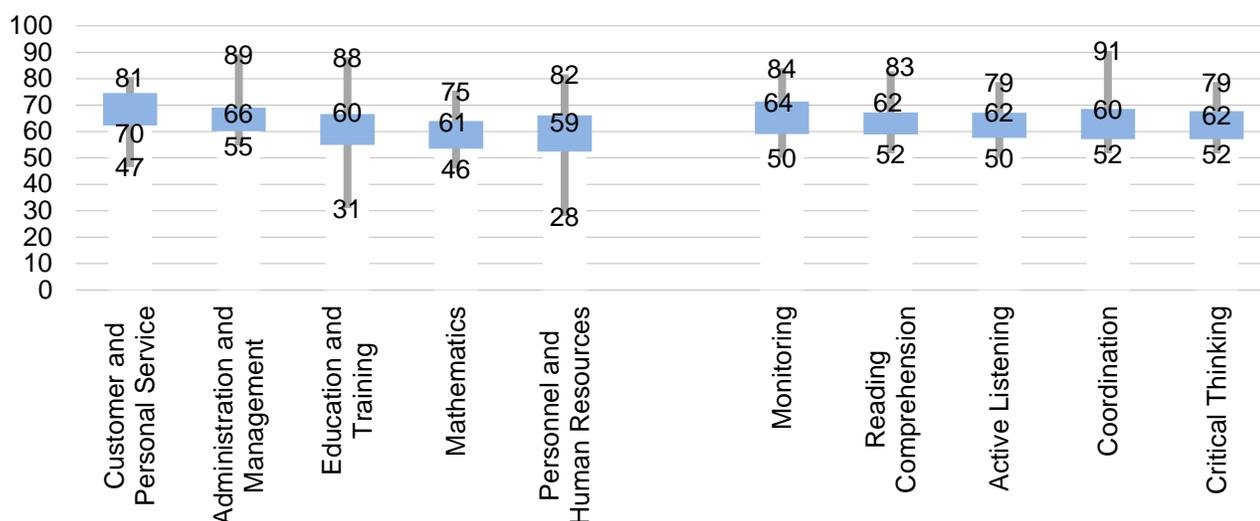
SOC	Title	Avg. Educational Level	Available Workers
51-1011	First-line supervisors/managers of production and operating workers	Exp. In field	34
11-9199	Managers, all other	Exp. In field	27
11-3051	Industrial production managers	Exp. In field	20
33-1099	First-line supervisors/managers, protective service workers, all other	Exp. In field	15
49-1011	First-line supervisors/managers of mechanics, installers, and repairers	Exp. In field	13
11-3031	Financial managers	Deg. + exp.	7
11-1021	General and operations managers	Deg. + exp.	7
11-9121	Natural sciences managers	Deg. + exp.	6

37-1011	First-line supervisors/managers of housekeeping and janitorial workers	Exp. In field	6
53-1031	First-line supervisors/managers of transportation and material-moving machine and vehicle operators	Exp. In field	5
13-1022	Wholesale and retail buyers, except farm products	Exp. In field	4
11-9041	Engineering managers	Deg. + exp.	4
11-3011	Administrative services managers	Deg. + exp.	3
11-3021	Computer and information systems managers	Deg. + exp.	3
11-3042	Training and development managers	Deg. + exp.	3
11-3061	Purchasing managers	Deg. + exp.	3
11-3049	Human resources managers, all other	Deg. + exp.	2
11-3071	Transportation, storage, and distribution managers	Exp. In field	1
43-1011	First-line supervisors/managers of office and administrative support workers	Exp. In field	1
11-9021	Construction managers	Bachelor's	1
11-2031	Public relations managers	Deg. + exp.	1
11-9111	Medical and health services managers	Deg. + exp.	1
11-1011	Chief executives	Deg. + exp.	1
11-2022	Sales managers	Deg. + exp.	1
Total Available Workers			169

Table 1.4- Top 10 Competency Categories

Knowledge	Skills
Customer and Personal Service	Monitoring
Administration and Management	Reading Comprehension
Education and Training	Active Listening
Mathematics	Coordination
Personnel and Human Resources	Critical Thinking

Figure 1.2 – Distribution of Top 10 Competency Values for Executives & Managers



MACHINE OPERATORS & MECHANICS

The machine operators and mechanics occupational group comprises occupations with a wide disparity of knowledge and skills. This is apparent from the size of the boxes in Figure 1.3, and from the titles of the occupations in the group. Two of the four occupations from this group—packing machine operators and inspectors—are fairly low-wage and low-skill production occupations. These workers could transition easily into the industry groups that have relatively low skill requirements for entry such as food manufacturing, wood products and transportation, distribution and logistics. Of the other two occupations, industrial machinery mechanics is worthy of mention because these workers are in high demand in all forms of manufacturing due to their unusually high competency in mechanical knowledge and equipment maintenance, among other competencies.

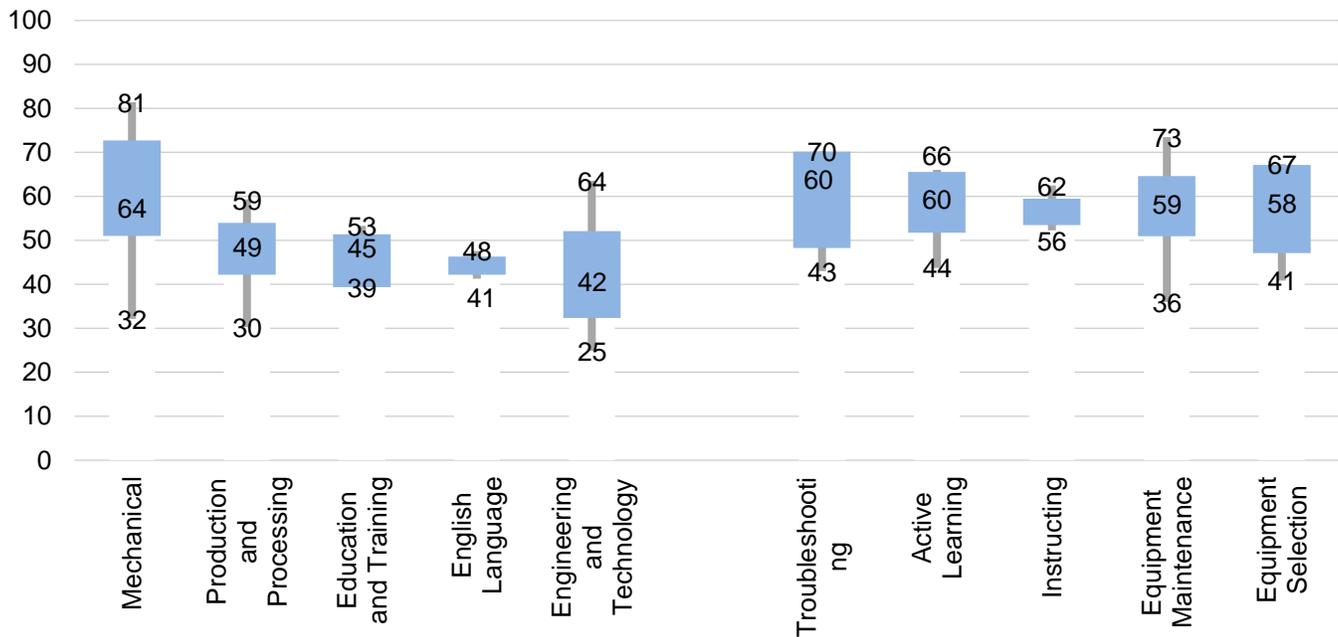
Table 1.5- Occupations in Group

SOC	Title	Avg. Educational Level	Available Workers
49-9041	Industrial machinery mechanics	LT OJT	74
51-9061	Inspectors, testers, sorters, samplers, and weighers	MT OJT	38
51-9111	Packaging and filling machine operators and tenders	ST OJT	12
49-9069	Precision instrument and equipment repairers, all other	MT OJT	1
Total Available Workers			125

Table 1.6- Top 10 Competency Categories

Knowledge	Skills
Mechanical	Troubleshooting
Production and Processing	Active Learning
Education and Training	Instructing
English Language	Equipment Maintenance
Engineering and Technology	Equipment Selection

Figure 1.3 – Distribution of Top 10 Competency Values for Machine Operators & Mechanics



ENGINEERS

Workers from the engineers category are among the most highly skilled of all employees from the Pine Bluff Arsenal. Since these workers typically have higher skills and wages than average, they possess the ability to generate more revenue and innovation for Southeast Arkansas. It is important to maintain these workers within the region, if at all possible. By far the largest number of workers laid off in this category include industrial engineers and health and safety engineers. A small number of industrial engineers are needed in every manufacturing industry, but particularly those that are highly automated, such as machinery manufacturing and food processing. Health and safety engineers have a smaller number of options as they tend to work in government, construction, or chemical manufacturing. Of those industries, chemical manufacturing is the only one with a strong presence in Southeast Arkansas.

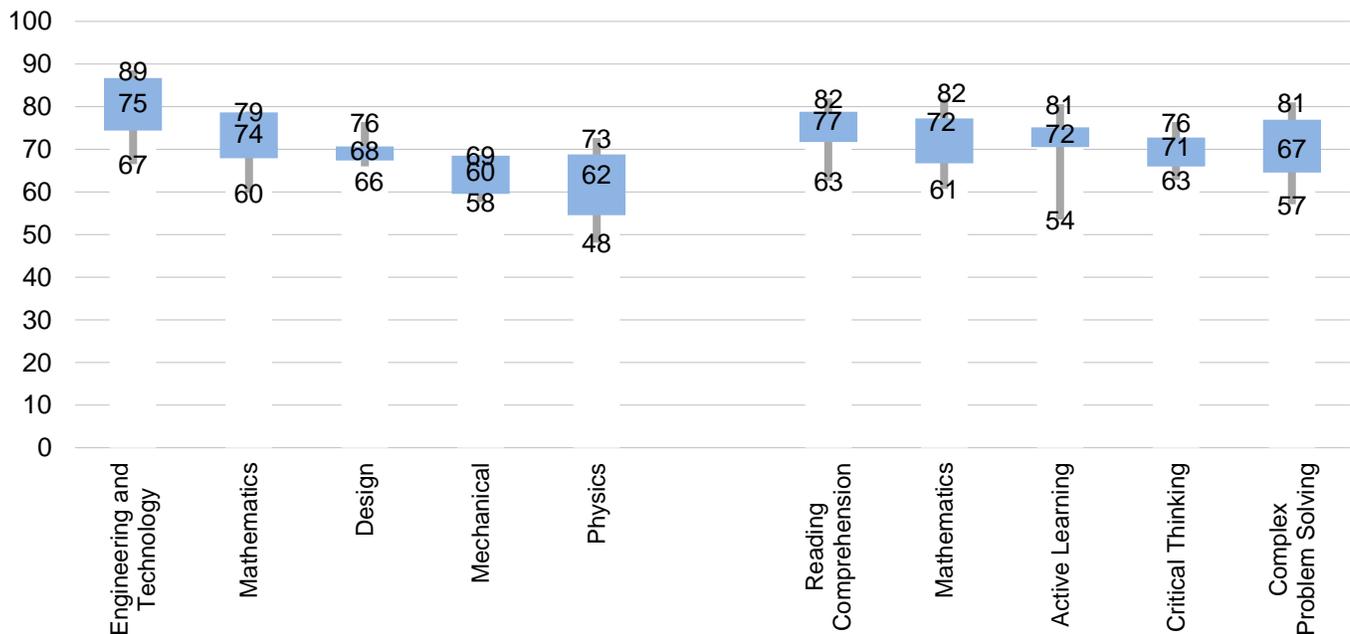
Table 1.7- Occupations in Group

SOC	Title	Avg. Educational Level	Available Workers
17-2112	Industrial engineers	Bachelor's	26
17-2111	Health and safety engineers, except mining safety engineers and inspectors	Bachelor's	22
17-2199	Engineers, all other	Bachelor's	8
17-2041	Chemical engineers	Bachelor's	3
17-2081	Environmental engineers	Bachelor's	2
17-2141	Mechanical engineers	Bachelor's	1
Total Available Workers			62

Table 1.8- Top 10 Competency Categories

Knowledge	Skills
Engineering and Technology	Reading Comprehension
Mathematics	Mathematics
Design	Active Learning
Mechanical	Critical Thinking
Physics	Complex Problem Solving

Figure 1.4 – Distribution of Top 10 Competency Values for Engineers



SCIENTIFIC TECHNICIANS

The knowledge and skills of scientific technicians are very specialized in their particular area of expertise. For instance, chemical technicians are advanced in knowledge of chemistry, and electronic engineering technicians are advanced in their knowledge of mechanics and electronics. Not surprisingly, their specific skills will dictate which industries are the best fit for each occupation. Chemical technicians would fill a niche in the chemical manufacturing industry group. Industrial engineering technicians will be needed in the same industries as industrial engineers (*i.e.*, more automated manufacturing industries). Life, physical, and social science technicians is a difficult occupation to categorize because it is an “all other” category, therefore the competencies listed are not necessarily indicative of the competencies of Pine Bluff Arsenal workers. These 21 workers should be considered on a case-by-case basis. If their skills and experience lean toward chemical expertise, they might be able to transition into positions as chemical technicians. Likewise, if they have a strong background in mechanics, transitioning into a mechanical engineering technician position might be a good fit.

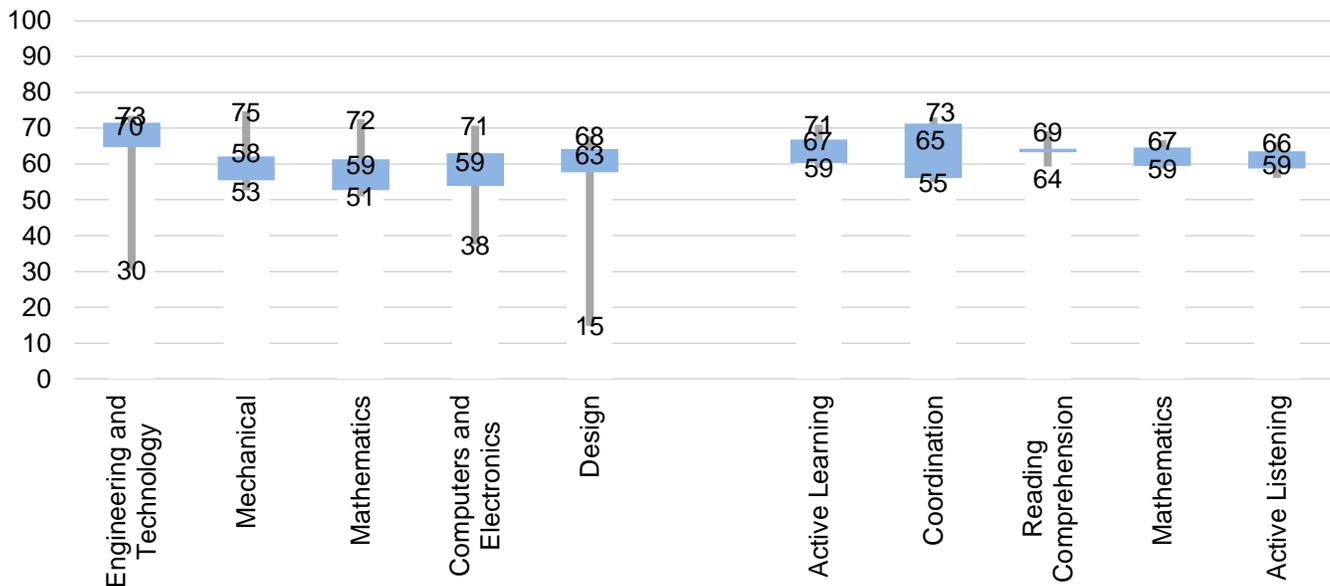
Table 1.9- Occupations in Group

SOC	Title	Avg. Educational Level	Available Workers
19-4099	Life, physical, and social science technicians, all other	Associate's	21
19-4031	Chemical technicians	Associate's	18
17-3026	Industrial engineering technicians	Associate's	9
17-3023	Electrical and electronic engineering technicians	Associate's	8
17-3027	Mechanical engineering technicians	Associate's	5
17-3029	Engineering technicians, except drafters, all other	Associate's	1
Total Available Workers			62

Table 1.10- Top 10 Competency Categories

Knowledge	Skills
Engineering and Technology	Active Learning
Mechanical	Coordination
Mathematics	Reading Comprehension
Computers and Electronics	Mathematics
Design	Active Listening

Figure 1.5 – Distribution of Top 10 Competency Values for Scientific Technicians



CLERKS & SECRETARIAL WORKERS

Occupations in the clerks and secretarial workers category are available to workers at the short-term and moderate-term on-the-job training level. Due to their high scores in clerical, customer and personal service, and active listening, these workers are required in offices and front desks in virtually every industry group. The knowledge and skills of these workers, in most cases, does not limit them to work in a manufacturing setting. So career transitions for these workers could move them toward one of the production-based target industry groups or toward the business and professional services industries (not analyzed in this report).

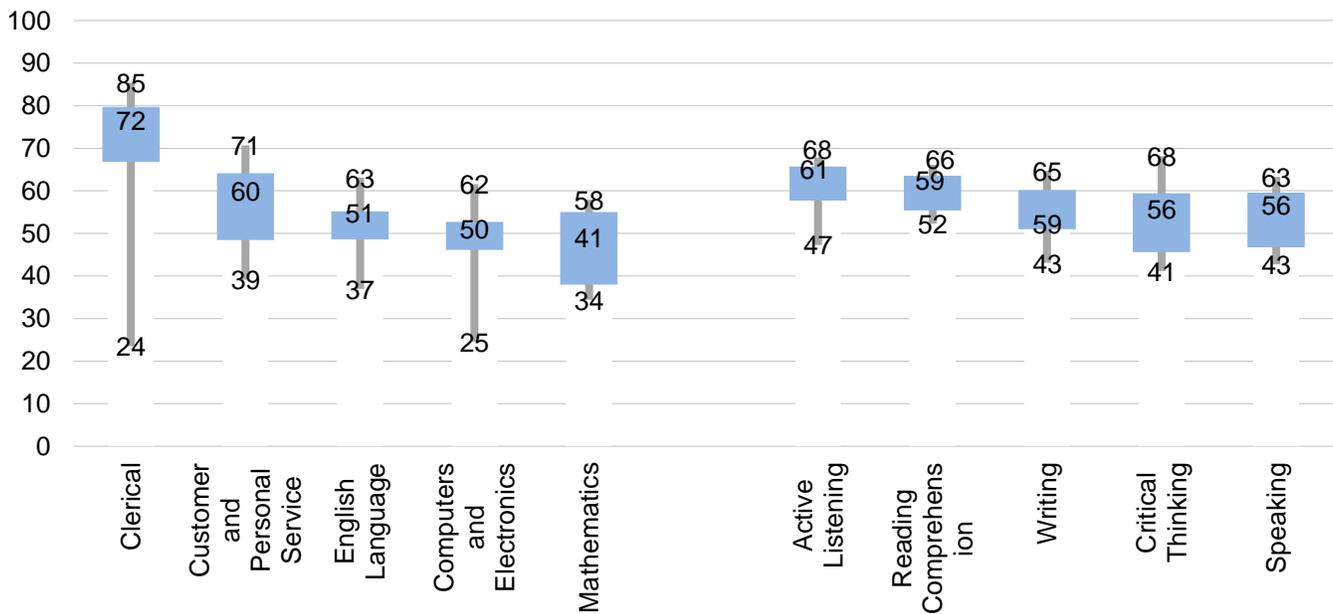
Table 1.11- Occupations in Group

SOC	Title	Avg. Educational Level	Available Workers
43-9061	Office clerks, general	ST OJT	23
43-5061	Production, planning, and expediting clerks	ST OJT	17
43-6011	Executive secretaries and administrative assistants	MT OJT	17
43-4199	Information and record clerks, all other	ST OJT	3
43-9199	Office and administrative support workers, all other	ST OJT	2
43-3061	Procurement clerks	ST OJT	1
43-3031	Bookkeeping, accounting, and auditing clerks	MT OJT	2
43-6014	Secretaries, except legal, medical, and executive	MT OJT	2
43-4071	File clerks	ST OJT	1
43-4171	Receptionists and information clerks	ST OJT	1
43-5081	Stock clerks and order fillers	ST OJT	1
Total Available Workers			70

Table 1.12- Top 10 Competency Categories

Knowledge	Skills
Clerical	Active Listening
Customer and Personal Service	Reading Comprehension
English Language	Writing
Computers and Electronics	Critical Thinking
Mathematics	Speaking

Figure 1.6 – Distribution of Top 10 Competency Values for Clerks



BUSINESS OPERATIONS SPECIALISTS

Much like the occupations in the clerks and secretarial workers section above, these workers have skills which will afford them many different options in terms of industry and work environment. The key distinction between this group and clerical and secretarial workers is that these workers tend to possess a bachelor's degree or a degree plus some work experience, so they typically have greater knowledge and skills in mathematics, communications, and critical thinking.

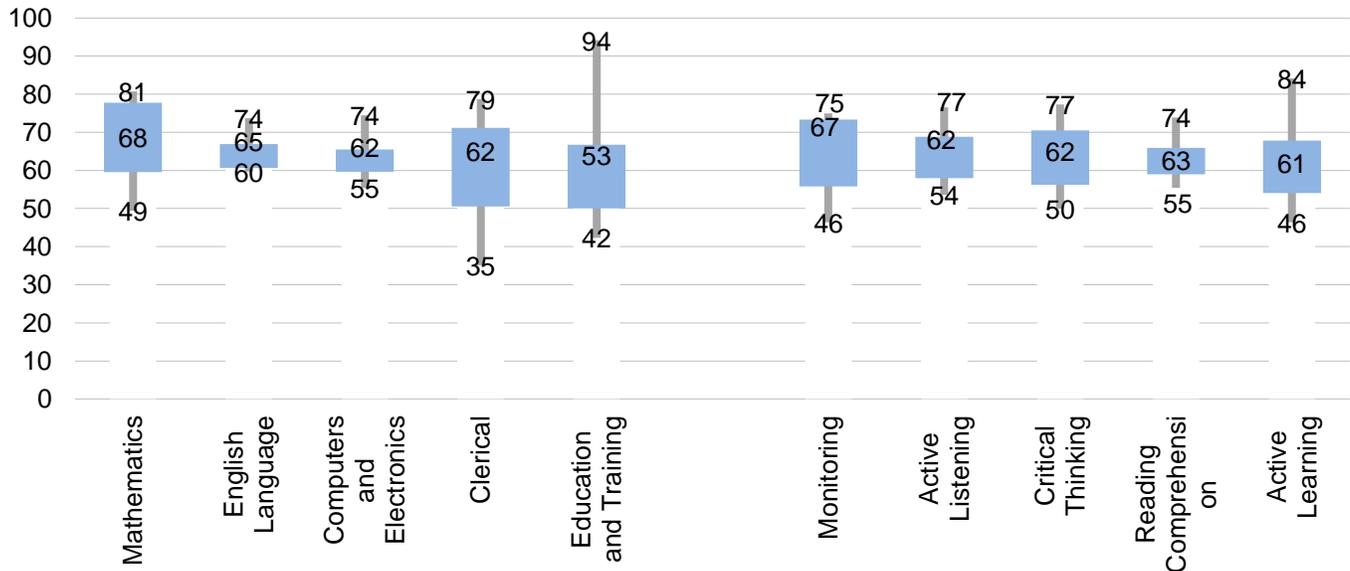
Table 1.13- Occupations in Group

SOC	Title	Avg. Educational Level	Available Workers
13-1199	Business operation specialists, all other	Bachelor's	16
13-1051	Cost estimators	Exp. in field	8
13-1079	Human resources, training, and labor relations specialists, all other	Bachelor's	8
13-2011	Accountants and auditors	Bachelor's	8
13-1073	Training and development specialists	Bachelor's	5
13-1081	Logisticians	Bachelor's	4
13-2031	Budget analysts	Bachelor's	3
13-1061	Emergency management specialists	Exp. in field	2
13-1071	Employment, recruitment, and placement specialists	Bachelor's	1
15-2041	Statisticians	Master's	1
Total Available Workers			56

Table 1.14- Top 10 Competency Categories

Knowledge	Skills
Mathematics	Monitoring
English Language	Active Listening
Computers and Electronics	Critical Thinking
Clerical	Reading Comprehension
Education and Training	Active Learning

Figure 1.7 – Distribution of Top 10 Competency Values for Business Operations Specialists



ENVIRONMENTAL SPECIALISTS

Environmental specialists represent a small but crucial group of workers with specialized knowledge in fields such as chemistry, biology, and public safety. Of the soon-to-be displaced workers, the largest proportion are environmental science technicians and environmental scientists. Both of these occupations face similar options. Based on national averages, the largest number of these workers is employed in government, consulting services, and research and development. None of these options is particularly strong in Southeast Arkansas, though a handful of these workers would be able to find employment in a research and development capacity within either the biotechnology or sustainable agriculture industries.

