

Ohio

**Department of
Job and Family Services**

John R. Kasich, Governor
Cynthia C. Dungey, Director

OHIO SHALE

QUARTERLY ECONOMIC TRENDS FOR OHIO OIL AND GAS INDUSTRIES



JANUARY 2017

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A Message from Director Dungey

Ohio is fortunate to have a natural resource that can provide good jobs for families and reinvigorate many of our communities, especially those in the eastern part of the state. As you'll see in the pages that follow, core shale-related employment, which includes such things as oil and gas pipeline construction and well drilling, increased 56.8 percent from the second quarter of 2011 to the second quarter of 2016. Ancillary employment – for example, freight trucking and environmental consulting – also increased. We expect non-shale industries, such as food and retail businesses near drilling sites and the surrounding communities, to benefit from shale activity, as well.

The average wages of shale-related jobs are excellent: \$75,719 in core industries and \$64,479 in ancillary industries. In both cases, this is higher than the average wage in all Ohio industries: \$47,250.

At the Ohio Department of Job and Family Services (ODJFS), we have been working hard to help more Ohioans take advantage of these opportunities. We've been working closely with local workforce investment areas, community colleges, other post-secondary educational institutions, and employers to identify the occupations most in need of workers and to make sure that appropriate training programs are in place. In any given month, thousands of shale-related job openings are posted online, at **OhioMeansJobs.com**. The Ohio Department of Higher Education also provides an overview of shale-related employment opportunities and information about education and training at **OhioEnergyPathways.org**.

Individuals can sign up for on-the-job training opportunities at any of the state's local OhioMeansJobs centers, which provide job training and other services to Ohioans looking for work and employers looking for workers. Individuals can post their resumes, and employers can post job openings at **OhioMeansJobs.com**.

We encourage any Ohioans in need of work or who may be considering new careers to explore these opportunities. We're committed to improving the well-being of Ohio's workforce and families, and are excited about the potential shale holds to make a difference in so many families' lives.

A handwritten signature in black ink that reads "Cynthia C. Dungey".

Cynthia C. Dungey, Director
Ohio Department of Job and Family Services



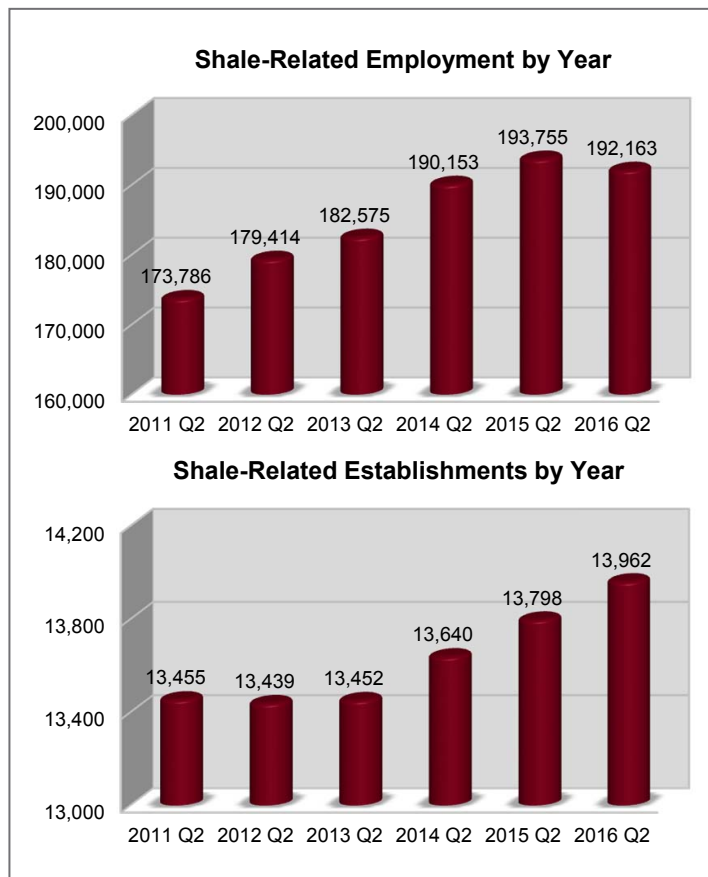
EXECUTIVE SUMMARY

Employment (2011 Q2 to 2016 Q12) See page 6.

- Core shale-related industry employment (such as pipeline construction and well drilling) was up by 3,901 (56.8 percent).
- Ancillary shale-related industry employment (such as freight trucking and environmental consulting) increased by 14,476 (8.7 percent).
- All industry employment was up by 354,807 (7.1 percent).

Business Establishments (2011 Q2 to 2016 Q2) See page 6.

- Core shale-related business establishments increased by 246 (41.6 percent).
- Ancillary shale-related establishments increased by 261 (2.0 percent).
- Over the same time period, Ohio experienced an increase of 4,668 (1.6 percent) business establishments in all industries.
- Shale-related business establishments totaled 13,962 during the second quarter of 2016.



Wages (2015 Q3 through 2016 Q2) See page 9.

- The four-quarter average wage across all industries was \$47,250.
- The four-quarter average wage in core shale-related industries was \$75,719, which was \$28,469 greater than the average for all industries.
- The four-quarter average wage in ancillary shale-related industries was \$64,479, which was \$17,229 higher than the average for all industries.

Online Job Postings (2016 Q4) See page 10.

- Ohio had 3,484 online job postings in core and ancillary shale-related industries in 2016 Q4.

Stable Employment, All Hires and Separations (2011 Q4 to 2015 Q4) See page 14.

- Stable jobs, those present at the beginning and end of a quarter, increased in three core shale-related industries: support activities for mining, utility system construction, and pipeline transportation of natural gas.

These data are meant to provide a barometer of shale-related economic activity and employment trends. While the vast majority of shale-related employment can be found in certain industries, not all business establishments in those industries are involved in shale activity. For those that are, not all of their products and services and, therefore, their employment, are necessarily linked to shale-related economic activity.

BACKGROUND INFORMATION

Data Sources

The purpose of this quarterly publication is to provide the most current available data on shale-related economic activity in Ohio as compared to the base year of 2011. Although several data sources are cited in this publication, the primary source is the Quarterly Census of Employment and Wages (QCEW).

The QCEW program derives its data from quarterly tax reports of employers subject to state and federal unemployment insurance laws. This includes 95 percent or more of all wage and salary employment in Ohio. Under the QCEW program, employment data represent the number of covered workers who worked during, or received pay for, the pay period including the 12th of the month. Excluded are members of the armed forces, the self-employed, unpaid family workers and railroad workers covered by the railroad unemployment insurance system. Data is published approximately six months after the quarter ends.

Also included in this publication are several additional data sources that capture Ohio's most current overall economic situation (Local Area Unemployment Statistics and Current Employment Statistics), employer demand (The Conference Board Help Wanted OnLine™ Data Set) and hiring activity (Quarterly Workforce Indicators). For an explanation of all data sources, please refer to the "Definitions" section on page 18.

In this edition, most current data from the QCEW program are for the second quarter of 2016. Because the data are not seasonally adjusted, the same quarter of a given year must be used when analyzing growth over time. This will ensure that seasonal factors are not influencing employment change. Therefore, second quarter 2016 QCEW data are compared to second quarter 2011 QCEW data.

Data Limitations

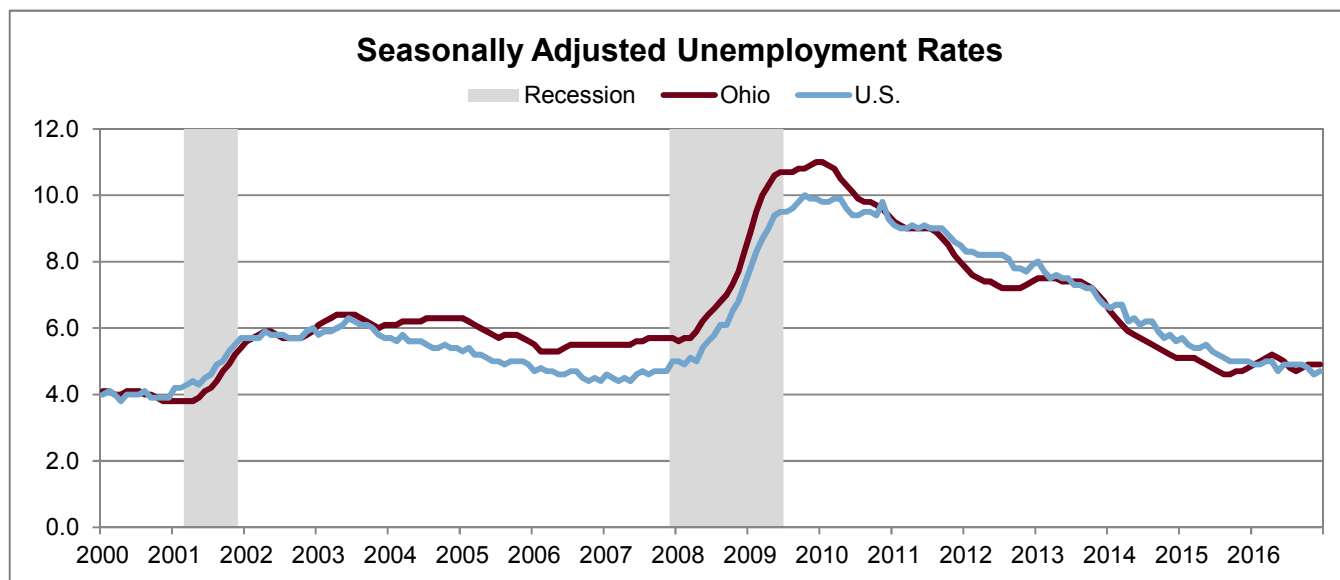
The North American Industry Classification System (NAICS) was used to define shale-related industries. Much of the information included in this publication reflects data on a group of six industries identified as "core" and a group of 30 industries identified as "ancillary." These data are meant to provide a barometer of shale-related economic activity and employment trends. While the vast majority of shale-related employment can be found in these industries, not all business establishments in these industries are involved in shale activity. For those that are, not all of their products and services and, therefore, their employment are necessarily linked to shale-related economic activity. This is particularly true for the ancillary industries.