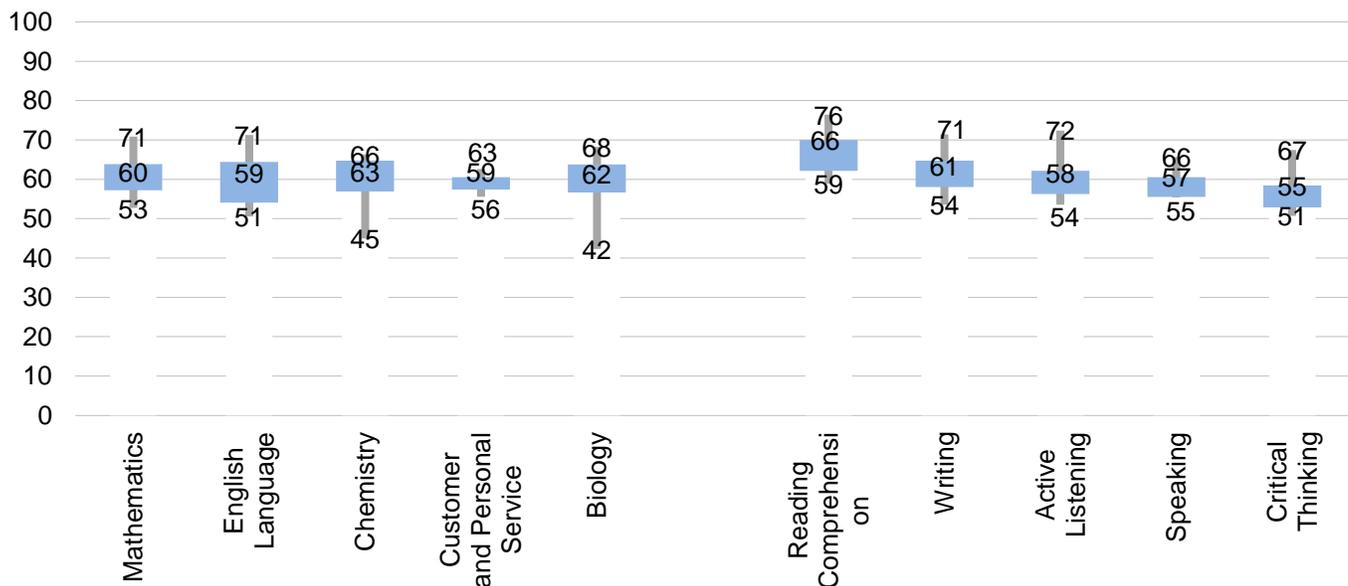
Table 1.15- Occupations in Group

SOC	Title	Avg. Educational Level	Available Workers
19-4091	Environmental science and protection technicians, including health	Associate's	38
19-2041	Environmental scientists and specialists, including health	Master's	6
13-1041	Compliance officers, except agriculture, construction, health and safety, and transportation	LT OJT	4
17-3025	Environmental engineering technicians	Associate's	1
Total Available Workers			49

Table 1.16- Top 10 Competency Categories

Knowledge	Skills
Mathematics	Reading Comprehension
English Language	Writing
Chemistry	Active Listening
Customer and Personal Service	Speaking
Biology	Critical Thinking

Figure 1.8 – Distribution of Top 10 Competency Values for Environmental Specialists



ALL OTHER WORKERS

There are no top competencies or chart shown with this group because these occupations have little in common with one another; they are grouped together simply because they did not fit well in any of the other groups. There are two occupations in this group that are worthy of attention—security guards and chemists. The security guard category needs to be addressed because, given the large number of them, it would be efficient to develop a mass career transition strategy for these workers. Security guards are relatively skilled in categories such as customer service, communication, and

monitoring. There may be potential to transition these workers into entry-level positions in both the healthcare industry group and the transportation, storage and distribution industry group. Chemists are naturally strong in the fields of chemistry, mathematics, and reading comprehension. There may be some opportunity for chemists to transfer into sustainable agriculture and biotechnology, but at this point the number of positions in those categories is fairly limited.

Table 1.17- Occupations in Group

SOC	Title	Avg. Educational Level	Available Workers
33-9032	Security guards	ST OJT	135
19-2031	Chemists	Bachelor's	19
53-7062	Laborers and freight, stock, and material movers, hand	ST OJT	13
51-6011	Laundry and dry-cleaning workers	MT OJT	3
Total Available Workers			170

The following three groups of occupations will each experience 25 or fewer job losses at the Pine Bluff Arsenal. They are not analyzed in depth for this reason, and because they are in fields with enough projected growth to assume that these career transitions will be easier than for workers in the occupational groups discussed above. Appendix A contains detailed data on each of the occupations in these groups.

MEDICAL SPECIALISTS

There are 25 workers being laid off in medical specialists fields. With strong growth projected in the healthcare industry, most of these workers should not have trouble finding reemployment at a hospital or with another healthcare provider.

PUBLIC RELATIONS WORKERS

Occupations in this group include public relations specialists, technical writers, and other writers. Job opportunities for these workers will mostly be found in the professional and business services industries, but manufacturing may offer some job openings as well.

COMPUTER SPECIALISTS

There are only seven workers in this group of occupations who will be losing their jobs. Though jobs in computers and information are not growing at an exceptionally high rate in Southeast Arkansas, there should be enough positions available to reemploy this number of workers. These positions would probably be in the information or education sector, though manufacturing industries may have some openings as well.

CHAPTER 2: INDUSTRY GROUP SUMMARIES

CHAPTER OVERVIEW

This chapter is designed to outline each of Southeast Arkansas' seven target industry groups. This includes highlights such as past and present employment numbers, projected job growth, overall growth potential, and lists of critical occupations. Recall, as illustrated in Figure I.1, that the target industry groups are the basis for selecting the target occupations that the laid-off PBA workers should be transitions into. This chapter also contains an educational gap analysis for each industry group which provides the first step in determining whether the region is investing enough of its collective resources toward educating and training workers for these industry groups.

CONTENT ORIENTATION

Each industry group summary is designed similarly— with the same progression of tables, charts, and analysis sections. In order to avoid restating this information within each section this introduction describes the characteristics of each set of tables and figures. Though the table and figure numbers will be different in each industry group summary, the general content of these components will remain the same.

Each industry group summary has been assigned its own prefix number, which is attached to every table or figure in that section— beginning at 2 with metals and machinery manufacturing and ending at 8 with timber and wood products manufacturing. The tables and figures in each section are differentiated by suffix identification (*i.e.*: 2.1, 2.2., and so on), which will progress in numerical order throughout each section. There are six tables and three figures within each section, so for example the metal and machinery manufacturing section begins with Table 2.1 and ends at Table 2.6. Likewise the figures in that section begin with Figure 2.1 and end with Figure 2.3.

Since there are the same number of tables and figures in each section, the suffix numbers indicate that the information in that table or figure is of the same type as the corresponding suffix in each of the other industry group summaries. For example, Table 2.1 contains the overall employment information for metal and machinery manufacturing, and Table 3.1 contains the overall employment information for sustainable agriculture and food manufacturing. This ordering will become clearer as the reader moves through chapter 2, but a brief explanation is necessary in order to provide context for the table and figure descriptions below.

In order to describe the contents of these tables and figures we will refer to them with an X in the prefix spot and the appropriate number in the suffix spot, (*i.e.*: X.1, X.2, and so on).

PROTOCOL FOR FIGURES AND TABLES

Figure X.1 and **Table X.1** display the employment change in the group of industries between 2002 and 2010, and a projection of employment change from 2010-2015. You will notice that from 2010 forward the lines are dotted instead of solid, which is done to indicate that these numbers are a simulation of what could occur in the future. These projections are based on the assumption that the economic forces that have been affecting the region for the past 20 years will remain roughly similar in the near-term future.

Table X.2 contains a list of the most critical economic indicators related to this group of industries. This includes location quotient and shift share figures, average job multiplier, average regional integration and overall growth potential. These concepts are explained in full in Appendix C: Notes about the Data. To summarize:

- Average Job Multiplier measures the economic “ripple effects” of the industry group. Specifically this measures the number of additional jobs outside of that industry group that would result from an increase of one job within the industry group.
- Average Regional Integration measures how well integrated or “clustered” that group of industries is within the region.
- Overall Growth Potential is a consideration of all factors that are not already represented within the data analysis (e.g., national and international economic factors, potential changes in federal policies, public support, etc.)

Table X.3 shows the employment, employment change and location quotient in each county within the 14-county region. **Figure X.2** displays the number of jobs in each county, with the darker green representing a higher number of jobs.

Table X.4 contains employment data at the 6-digit NAICs level for 2002, 2010, and projected employment for 2015. The earnings per worker (EPW) are displayed for the latest year, 2010. The top 5 industries on this list are also displayed in **Figure X.3**.

Table X.5 contains a full list of the occupations that are most critical to the success of this group of industries. The occupations were determined based on the percent of this industry group that they compose. The occupations have also been separated into different classes based on the level of skill required for that occupation, including “Short & Moderate Term on-the-job training,” “Long-Term on-the-job training,” “Work experience in a related field” and “College degree.” In order to limit the amount of data shown to only the most critical information, we have displayed the top 10 occupations for each of these educational categories. In this table it is critical to take note of the last column, “PBA Available,” which shows the number of soon to be available workers from the Pine Bluff Arsenal. This provides a critical link for workforce developers to find the incumbent labor to fill the current and future needs of the industry group.

Table X.6 ties the occupations from Table X.5 to regional postsecondary training programs within the region in order to determine the level to which regional colleges and universities are addressing the demand for workers in these industries. CIP codes are the standard coding system used by most postsecondary institutions. The “occupational linkages” column shows which occupations are associated with the CIP code according to common college-to-work transitions (*e.g.*, people who study mechanical engineering usually become mechanical engineers). The average annual openings column contains the sum of the annual openings for the occupations shown in the occupational linkages column. The 2009 regional completions column displays the number of completers or graduates who finished programs at regional schools in the previous academic year. Comparing these two figures will help provide a ballpark estimate for whether regional colleges are providing near the requisite number of completers to fill the number of annual openings.⁷

Lastly, each industry group summary contains several analytical sections. The analytical sections each begin with an executive summary after the initial header, followed by three brief paragraphs following Tables X.1, X.2 and X.3, and two more through paragraphs after Tables X.4 and X.6.

⁷ Please keep in mind that there are limitations to this approach. The educational gap analysis should not be seen as a precise calculation but rather an estimate based on multiple assumptions. This method does not take into account factors such as post-college out-migration and in-migration, workers who live in the area but out-commute, students whose field of study is significantly different from type of job that they accept, the quality or content of education, or skills that can be obtained through on-the-job or apprenticeship training. Nevertheless this approach is instructive for high-level analysis of how much educational investment is being put into these industries.

METALS & MACHINERY MANUFACTURING

METALS & MACHINERY MANUFACTURING: INDUSTRY GROUP SUMMARY

Metal and machinery manufacturing is a diverse mixture of industries that produce goods such as air conditioners, small arms, and wind turbines, among many other things. Metal manufacturing requires a workforce with a very specific set of skills that is somewhat rare, giving this region a distinct competitive advantage in business recruitment. On a less positive note, metal manufacturing does come with the possibility of plant closure and the offshoring of jobs. The talent stream for this group of industries appears to be adequate. However, the addition of educational programs for mechanical engineers and drafters would be beneficial.

TOTAL CLUSTER GROWTH, REGION VS. STATE & NATION

Figure 2.1

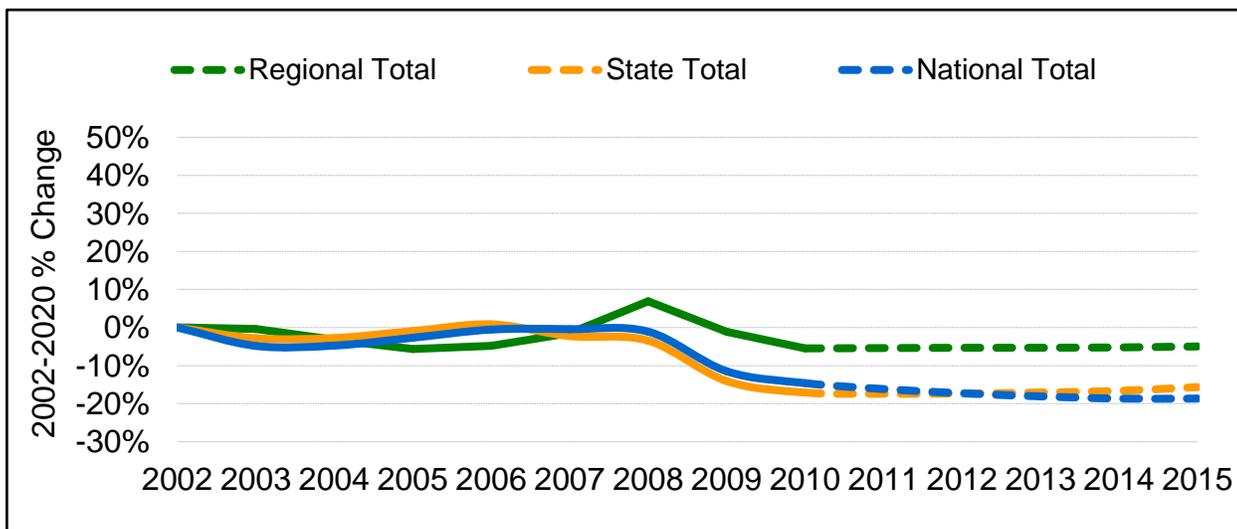


Table 2.1

Region	2002 Jobs	2010 Jobs	2015 Jobs	10-'15 Change	10-'15 % Change	Current EPW
Regional Total	6,475	6,118	6,152	34	1%	\$52,169
State Total	35,470	29,410	29,916	506	2%	\$53,237
National Total	2,761,652	2,357,928	2,246,067	(111,861)	(5%)	\$62,105

The number of jobs in metal and machinery manufacturing in Southeast Arkansas peaked in 2008 and has steadily declined since that time. According to this projection, the number of jobs will continue to decline at the national level, but the state of Arkansas and Southeast Arkansas will pick up a greater market share as employment in these industries will steadily increase from 2010-2015.

ECONOMIC INDICATORS

Table 2.2

Economic Indicators	
Location Quotient	
2002 Location Quotient	1.53
2010 Location Quotient	1.75
2015 Location Quotient	1.9
Shift Share	
Shift Share: Regional Competitiveness Effect	264
Shift Share: Industrial Mix Effect	(741)
Shift Share: National Effect	510
Miscellaneous	
Average Job Multiplier	2.1
Average Regional Integration	43%
Overall Growth Potential	Uncertain

According to these economic indicators, this industry group is highly concentrated in Southeast Arkansas. There are 75% more jobs, as of 2010, in this industry per capita than the national average. This ratio has increased since 2002 and is projected to continue increasing into 2015. The shift share analysis indicates that the industry has experienced employment loss at the national level, which makes the increase in regional employment even more significant. This region is effectively growing more specialized in metal and machinery manufacturing, while other regions in the US are moving in other directions. This industry also posts strong numbers for average job multiplier and average regional integration, showing that many of the industries are thoroughly integrated as part of the same supply chain. On average, an increase of 1 job in one of these industries results in 1.1 additional jobs in other related industries.

CLUSTER EMPLOYMENT BY COUNTY

Figure 2.2

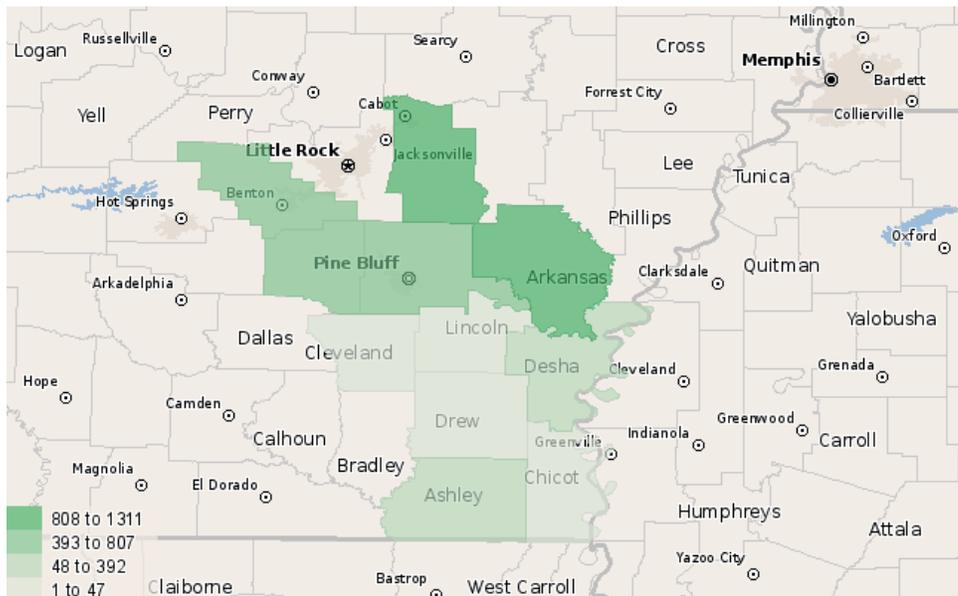


Table 2.3

County	2002 Jobs	2010 Jobs	2015 Jobs	2010 LQ	10-'15 Change	10-'15 % Change
Arkansas	1,178	1,311	1,548	7.11	237	18%
Ashley	142	164	194	1.16	30	18%
Drew	35	17	33	0.14	16	94%
Lonoke	1,081	1,023	1,035	3.44	12	1%
Bradley	<10	0	0	0.00	0	0%
Dallas	19	0	0	0.00	0	0%
Lincoln	190	21	<10	--	--	--
Chicot	<10	<10	<10	--	--	--
Cleveland	18	<10	<10	--	--	--
Desha	122	78	61	0.92	(17)	(22%)
Pulaski*	1,581	1,790	1,771	1.33	(19)	(1%)
Jefferson	947	457	418	0.84	(39)	(9%)
Saline	695	711	634	1.77	(77)	(11%)
Grant	461	540	445	6.22	(95)	(18%)

* Only five ZIP codes inside Pulaski County were used.

Jobs in metals and machinery manufacturing are primarily clustered in Arkansas, Lonoke, and Pulaski Counties, though almost all of the counties have some employment in this group of industries.

DETAILED CLUSTER DATA

Figure 2.3

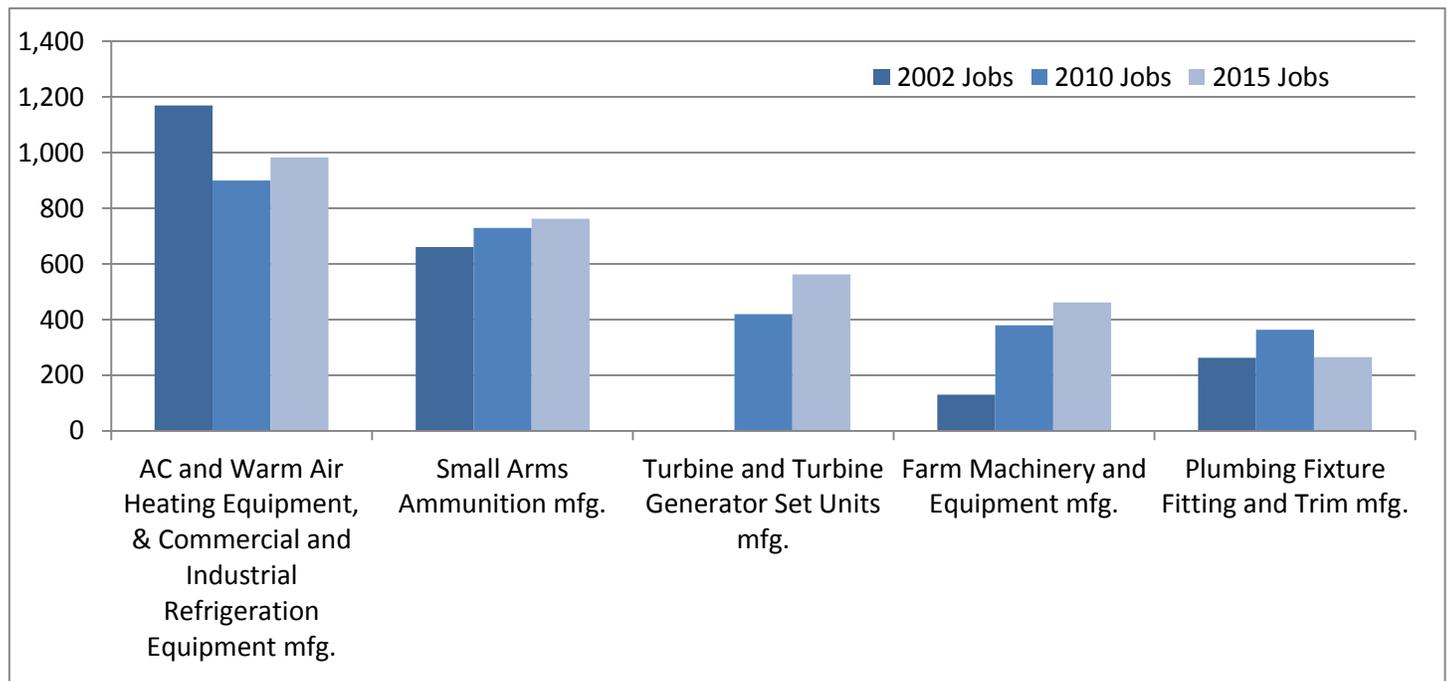


Table 2.4

Description	2002 Jobs	2010 Jobs	2015 Jobs	Current EPW	10-'15 Change	10-'15 % Change	2010 LQ
AC and Warm Air Heating Equipment, & Commercial and Industrial Refrigeration Equipment mfg.	1,169	900	983	\$45,579	83	9%	7.11
Small Arms Ammunition mfg.	660	729	762	\$64,715	33	5%	51.47
Turbine and Turbine Generator Set Units mfg.	0	419	562	\$59,507	143	34%	10.87
Farm Machinery and Equipment mfg.	130	379	462	\$30,456	83	22%	4.41
Plumbing Fixture Fitting and Trim mfg.	263	363	265	\$30,003	(98)	(27%)	27.17
Fabricated Structural Metal mfg.	428	310	283	\$60,311	(27)	(9%)	2.23
Fabricated Pipe and Pipe Fitting mfg.	180	301	314	\$55,740	13	4%	7.02
Prefabricated Metal Building and Component mfg.	614	289	230	\$55,244	(59)	(20%)	6.07
Industrial Valve mfg.	81	190	201	\$55,929	11	6%	5.17
Machine Shops	141	185	171	\$41,299	(14)	(8%)	0.46
Alumina Refining	284	173	93	\$68,195	(\$80)	(\$0)	58.26
Fluid Power Cylinder and Actuator mfg.	146	142	139	\$60,120	(3)	(2%)	5.91
Other Engine Equipment mfg.	15	141	156	\$58,875	15	11%	2.24
Iron and Steel Pipe and Tube mfg. from Purchased Steel	263	117	67	\$52,636	(50)	(43%)	3.1
Metal Window and Door mfg.	347	107	31	\$45,543	(76)	(71%)	1.31
Sheet Metal Work mfg.	58	102	131	\$58,127	\$29	\$0	0.69
Pump and Pumping Equipment mfg.	131	90	46	\$60,670	(44)	(49%)	2.18
Cutting Tool and Machine Tool Accessory mfg.	101	82	108	\$53,170	26	32%	2.26
Industrial and Commercial Fan and Blower mfg.	14	72	94	\$53,481	22	31%	4.57