The data in this publication include government employment (federal, state and local) in all shale-related industries because significant non-private employment is present in a number of these industries, most notably: highway, street and bridge construction; engineering services; water supply and irrigation systems; and sewage treatment facilities.

As shale-related activity develops further in Ohio, additional industries may be added to the ancillary group, based on such factors as significant employment gains in an industry in a geographic region or the identification of a group of companies in the same industry involved in shale-related activity.

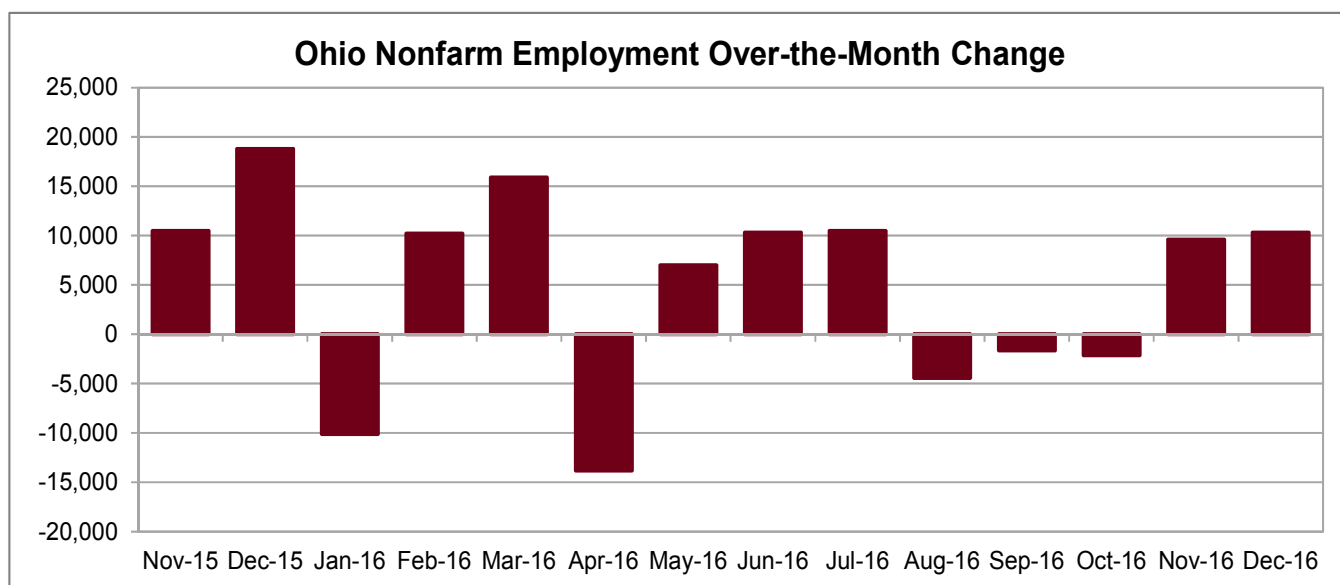
Snapshot of Employment in Ohio

- Ohio's seasonally adjusted unemployment rate for December 2016 was 4.9 percent.
 - The rate did not change from November.



Note: Recessionary periods as defined by the National Bureau of Economic Research (NBER).

- Ohio had 5,517,200 seasonally adjusted nonfarm jobs in December 2016.
 - Compared to December 2015, employment has increased by 41,800 jobs.



- In December 2016, 11,300 workers were employed in the mining and logging industries.
 - From December 2011 to December 2016, employment in the mining and logging industries decreased by 400 jobs.

STATEWIDE SHALE-RELATED INDUSTRIES

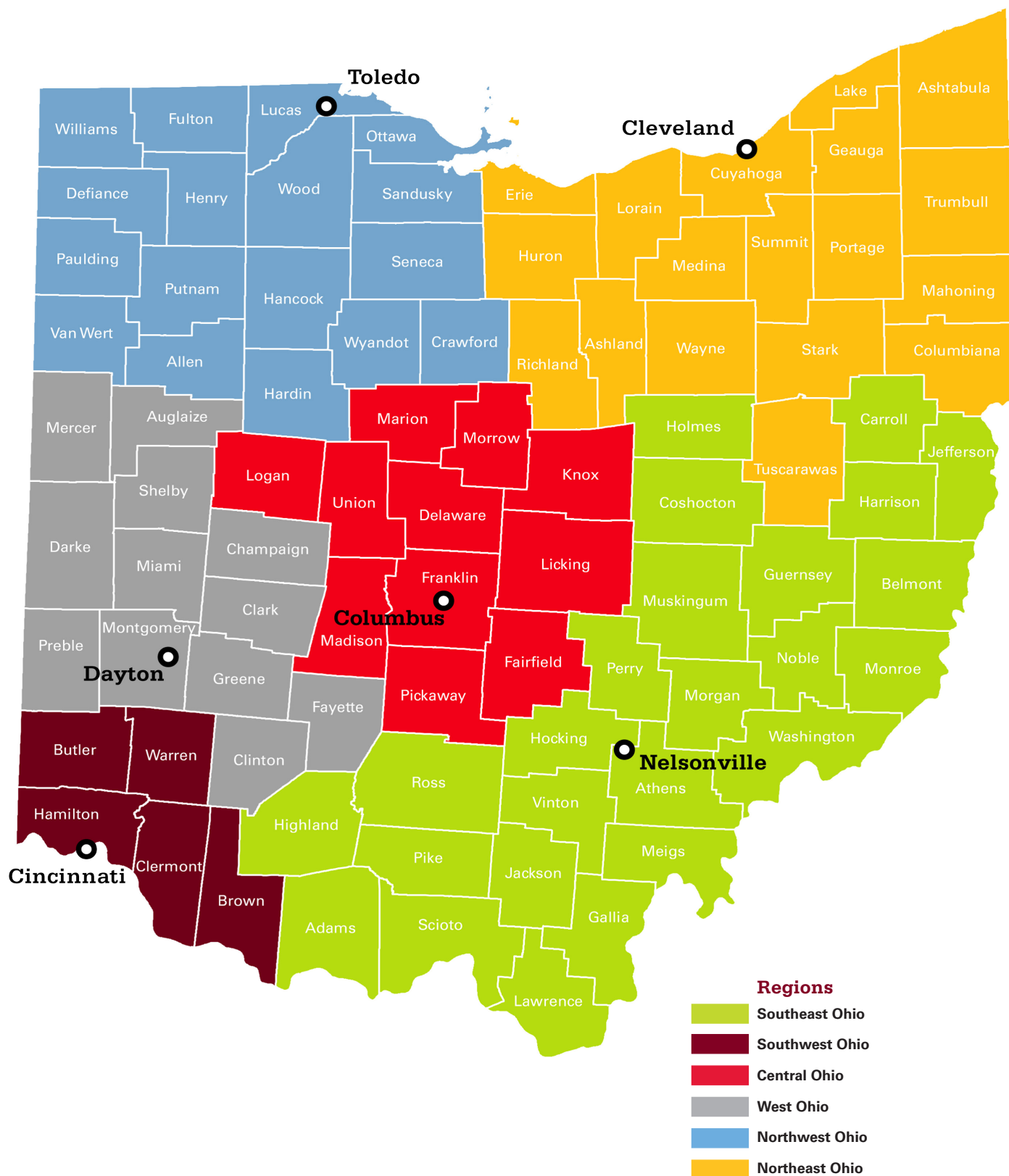
- From 2011 Q2 to 2016 Q2, employment in core industries increased by 3,901 (56.8 percent). Over the same period, employment in ancillary industries increased by 14,476 (8.7 percent).
- From 2011 Q2 to 2016 Q2, the number of business establishments in the core industries grew by 246 (41.6 percent), while establishments in ancillary industries increased by 261 (2.0 percent).

Number of Business Establishments and Employment in Shale-Related Industries (2011 Q2 - 2016 Q2)

Core Industries		2011 Q2		2016 Q2		Change	
NAICS	Title	Estab.	Empl.	Estab.	Empl.	Estab.	Empl.
211111	Crude petroleum and natural gas extraction	194	2,863	177	1,346	-17	-1,517
211112	Natural gas liquid extraction	3	24	16	293	13	269
213111	Drilling oil and gas wells	79	525	112	1,071	33	546
213112	Support activities for oil and gas operations	181	1,292	308	2,972	127	1,680
237120	Oil and gas pipeline construction	98	1,862	176	4,605	78	2,743
486210	Pipeline transportation of natural gas	36	307	48	487	12	180
Core Industry Totals		591	6,873	837	10,774	246	3,901
Ancillary Industries		2011 Q2		2016 Q2		Change	
NAICS	Title	Estab.	Empl.	Estab.	Empl.	Estab.	Empl.
221112	Fossil fuel electric power generation	83	5,292	72	4,110	-11	-1,182
221210	Natural gas distribution	142	3,723	152	5,498	10	1,775
221310	Water supply and irrigation systems	248	6,049	260	5,872	12	-177
221320	Sewage treatment facilities	212	3,846	216	3,800	4	-46
237110	Water and sewer system construction	390	5,029	356	5,843	-34	814
237310	Highway, street, and bridge construction	724	15,156	734	17,120	10	1,964
238912	Nonresidential site preparation contractors	628	5,117	647	6,489	19	1,372
325110	Petrochemical manufacturing	5	357	5	309	0	-48
325120	Industrial gas manufacturing	47	748	46	791	-1	43
331110	Iron and steel mills and ferroalloy manufacturing	58	9,982	60	7,776	2	-2,206
331210	Iron, steel pipe and tube from purchase steel	53	3,122	38	2,692	-15	-430
333131	Mining machinery and equipment manufacturing	12	453	11	319	-1	-134
333132	Oil and gas field machinery and equipment	6	137	10	216	4	79
423810	Construction equipment merchant wholesalers	200	2,575	188	2,767	-12	192
423830	Industrial machinery merchant wholesalers	1,693	15,287	1,624	17,461	-69	2,174
423840	Industrial supplies merchant wholesalers	503	4,803	501	5,696	-2	893
484110	General freight trucking, local	1,361	12,206	1,387	13,134	26	928
484220	Other specialized trucking, local	1,008	7,094	1,059	8,353	51	1,259
484230	Other specialized trucking, long-distance	284	4,540	345	6,073	61	1,533
531190	Lessors of other real estate property	291	949	286	984	-5	35
532412	Other heavy machinery rental and leasing	167	1,318	199	1,983	32	665
541330	Engineering services	2,285	27,611	2,430	29,069	145	1,458
541360	Geophysical surveying and mapping services	51	257	58	254	7	-3
541380	Testing laboratories	359	6,535	395	6,805	36	270
541620	Environmental consulting services	299	1,676	324	2,002	25	326
562910	Remediation services	178	2,394	207	3,740	29	1,346
811310	Commercial machinery repair and maintenance	1,102	7,328	1,051	9,233	-51	1,905
924110	Air, water, and waste program administration	165	6,259	160	6,263	-5	4
924120	Administration of conservation programs	281	6,586	272	6,237	-9	-349
926130	Utility regulation and administration	29	484	32	500	3	16
Ancillary Industry Totals		12,864	166,913	13,125	181,389	261	14,476
Core Industries and Ancillary Industries Totals		13,455	173,786	13,962	192,163	507	18,377
All Industries Totals		288,288	4,987,972	292,956	5,342,779	4,668	354,807