Automatic Vending Machine mfg.	45	57	64	\$60,311	\$7	\$0	11.33
Industrial Mold mfg.	28	56	83	\$46,174	27	48%	1.05
Iron and Steel Mills	0	55	73	\$51,668	18	\$0	0.43
Conveyor and Conveying Equipment mfg.	44	50	69	\$64,223	19	38%	1.28
Other Commercial and Service Industry Machinery mfg.	47	49	44	\$70,279	(5)	(10%)	0.65
Special Die and Tool, Die Set, Jig, and Fixture mfg.	54	49	44	\$54,829	(5)	(10%)	0.53
All Other Miscellaneous General Purpose Machinery mfg.	66	49	44	\$45,927	(5)	(10%)	0.83
Other Fabricated Wire Product mfg.	227	46	18	\$45,897	(28)	(61%)	1.07
Plate Work mfg.	22	43	47	\$72,223	\$4	\$0	0.62
Industrial Truck, Tractor, Trailer, and Stacker Machinery mfg.	27	43	29	\$59,548	(14)	(33%)	1.5
Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers	38	43	35	\$32,201	(8)	(19%)	0.55
Bolt, Nut, Screw, Rivet, and Washer mfg.	47	41	35	\$43,019	(6)	(15%)	0.75
Other Metal Container mfg.	80	38	22	\$47,652	(16)	(42%)	1.66
All Other Industrial Machinery mfg.	<10	38	35	\$67,837	(3)	(8%)	0.84
Ornamental and Architectural Metal Work mfg.	<10	36	41	\$42,774	\$5	\$0	0.59
Optical Instrument and Lens mfg.	27	34	38	\$58,696	4	12%	0.96
Steel Wire Drawing	0	30	32	\$56,624	2	7%	2.32
Hand and Edge Tool mfg.	<10	29	37	\$32,493	8	28%	0.7
Elevator and Moving Stairway mfg.	13	22	31	\$73,555	\$9	\$0	1.66
Industrial Process Furnace and Oven mfg.	0	21	32	\$12,630	11	52%	1.24
Construction Machinery mfg.	43	21	16	\$61,734	(5)	(24%)	0.2
Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	0	19	39	\$35,032	\$20	\$1	1.24
Mining Machinery and Equipment mfg.	<10	18	18	\$46,816	0	0%	1.09
Ball and Roller Bearing mfg.	0	16	24	\$73,369	8	50%	0.38
Fluid Power Pump and Motor mfg.	15	16	15	\$59,515	(1)	(\$0)	0.6
Air and Gas Compressor mfg.	121	15	<10	--	--	--	--
Secondary Smelting and Alloying of Aluminum	176	14	<10	--	--	--	--
Ammunition (except Small Arms) mfg.	0	12	11	\$61,441	(\$1)	(\$0)	0.55
Machine Tool (Metal Forming Types) mfg.	0	12	28	\$40,063	16	\$1	0.68
Custom Roll Forming	38	11	10	\$50,807	(1)	(\$0)	1.4
Steel Foundries (except Investment)	11	0	0	\$0	0	--	0
Copper Wire (except Mechanical) Drawing	63	0	0	\$0	0	--	0
Rolled Steel Shape mfg.	27	<10	11	--	--	--	--
Paper Industry Machinery mfg.	44	<10	<10	--	--	--	--
All Other Miscellaneous Fabricated Metal Product mfg.	80	<10	<10	--	--	--	--

* Note: Industries with >10 employees in 2010 have been excluded

The employment summary for this group of industries is punctuated by large numbers of job losses in large industries such as prefabricated metal building and component manufacturing and plumbing fixture fitting and trim manufacturing. Yet at the same time, other smaller industries have been growing in recent years and are projected to continue doing so, including farm machinery and equipment manufacturing and air-conditioning and warm air heating equipment and commercial and

industrial refrigeration equipment manufacturing. From a workforce development perspective, in the near-term future there will be plenty of experienced workers with the requisite skills to be employed at those businesses that are looking to hire. The key will be preventing this talent from leaving the region, and directing them to the appropriate businesses that are hiring.

OCCUPATION OVERVIEW

Table 2.5

SOC Code	Description	2010 Jobs	2015 Jobs	Change	% Change	% of Industry	Current Hourly Earnings	PBA Available
Short & Moderate Term On-the-Job Training								
51-2092	Team assemblers	957	1,031	74	8%	16%	\$12.18	--
51-9198	Helpers--Production workers	245	239	(6)	(2%)	4%	\$12.16	--
51-4031	Cutting, punching, and press machine setters, operators, and tenders, metal and plastic	234	210	(24)	(10%)	4%	\$13.55	--
51-2099	Assemblers and fabricators, all other	193	201	8	4%	3%	\$12.36	--
51-2041	Structural metal fabricators and fitters	176	170	(6)	(3%)	3%	\$13.11	--
51-9061	Inspectors, testers, sorters, samplers, and weighers	166	170	4	2%	3%	\$14.48	38
53-7062	Laborers and freight, stock, and material movers, hand	142	135	(7)	(5%)	2%	\$9.84	13
51-4011	Computer-controlled machine tool operators, metal and plastic	138	149	11	8%	2%	\$15.28	--
41-4012	Sales representatives, wholesale and manufacturing, except technical and scientific products	105	102	(3)	(3%)	2%	\$24.43	--
51-4032	Drilling and boring machine tool setters, operators, and tenders, metal and plastic	98	91	(7)	(7%)	2%	\$12.98	--
Long Term On-the-Job Training								
51-4121	Welders, cutters, solderers, and brazers	341	333	(8)	(2%)	6%	\$14.60	--
51-4041	Machinists	202	208	6	3%	3%	\$17.19	--
49-9041	Industrial machinery mechanics	93	100	7	8%	2%	\$19.16	74
47-2211	Sheet metal workers	76	72	(4)	(5%)	1%	\$15.13	--

51-4111	Tool and die makers	63	71	8	13%	1%	\$20.37	--
47-2111	Electricians	31	31	0	0%	1%	\$18.37	--
Work Experience in Related Field								
51-1011	First-line supervisors/managers of production and operating workers	201	203	2	1%	3%	\$21.73	34
11-9199	Managers, all other	74	85	11	15%	1%	\$16.39	27
11-3051	Industrial production managers	46	46	0	0%	1%	\$39.98	20
13-1023	Purchasing agents, except wholesale, retail, and farm products	40	42	2	5%	1%	\$21.21	--
43-1011	First-line supervisors/managers of office and administrative support workers	36	36	0	0%	1%	\$16.62	1
49-1011	First-line supervisors/managers of mechanics, installers, and repairers	26	26	0	0%	0%	\$23.04	13
13-1051	Cost estimators	19	19	0	0%	0%	\$20.89	8
College Degree								
17-3013	Mechanical drafters	32	32	0	0%	1%	\$19.12	--
17-2112	Industrial engineers	50	57	7	14%	1%	\$30.67	26
17-2141	Mechanical engineers	49	54	5	10%	1%	\$32.81	1
13-2011	Accountants and auditors	28	29	1	4%	0%	\$16.88	8
11-1021	General and operations managers	85	80	(5)	(6%)	1%	\$31.44	7
11-1011	Chief executives	50	54	4	8%	1%	\$25.25	1
11-2022	Sales managers	19	20	1	5%	0%	\$37.60	1

EDUCATIONAL PROGRAM OVERVIEW

Table 2.6⁸

CIP Code	Program Name	Occupational Linkages		Average Annual Openings	2009 Regional Completions	College(s)
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⁸To review, the occupational linkages column shows which occupations are associated with the listed CIP code according to common college-to-work transitions (e.g. people who study mechanical engineering usually become mechanical engineers). The average annual openings column contains the sum of the annual openings for the occupations shown in the occupational linkages column. The 2009 regional completions column displays the number of completers or graduates who finished programs at regional schools in the previous academic year. Comparing these two figures will help provide a ballpark estimate for whether regional colleges are providing near the requisite number of completers to fill the number of annual openings.

Career & Technical Education					
47.0303	Industrial Mechanics and Maintenance Technology	Industrial machinery mechanics; Machinists	40	37	SEAC; UAM
47.0105	Industrial Electronics Technology/Technician	Electricians	47	6	SEAC
Bachelor's & Above					
52.0000	Business/Commerce Programs	Chief executives; General and operations managers	147	325	SEAC; UALR
15.0612	Industrial Technology/Technician	General and operations managers; Industrial production managers; First-line supervisors/managers of production and operating workers	115	21	UAPB
52.0101	Marketing/Marketing Management, General	Sales managers	14	39	UALR
52.1601	Taxation	Accountants and auditors	54	15	UALR
15.0805	Mechanical Engineering/Mechanical Technology/Technician	Mechanical engineers	7	6	UALR
Key Gaps					
15.1306	Mechanical Drafting and Mechanical Drafting CAD/CADD	Mechanical drafters	3	0	n/a

The bulk of the labor needs of the metals and machinery manufacturing industry group consist of occupations which require short- and moderate-term on-the-job training. Typically, businesses are able to find and employ workers at these levels without much difficulty. There do, however, appear to be some educational gaps for occupations that require a college degree. Although an educational program does exist for mechanical engineering, with only six graduates in 2009, there will not be enough of these workers in the region to serve the needs of this and other industries. This will result in some businesses having to recruit workers from outside of the region. Additionally, there is no program within the region that trains specifically for mechanical drafting, which is one of the key in-demand occupations for this industry group.⁹

This industry group will benefit from the availability of dislocated workers from the Pine Bluff Arsenal. Many of the occupational categories in Table 2.5 are the same as the occupational categories of those workers who will be displaced from the Arsenal, including such key occupations as industrial engineers and first-line supervisors/managers of production and operating workers.

⁹ The educational gap analysis should not be seen as a precise calculation but rather an estimate based on multiple assumptions. This method does not take into account factors such as post-college out-migration and in-migration, workers who live in the area but out-commute, students whose field of study is significantly different from type of job that they accept, the quality or content of education, or skills that can be obtained through on-the-job or apprenticeship training. Nevertheless this approach is instructive for high-level analysis of how much educational investment is being put into these industries.

SUSTAINABLE AGRICULTURE AND FOOD MANUFACTURING

SUSTAINABLE AGRICULTURE AND FOOD MANUFACTURING: INDUSTRY GROUP SUMMARY

Sustainable agriculture and food processing is strongly interconnected with the history and economy of this region. Though jobs are steadily decreasing in agriculture, production of agricultural goods is not in decline. Because of superior equipment and technology, less labor is needed in this industry to achieve the same level of output. The region also has the added benefit of several nearby colleges that offer specialized programs and perform research in sustainable agricultural practices. On the international scale, food production is likely to increase both in the US and abroad as more countries move toward industrialization and have greater demand for both semi-finished and prepackaged food products. This industry group would benefit from the start of a food science educational program that could train workers for occupations that are critical to this industry group.

TOTAL CLUSTER GROWTH, REGION VS. STATE & NATION

Figure 3.1

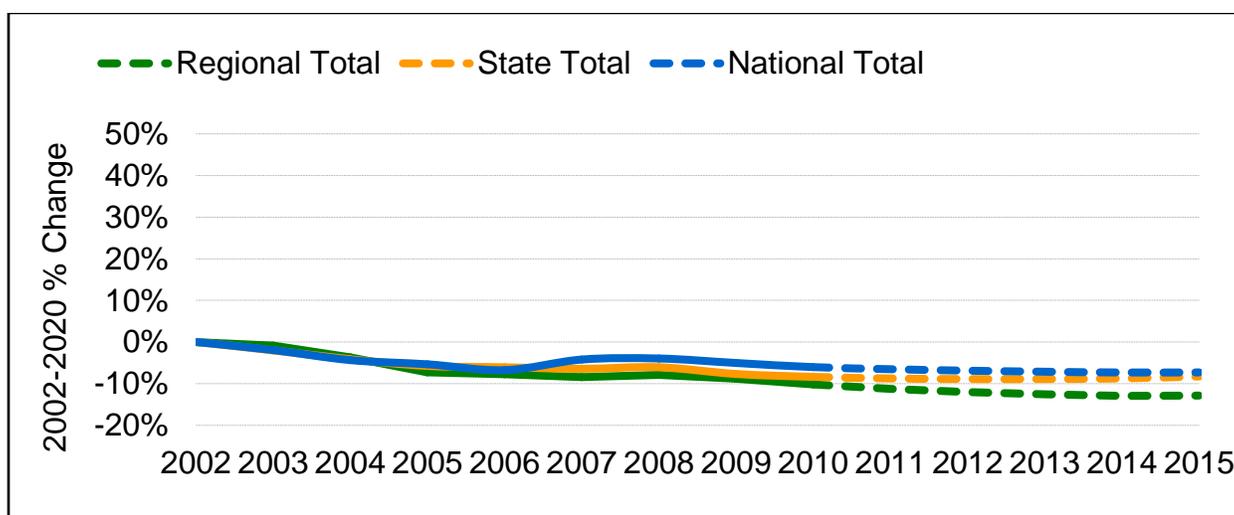


Table 3.1

Region	2002 Jobs	2010 Jobs	2015 Jobs	10-'15 Change	10-'15 % Change	Current EPW
Regional Total	15,416	13,847	13,432	(415)	(3%)	\$40,899
State Total	126,184	115,610	115,711	101	0%	\$35,914
National Total	5,341,459	5,018,683	4,950,827	(67,856)	(1%)	\$37,240

The amount of jobs in sustainable agriculture and food production in Southeast Arkansas has declined slowly and steadily from 2002 to 2010. According to employment projections, this trend is expected to continue on toward 2015, with a loss of about 400 jobs or a 3% decline. Despite significant declines over the past eight years, employment is projected to remain steady for the state

of Arkansas. Though the industry group is projected to decline in aggregate, this hides the fact that some industries within this group are expected to grow considerably, and others are in precipitous decline. It is also worth noting that these jobs in Southeast Arkansas pay much higher, on average, than the state and the nation, which is the opposite of the trend that exists in almost every other industry group.

ECONOMIC INDICATORS

Table 3.2

Economic Indicators	
Location Quotient	
2002 Location Quotient	1.88
2010 Location Quotient	1.86
2015 Location Quotient	1.88
Shift Share	
Shift Share: Regional Competitiveness Effect	(200)
Shift Share: Industrial Mix Effect	(1,370)
Shift Share: National Effect	1,155
Miscellaneous	
Average Job Multiplier	2.7
Average Regional Integration	64%
Overall Growth Potential	Strong

The location quotient scores indicate that this region has 88% more employment in agriculture and food manufacturing per capita than the national average. According to shift share analysis, the region has slightly declined with respect to the national trend among these industries (a loss of 200 jobs in regional competitiveness). The average job multiplier of 2.7 is the highest of all industry groups analyzed in this report, and shows that there is a significant value adding a supply chain of industries that produce a high number of jobs in the region.

CLUSTER EMPLOYMENT BY COUNTY

Figure 3.2

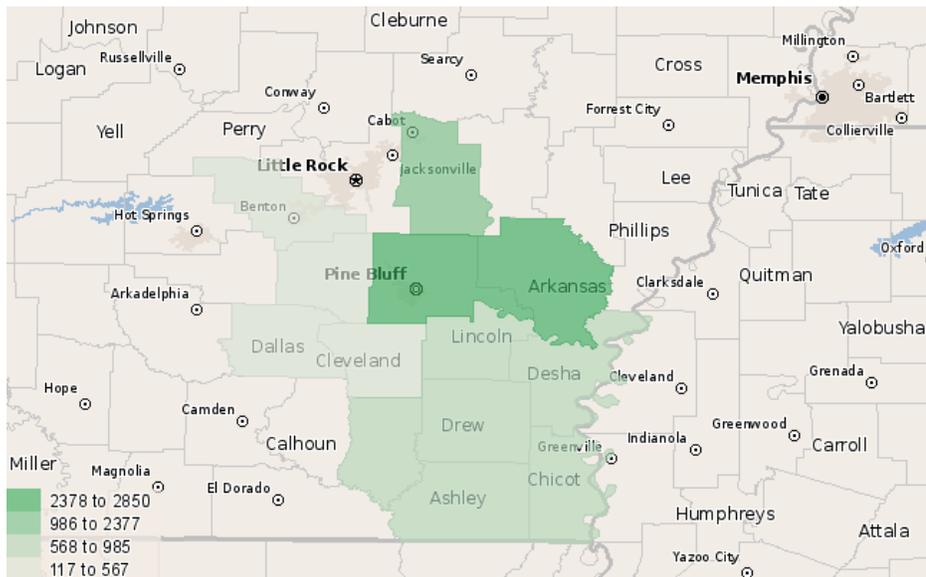


Table 3.3

County	2002 Jobs	2010 Jobs	2015 Jobs	2010 LQ	10-'15 Change	10-'15 % Change
Jefferson	3,113	2,639	2,644	2.28	5	0%
Arkansas	2,876	2,850	2,827	7.26	(23)	(1%)
Lonoke	1,755	1,646	1,587	2.60	(59)	(4%)
Pulaski*	1,294	1,033	826	0.36	-207	-20
Desha	1,046	886	774	4.92	(112)	(13%)
Ashley	1,000	732	670	2.43	(62)	(8%)
Chicot	976	879	863	5.96	(16)	(2%)
Lincoln	781	912	992	6.76	80	9%
Bradley	744	571	626	3.76	55	10%
Saline	588	424	347	0.50	(77)	(18%)
Drew	542	619	652	2.40	33	5%
Grant	290	279	271	1.51	(8)	(3%)
Cleveland	262	259	252	4.40	(7)	(3%)
Dallas	148	117	101	0.92	(16)	(14%)

The number of jobs in sustainable agriculture and food production are spread fairly evenly across the region. Though there are fewer jobs in counties such as Cleveland, Grant, and Drew, the high location quotient scores indicate that the industries are still very critical to these counties. The only counties that do not have large LQ scores in these industries are Pulaski, Saline, and Dallas, which indicates that agriculture and food manufacturing are smaller in these counties relative to their overall population.

DETAILED CLUSTER DATA

Figure 3.3

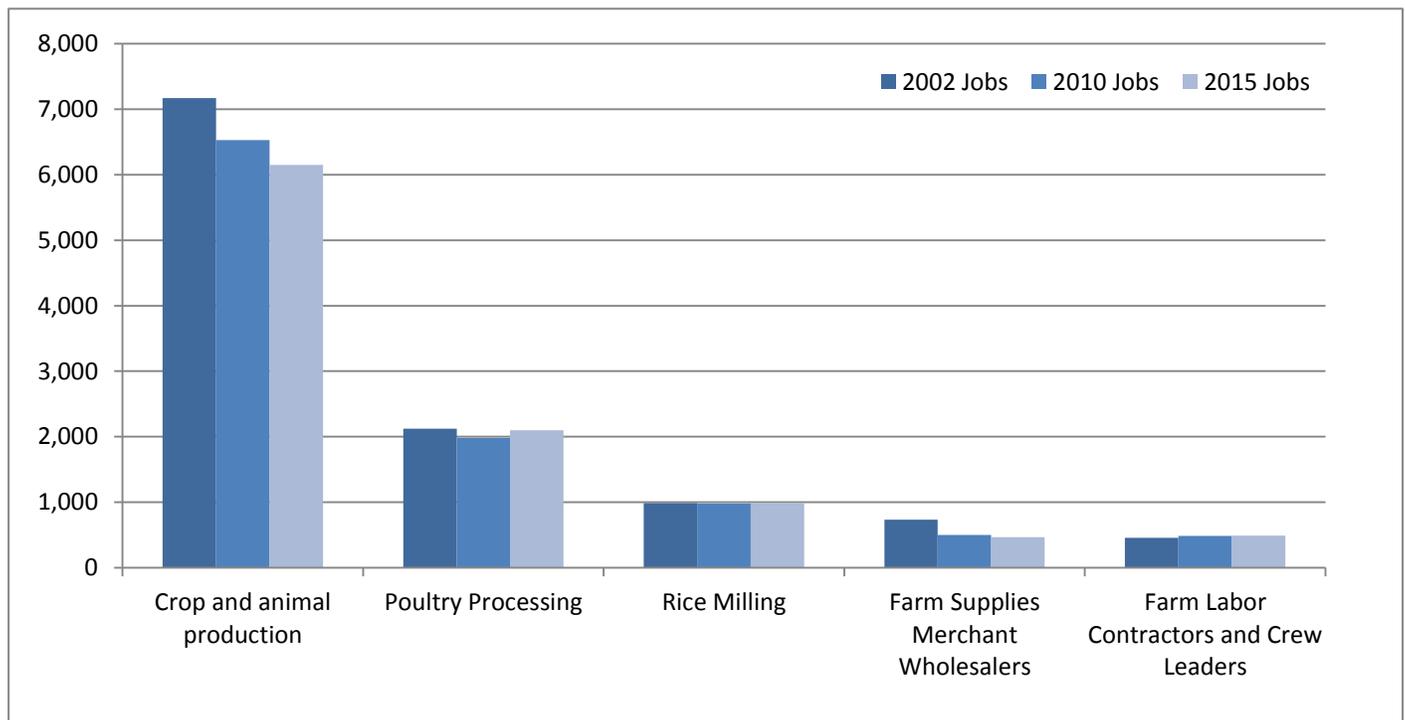


Table 3.4

Description	2002 Jobs	2010 Jobs	2015 Jobs	Current EPW	Change	% Change	2010 National LQ
Crop and animal production	7,169	6,526	6,150	\$35,765	(376)	(6%)	1.70
Poultry Processing	2,124	1,981	2,097	\$41,827	116	6%	5.74
Rice Milling	987	984	988	\$50,601	4	0%	156.20
Farm Supplies Merchant Wholesalers	735	500	466	\$52,755	(34)	(7%)	3.05
Farm Labor Contractors and Crew Leaders	455	487	492	\$21,873	5	1%	1.24
Soil Preparation, Planting, and Cultivating	490	481	543	\$43,291	62	13%	4.90
Farm and Garden Machinery and Equipment Merchant Wholesalers	551	414	319	\$54,374	(95)	(23%)	2.76
Farm Machinery and Equipment Manufacturing	130	379	462	\$30,456	83	22%	4.41
Fluid Milk Manufacturing	201	286	272	\$48,662	(14)	(5%)	3.57
Soft Drink Manufacturing	336	262	241	\$54,326	(21)	(8%)	2.40
Soybean Processing	275	231	175	\$63,037	(56)	(24%)	13.22
Animal (except Poultry) Slaughtering	458	199	103	\$55,371	(96)	(48%)	0.89
Cotton Ginning	282	143	81	\$40,937	(62)	(43%)	9.60
Postharvest Crop Activities (except Cotton Ginning)	144	123	137	\$48,981	14	11%	0.91
Other Animal Food Manufacturing	66	105	94	\$46,703	(11)	(10%)	2.07

Roasted Nuts and Peanut Butter Manufacturing	202	101	70	\$60,828	(31)	(31%)	5.09
Other Oilseed Processing	99	96	89	\$51,233	(7)	(7%)	32.87
Grain and Field Bean Merchant Wholesalers	11	78	79	\$61,406	1	1%	1.09
Fertilizer (Mixing Only) Manufacturing	47	74	149	\$58,626	75	101%	5.72
Farm Management Services	37	72	98	\$47,669	26	36%	1.72
Commercial Bakeries	87	64	80	\$31,575	16	25%	0.33
Retail Bakeries	65	37	42	\$22,475	5	14%	0.30
Rendering and Meat Byproduct Processing	14	33	28	\$58,100	(5)	(15%)	2.46
Frozen Cakes, Pies, and Other Pastries Manufacturing	175	30	<10	--	--	--	--
Other Farm Product Raw Material Merchant Wholesalers	24	27	23	\$74,977	(4)	(15%)	1.84
Dog and Cat Food Manufacturing	11	21	23	\$52,898	2	10%	0.71
Bottled Water Manufacturing	61	17	<10	--	--	--	--
Livestock Merchant Wholesalers	66	14	13	\$17,509	(1)	(7%)	0.47
Meat Processed from Carcasses	<10	11	14	\$43,761	3	27%	0.06
Ice Manufacturing	<10	11	10	\$63,224	(1)	(9%)	0.84
Perishable Prepared Food Manufacturing	<10	10	15	\$37,456	5	50%	0.17
Spice and Extract Manufacturing	31	0	0	\$0	0	0%	0.00

* Note: Industries with >10 employees in 2010 have been excluded

Inside this cluster, there are two industries that make up the lion's share of employment for the group—crop and animal production and poultry processing—while the remaining industries are composed of specialized wholesale industries and food manufacturing. Most individual industries are projected to continue shedding employment in the future, led by crop and animal production, farm supply merchant wholesalers, and animal slaughtering. However, industries with a smaller share of employment—such as soil preparation, planting, and cultivating and farm machinery and equipment manufacturing—are projected to see healthy growth. It is also worth noting that several individual industries have very large location quotients, namely rice milling, soybean processing, and other oilseed manufacturing. These industries represent a unique niche that is being met by businesses in Southeast Arkansas and represent an opportunity to increase exports out of these counties and increase overall wealth within the region.