Source: Quarterly Census of Employment and Wages.

JOB SOHIO NETWORK REGIONS

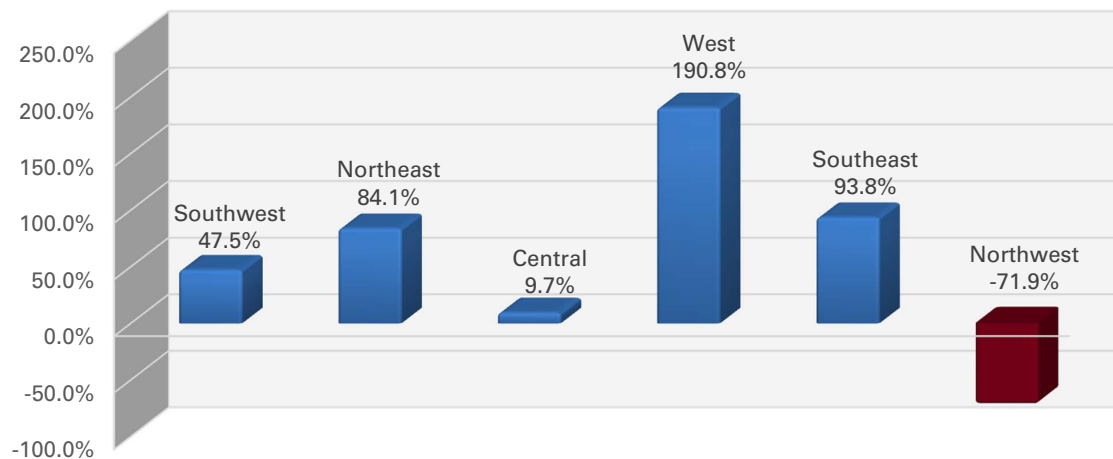


REGIONAL SHALE-RELATED INDUSTRIES

The JobsOhio Network is a partnership of statewide economic development organizations with deep ties to their business communities. The following charts show trends in shale-related employment for each of the six JobsOhio regions.

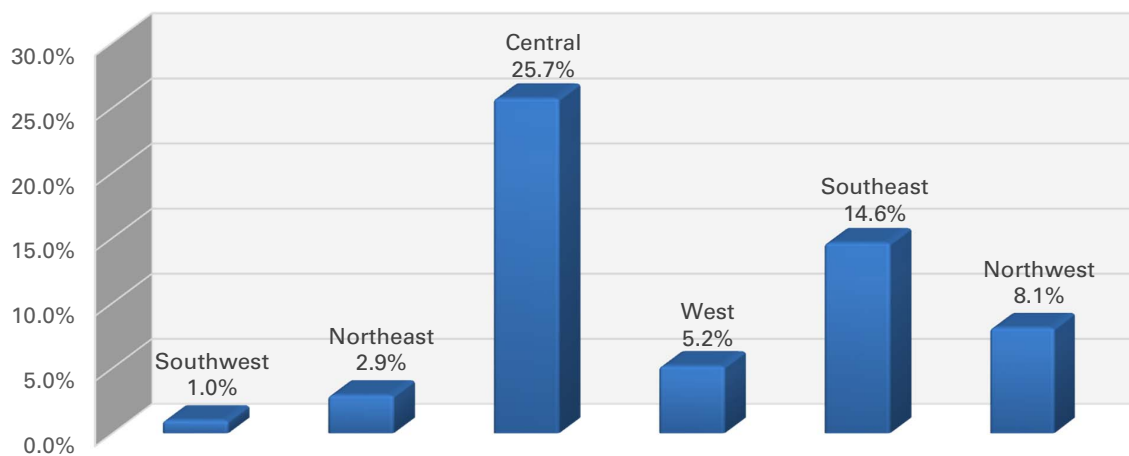
Large percentage increases and decreases in employment may be the result of a change in industry classification following a routine NAICS assignment review. Changes in NAICS assignments are typically done with the publication of the first-quarter data.

Core Shale-Related Industries Percent Employment Change (2011 Q2 - 2016 Q2)



- The largest percent growth in employment for core shale-related industries was in the West region (190.8 percent), followed by the Southeast region (93.8 percent).

Ancillary Shale-Related Industries Percent Employment Change (2011 Q2 - 2016 Q2)



- For ancillary shale-related industries, the largest percent growth in employment was in the Central region (25.7 percent), followed by the Southeast region (14.6 percent).

Source: Quarterly Census of Employment and Wages program, Enhanced Quarterly Unemployment Insurance file.

WAGES FOR OHIO SHALE-RELATED CORE AND ANCILLARY INDUSTRIES

- The four-quarter average wage across all industries for 2015 Q3 through 2016 Q2 was \$47,250.
- The four-quarter average wage in the core industries was \$28,469 greater than the average wage for all industries.
- The four-quarter average wage in the ancillary industries was \$17,229 higher than the average wage for all industries.

Large changes in average wages may be the result of a change in industry classification following a routine NAICS assignment review.

**Core Shale-
Related Industries
(2015 Q3 - 2016 Q2)**

\$75,719

**Ancillary Shale-
Related Industries
(2015 Q3 - 2016 Q2)**

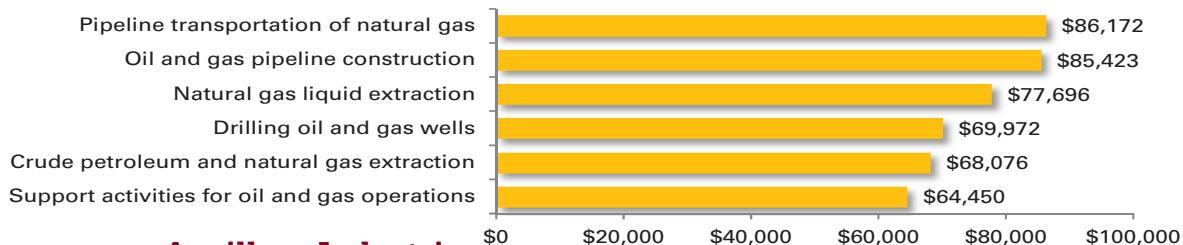
\$64,479

**All Ohio Industries
(2015 Q3 - 2016 Q2)**

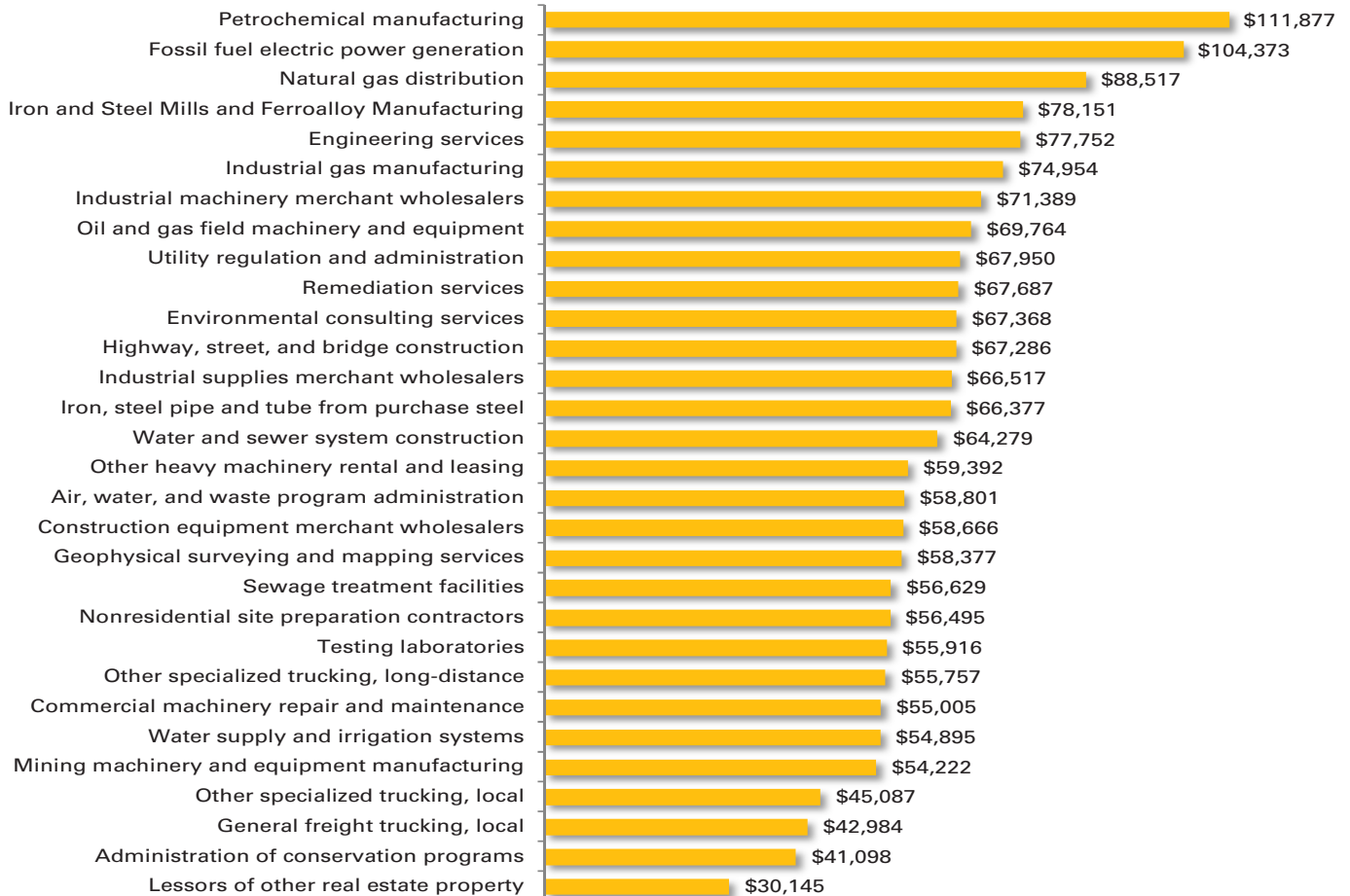
\$47,250

Four-Quarter Average Wage by Industry

Core Industries



Ancillary Industries



OHIO SHALE-RELATED ONLINE JOB POSTINGS

Statewide Online Job Postings

	2015 Q4	2016 Q4	% Change
Core Industries	179	81	-54.7%
Ancillary Industries	5,037	3,403	-32.4%
Total: ALL Industries	272,016	195,266	-28.2%

Regional Online Job Postings

Core and Ancillary Combined	2015 Q4	2016 Q4	% Change
Southwest Ohio	870	849	-2.4%
Northeast Ohio	1,684	1,146	-31.9%
Central Ohio	938	544	-42.0%
West Ohio	610	391	-35.9%
Southeast Ohio	436	177	-59.4%
Northwest Ohio	623	313	-49.8%
Total*	5,216	3,484	-33.2%

Source: The Conference Board Help Wanted Online® (HWOL). New ads only. Data are subject to revision. Not seasonally adjusted. Excludes miscellaneous ads.