OCCUPATION OVERVIEW

Table 3.5

SOC Code	Description	2010 Jobs	2015 Jobs	Change	% Change	% of Industry	Current Hourly Earnings	PBA Available
Short & Moderate Term On-the-Job Training								
45-209A	Miscellaneous agricultural workers	1,960	1,872	(88)	(4%)	14%	\$11.53	--

51-3022	Meat, poultry, and fish cutters and trimmers	615	624	9	1%	4%	\$10.95	--
51-9111	Packaging and filling machine operators and tenders	435	419	(16)	(4%)	3%	\$12.84	12
51-9198	Helpers--Production workers	383	385	2	1%	3%	\$12.14	--
53-7062	Laborers and freight, stock, and material movers, hand	367	347	(20)	(5%)	3%	\$9.86	13
51-2092	Team assemblers	214	247	33	15%	2%	\$12.19	--
53-3032	Truck drivers, heavy and tractor-trailer	209	199	(10)	(5%)	1%	\$15.49	--
41-4012	Sales representatives, wholesale and manufacturing, except technical and scientific products	184	167	(17)	(9%)	1%	\$24.50	--
39-2011	Animal trainers	181	189	8	4%	1%	\$11.63	--
53-7064	Packers and packagers, hand	180	168	(12)	(7%)	1%	\$8.77	--
Long Term On-the-Job Training								
11-9012	Farmers and ranchers	3,226	3,025	(201)	(6%)	23%	\$13.17	--
49-9041	Industrial machinery mechanics	189	201	12	6%	1%	\$19.14	74
51-4121	Welders, cutters, solderers, and brazers	56	68	12	21%	0%	\$14.40	--
51-3021	Butchers and meat cutters	42	43	1	2%	0%	\$13.48	--
51-3011	Bakers	28	29	1	4%	0%	\$11.98	--
47-2111	Electricians	19	20	1	5%	0%	\$18.16	--
51-4041	Machinists	18	21	3	17%	0%	\$17.12	--
Work Experience in Related Field								
45-2041	Graders and sorters, agricultural products	177	178	1	1%	1%	\$12.32	--
51-1011	First-line supervisors/managers of production and operating workers	150	152	2	1%	1%	\$21.76	34
45-1099	Supervisors, farming, fishing,	114	114	0	0%	1%	\$22.07	--

and forestry workers								
11-9199	Managers, all other	91	106	15	16%	1%	\$16.41	27
11-3051	Industrial production managers	48	47	(1)	(2%)	0%	\$39.86	30
49-1011	First-line supervisors/managers of mechanics, installers, and repairers	47	45	(2)	(4%)	0%	\$23.00	13
43-1011	First-line supervisors/managers of office and administrative support workers	38	36	(2)	(5%)	0%	\$16.62	1
41-1012	First-line supervisors/managers of non-retail sales workers	27	25	(2)	(7%)	0%	\$20.24	--
53-1021	First-line supervisors/managers of helpers, laborers, and material movers, hand	26	25	(1)	(4%)	0%	\$16.70	--
45-2011	Agricultural inspectors	25	26	1	4%	0%	\$19.83	--
College Degree								
11-9011	Farm, ranch, and other agricultural managers	1,245	1,196	(49)	(4%)	9%	\$16.14	--
49-3041	Farm equipment mechanics	114	88	(26)	(23%)	1%	\$14.13	--
11-1021	General and operations managers	75	68	(7)	(9%)	1%	\$31.41	7
11-1011	Chief executives	59	59	0	0%	0%	\$25.52	1
13-2011	Accountants and auditors	34	32	(2)	(6%)	0%	\$17.08	8
53-2012	Commercial pilots	28	29	1	4%	0%	\$36.68	--
19-1012	Food scientists and technologists	24	24	0	0%	0%	\$21.67	--
17-2112	Industrial engineers	23	26	3	13%	0%	\$30.60	26
19-1032	Foresters	23	24	1	4%	0%	\$24.33	--
19-1031	Conservation scientists	18	19	1	6%	0%	\$24.88	--

EDUCATIONAL PROGRAM OVERVIEW

Table 3.6

CIP Code	Program Name	Occupational Linkages	Average Annual Openings	2009 Regional Completions	College(s)
Career & Technical Education					
48.0508	Welding Technology/Welder	Welders, cutters, solderers, and brazers	32	83	SEAC; UAM
47.0303	Industrial Mechanics and Maintenance Technology	Machinists; Industrial machinery mechanics	40	37	SEAC; UAM
47.0105	Industrial Electronics Technology/Technician	Electricians	47	6	SEAC
Bachelor's & Above					
52.0000	Business/Commerce Programs	Chief executives; General and operations managers	147	325	SEAC; UALR
01.0102	Agribusiness/Agricultural Business Operations	Farmers and ranchers; Supervisors, farming, fishing, and forestry workers; Agricultural inspectors	41	39	UALR; UAM; UAPB
03.0000	Forest Management & Forestry	Foresters; Conservation scientists	3	10	UAM
Key Gaps					
47.0606	Small Engine Mechanics and Repair Technology/Technician	Farm equipment mechanics	3	0	UAM
01.1001	Food Science	Food scientists and technologists; Farm, ranch, and other agricultural managers; Agricultural inspectors	39	0	n/a

The bulk of the labor needs of the sustainable agriculture and food manufacturing industry group consist of occupations which require short- and moderate-term on-the-job training. Typically, businesses are able to find and employ workers at these levels without much difficulty. There do, however, appear to be some educational gaps for certain occupations that require a college degree.¹⁰ For instance, occupations such as food scientists and technologists and agricultural inspectors are critical for the harvest and production of quality food products. The region does not currently offer a food science program, which would train workers for these and many other occupations that are critical to this industry group. Another less immediate concern is the apparent need for farm equipment mechanics, which could be served by a small engine, diesel engine, or farm equipment maintenance program. Although, mechanics of this sort often obtain their position through on-the-job

¹⁰ The educational gap analysis should not be seen as a precise calculation but rather an estimate based on multiple assumptions. This method does not take into account factors such as post-college out-migration and in-migration, workers who live in the area but out-commute, students whose field of study is significantly different from type of job that they accept, the quality or content of education, or skills that can be obtained through on-the-job or apprenticeship training. Nevertheless this approach is instructive for high-level analysis of how much educational investment is being put into these industries.

training instead of traditional classroom education, this sort of program would help ensure the existence of a continuous talent pipeline for these industries.

This industry group will benefit from the availability of dislocated workers from the Pine Bluff Arsenal in certain isolated cases, for instance, with the availability of first-line supervisors/managers of production and operating workers and packaging and filling machine operators and tenders.

CHEMICAL & CHEMICAL PRODUCTS MANUFACTURING

CHEMICAL MANUFACTURING: INDUSTRY GROUP SUMMARY

Chemical and chemical product manufacturing is clearly an industry group in which the region has a competitive advantage. Even outside of the PBA, there are many companies producing various forms of organic and inorganic chemicals and chemical products. Experience working with volatile chemicals is a rare skill, and many businesses are looking for the level of chemical expertise that exists in the region. The “uncertain” growth potential is due to the possible implementation of more stringent environmental restrictions in the future, and the spotty reputation that chemical production has across the United States. To further ensure the success of this industry group in the future, the creation of a two-year program chemical technicians program would be extremely helpful.

TOTAL CLUSTER GROWTH, REGION VS. STATE & NATION

Figure 4.1

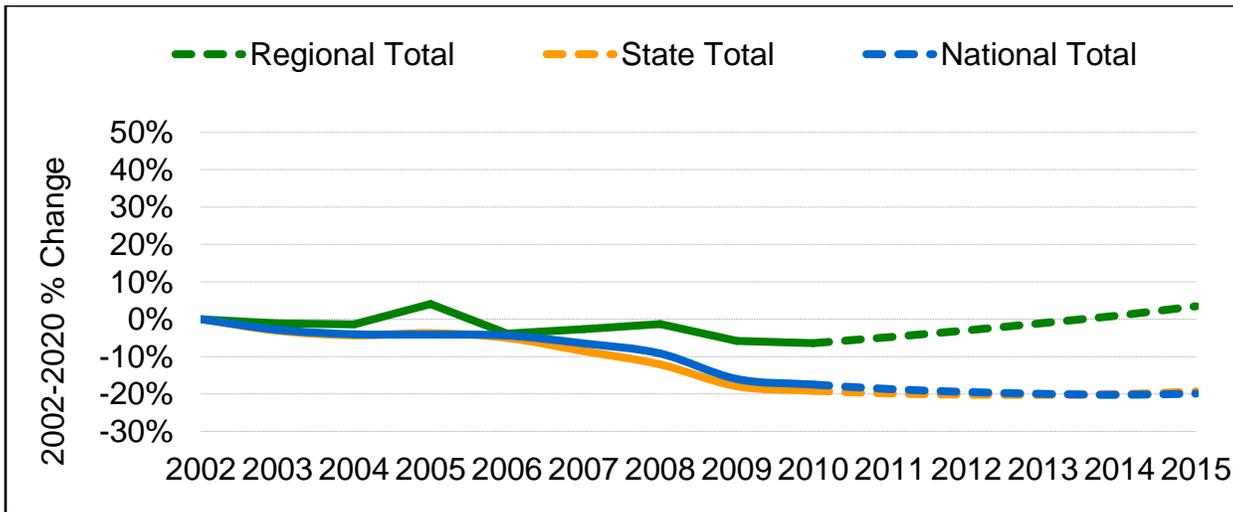


Table 4.1

Region	2002 Jobs	2010 Jobs	2015 Jobs	10-'15 Change	10-'15 % Change	Current EPW
Regional Total	3,475	3,251	3,596	345	11%	\$62,194
State Total	27,649	22,357	22,307	(50)	0%	\$57,499
National Total	2,444,825	2,017,153	1,957,659	(59,494)	(3%)	\$76,407

Like the rest of the state and the nation, Southeast Arkansas has lost a substantial number of chemical and chemical products manufacturing jobs since 2002. Nevertheless, the region is projected to perform much stronger than the rest of Arkansas and the US through 2015. Earnings in chemical manufacturing are also higher in the region compared to the state; the nation, however, eclipses both in terms of earnings.

ECONOMIC INDICATORS

Table 4.2

Economic Indicators	
Location Quotient	
2002 Location Quotient	0.93
2010 Location Quotient	1.08
2015 Location Quotient	1.27
Shift Share	
Shift Share: Regional Competitiveness Effect	387
Shift Share: Industrial Mix Effect	-313
Shift Share: National Effect	271
Miscellaneous	
Average Job Multiplier	2.5
Average Regional Integration	33%
Overall Growth Potential	Uncertain

As a share of employment, chemical and chemical products manufacturing in Southeast Arkansas has risen slightly since 2002, and is projected to increase substantially over the next five years. There are 8% more jobs in this region per capita, as compared to the national average—and that number is expected to grow to 27% per capita by 2015. Chemical manufacturing also posts strong numbers in other key indicators. The industry cluster’s average regional integration of 80% shows it is fairly well clustered in the region, and the average job multiplier of 2.5 means that for every 1 chemical manufacturing job an average of 1.5 jobs are created in other industries in Southeast Arkansas.

CLUSTER EMPLOYMENT BY COUNTY

Figure 4.2

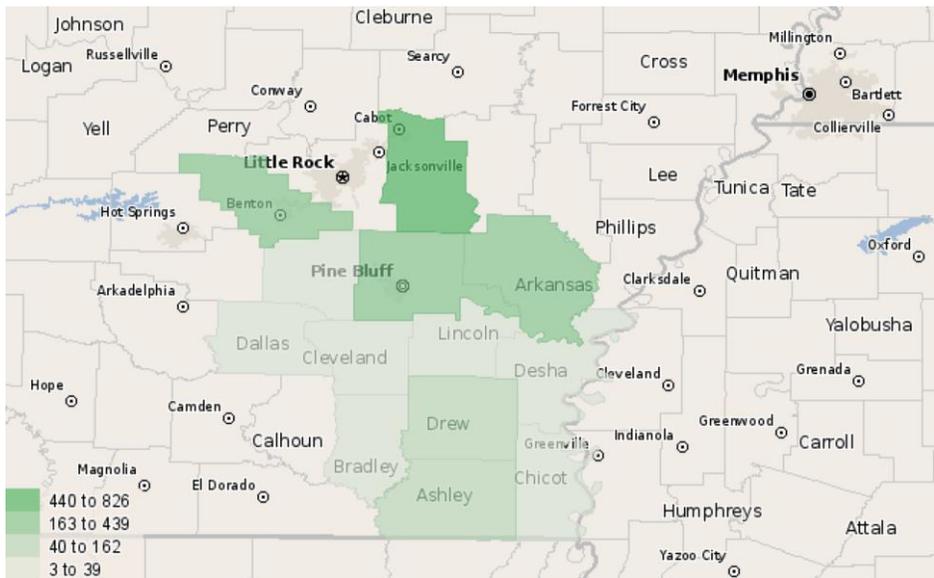


Table 4.3

County	2002 Jobs	2010 Jobs	2015 Jobs	2010 LQ	10-'15 Change	10-'15 % Change
Pulaski*	1,571	1,183	871	0.98	-312	(-36%)
Lonoke	734	826	881	3.25	55	6%
Saline	362	391	378	1.14	-13	(-3%)
Jefferson	250	275	556	0.59	281	50%
Drew	160	117	90	1.13	-27	(-30%)
Grant	123	38	30	0.51	-8	(-27%)
Ashley	112	158	349	1.3	191	55%
Arkansas	90	267	392	1.69	125	32%
Desha	25	11	9	0.15	-2	(-22%)
Cleveland	18	6	--	--	--	--
Lincoln	14	12	12	0.22	0	0.00%
Dallas	<10	<10	--	--	--	--
Bradley	<10	<10	11	0.17	--	--
Chicot	<10	<10	--	--	--	--

* Only five ZIP codes inside Pulaski County were used.

Jobs in chemical and chemical product manufacturing are most concentrated in Lonoke County, which is expected to see a slight increase in jobs from 2010 to 2015. The segment of Pulaski County selected for this analysis has by far the most chemical manufacturing jobs in the region, though it is projected to lose 36% of employment in the cluster through 2015. It's estimated, on the other hand, that chemical manufacturing jobs will more than double in Jefferson County, from 275 to 556.

DETAILED CLUSTER DATA

Figure 4.3

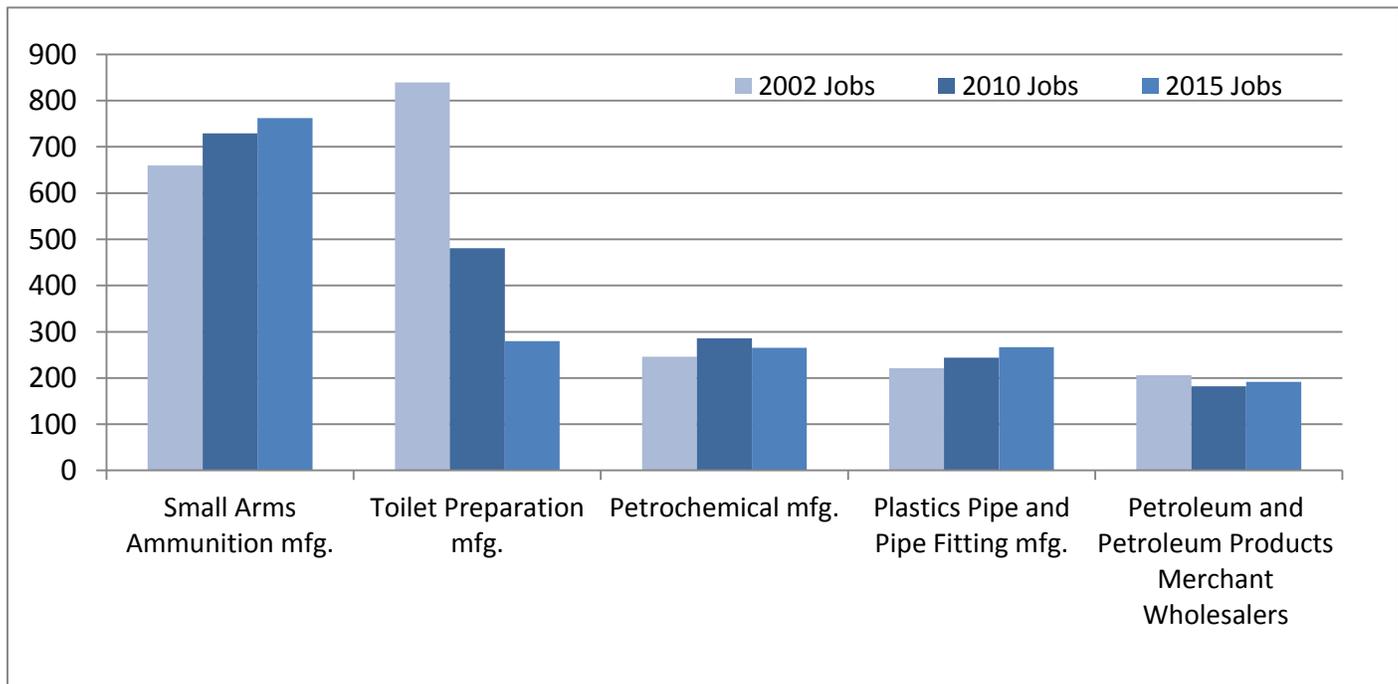


Table 4.4

Description	2002 Jobs	2010 Jobs	2015 Jobs	Current EPW	10-'15 Change	10-'15 % Change	2010 LQ
Small Arms Ammunition mfg.	660	729	762	\$64,715	33	5%	51.46
Toilet Preparation mfg.	839	481	280	\$63,449	(201)	(42%)	6.25
Petrochemical mfg.	246	286	265	\$95,854	(21)	(7%)	7.92
Plastics Pipe and Pipe Fitting mfg.	221	244	267	\$53,650	23	9%	5.63
Petroleum and Petroleum Products Merchant Wholesalers	206	182	192	\$52,583	10	5%	1.87
Unlaminated Plastics Profile Shape mfg.	63	144	140	\$60,940	(4)	(3%)	4.37
All Other Plastics Product mfg.	248	128	81	\$39,199	(47)	(37%)	0.32
Other Chemical and Allied Products Merchant Wholesalers	100	107	108	\$63,225	1	1%	0.67
Plastics Material and Resin mfg.	68	103	192	\$48,949	89	86%	1.25
Petroleum Bulk Stations and Terminals	76	92	87	\$52,189	(5)	(5%)	1.90
Ready-Mix Concrete mfg.	137	76	68	\$43,231	(8)	(11%)	0.53
Fertilizer (Mixing Only) mfg.	47	74	149	\$58,626	75	101%	5.76
All Other Miscellaneous Chemical Product and Preparation mfg.	<10	70	276	\$71,954	206	294%	1.22
Printing Ink mfg.	20	59	85	\$72,996	26	44%	3.78
Polystyrene Foam Product mfg.	120	52	18	\$27,119	(34)	(65%)	1.21
All Other Basic Inorganic Chemical mfg.	<10	49	193	\$102,947	144	294%	1.10
Mineral Wool mfg.	<10	47	56	\$23,143	9	19%	2.00
Cement mfg.	15	32	33	\$84,806	1	3%	1.36
Plastics Bottle mfg.	35	30	57	\$45,950	27	90%	0.59
Tire mfg. (except Retreading)	40	28	22	\$56,875	(6)	(21%)	0.40
Rubber and Plastics Hoses and Belting mfg.	<10	27	60	\$66,528	33	122%	0.76
Porcelain Electrical Supply mfg.	0	26	20	\$54,953	(6)	(23%)	3.28
Plastics Packaging Film and Sheet (including Laminated) mfg.	<10	25	44	\$58,457	19	76%	1.29
Cut Stone and Stone Product mfg.	60	19	15	\$38,274	(4)	(21%)	0.46
Ground or Treated Mineral and Earth mfg.	<10	16	21	\$70,023	5	31%	1.83
Concrete Block and Brick mfg.	29	13	<10	--	--	--	0.44
Plastics Materials and Basic Forms and Shapes Merchant Wholesalers	15	13	<10	--	--	--	0.41
Unlaminated Plastics Film and Sheet (except Packaging) mfg.	0	13	18	\$36,562	5	38%	0.21
Polish and Other Sanitation Good mfg.	0	12	<10	--	--	--	0.33
Ammunition (except Small Arms) mfg.	0	12	11	\$61,441	(1)	(8%)	0.53
Plastics Bag and Pouch mfg.	15	10	<10	--	--	--	0.21
Cellulosic Organic Fiber mfg.	65	0	0	\$0	0	0%	0.00
Other Concrete Product mfg.	55	<10	<10	--	--	--	--

* Note: Industries with >10 employees in 2010 have been excluded

Inside this cluster, toilet preparation manufacturing and all other plastic products manufacturing have experienced significant losses since 2002 and are projected to shed many more jobs. However,

industries with a smaller share of employment—such as plastics pipe and pipe fitting manufacturing and plastic material and resin manufacturing—are projected to see healthy growth. Plastics pipe and pipe fitting manufacturing is also very concentrated in the region, as compared to the nation.