Data are not comparable to previous *Ohio Shale Quarterly Economic Trends for Ohio Oil and Gas Industries* reports due to HWOL 2016 methodological revisions.

**The total includes job ads that may have listed the entire state as the geographical area. As a result, the sum of the job ads for the regions may be lower, since it does not include ads without a city or metropolitan statistical area specification.*

Statewide Online Job Postings

- Job postings decreased in core (-54.7 percent) and ancillary (-32.4 percent) shale-related industries.
- Total job postings across all Ohio industries decreased in 2016 Q4 compared to 2015 Q4.
- Overall, job postings decreased 28.2 percent in core and ancillary shale-related industries.

Regional Online Job Postings

- Job postings decreased in all JobsOhio Network Regions in 2016 Q4 compared to 2015 Q4.

WELL ACTIVITY STATUS AS OF JANUARY 14, 2017

HORIZONTAL OIL AND GAS WELLS IN THE UTICA/POINT PLEASANT AND MARCELLUS FORMATIONS OHIO DEPARTMENT OF NATURAL RESOURCES 2017

ODNR OFFICE OF INFORMATION TECHNOLOGY
January 2017

Horizontal Wells Activity Status at end of Saturday 01/14/2017:

Wells Permitted To Date:

Utica: 2353
Marcellus: 45
(4 Utica-Permitted wells are not mapped
due to bad locational coordinates.)
(3 Utica-Permitted wells are not mapped
due to well length ≥ 15000 feet.)

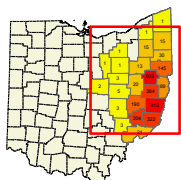
Wells Drilled To Date:

Utica: 1898
Marcellus: 29
(3 Utica-Drilled wells are not mapped
due to bad locational coordinates.)
(3 Utica-Drilled wells are not mapped
due to well length ≥ 15000 feet.)

Wells Producing To Date:

Utica: 1476
Marcellus: 21
(1 Utica-Producing well is not mapped
due to well length ≥ 15000 feet.)

Utica/Point Pleasant and Marcellus Horizontal Well Head Count by County



Well Head Count by County

Well Head Count Range	Color
0 - 10	Yellow
11 - 50	Light Orange
51 - 100	Orange
101 - 200	Dark Orange
201 - 400	Red-Orange
401 - 600	Red

Projection is Ohio state plane coordinate system, south zone
North American Datum 1983.