OCCUPATION OVERVIEW

Table 4.5

SOC Code	Description	2010 Jobs	2015 Jobs	Change	% Change	% of Industry	Current Hourly Earnings	PBA Workers
Short & Moderate Term On-The-Job Training								
51-9111	Packaging and filling machine operators and tenders	102	116	14	14%	3%	\$12.77	12
51-9198	Helpers--Production workers	98	115	17	17%	3%	\$12.16	--
53-7062	Laborers and freight, stock, and material movers, hand	91	91	0	0%	3%	\$9.84	13
53-7064	Packers and packagers, hand	66	54	(12)	(18%)	2%	\$8.75	--
53-7051	Industrial truck and tractor operators	57	61	4	7%	2%	\$13.02	--
43-5071	Shipping, receiving, and traffic clerks	46	47	1	2%	1%	\$12.39	--
43-9061	Office clerks, general	32	34	2	6%	1%	\$9.63	23
43-5081	Stock clerks and order fillers	27	25	(2)	(7%)	1%	\$8.98	1
43-5061	Production, planning, and expediting clerks	25	28	3	12%	1%	\$18.03	17
53-7063	Machine feeders and offbearers	24	27	3	13%	1%	\$11.85	--
Long-Term On-The-Job Training								
49-9041	Industrial machinery mechanics	75	99	24	32%	2%	\$19.16	74
51-8091	Chemical plant and system operators	53	92	39	74%	2%	\$22.27	83
51-4121	Welders, cutters, solderers, and brazers	36	37	1	3%	1%	\$14.60	--
51-4041	Machinists	30	33	3	10%	1%	\$17.19	--

Work Experience in Related Field								
51-1011	<i>First-line supervisors/managers of production and operating workers</i>	105	122	17	16%	3%	\$21.73	34
11-9199	<i>Managers, all other</i>	38	44	6	16%	1%	\$16.39	27
11-3051	<i>Industrial production managers</i>	27	32	5	19%	1%	\$39.98	20
43-1011	<i>First-line supervisors/managers of office and administrative support workers</i>	26	26	0	0%	1%	\$16.62	1
49-1011	<i>First-line supervisors/managers of mechanics, installers, and repairers</i>	20	25	5	25%	1%	\$23.04	13
College Degree								
19-4031	<i>Chemical technicians</i>	21	28	7	33%	1%	\$19.42	18
19-2031	<i>Chemists</i>	36	48	12	33%	1%	\$33.18	19
17-2112	<i>Industrial engineers</i>	21	28	7	33%	1%	\$30.67	26
11-1021	<i>General and operations managers</i>	52	53	1	2%	2%	\$31.44	7
11-1011	<i>Chief executives</i>	30	34	4	13%	1%	\$25.25	1

EDUCATIONAL PROGRAM OVERVIEW

Table 4.6

CIP Code	Program Name	Occupational Linkages	Average Annual Openings	2009 Regional Completions	College(s)
Career & Technical Education					
48.0508	Welding Technology/Welder	Welders, cutters, solderers, and brazers	32	83	SEAC; UAM
52.0302	Accounting Technology/Technician and Bookkeeping	Office clerks, general; Shipping, receiving, and traffic clerks; Stock clerks and order fillers; Production, planning, and expediting clerks	229	45	SEAC

47.0303	Industrial Mechanics and Maintenance Technology	Industrial machinery mechanics; Machinists	40	37	SEAC; UAM
Bachelor's & Above					
52	Business/Commerce Programs	General and operations managers; Chief executives	147	325	SEAC; UALR
15.0612	Industrial Technology/Technician	General and operations managers; Industrial production managers; First-line supervisors/managers of production and operating workers	115	21	UAPB
40.0501	Chemistry, General*	Others, not listed		5	UALR
Key Gaps					
41.0301	Chemical Technology/Technician	Chemical plant and system operators; Chemical technicians	15	0	n/a
* Note: The number of completers for this category includes just postgraduate students, because this career path typically requires a high level of education.					

The labor needs of the chemical manufacturing industry group are quite similar to those of the previous two types of manufacturing industry groups, and the same can be said about these industries—there are many short- and moderate-term on-the-job training occupations. The key difference in this group is the need for workers with knowledge of chemistry and production of chemical-based products. For instance, occupations such as chemical plant and system operators, chemical technicians, and chemists are critical to the success of these industries. The University of Arkansas-Little Rock offers a chemistry program at both the bachelor's and master's level, which no doubt helps serve the need for some of the chemists in these industries. However, there is no two-year program designed to instruct students about basic chemical tests and the production of chemical-based products, which could be done through the advent of a chemical technicians program.¹¹

Just as with the previous two industry groups, this group of industries stands to benefit from the availability of certain dislocated workers from the Pine Bluff Arsenal (e.g., chemical plant and system operators and chemists, among others).

¹¹ The educational gap analysis should not be seen as a precise calculation but rather an estimate based on multiple assumptions. This method does not take into account factors such as post-college out-migration and in-migration, workers who live in the area but out-commute, students whose field of study is significantly different from type of job that they accept, the quality or content of education, or skills that can be obtained through on-the-job or apprenticeship training. Nevertheless this approach is instructive for high-level analysis of how much educational investment is being put into these industries.

BIOTECHNOLOGY

BIOTECHNOLOGY: INDUSTRY GROUP SUMMARY

Biotechnology is currently one of the nation’s hottest industries for both new job growth and public investment. This region does not currently have a huge employment base in this field, but the projected growth and earnings level are very strong. Additionally, biotech, unlike many other goods and services, is difficult for up-and-coming world economies such as China and India to replicate. Therefore it comes with some stronger job security than many other industries. Currently, the labor needs of these industries are being met, but if the industry were expanded in the future, the addition of a program that specializes in training biotechnology technicians at the two-year level may be required.

TOTAL CLUSTER GROWTH, REGION VS. STATE & NATION

Figure 5.1

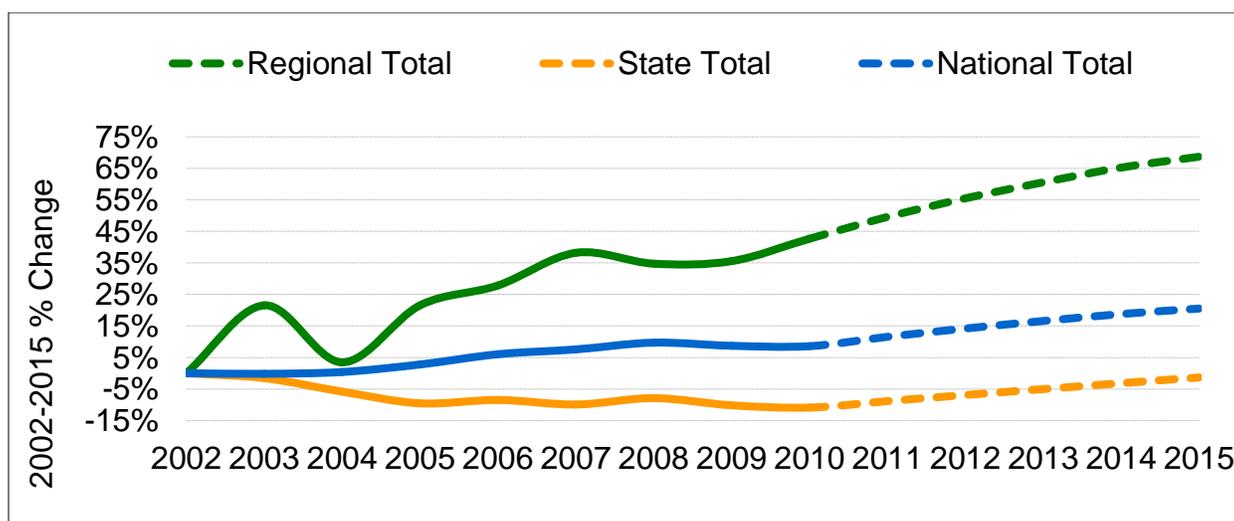


Table 5.1

Description	2002 Jobs	2010 Jobs	2015 Jobs	Change	% Change	Current EPW
Regional Total	492	702	830	128	18%	\$66,103
State Total	4,517	4,025	4,457	432	11%	\$53,049
National Total	1,255,567	1,363,376	1,513,273	149,897	11%	\$102,764

There are not a large amount of biotechnology jobs in Southeast Arkansas, but the cluster has grown by nearly 43% since 2002 and is projected to increase by another 18% by 2015. The projected growth rate of the cluster for the region eclipses both the state and the US, though earnings at the national level are much higher.

ECONOMIC INDICATORS

Table 5.2

Economic Indicators	
Location Quotient	
2002 Location Quotient	0.26
2010 Location Quotient	0.35
2015 Location Quotient	0.38
Shift Share	
Shift Share: Regional Competitiveness Effect	30
Shift Share: Industrial Mix Effect	39
Shift Share: National Effect	59
Miscellaneous	
Average Job Multiplier	2.5
Average Regional Integration	14%
Overall Growth Potential	Strong

Employment in biotechnology is much less concentrated in Southeast Arkansas as compared to the national average. However, the cluster is projected to have 12% more jobs per capita in 2015 than in 2002. The shift share analysis shows that part of the growth is due to the national economy and industry-wide factors, and part of the region’s growth is due to regional factors. In addition, biotechnology has a fairly high job multiplier of 2.5, which means that with each new job in biotechnology, the region would also gain an average of 1.5 additional jobs in related industries, such as transportation, machinery repair, local government, etc.

CLUSTER EMPLOYMENT BY COUNTY

Figure 5.2

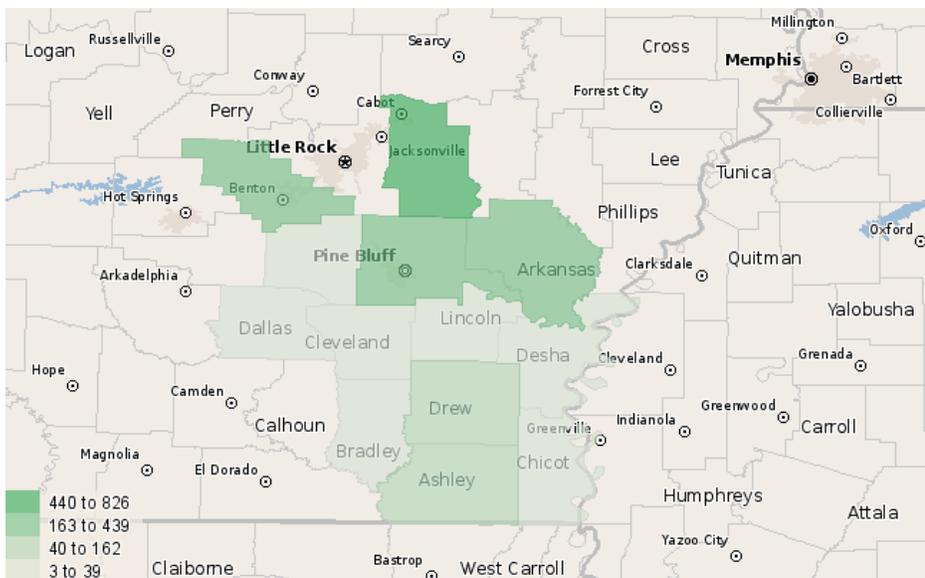


Table 5.3

County	2002 Jobs	2010 Jobs	2015 Jobs	2010 LQ	10-'15 Change	10-'15 % Change
Pulaski*	218	272	281	0.35	9	3%
Jefferson	198	360	465	1.15	105	29%
Saline	25	10	<10	--	--	--
Arkansas	17	46	56	0.43	10	22%
Drew	17	<10	--	--	--	--
Grant	13	0	0	0	0	0
Lonoke	<10	10	14	0.06	4	40%
Ashley	<10	<10	--	--	--	--
Dallas	<10	<10	--	--	--	--
Bradley	<10	<10	--	--	--	--
Chicot	<10	0	0	0	0	0
Desha	<10	<10	--	--	--	--
Lincoln	<10	<10	--	--	--	--
Cleveland	<10	<10	--	--	--	--

* Only five ZIP codes inside Pulaski County were used.

The large majority of biotechnology jobs in the region are located in Jefferson and Pulaski Counties. Jefferson County has 15% more biotech jobs per capita than the nation and is expected to experience 29% growth from 2010-2015, further pointing to its strength in the region and potentially promising future.

DETAILED CLUSTER DATA

Figure 5.3

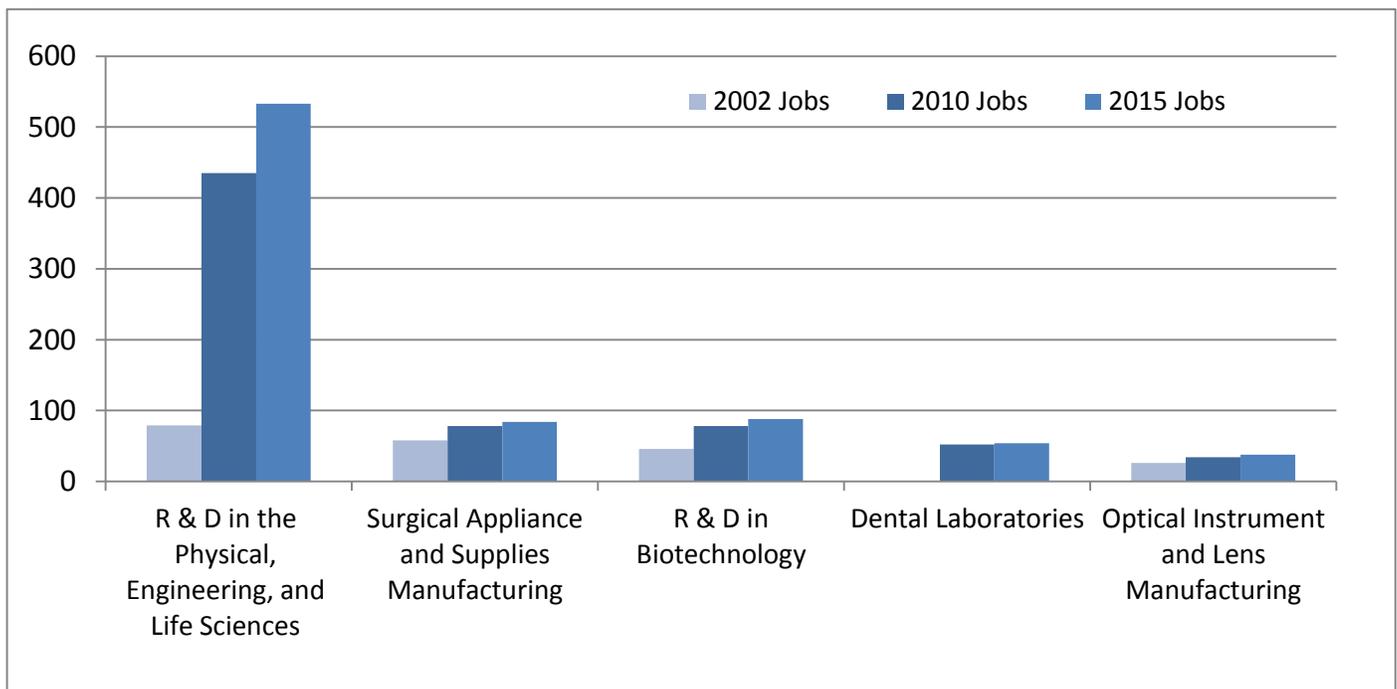


Table 5.4

Description	2002 Jobs	2010 Jobs	2015 Jobs	Current EPW	Change	% Change	2010 National LQ
R & D in the Physical, Engineering, and Life Sciences	79	435	533	\$70,976	98	23%	0.65
Surgical Appliance and Supplies Manufacturing	58	78	84	\$81,447	6	8%	0.53
R & D in Biotechnology	46	78	88	\$52,253	10	13%	0.34
Optical Instrument and Lens Manufacturing	26	34	38	\$58,696	4	12%	0.96
Dental Laboratories	<10	52	54	\$39,184	2	4%	0.65

* Note: Industries with >10 employees in 2010 have been excluded

The employment summary makes clear that research and development in the physical, engineering, and life sciences (except biotechnology) industry is a key driver in Southeast Arkansas' biotechnology cluster. It experienced 450% growth from 2002-2010, jumping from 79 jobs to 435 jobs in that time period. And the R&D industry is projected to grow by another 23% by 2015. The industry's growth is coupled with another related and emerging industry—research and development in biotechnology.

In terms of concentration, optical instrument and lens manufacturing has the most jobs per capita inside the cluster—just under the national average. The industry is estimated to grow 12% by 2015.

OCCUPATION OVERVIEW

Table 5.5

SOC Code	Description	2010 Jobs	2015 Jobs	Change	% Change	% of Industry	Current Hourly Earnings	PBA Available
Short & Moderate Term On-the-Job Training								
37-2011	Janitors and cleaners, except maids and housekeeping cleaners	<10	<10	--	--	--	--	--
43-5071	Shipping, receiving, and traffic clerks	<10	<10	--	--	--	--	--
43-9061	Office clerks, general	<10	10	--	--	--	--	23
51-9111	Packaging and filling machine operators and tenders	<10	<10	--	--	--	--	12
51-9198	Helpers--Production workers	<10	<10	--	--	--	--	--
53-7062	Laborers and freight, stock, and material movers, hand	<10	<10	--	--	--	--	13

41-4011	Sales representatives, wholesale and manufacturing, technical and scientific products	<10	<10	--	--	--	--	--
41-4012	Sales representatives, wholesale and manufacturing, except technical and scientific products	<10	<10	--	--	--	--	--
43-3031	Bookkeeping, accounting, and auditing clerks	<10	<10	--	--	--	--	2
43-4051	Customer service representatives	<10	<10	--	--	--	--	--
Long Term On-the-Job Training								
51-9081	Dental laboratory technicians	15	17	2	13%	2%	\$17.24	--
51-9082	Medical appliance technicians	15	16	1	7%	2%	\$16.96	--
11-9199	Managers, all other	19	23	4	21%	3%	\$16.39	27
Work Experience in Related Field								
13-1023	Purchasing agents, except wholesale, retail, and farm products	<10	<10	--	--	--	--	--
43-1011	First-line supervisors/managers of office and administrative support workers	<10	<10	--	--	--	--	1
51-1011	First-line supervisors/managers of production and operating workers	<10	<10	--	--	--	--	34
15-1041	Computer support specialists	<10	<10	--	--	--	--	--
College Degree								
17-3023	Electrical and electronic engineering technicians	<10	<10	--	--	--	--	8
19-4021	Biological technicians	12	15	3	25%	2%	\$16.18	--
19-4031	Chemical technicians	<10	10	--	--	--	--	18
19-4099	Life, physical, and social science technicians, all	11	13	2	18%	2%	\$19.33	21

<i>other</i>								
13-1073	Training and development specialists	<10	<10	--	--	--	--	5
13-1199	Business operation specialists, all other	12	15	3	25%	2%	\$23.73	16
13-2011	Accountants and auditors	<10	<10	--	--	--	--	8
15-1021	Computer programmers	<10	<10	--	--	--	--	2
15-1031	Computer software engineers, applications	<10	<10	--	--	--	--	--
15-1032	Computer software engineers, systems software	<10	<10	--	--	--	--	--

The bulk of Pine Bluff Arsenal related occupations that make up the biotechnology industry group have a very small presence in Southeast Arkansas and are expected to see only minimal growth by 2015. However, biotechnology jobs that, on average, require bachelor degrees and more advanced training are expected to fare better. Chemists is the largest occupation inside the industry group, and it is estimated to grow 6% in the next four years. That matches up with well the number of PBA chemists who are expected to become available in the next two years. Statisticians and general/operation managers should also see slight growth while providing opportunities for former PBA employees in these fields.

EDUCATIONAL PROGRAM OVERVIEW

Table 5.6

CIP Code	Program Name	Occupational Linkages	Average Annual Openings	2009 Regional Completions	College(s)
Career & Technical Education					
52.0401	Administrative Assistant and Secretarial Science, General	First-line supervisors/managers of office and administrative support workers; Bookkeeping, accounting, and auditing clerks; Office clerks, general	256	47	UAM; SEAC
52.0302	Accounting Technology/Technician and Bookkeeping	Bookkeeping, accounting, and auditing clerks; Office clerks, general	164	45	SEAC
Bachelor's & Above					
11.0101	Computer and Information Sciences, General	Computer programmers; Computer software engineers, applications; Computer software engineers, systems software	21	41	SEAC; UALR

51.1005	Clinical Laboratory Science/Medical Technology/Technologist	Dental laboratory technicians; Biological technicians; Life, physical, and social science technicians, all other	16	25	UAMS
26.0202	Biochemistry	Biochemists and biophysicists		10	UAMS
26.1103	Bioinformatics	Computer programmers; Computer software engineers, applications; Computer software engineers, systems software	21	5	UALR
26.0503	Medical Microbiology and Bacteriology	Others, not listed		2	UAMS
40.0501	Chemistry, General*	Others, not listed		5	UALR
Key Gaps					
26.1201	Biotechnology	Life, physical, and social science technicians, all other; Chemical technicians; Biological technicians	18	0	SEAC
* Note: The number of completers for this category includes just postgraduate students, because this career path typically requires a high level of education.					

The biotechnology industry group is, as of 2010, relatively small in employment. Therefore, Table 5.5 is mostly composed of “<10” in the employment columns. Despite this, the table is very useful in indicating the staffing patterns, or groups of occupations that are typically employed by these industries. If this industry group expands, the occupations employed by these industries will remain relatively the same. This industry group is unique in that it contains two very distinct types of industries, which therefore require different labor needs. The two types of industry groups are research and development—which requires highly skilled scientists, scientific technicians, and clerical workers—and production industries—which require a host of short- and moderate-term on-the-job training workers and a few specialized production workers. Currently, the needs of these industries are being met relatively well, but if the industry were expanded in the future, the addition of a program that specializes in training biotechnology technicians at the two-year level would be well worth considering.¹²

As with other industries, a number of production and clerical workers from the Pine Bluff Arsenal could be moved into employment within biotechnology industries, the most notable of which are chemical technicians and life, physical, and social science technicians, all other.

¹² The educational gap analysis should not be seen as a precise calculation but rather an estimate based on multiple assumptions. This method does not take into account factors such as post-college out-migration and in-migration, workers who live in the area but out-commute, students whose field of study is significantly different from type of job that they accept, the quality or content of education, or skills that can be obtained through on-the-job or apprenticeship training. Nevertheless this approach is instructive for high-level analysis of how much educational investment is being put into these industries.

HEALTHCARE & SOCIAL ASSISTANCE

HEALTHCARE AND SOCIAL ASSISTANCE: INDUSTRY GROUP SUMMARY

Healthcare and social assistance is one of the highest-growth industries within the region and across the nation. It stands to benefit further from the burgeoning group of retiring baby boomers, who tend to have greater healthcare needs than younger generations.¹³ There is some uncertainty as to how recent healthcare legislation will affect the job prospects in this industry. Currently, all of the occupations essential to this industry group are being trained for by colleges within the region.

TOTAL CLUSTER GROWTH, REGION VS. STATE & NATION

Figure 6.1

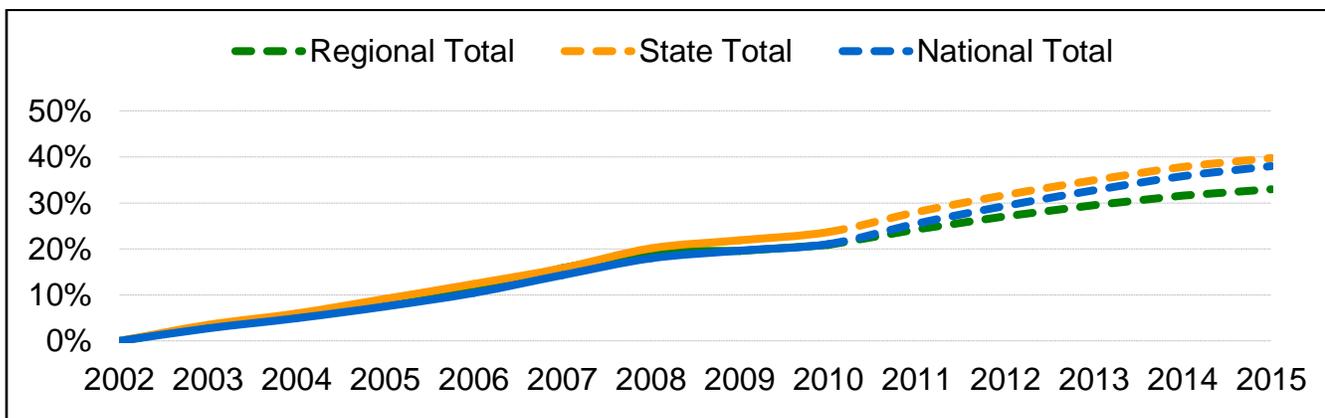


Table 6.1

Description	2002 Jobs	2010 Jobs	2015 Jobs	10-'15 Change	10-'15 % Change	Current EPW
Regional Total	30,597	36,977	40,680	3,703	10%	\$49,130
State Total	123,225	152,401	172,230	19,829	13%	\$44,683
National Total	14,215,123	17,208,726	19,618,668	2,409,942	14%	\$53,454

Over the next several years, healthcare employment is expected to see 10% growth in Southeast Arkansas, which is a slightly slower pace than rest of the state and the US. Earnings, however, are higher in the 14-county region than the rest of Arkansas.

ECONOMIC INDICATORS

Table 6.2

¹³ Goodman, Ellen. "The Baby Boomers' Longevity Revolution." *Washington Post*, January 2, 2011. Accessed January 12, 2011. <http://www.washingtonpost.com/wp-dyn/content/article/2010/12/31/AR2010123102689.html>

Economic Indicators	
Location Quotient	
2002 Location Quotient	1.4
2010 Location Quotient	1.45
2015 Location Quotient	1.44
Shift Share	
Shift Share: Regional Competitiveness Effect	(1,239)
Shift Share: Industrial Mix Effect	1,859
Shift Share: National Effect	3,084
Miscellaneous	
Average Job Multiplier	1.7
Average Regional Integration	87%
Overall Growth Potential	Excellent

According to these economic indicators, this industry group is highly concentrated in Southeast Arkansas. Currently there are 45% more jobs in this industry per capita than the national average. This ratio has increased only slightly since 2002 and is projected to hold steady into 2015. The shift share analysis indicates that most of the growth can be attributed to national and industry-wide factors, not specific regional competitiveness. This industry also posts strong numbers for average job multiplier and average regional integration, showing that many of the industries are thoroughly integrated as part of the same supply chain. On average, an increase of 1 job in one of these industries results in 0.7 additional jobs in other related industries.

CLUSTER EMPLOYMENT BY COUNTY

Figure 6.2

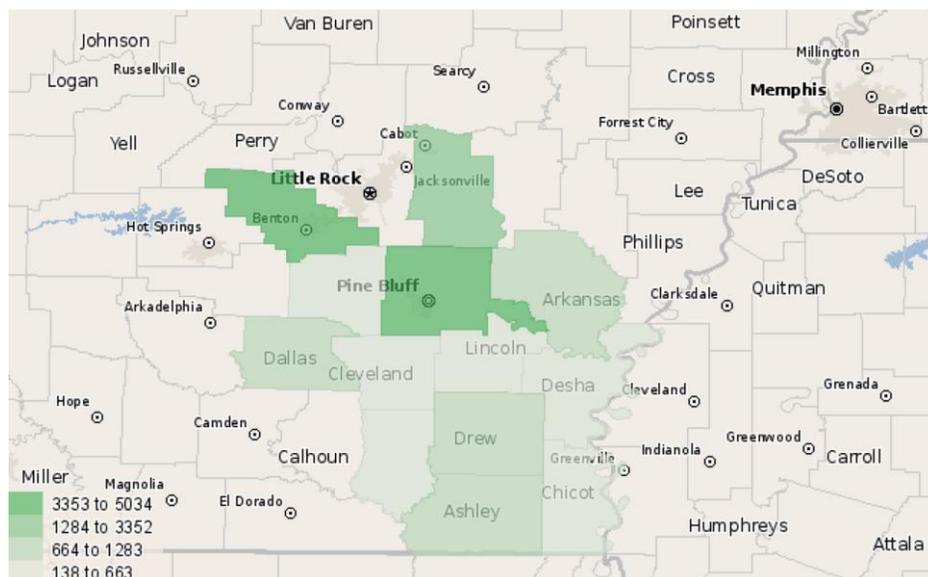


Table 6.3

County	2002 Jobs	2010 Jobs	2015 Jobs	2010 LQ	10-'15 Change	10-'15 % Change
Pulaski*	17,324	20,280	21,837	2.06	1,557	8%
Jefferson	4,769	5,034	5,123	1.27	89	2%
Saline	2,345	3,369	4,264	1.15	895	27%
Lonoke	1,267	1,657	2,045	0.76	388	23%
Arkansas	1,004	1,148	1,268	0.85	120	10%
Drew	669	882	946	1.00	64	7%
Ashley	656	791	823	0.77	32	4%
Dallas	571	830	914	1.90	84	10%
Bradley	542	645	700	1.24	55	9%
Chicot	452	655	766	1.29	111	17%
Desha	430	609	676	0.99	67	11%
Lincoln	260	382	426	0.82	44	12%
Grant	208	558	726	0.88	168	30%
Cleveland	101	138	168	0.68	30	22%

* Only five ZIP codes inside Pulaski County were used.

Most of the 14 counties in Southeast Arkansas have a substantial number of healthcare and social assistances jobs. Saline County is projected to see the most growth (27%) through 2015, whereas Pulaski County is the most concentrated with healthcare employment (more than twice the national average).

DETAILED CLUSTER DATA

Figure 6.3

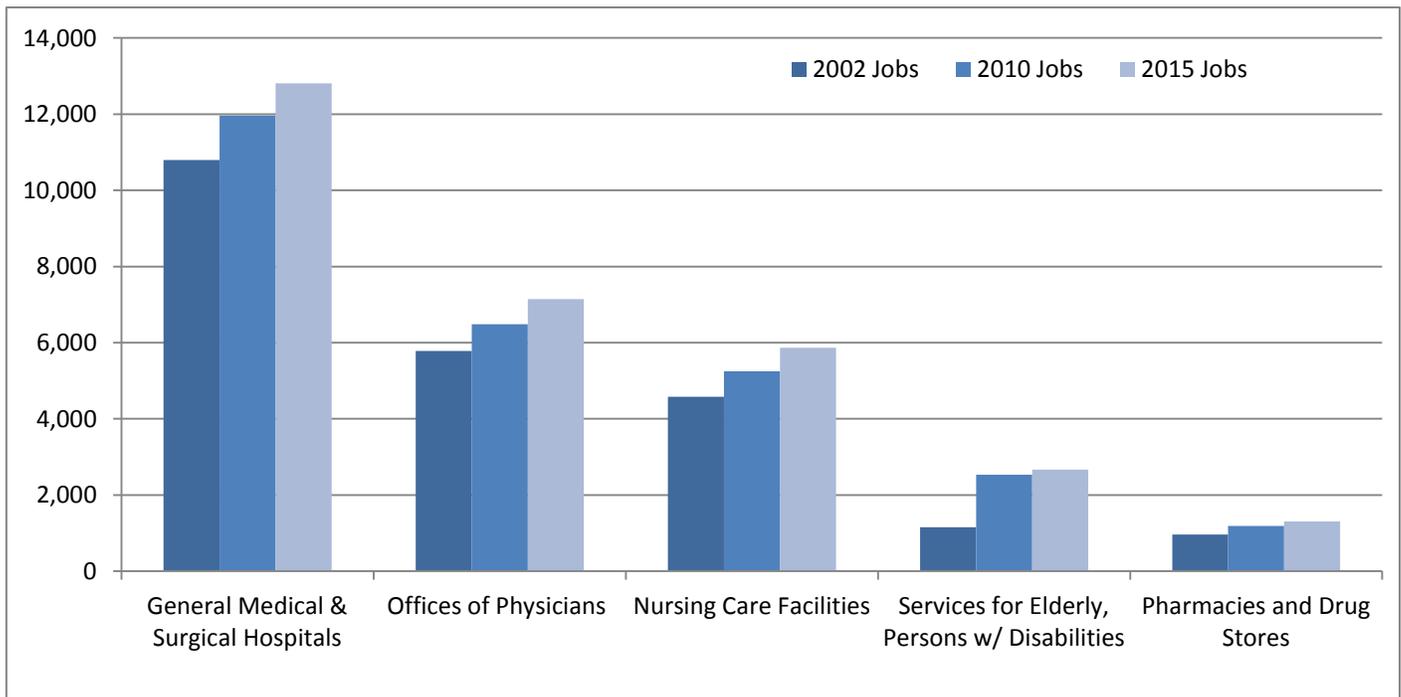


Table 6.4

Description	2002 Jobs	2010 Jobs	2015 Jobs	Current EPW	Change	% Change	2010 National LQ
General Medical and Surgical Hospitals	10,798	11,966	12,806	\$48,740	840	7%	1.84
Offices of Physicians (except Mental Health Specialists)	5,781	6,482	7,143	\$92,430	661	10%	1.75
Nursing Care Facilities	4,578	5,252	5,863	\$25,325	611	12%	2.14
Services for the Elderly and Persons with Disabilities	1,153	2,531	2,667	\$18,640	136	5%	2.29
Pharmacies and Drug Stores	961	1,189	1,308	\$39,263	119	10%	1.09
Home Health Care Services	998	1,144	1,274	\$25,916	130	11%	0.56
Offices of Dentists	842	1,033	1,185	\$55,840	152	15%	0.78
Psychiatric and Substance Abuse Hospitals	773	981	1,174	\$40,691	193	20%	6.62
Offices of Physical, Occupational and Speech Therapists, and Audiologists	629	834	967	\$41,976	133	16%	1.48
Other Residential Care Facilities	280	647	809	\$31,300	162	25%	2.45
Specialty (except Psychiatric and Substance Abuse) Hospitals	220	523	686	\$54,271	163	31%	1.79
Residential Mental Retardation Facilities	517	447	541	\$29,603	94	21%	0.74
Homes for the Elderly	117	364	491	\$24,463	127	35%	0.66
Outpatient Mental Health and Substance Abuse Centers	378	350	276	\$38,232	(74)	(21%)	1.37
Blood and Organ Banks	264	307	311	\$49,321	4	1%	2.60
Offices of Optometrists	183	284	323	\$39,743	39	14%	1.49
Medical Laboratories	208	276	299	\$65,974	23	8%	1.11
Child and Youth Services	221	247	225	\$24,987	(22)	(9%)	0.71
Offices of All Other Miscellaneous Health Practitioners	164	243	285	\$52,617	42	17%	0.50
All Other Health and Personal Care Stores	85	205	245	\$48,457	40	20%	1.52
Residential Mental Health and Substance Abuse Facilities	164	198	209	\$32,733	11	6%	0.68
Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers	100	195	210	\$74,374	15	8%	0.68
Freestanding Ambulatory Surgical and Emergency Centers	185	170	204	\$56,687	34	20%	1.22
Offices of Chiropractors	130	149	157	\$33,688	8	5%	0.63
Kidney Dialysis Centers	146	128	136	\$53,465	8	6%	0.92
Diagnostic Imaging Centers	61	127	152	\$79,166	25	20%	0.98
Ambulance Services	191	123	101	\$36,177	(22)	(18%)	0.49
Offices of Physicians, Mental Health Specialists	106	121	136	\$65,088	15	12%	0.78
Offices of Mental Health Practitioners (except Physicians)	58	117	146	\$34,087	29	25%	0.36
All Other Outpatient Care Centers	61	82	97	\$87,231	15	18%	0.53

Continuing Care Retirement Communities	55	81	88	\$29,790	7	9%	0.14
Offices of Podiatrists	62	71	68	\$58,024	(3)	(4%)	1.18
All Other Miscellaneous Ambulatory Health Care Services	36	45	46	\$47,398	1	2%	0.41
Family Planning Centers	41	27	19	\$34,968	(8)	(30%)	0.81
Optical Goods Stores	38	20	11	\$45,822	(9)	(45%)	0.21
Ophthalmic Goods Merchant Wholesalers	14	11	<10	--	--	--	--

* Note: Industries with >10 employees in 2010 have been excluded

The employment summary shows that jobs in the healthcare and social assistance cluster are dominated by the following three industries: general medical and surgical hospitals, offices of physicians (except mental health specialists), and nursing care facilities. Those industries make up 23,700 of the industry group's nearly 37,000 jobs in Southeast Arkansas and are all projected to grow by 7-12% through 2015. Other healthcare industries are performing well too, particularly psychiatric and substance abuse hospitals—which is projected to grow by 20% and is six times more concentrated in the region than the national average.

OCCUPATION OVERVIEW

Table 6.5

SOC Code	Description	2010 Jobs	2015 Jobs	Change	% Change	% of Industry	Current Hourly Earnings	PBA
Short & Moderate Term On-the-Job Training								
39-9021	Personal and home care aides	1,654	1,879	225	14%	4%	\$8.01	--
31-1011	Home health aides	831	986	155	19%	2%	\$8.75	--
43-4171	Receptionists and information clerks	817	846	29	4%	2%	\$10.08	1
37-2012	Maids and housekeeping cleaners	761	755	(6)	(1%)	2%	\$7.65	--
43-9061	Office clerks, general	501	543	42	8%	1%	\$9.63	23
43-4111	Interviewers, except eligibility and loan	466	521	55	12%	1%	\$10.83	--
35-3041	Food servers, nonrestaurant	299	331	32	11%	1%	\$7.89	--
41-2011	Cashiers, except gaming	294	305	11	4%	1%	\$7.99	--
31-9099	Healthcare support workers, all other	279	305	26	9%	1%	\$13.94	--
39-9011	Child care workers	253	295	42	17%	1%	\$7.54	--
Long Term On-the-Job Training								
41-4012	Sales representatives, wholesale and manufacturing, except technical and scientific products	23	24	1	4%	0%	\$24.43	--
Work Experience in Related Field								
29-2081	Opticians, dispensing	143	158	15	10%	0%	\$12.28	--

43-1011	First-line supervisors/managers of office and administrative support workers	515	559	44	9%	1%	\$16.62	1
41-1011	First-line supervisors/managers of retail sales workers	130	145	15	12%	0%	\$13.19	--
35-1012	First-line supervisors/managers of food preparation and serving workers	98	106	8	8%	0%	\$11.51	--
11-9199	Managers, all other	53	57	4	8%	0%	\$16.39	27
37-1011	First-line supervisors/managers of housekeeping and janitorial workers	46	48	2	4%	0%	\$9.32	6
39-1021	First-line supervisors/managers of personal service workers	40	45	5	13%	0%	\$12.13	--
49-1011	First-line supervisors/managers of mechanics, installers, and repairers	28	30	2	7%	0%	\$23.04	13
College Degree								
11-9051	Food service managers	23	25	2	9%	0%	\$15.39	--
31-1012	Nursing aides, orderlies, and attendants	3,927	4,381	454	12%	11%	\$9.91	--
29-2061	Licensed practical and licensed vocational nurses	2,176	2,393	217	10%	6%	\$16.45	--
43-6013	Medical secretaries	610	675	65	11%	2%	\$12.97	--
29-2055	Surgical technologists	288	326	38	13%	1%	\$15.15	--
29-2099	Healthcare technologists and technicians, all other	232	252	20	9%	1%	\$16.36	--
31-9094	Medical transcriptionists	206	214	8	4%	1%	\$13.43	--
29-2041	Emergency medical technicians and paramedics	108	96	(12)	(11%)	0%	\$10.61	13
29-9099	Healthcare practitioners and technical workers, all other	53	58	5	9%	0%	\$13.15	--
31-9011	Massage therapists	22	25	3	14%	0%	\$16.45	--

EDUCATIONAL PROGRAM OVERVIEW

Table 6.6

CIP Code	Program Name	Occupational Linkages	Average Annual Openings	2009 Regional Completions	College(s)
Career & Technical Education					
51.0700	Medical Reception/Receptionist	Office clerks, general; Bookkeeping, accounting, and auditing clerks; First-line supervisors/managers of office and administrative support workers; Medical transcriptionists	261	93	UAM; SEAC
13.1210	Early Childhood Education and Teaching	Child care workers	130	63	UAPB; UALR
Bachelor's & Above					
51.1601	Nursing/Registered Nurse (RN, ASN, BSN, MSN)	Registered nurses	264	393	SEAC; UAM; UAMS; Jefferson
51.1614	Nurse/Nursing Assistant/Aide and Patient Care Assistant	Nursing aides, orderlies, and attendants	148	223	SEAC; UAM
51.1613	Licensed Practical/Vocational Nurse Training	Licensed practical and licensed vocational nurses	134	69	SEAC; UAM
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	Emergency medical technicians and paramedics	4	69	SEAC; UAM; UAMS
51.0999	Allied Health Diagnostic, Intervention, and Treatment Professions, Other	Licensed practical and licensed vocational nurses; Healthcare technologists and technicians, all other;	145	26	UAMS
51.0909	Surgical Technology/Technologist	Surgical technologists	16	20	SEAC; UAM
Key Gaps					
None					

In general, the colleges in Southeast Arkansas are doing an excellent job of providing the necessary labor force for the healthcare industry. As Table 6.6 indicates, there are at least eight educational programs types that directly feed into these industries, and that is just considering the largest occupations in the industry. It should be mentioned, however, that since these statistics include the University of Arkansas Medical Center, many, if not most, of the graduates can be expected to migrate to other areas within the state and region, after graduating from their respective programs.¹⁴

¹⁴ The educational gap analysis should not be seen as a precise calculation but rather an estimate based on multiple assumptions. This method does not take into account factors such as post-college out-migration and in-migration, workers who live in the area but out-commute, students whose field of study is significantly different from type of job that they accept, the quality or content of education, or skills that can be obtained through on-the-job or apprenticeship training.

Since the Pine Bluff Arsenal is involved in a distinctly different type of business, there is little opportunity for directly transitioning workers without retraining them for the healthcare industry. There are a few exceptions to this rule. For example, first-line supervisors/managers of mechanics, installers, and repairers as well as emergency medical technicians and paramedics present some opportunity for direct career transition without significant retraining.

Nevertheless this approach is instructive for high-level analysis of how much educational investment is being put into these industries.

TRANSPORTATION, DISTRIBUTION & LOGISTICS

TRANSPORTATION, DISTRIBUTION & LOGISTICS INDUSTRY GROUP SUMMARY

Transportation, distribution and logistics (TDL) has potential for growth due to the existing infrastructure in railways, highways, and the port system along the Mississippi River. This industry is also closely tied to manufacturing in that the more goods are produced, the more will need to be exported. Given the number of workers involved in this industry, some specialty educational programs such as truck driving and management of transportation, storage and distribution would be well worth consideration.

TOTAL CLUSTER GROWTH, REGION VS. STATE & NATION

Figure 7.1

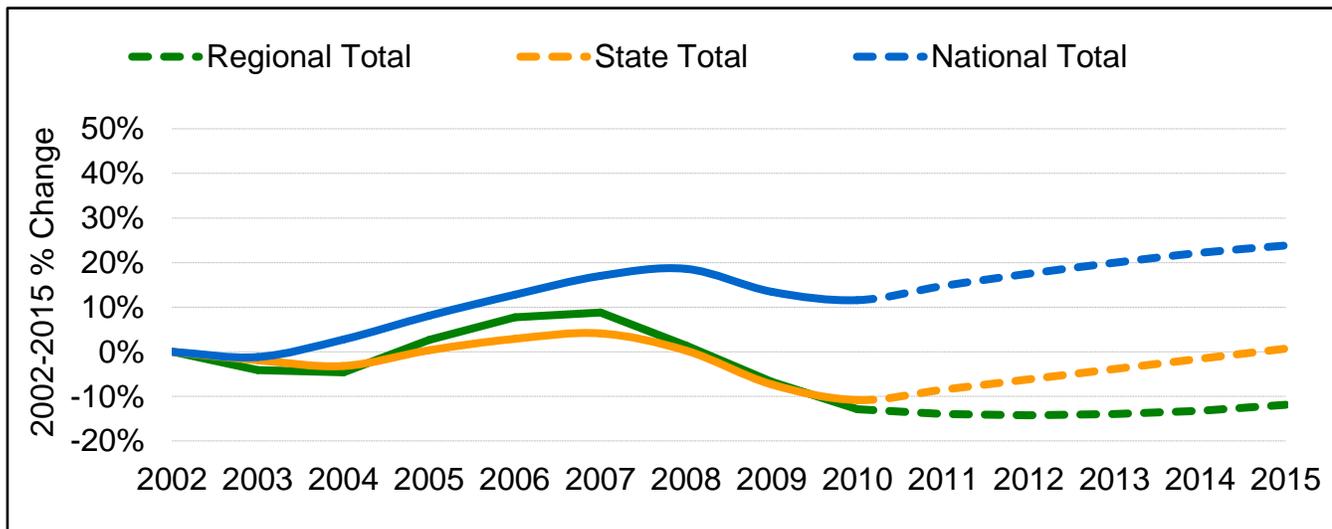


Table 7.1

Description	2002 Jobs	2010 Jobs	2015 Jobs	Change	% Change	Current EPW
Regional Total	8,070	7,032	7,114	82	1%	\$58,071
State Total	51,915	46,300	52,282	5,982	13%	\$48,998
National Total	2,317,341	2,585,673	2,869,593	283,920	11%	\$57,281

This industry group has lost more than 1,000 jobs in Southeast Arkansas since 2002, and is expected to see only minimal growth over the next few years. The regional decline has come at the same time as massive decline at the state level as well. Earnings in the region, however, are much higher than they are in the state as a whole (\$58,071 vs. \$48,998).

ECONOMIC INDICATORS

Table 7.2

Economic Indicators	
Location Quotient	
2002 Location Quotient	2.27
2010 Location Quotient	1.83
2015 Location Quotient	1.72
Shift Share	
Shift Share: Regional Competitiveness Effect	(-613)
Shift Share: Industrial Mix Effect	107
Shift Share: National Effect	586
Miscellaneous	
Average Job Multiplier	2.0
Average Regional Integration	83%
Overall Growth Potential	Uncertain

According to these economic indicators, this industry group is highly concentrated in Southeast Arkansas. Currently there are 83% more jobs in this industry per capita than the national average—a drop from 127% in 2002. This ratio is projected to drop slightly by 2015. The shift share analysis indicates that most of the growth can be attributed to national and industry-wide factors, not specific regional competitiveness.

CLUSTER EMPLOYMENT BY COUNTY

Figure 7.2

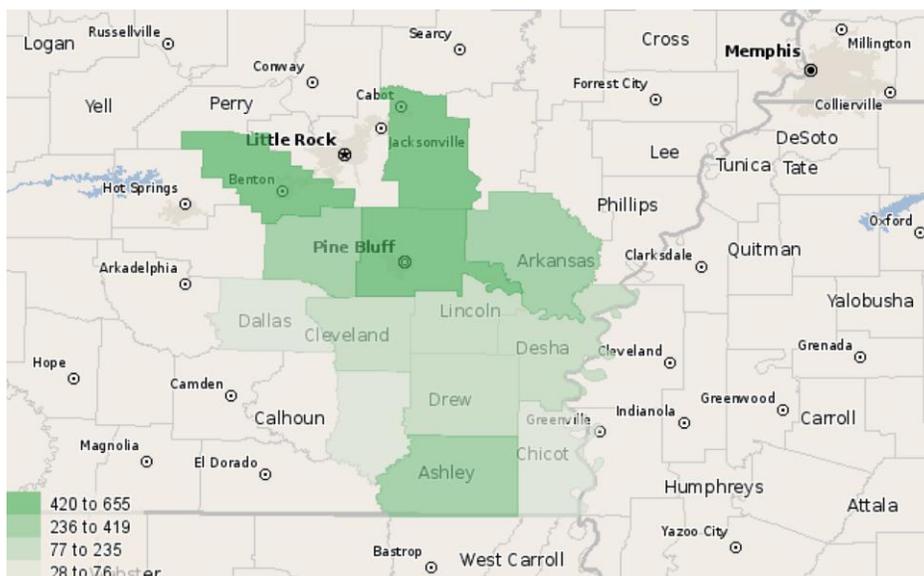


Table 7.3

County	2002 Jobs	2010 Jobs	2015 Jobs	2010 LQ	10-'15 Change	10-'15 % Change
Pulaski*	5,069	3,969	3,978	2.68	9	0%
Jefferson	873	655	590	1.1	(65)	(10%)
Lonoke	52	621	663	1.9	42	7%
Saline	404	427	420	0.97	(7)	-2%
Arkansas	310	331	273	1.64	(58)	(18%)
Grant	194	245	299	2.57	54	22%
Ashley	182	243	264	1.56	21	9%
Drew	109	104	116	0.78	12	12%
Cleveland	96	116	143	3.81	27	25%
Desha	93	107	121	1.15	14	13%
Dallas	78	36	35	0.55	(1)	(3%)
Lincoln	71	110	137	1.59	27	25%
Bradley	42	42	46	0.54	4	10%
Chicot	38	28	28	0.37	0	0%

* Only five ZIP codes inside Pulaski County were used.

Employment in the TDL industry group is primarily focused in Pulaski County, which is projected to show no growth from 2010-15. However, the segment of Pulaski County used for this analysis is more than twice a concentration of jobs than the national average.

DETAILED CLUSTER DATA

Figure 7.3

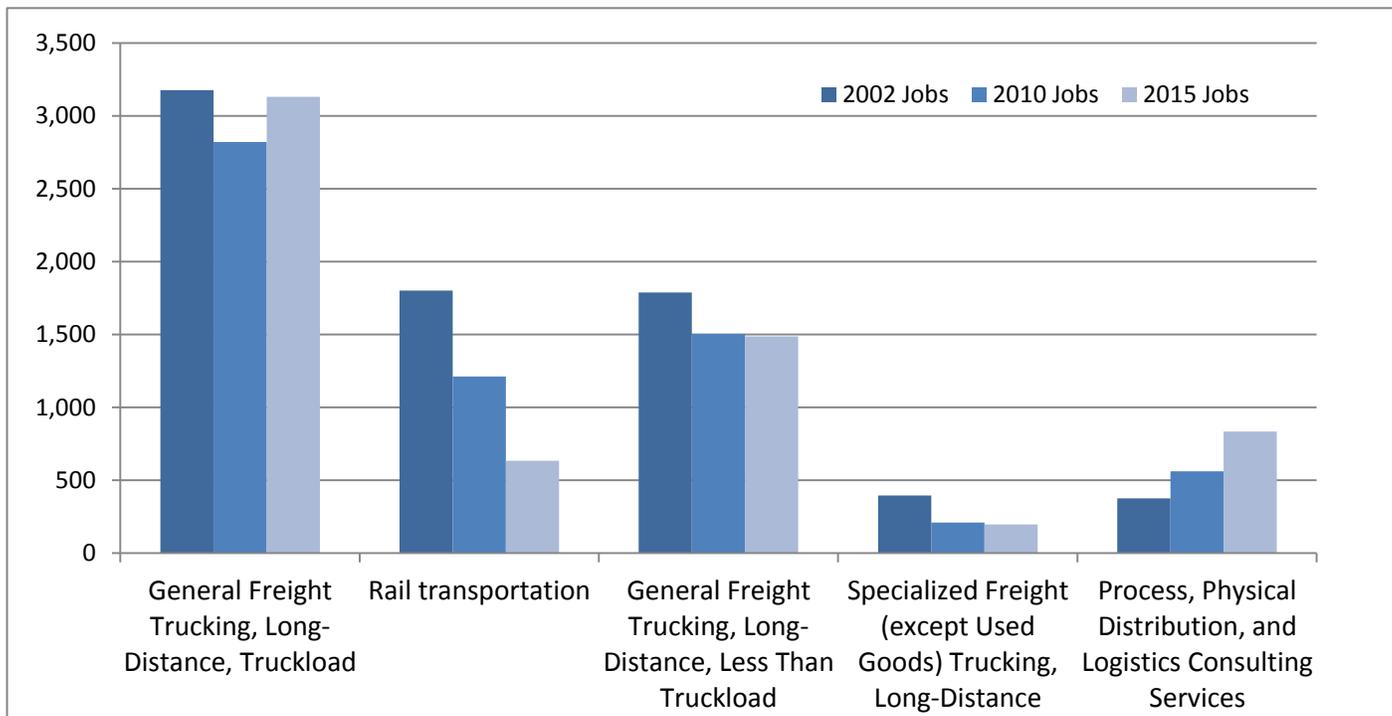


Table 7.4

Description	2002 Jobs	2010 Jobs	2015 Jobs	Current EPW	10-'15 Change	10-'15 % Change	2010 LQ
General Freight Trucking, Long-Distance, Truckload	3,177	2,821	3,132	\$45,481	311	11%	2.31
Rail transportation	1,789	1,504	1,487	\$77,163	(17)	(1%)	4.01
General Freight Trucking, Long-Distance, Less Than Truckload	1,801	1,212	633	\$63,352	(579)	(48%)	3.32
Specialized Freight (except Used Goods) Trucking, Long-Distance	375	562	834	\$69,232	272	48%	3.03
Process, Physical Distribution, and Logistics Consulting Services	132	277	376	\$48,546	99	36%	1.34
Freight Transportation Arrangement	194	230	211	\$82,894	(19)	(8%)	0.76
General Warehousing and Storage	395	210	196	\$35,208	(14)	(7%)	0.24
Support Activities for Rail Transportation	84	112	144	\$45,639	32	29%	3.18
Other Warehousing and Storage	78	47	46	\$27,540	(1)	(2%)	0.57
Advertising Material Distribution Services	23	25	22	\$27,693	(3)	(12%)	0.86
Refrigerated Warehousing and Storage	19	25	26	\$36,807	1	4%	0.33

* Note: Industries with >10 employees in 2010 have been excluded

The employment summary shows that jobs in the TDL cluster are primarily composed of long-distance general freight trucking (truckload and less than truckload) and rail transportation. Those industries make up 78% of the industry group's jobs in Southeast Arkansas. However, general freight trucking, long-distance, less than truckload is projected to lose 48% of jobs from 2010-15. All told, six of the 14 industries in the cluster are expected to lose jobs in the next five years.

OCCUPATION OVERVIEW

Table 7.5

SOC Code	Description	2010 Jobs	2015 Jobs	Change	% Change	% of Industry	Current Hourly Earnings	PBA
Short & Moderate-Term On-the-Job Training								
53-3032	Truck drivers, heavy and tractor-trailer	2,836	2,826	(10)	0%	40%	\$15.44	--
53-3033	Truck drivers, light or delivery services	400	430	30	8%	6%	\$13.25	--
53-7062	Laborers and freight, stock, and material movers, hand	379	358	(21)	(6%)	5%	\$9.84	13
53-3031	Driver/sales workers	322	358	36	11%	5%	\$13.11	--
53-7051	Industrial truck and tractor operators	81	74	(7)	(9%)	1%	\$13.02	--
43-9061	Office clerks, general	73	73	0	0%	1%	\$9.63	23

53-7064	Packers and packagers, hand	39	40	1	3%	1%	\$8.75	--
43-5081	Stock clerks and order fillers	35	32	(3)	(9%)	0%	\$8.98	1
43-5071	Shipping, receiving, and traffic clerks	28	25	(3)	(11%)	0%	\$12.39	--
53-4019	Locomotive engineers and operators	263	269	6	2%	4%	\$17.20	--
Long Term On-the-Job Training								
49-3043	Rail car repairers	58	62	4	7%	1%	\$22.47	--
51-4121	Welders, cutters, solderers, and brazers	51	50	(1)	(2%)	1%	\$14.60	--
47-2111	Electricians	32	30	(2)	(6%)	0%	\$18.37	--
51-4041	Machinists	32	31	(1)	(3%)	0%	\$17.19	--
Work Experience in Related Field								
53-1031	First-line supervisors/managers of transportation and material-moving machine and vehicle operators	99	93	(6)	(6%)	1%	\$22.14	5
11-9199	Managers, all other	73	84	11	15%	1%	\$16.39	27
49-1011	First-line supervisors/managers of mechanics, installers, and repairers	58	57	(1)	(2%)	1%	\$23.04	13
11-3071	Transportation, storage, and distribution managers	58	56	(2)	(3%)	1%	\$27.00	1
43-1011	First-line supervisors/managers of office and administrative support workers	53	54	1	2%	1%	\$16.62	1
53-1021	First-line supervisors/managers of helpers, laborers, and material movers, hand	43	42	(1)	(2%)	1%	\$16.71	--
53-6051	Transportation inspectors	34	35	1	3%	0%	\$20.07	--
47-1011	First-line supervisors/managers of construction trades and extraction workers	21	21	0	0%	0%	\$18.65	--
College Degree								
49-3031	Bus and truck mechanics and diesel engine specialists	163	157	(6)	(4%)	2%	\$17.94	--
49-2093	Electrical and electronics installers and repairers, transportation equipment	33	32	(1)	(3%)	0%	\$19.03	--

13-1199	Business operation specialists, all other	21	22	1	5%	0%	\$23.73	16
13-2011	Accountants and auditors	20	22	2	10%	0%	\$16.88	8
13-1111	Management analysts	78	97	19	24%	1%	\$16.12	--
11-1021	General and operations managers	59	58	(1)	(2%)	1%	\$31.44	7
11-1011	Chief executives	39	43	4	10%	1%	\$25.25	1

EDUCATIONAL PROGRAM OVERVIEW

Table 7.6

CIP Code	Program Name	Occupational Linkages	Average Annual Openings	2009 Regional Completions	College(s)
Career & Technical Education					
48.0508	Welding Technology/Welder	Welders, cutters, solderers, and brazers	32	83	SEAC; UAM
47.0303	Industrial Mechanics and Maintenance Technology	Machinists	12	37	SEAC; UAM
Bachelor's & Above					
52.0000	Business/Commerce Programs	Business operation specialists, all other; Chief executives; General and operations managers	192	325	SEAC; UALR
52.1601	Taxation	Accountants and auditors	54	15	UALR
Key Gaps					
49.0205	Truck and Bus Driver/Commercial Vehicle Operation	Truck drivers, light or delivery services; Industrial truck and tractor operators	82	0	n/a
47.0606	Small Engine Mechanics and Repair Technology/Technician	Farm equipment mechanics	3	0	UAM
52.0203	Logistics and Materials Management	General and operations managers; Transportation, storage, and distribution managers; First-line supervisors/managers of transportation and material-moving machine and vehicle operators; Transportation inspectors	97	0	n/a

The TDL industry group is staffed primarily by truck drivers, various clerical workers, and maintenance and repair occupations. Of these, there are only a few types of occupations that typically require postsecondary education. Maintenance and repair workers are being trained for relatively well by regional education providers, as are clerical workers (e.g., office clerks) and stock clerks. There are only a few glaring needs in educational training, and they revolve around truck drivers and

logisticians. As of now there are more than 2,800 truck drivers in the region, yet no school trains directly for these workers. Likewise, there are more than 50 transportation, storage, and distribution managers—and a few more in similar occupational categories such as logisticians—with no local training available.¹⁵

Since the Pine Bluff Arsenal is involved in a distinctly different type of business, there is little opportunity for directly transitioning workers without retraining them for the transportation industry. There are a few exceptions to this rule, including occupations such as managers, accountants, and business operations specialists.

¹⁵ The educational gap analysis should not be seen as a precise calculation but rather an estimate based on multiple assumptions. This method does not take into account factors such as post-college out-migration and in-migration, workers who live in the area but out-commute, students whose field of study is significantly different from type of job that they accept, the quality or content of education, or skills that can be obtained through on-the-job or apprenticeship training. Nevertheless this approach is instructive for high-level analysis of how much educational investment is being put into these industries.

TIMBER & WOOD PRODUCTS MANUFACTURING

TIMBER & WOOD PRODUCTS MANUFACTURING INDUSTRY GROUP SUMMARY

The timber and wood products industry is a natural fit for this region due to the abundance of timber in the area. This industry has been harmed in recent years by the decrease in new home construction and changes in environmental policies. The industry has decreased in employment considerably in recent years, yet job losses have been lower in this region than many others in the United States, signaling that Southeast Arkansas has still maintained its competitive advantage in this industry. There is enough highly-skilled production workers involved in this industry group that some form of apprenticeship training or two-year collegiate program may be warranted.

TOTAL CLUSTER GROWTH, REGION VS. STATE & NATION

Figure 8.1

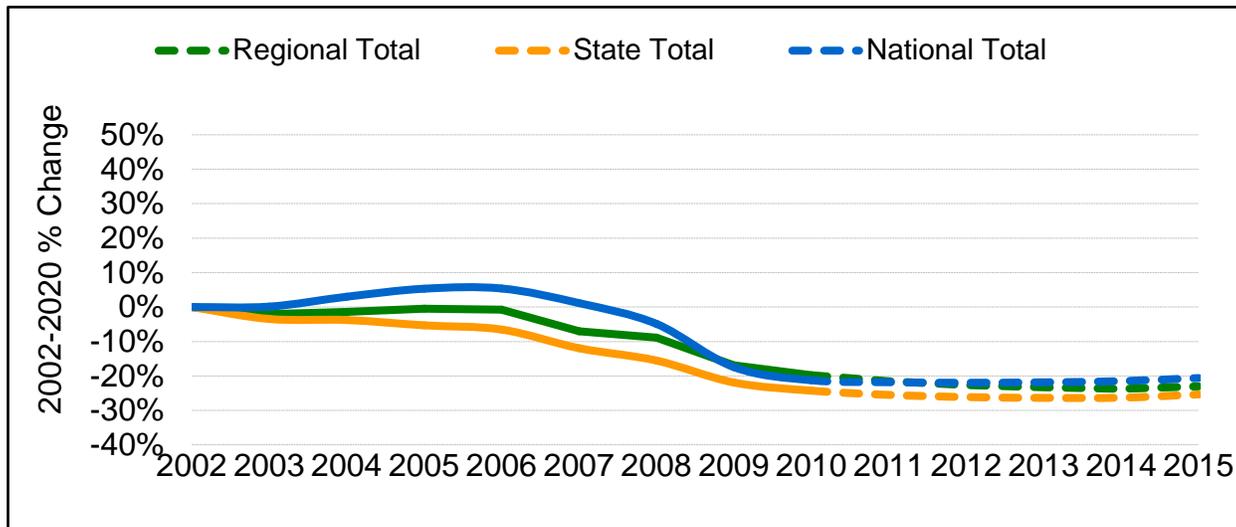


Table 8.1

Region	2002 Jobs	2010 Jobs	2015 Jobs	10-'15 Change	10-'15 % Change	Current EPW
Regional Total	12,652	10,151	9,744	(407)	(4%)	\$56,659
State Total	56,028	42,429	41,816	(613)	(1%)	\$46,704
National Total	3,269,607	2,574,786	2,595,904	21,118	1%	\$48,750

This industry group has lost about 2,500 jobs in Southeast Arkansas since 2002, and is expected to see further decline over the next five years. The same pattern is occurring at the state and national levels as well. This is a damaging loss to the regional economy because earnings in this industry are much higher than the regional average—and, in fact, are higher than the national and state averages for these industries as well.

ECONOMIC INDICATORS

Table 8.2

Economic Indicators	
Location Quotient	
2002 Location Quotient	2.53
2010 Location Quotient	2.65
2015 Location Quotient	2.6
Shift Share	
Shift Share: Regional Competitiveness Effect	441
Shift Share: Industrial Mix Effect	(1,696)
Shift Share: National Effect	848
Miscellaneous	
Average Job Multiplier	2.7
Average Regional Integration	75%
Overall Growth Potential	Declining

According to these economic indicators, this industry group is very highly concentrated in Southeast Arkansas. Currently there are 265% more jobs in this industry per capita than the national average, and although employment has declined since 2002, the location quotient has risen, indicating that the region is gaining a higher share of overall timber and wood products employment due to greater declines at the national level.

CLUSTER EMPLOYMENT BY COUNTY

Figure 8.2

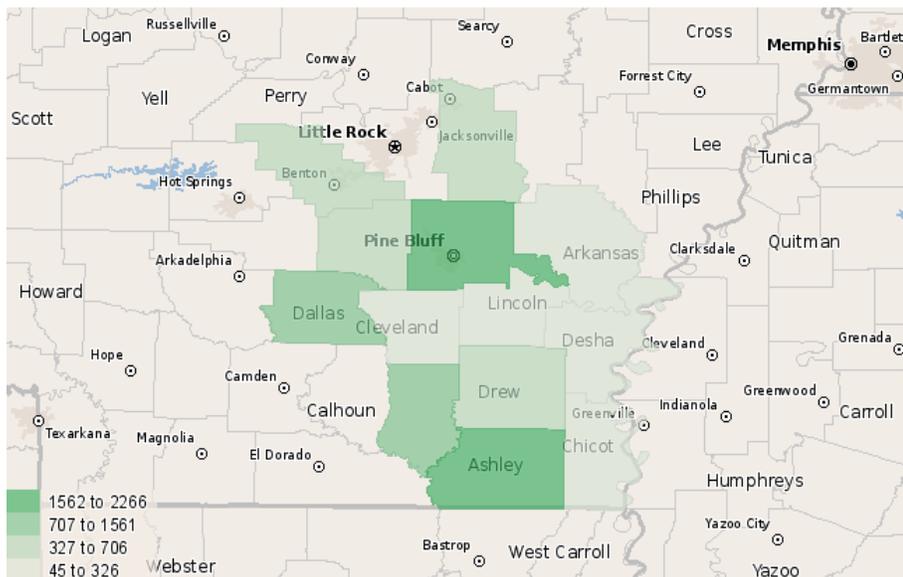


Table 8.3

County	2002 Jobs	2010 Jobs	2015 Jobs	2010 LQ	10-'15 Change	10-'15 % Change
Dallas	1,043	1,076	1,282	16.49	206	19%
Arkansas	146	208	247	1.02	39	19%
Cleveland	278	229	267	7.54	38	17%
Drew	860	695	727	5.27	32	5%
Grant	570	565	596	5.96	31	5%
Lonoke	292	327	347	1.00	20	6%
Chicot	22	45	56	0.59	11	24%
Lincoln	121	58	63	0.84	5	9%
Desha	625	179	171	1.95	(8)	(4%)
Saline	694	642	631	1.46	(11)	(2%)
Pulaski*	1,263	955	917	0.65	(38)	(4%)
Bradley	1,146	911	844	11.38	(67)	(7%)
Ashley	3,148	2,266	2,043	14.56	(223)	(10%)
Jefferson	2,445	1,996	1,553	3.36	(443)	(22%)

* Only five ZIP codes inside Pulaski County were used.

Employment in this industry groups is spread relatively evenly across several counties in the region—Jefferson, Ashley, Bradley, Pulaski, and Dallas. Of these counties, Dallas is the only one which is projected to see job growth (206 jobs between 2010 and 2015). The remaining counties that rely heavily on timber and wood products industries are projected to decline by between 2% and 22%.

DETAILED CLUSTER DATA

Figure 8.3

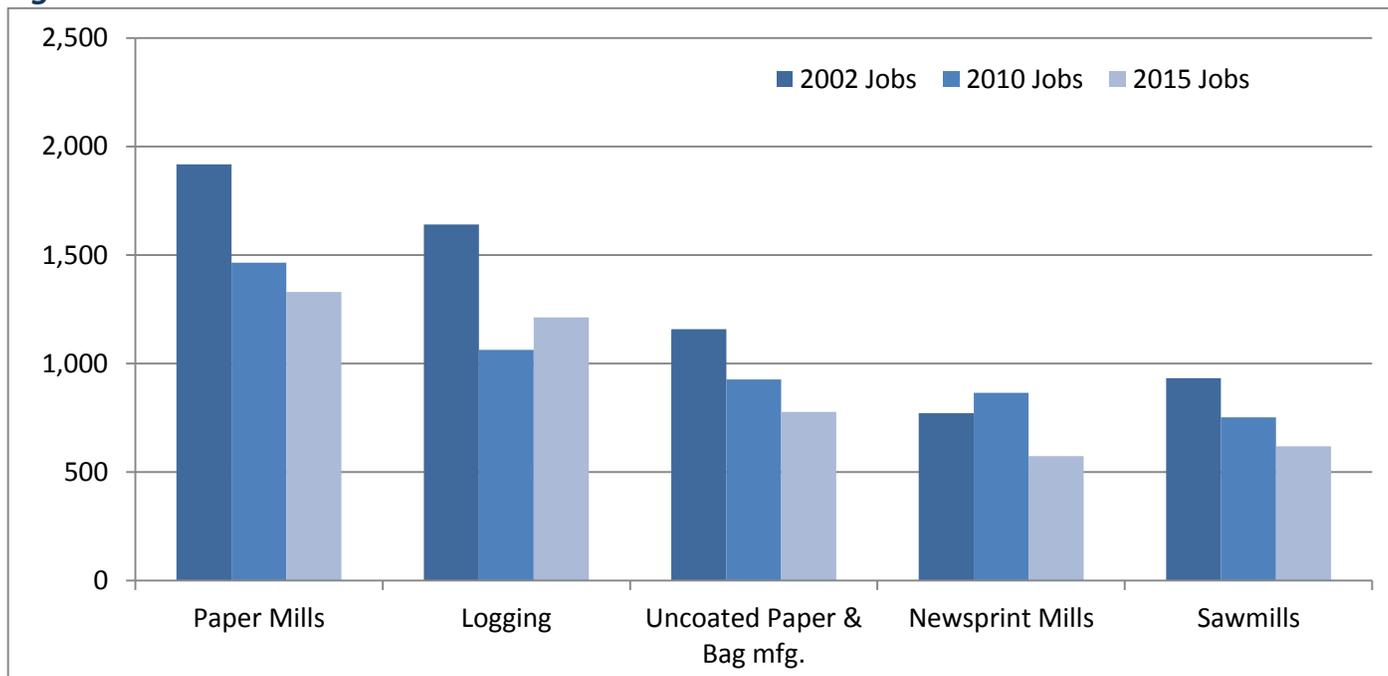


Table 8.4

Description	2002 Jobs	2010 Jobs	2015 Jobs	Current EPW	10-'15 Change	10-'15 % Change	2010 LQ
Paper (except Newsprint) Mills	1,918	1,464	1,330	\$95,780	(134)	(9%)	14.76
Logging	1,640	1,063	1,213	\$48,384	150	14%	6.56
Uncoated Paper and Multiwall Bag mfg.	1,158	927	777	\$46,277	(150)	(16%)	64.54
Newsprint Mills	772	866	573	\$89,367	(293)	(34%)	75.46
Sawmills	933	752	619	\$44,542	(133)	(18%)	6.26
Softwood Veneer and Plywood mfg.	1,081	713	645	\$64,046	(68)	(10%)	35.33
Other Millwork (including Flooring)	629	573	611	\$34,753	38	7%	8.42
Residential finish carpentry contractors	353	500	581	\$27,143	81	16%	1.16
Support Activities for Forestry	301	325	401	\$36,748	76	23%	5.83
Nonresidential roofing contractors	247	226	227	\$49,195	1	0%	1.24
Residential flooring contractors	82	217	268	\$35,714	51	24%	1.11
Coated and Laminated Packaging Paper mfg.	124	195	240	\$36,499	45	23%	8.67
Wood Container and Pallet mfg.	177	158	178	\$46,805	20	13%	1.81
Corrugated and Solid Fiber Box mfg.	70	146	147	\$44,422	1	1%	1.04
Showcase, Partition, Shelving, and Locker mfg.	152	141	144	\$53,722	3	2%	2.19
Residential siding contractors	98	135	155	\$29,931	20	15%	1.45
Nonresidential flooring contractors	153	134	116	\$37,302	(18)	(13%)	1.42
Cut Stock, Resawing Lumber, and Planing	61	130	98	\$40,301	(32)	(25%)	6.23
Wood Preservation	193	128	80	\$47,446	(48)	(38%)	8.23
Timber Tract Operations	111	125	164	\$54,820	39	31%	11.87
Reconstituted Wood Product mfg.	0	122	225	\$62,751	103	84%	6.21
Residential roofing contractors	69	101	106	\$39,987	5	5%	0.66
Residential framing contractors	162	99	78	\$32,555	(21)	(21%)	0.76
Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers	108	95	76	\$54,519	(19)	(20%)	0.63
Wood Kitchen Cabinet and Countertop mfg.	162	92	104	\$28,216	12	13%	0.50
Upholstered Household Furniture mfg.	51	92	99	\$45,262	7	8%	1.22
Paperboard Mills	628	84	51	\$112,745	(33)	(39%)	1.80
Nonresidential finish carpentry contractors	131	65	28	\$32,390	(37)	(57%)	0.49
Sanitary Paper Product mfg.	119	64	50	\$81,902	(14)	(22%)	1.37
Nonupholstered Wood Household Furniture mfg.	150	62	43	\$24,605	(19)	(31%)	0.99
Nonresidential siding contractors	34	59	53	\$51,262	(6)	(10%)	3.79
Hardwood Veneer and Plywood mfg.	146	58	23	\$57,956	(35)	(60%)	2.51
Fiber Can, Tube, Drum, and Similar Products mfg.	238	58	31	\$47,459	(27)	(47%)	4.34
Nonresidential framing contractors	19	47	47	\$44,565	0	0%	1.10
Institutional Furniture mfg.	23	41	81	\$93,022	40	98%	1.17
All Other Miscellaneous Wood Product mfg.	71	20	14	\$29,337	(6)	(30%)	0.52
Furniture Merchant Wholesalers	12	13	12	\$53,289	(1)	(8%)	0.18
Wood Window and Door mfg.	33	12	12	\$38,735	0	0%	0.15
Paper Industry Machinery mfg.	44	<10	<10	--	--	--	--
Folding Paperboard Box mfg.	143	0	0	\$0	0	--	0.00

* Note: Industries with >10 employees in 2010 have been excluded

There are several large industries within this group including paper (except newsprint) mills, logging, uncoated paper and multiwall bag manufacturing, and softwood veneer and plywood manufacturing. All of these industries have declined in employment since 2002 and most are continued to do so through 2015. The same is not true for all of the industries within this group, however. Of the 41 industries, 17 have grown since 2002 and 21 are projected to grow or maintain current employment into 2015.

OCCUPATION OVERVIEW

Table 8.5

SOC Code	Description	2010 Jobs	2015 Jobs	Change	% Change	% of Industry	Current Hourly Earnings	PBA Available
Short & Moderate Term On-the-Job Training								
51-9198	Helpers--Production workers	627	549	(78)	(12%)	6%	\$12.14	--
51-2092	Team assemblers	563	570	7	1%	6%	\$12.19	--
45-4022	Logging equipment operators	419	490	71	17%	4%	\$17.20	--
51-9196	Paper goods machine setters, operators, and tenders	395	327	(68)	(17%)	4%	\$15.27	--
53-7062	Laborers and freight, stock, and material movers, hand	347	297	(50)	(14%)	3%	\$9.86	13
53-7063	Machine feeders and offbearers	319	260	(59)	(18%)	3%	\$11.83	--
53-7051	Industrial truck and tractor operators	307	272	(35)	(11%)	3%	\$12.98	--
51-7042	Woodworking machine setters, operators, and tenders, except sawing	266	278	12	5%	3%	\$12.42	--
51-7041	Sawing machine setters, operators, and tenders, wood	254	240	(14)	(6%)	3%	\$13.34	--
53-3032	Truck drivers, heavy and tractor-trailer	247	259	12	5%	2%	\$15.49	--
Long Term On-the-Job Training								
47-2031	Carpenters	314	328	14	4%	3%	\$15.42	--
49-9041	Industrial machinery mechanics	303	281	(22)	(7%)	3%	\$19.14	74
49-9044	Millwrights	136	115	(21)	(15%)	1%	\$21.43	--
51-7011	Cabinetmakers and bench carpenters	128	138	10	8%	1%	\$12.56	--
47-2111	Electricians	125	109	(16)	(13%)	1%	\$18.16	--
51-8021	Stationary engineers and boiler operators	66	53	(13)	(20%)	1%	\$21.01	--

47-2152	Plumbers, pipefitters, and steamfitters	53	45	(8)	(15%)	1%	\$18.20	--
47-2211	Sheet metal workers	23	24	1	4%	0%	\$14.91	--
51-4121	Welders, cutters, solderers, and brazers	23	21	(2)	(9%)	0%	\$14.40	--
51-8091	Chemical plant and system operators	20	17	(3)	(15%)	0%	\$23.31	83
Work Experience in Related Field								
51-1011	First-line supervisors/managers of production and operating workers	204	183	(21)	(10%)	2%	\$21.76	34
47-1011	First-line supervisors/managers of construction trades and extraction workers	162	170	8	5%	2%	\$18.42	--
45-1099	Supervisors, farming, fishing, and forestry workers	105	119	14	13%	1%	\$22.07	--
11-3051	Industrial production managers	62	54	(8)	(13%)	1%	\$39.86	20
49-1011	First-line supervisors/managers of mechanics, installers, and repairers	53	46	(7)	(13%)	1%	\$23.00	13
11-9199	Managers, all other	43	42	(1)	(2%)	0%	\$16.41	27
45-2041	Graders and sorters, agricultural products	42	51	9	21%	0%	\$12.32	--
43-1011	First-line supervisors/managers of office and administrative support workers	33	31	(2)	(6%)	0%	\$16.62	1
13-1023	Purchasing agents, except wholesale, retail, and farm products	22	21	(1)	(5%)	0%	\$21.20	--
13-1051	Cost estimators	20	21	1	5%	0%	\$20.76	8
College Degree								
11-9021	Construction managers	156	164	8	5%	2%	\$16.15	1
11-1021	General and operations managers	74	68	(6)	(8%)	1%	\$31.41	7
11-1011	Chief executives	56	55	(1)	(2%)	1%	\$25.52	1
51-5022	Prepress technicians and workers	19	17	(2)	(11%)	0%	\$15.59	--
49-2094	Electrical and electronics repairers, commercial and industrial equipment	14	13	(1)	(7%)	0%	\$21.57	--
19-1032	Foresters	38	38	0	0%	0%	\$24.33	--
17-2112	Industrial engineers	38	37	(1)	(3%)	0%	\$30.60	26

13-2011	Accountants and auditors	17	16	(1)	(6%)	0%	\$17.08	8
11-9011	Farm, ranch, and other agricultural managers	27	35	8	30%	0%	\$16.14	--
11-3031	Financial managers	11	11	0	0%	0%	\$24.51	7

EDUCATIONAL PROGRAM OVERVIEW

Table 8.6

CIP Code	Program Name	Occupational Linkages	Average Annual Openings	2009 Regional Completions	College(s)
Career & Technical Education					
48.0508	Welding Technology/Welder	Welders, cutters, solderers, and brazers	32	83	SEAC; UAM
47.0303	Industrial Mechanics & Maintenance Technology	Industrial truck and tractor operators; Industrial machinery mechanics; Millwrights; Electrical and electronics repairers, commercial and industrial equipment	78	37	SEAC; UAM
Bachelor's & Above					
52.0000	Business/Commerce Programs	Financial managers; Chief executives; General and operations managers	171	325	SEAC; UALR
15.1001	Construction Engineering Technology/Technician	Construction managers	21	48	UALR
52.1601	Taxation	Accountants and auditors	54	15	UALR
03.0000	Forest Management & Forestry	Foresters	2	10	UAM
Key Gaps					
49.0205	Truck and Bus Driver/Commercial Vehicle Operation	Truck drivers, heavy and tractor-trailer	11	0	n/a
10.0303	Prepress/Desktop Publishing and Digital Imaging and Design	Prepress technicians and workers	2	0	n/a

The labor needs of the timber and wood products industry group, like most of the other manufacturing groups analyzed in this report, are staffed primarily by workers who do not necessarily require a postsecondary degree. There are, however, some high-skill specialty workers in the long-term on-the-job training and work experience in a related field range that are often trained for at community colleges or through apprenticeships. Some of these occupations include stationary engineers and boiler operators; electricians; and millwrights. Often, data on these graduates are not reported to any central federal agency, making it difficult to determine whether or not the labor needs of these

occupations are being appropriately addressed. If this seems to be a matter worth examining, it would need to be researched through surveys or employer interviews.¹⁶

One of the key gaps pointed out for this industry group—truck driving—is also mentioned as a key gap for transportation, distribution and logistics industry group as well. Another educational program mentioned under key gaps is for prepress technicians, but this would only be recommended if employment in the industry were significantly increased.

¹⁶ The educational gap analysis should not be seen as a precise calculation but rather an estimate based on multiple assumptions. This method does not take into account factors such as post-college out-migration and in-migration, workers who live in the area but out-commute, students whose field of study is significantly different from type of job that they accept, the quality or content of education, or skills that can be obtained through on-the-job or apprenticeship training. Nevertheless this approach is instructive for high-level analysis of how much educational investment is being put into these industries.

APPENDIX A: FULL LIST OF PINE BLUFF ARSENAL LAYOFFS

Environmental Specialists			
SOC	Title	Avg. Educational Level	Available Workers
13-1041	Compliance officers, except agriculture, construction, health and safety, and transportation	LT OJT	4
19-4091	Environmental science and protection technicians, including health	Associate's	38
17-3025	Environmental engineering technicians	Associate's	1
19-2041	Environmental scientists and specialists, including health	Master's	6
Total Available Workers			49
Executives & managers			
SOC	Title	Avg. Educational Level	Available Workers
51-1011	First-line supervisors/managers of production and operating workers	Exp. in field	34
11-9199	Managers, all other	Exp. in field	27
11-3051	Industrial production managers	Exp. in field	20
33-1099	First-line supervisors/managers, protective service workers, all other	Exp. in field	15
49-1011	First-line supervisors/managers of mechanics, installers, and repairers	Exp. in field	13
37-1011	First-line supervisors/managers of housekeeping and janitorial workers	Exp. in field	6
53-1031	First-line supervisors/managers of transportation and material-moving machine and vehicle operators	Exp. in field	5
13-1022	Wholesale and retail buyers, except farm products	Exp. in field	4
11-3071	Transportation, storage, and distribution managers	Exp. in field	1
43-1011	First-line supervisors/managers of office and administrative support workers	Exp. in field	1
11-9021	Construction managers	Bachelor's	1
11-3031	Financial managers	Deg. + exp.	7
11-1021	General and operations managers	Deg. + exp.	7
11-9121	Natural sciences managers	Deg. + exp.	6
11-9041	Engineering managers	Deg. + exp.	4
11-3011	Administrative services managers	Deg. + exp.	3
11-3021	Computer and information systems managers	Deg. + exp.	3
11-3042	Training and development managers	Deg. + exp.	3
11-3061	Purchasing managers	Deg. + exp.	3
11-3049	Human resources managers, all other	Deg. + exp.	2
11-2022	Sales managers	Deg. + exp.	1
11-2031	Public relations managers	Deg. + exp.	1

11-9111	Medical and health services managers	Deg. + exp.	1
11-1011	Chief executives	Deg. + exp.	1
Total Available Workers			169
Engineers			
SOC	Title	Avg. Educational Level	Available Workers
17-2112	Industrial engineers	Bachelor's	26
17-2111	Health and safety engineers, except mining safety engineers and inspectors	Bachelor's	22
17-2199	Engineers, all other	Bachelor's	8
17-2041	Chemical engineers	Bachelor's	3
17-2081	Environmental engineers	Bachelor's	2
17-2141	Mechanical engineers	Bachelor's	1
Total Available Workers			62
Business Operations Specialists			
SOC	Title	Avg. Educational Level	Available Workers
13-1051	Cost estimators	Exp. in field	8
13-1061	Emergency management specialists	Exp. in field	2
13-1199	Business operation specialists, all other	Bachelor's	16
13-1079	Human resources, training, and labor relations specialists, all other	Bachelor's	8
13-2011	Accountants and auditors	Bachelor's	8
13-1073	Training and development specialists	Bachelor's	5
13-1081	Logisticians	Bachelor's	4
13-2031	Budget analysts	Bachelor's	3
13-1071	Employment, recruitment, and placement specialists	Bachelor's	1
15-2041	Statisticians	Master's	1
Total Available Workers			56
Computer Specialists			
SOC	Title	Avg. Educational Level	Available Workers
15-1099	Computer specialists, all other	Associate's	1
15-1051	Computer systems analysts	Bachelor's	4
15-1021	Computer programmers	Bachelor's	2
Total Available Workers			7
Scientific Technicians			
SOC	Title	Avg. Educational Level	Available Workers
19-4099	Life, physical, and social science technicians, all other	Associate's	21
19-4031	Chemical technicians	Associate's	18

17-3026	Industrial engineering technicians	Associate's	9
17-3023	Electrical and electronic engineering technicians	Associate's	8
17-3027	Mechanical engineering technicians	Associate's	5
17-3029	Engineering technicians, except drafters, all other	Associate's	1
Total Available Workers			62
Public Relations Workers			
SOC	Title	Avg. Educational Level	Available Workers
27-3031	Public relations specialists	Bachelor's	5
27-3043	Writers and authors	Bachelor's	3
27-3042	Technical writers	Bachelor's	1
27-2012	Producers and directors	Deg. + exp.	3
Total Available Workers			12
Medical Specialists			
SOC	Title	Avg. Educational Level	Available Workers
29-2041	Emergency medical technicians and paramedics	PSV Award	13
29-1111	Registered nurses	Associate's	2
29-9011	Occupational health and safety specialists	Bachelor's	5
29-1071	Physician assistants	Bachelor's	4
29-1069	Physicians and surgeons	Professional	1
Total Available Workers			25
Clerks			
SOC	Title	Avg. Educational Level	Available Workers
43-9061	Office clerks, general	ST OJT	23
43-5061	Production, planning, and expediting clerks	ST OJT	17
43-4199	Information and record clerks, all other	ST OJT	3
43-9199	Office and administrative support workers, all other	ST OJT	2
43-3061	Procurement clerks	ST OJT	1
43-4071	File clerks	ST OJT	1
43-4171	Receptionists and information clerks	ST OJT	1
43-5081	Stock clerks and order fillers	ST OJT	1
43-6011	Executive secretaries and administrative assistants	MT OJT	17
43-3031	Bookkeeping, accounting, and auditing clerks	MT OJT	2
43-6014	Secretaries, except legal, medical, and executive	MT OJT	2
Total Available Workers			70
Hazardous Materials Specialists			

SOC	Title	Avg. Educational Level	Available Workers
47-5031	Explosives workers, ordnance handling experts, and blasters	MT OJT	59
47-4071	Septic tank servicers and sewer pipe cleaners	MT OJT	34
47-4041	Hazardous materials removal workers	MT OJT	3
51-8091	Chemical plant and system operators	LT OJT	83
Total Available Workers			179
Machine Operators & Mechanics			
SOC	Title	Avg. Educational Level	Available Workers
51-9111	Packaging and filling machine operators and tenders	ST OJT	12
51-9061	Inspectors, testers, sorters, samplers, and weighers	MT OJT	38
49-9069	Precision instrument and equipment repairers, all other	MT OJT	1
49-9041	Industrial machinery mechanics	LT OJT	74
Total Available Workers			125
All Other Workers			
SOC	Title	Avg. Educational Level	Available Workers
33-9032	Security guards	ST OJT	135
53-7062	Laborers and freight, stock, and material movers, hand	ST OJT	13
51-6011	Laundry and dry-cleaning workers	MT OJT	3
19-2031	Chemists	Bachelor's	19
Total Available Workers			170
Total of all Occupational Groups			
Privately Employed			699
Government Employed			287
Grand Total			986

APPENDIX B: O*NET COMPETENCY DEFINITIONS

Table B.1 below provides definitions of the competencies referred to in Chapter 1. These definitions are taken from the O*NET resource center: http://online.onetcenter.org/help/online/browse_desc.

These definitions also tie the quantitative scores to the medium and high “scale anchors” or specific aptitudes that are required for a worker to receive a score at each level. There are more competencies than those listed here. We have limited the competencies to 20 knowledge categories and 17 skill categories that are referred to within this report.

Table B.1- Knowledge Competency Definitions and Scale Anchors

Knowledge	Description	Mid-Anchor Score	Middle Anchor	High Anchor Score	High Anchor
Administration and Management	Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.	57	Monitor progress of a project to ensure timely completion	86	Manage a \$10 million company
Biology	Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.	71	Investigate the effects of pollution on marine plants and animals	100	Isolate and identify a new virus
Chemistry	Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.	57	Use the proper concentration of chlorine to purify a water source	86	Develop a safe commercial cleaner
Clerical	Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.	43	Type 30 words per minute	71	Organize a storage system for company forms
Communications and Media	Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.	57	Be a radio disk jockey	71	Write a novel
Computers and Electronics	Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.	43	Use a word processor	86	Create a program to scan computer disks for viruses
Customer and Personal Service	Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.	29	Process customer dry-cleaning drop off	57	Work as a day care aide supervising 10 children
Design	Knowledge of design techniques, tools, and principals involved in production of precision technical plans, blueprints, drawings, and models.	57	Draw plans for remodeling a kitchen	86	Develop detailed plans for a high-rise office building
Education and Training	Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.	57	Lead a quality improvement seminar	86	Design a training program for new employees
Engineering and Technology	Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.	57	Design a more stable grocery cart	86	Plan for the impact of weather in designing a bridge

English Language	Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.	57	Edit a feature article in a local newspaper	86	Teach a college English class
Mathematics	Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.	57	Analyze data to determine areas with the highest sales	86	Derive a complex mathematical equation
Mechanical	Knowledge of machines and tools, including their designs, uses, repair, and maintenance.	29	Replace the filters in a furnace	57	Replace a valve on a steam pipe
Medicine and Dentistry	Knowledge of the information and techniques needed to diagnose and treat human injuries, diseases, and deformities. This includes symptoms, treatment alternatives, drug properties and interactions, and preventive health-care measures.	71	Fill a tooth cavity	100	Perform open heart surgery
Personnel and Human Resources	Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.	43	Interview applicants for a secretarial position	86	Design a new personnel selection and promotion system for the Army
Physics	Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.	57	Calculate water pressure through a pipe	86	Design a cleaner burning gasoline engine
Production and Processing	Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.	57	Supervise an appliance assembly line	86	Manage an international shipping company distribution center
Psychology	Knowledge of human behavior and performance; individual differences in ability, personality, and interests; learning and motivation; psychological research methods; and the assessment and treatment of behavioral and affective disorders.	57	Understand the impact of alcohol on human responses	86	Treat a person with severe mental illness
Public Safety and Security	Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.	57	Inspect a building site for safety violations	86	Command a military operation
Therapy and Counseling	Knowledge of principles, methods, and procedures for diagnosis, treatment, and rehabilitation of physical and mental dysfunctions, and for career counseling and guidance.	57	Provide job counseling to the unemployed	86	Counsel an abused child

Table B.2- Skill Competency Definitions and Scale Anchors

Skills	Description	Mid-Anchor Score	Middle Anchor	High Anchor Score	High Anchor
Reading Comprehension	Understanding written sentences and paragraphs in work related documents.	57	Read a memo from management describing new personnel policies	86	Read a scientific journal article describing surgical procedures
Active Listening	Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.	57	Answer inquiries regarding credit references	86	Preside as judge in a complex legal disagreement
Writing	Communicating effectively in writing as appropriate for the needs of the audience.	57	Write a memo to staff outlining new directives	86	Write a novel for publication
Speaking	Talking to others to convey information effectively.	57	Interview applicants to obtain personal and work history	86	Argue a legal case before the Supreme Court
Mathematics	Using mathematics to solve problems.	57	Calculate the square footage of a new home under construction	86	Develop a mathematical model to simulate and resolve an engineering problem
Critical Thinking	Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.	57	Evaluate customer complaints and determine appropriate responses	86	Write legal brief challenging a federal law
Active Learning	Understanding the implications of new information for both current and future problem-solving and decision-making.	57	Determine the impact of new menu changes on a restaurant's purchasing requirements	86	Identify the implications of a new scientific theory for product design
Learning Strategies	Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things.	57	Identify an alternative approach that might help trainees who are having difficulties	86	Apply principles of educational psychology to develop new teaching methods
Monitoring	Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.	57	Monitor a meeting's progress and revise the agenda to ensure that important topics are discussed	86	Review corporate productivity and develop a plan to increase productivity

Social Perceptiveness	Being aware of others' reactions and understanding why they react as they do.	57	Be aware of how a coworker's promotion will affect a work group	86	Counsel depressive patients during a crisis period
Coordination	Adjusting actions in relation to others' actions.	57	Work with others to put a new roof on a house	86	Work as director of a consulting project calling for interaction with multiple subcontractors
Instructing	Teaching others how to do something.	57	Instruct a coworker in how to operate a software program	86	Demonstrate surgical procedure to interns in a teaching hospital
Complex Problem Solving	Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.	57	Redesign a floor layout to take advantage of new manufacturing techniques	86	Develop and implement a plan to provide emergency relief for a major metropolitan area
Equipment Selection	Determining the kind of tools and equipment needed to do a job.	57	Choose a software application to use to complete a work assignment	86	Identify the equipment needed to produce a new product line
Operation and Control	Controlling operations of equipment or systems.	57	Monitor machine functions on an automated production line	86	Monitor and integrate control feedback in a petrochemical processing facility to maintain production flow
Equipment Maintenance	Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.	57	Clean moving parts in production machinery	86	Conduct maintenance checks on an experimental aircraft
Troubleshooting	Determining causes of operating errors and deciding what to do about it.	57	Identify the circuit causing an electrical system to fail	86	Direct the debugging of control code for a new operating system

APPENDIX C: NOTES ABOUT THE DATA

DEFINITIONS:

Average Job Multiplier is the number of additional jobs outside of that industry group that would result from an increase of one job in that specific group of industries. For example, biotechnology has a fairly high job multiplier of 2.5, which means that with each new job in biotechnology, the region would also gain an average of 1.5 additional jobs in related industries, such as transportation, machinery repair, local government, etc.

Average Regional Integration measures how well integrated or “clustered” that group of industries is within the region. More specifically this measures the amount of inputs and resources needed for business operations that are available within the 14-county region. For instance, agriculture and sustainable food manufacturing has an average regional integration of 85%, indicating that almost all of the components required to do business in these industries, such as farm machinery, fertilizers, agricultural business consultants, *etc.*, exist within the region. Like the job multiplier, this is a sign that growth in that industry group will have significant positive side effects across the rest of the regional economy.

Overall Growth Potential is a consideration of all regional, national, and international economic factors, and other hard-to-quantify effects such as potential changes in federal policies, public support and interest, and so on.