○ Utica/Point Pleasant Well Heads
● Marcellus Well Heads
— Horizontal Wellbores

Utica/Point Pleasant Bottom Hole

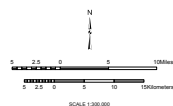
- PERMITTED-Permitted, Not Drilled, Cancelled
- DRILLED-Drilling Well Drilled
- PRODUCING-Producing, Plugged Back
- INACTIVE-Drilled Inactive, Shut in
- Last Hole or First Restoration
- Dry and Abandoned
- Plugged and Abandoned

Marcellus Bottom Hole

- PERMITTED-Permitted, Not Drilled, Cancelled
- DRILLED-Drilling Well Drilled
- PRODUCING-Producing, Plugged Back
- Inactive

ODNR Lands

- Division of Forestry
- Department
- Division of Parks
- Division of Watercraft
- Division of Wildlife
- Natural Areas and Preserves



Data source: The ODNR Division of Oil and Gas Resources provided the Well data from RBOMS; The ODNR Division of Geological Survey provided the S-SUB1-SUB- data; The ODNR Office of Information Technology provided the ODNR lands data; The NationalMap.gov provided the federal lands; Ohio Department of Transportation provided the city boundaries, roads, and water data.

KEY OCCUPATIONS IN CORE SHALE-RELATED INDUSTRIES

The occupations listed in the table below are found within the national staffing patterns of core shale-related industries. While these occupations are not exclusive to the core shale-related industries, all are in the top 20 of one or more of these industries.

A standard occupation classification (SOC) code is provided for each occupation. For a complete list of terms and definitions, please refer to the Staffing Patterns definition on page 19.

SOC Code	SOC Title	Median Annual Wage ¹	Typical Education, Work Experience, On-the-Job Training (OJT)
17-2171	Petroleum engineers	\$109,580	Bachelor's degree
19-2042	Geoscientists, except hydrologists and geographers	\$65,640	Bachelor's degree
19-4041	Geological and petroleum technicians	\$50,240	Associate's degree; Moderate-term OJT
47-2011	Boilermakers	\$57,990	HS/GED; Apprenticeship
47-2051	Cement masons and concrete finishers	\$41,120	Less than HS; Moderate-term OJT
47-2151	Pipelayers	\$43,890	Less than HS; Short-term OJT
47-2221	Structural iron and steel workers	\$58,030	HS/GED; Apprenticeship
47-3015	Helpers--pipelayers, plumbers, pipefitters, and steamfitters	\$23,820	HS/GED; Short-term OJT
47-5011	Derrick Operators, oil and gas	\$40,000	Less than HS; Short-term OJT
47-5012	Rotary drill operators, oil and gas	\$40,980	Less than HS; Moderate-term OJT
47-5021	Earth drillers, except oil and gas	\$44,120	HS/GED; Moderate-term OJT
47-5071	Roustabouts, oil and gas	\$30,510	Less than HS; Moderate-term OJT
47-5081	Helpers--extraction workers	\$40,610	HS/GED; Moderate-term OJT
53-7021	Crane and tower operators	\$37,760	HS/GED; 1-5 years experience; Moderate-term OJT
53-7032	Excavating and loading machine and dragline operators	\$40,420	HS/GED; 1-5 years experience; Moderate-term OJT
53-7062	Laborers and freight, stock, and material movers, hand	\$24,370	Less than HS; Short-term OJT

¹Annual wages have been calculated by multiplying the hourly mean wage by 2,080 hours.
Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics, May 2015.

IN-DEMAND SHALE-RELATED OCCUPATIONS

The occupations listed below have been identified as in-demand occupations through the Ohio Workforce Information Exchange — Job Forecast initiative as of November 2016. This initiative works directly with employers with at least one Ohio location to identify employers' most in-demand occupations over the next one, three and five years.

For more information on the Workforce Information Exchange, please refer to page 20.

SOC Code	SOC Title	Median Annual Wage ¹	Typical Education, Work Experience, On-the-Job Training (OJT)
11-1021	General and Operations Managers	\$89,950	Bachelor's degree, 1-5 Years Experience
11-9021	Construction Managers	\$84,990	Bachelor's degree, Moderate-Term OJT
11-9041	Architectural and engineering managers	\$120,520	Bachelor's degree; 5+ years experience
13-1051	Cost Estimators	\$56,610	Bachelor's degree
13-1071	Human resources specialists	\$54,670	Bachelor's degree
13-2011	Accountants and auditors	\$63,350	Bachelor's degree
13-2051	Financial Analysts	\$69,580	Bachelor's degree
13-1199	Business Operations Specialists, All Other	\$62,410	HS/GED, Long-Term OJT
15-1199	Computer Occupations, All Other	\$78,240	Bachelor's degree
17-2051	Civil Engineers	\$76,190	Bachelor's degree
43-3031	Bookkeeping, Accounting, and Auditing Clerks	\$35,800	HS/GED, Moderate-Term OJT
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	\$59,710	HS/GED, 5+ Years Experience
47-2031	Carpenters	\$43,780	HS/GED; Apprenticeship
47-2061	Construction Laborers	\$36,730	Less than HS, Short-term OJT
47-2073	Operating Engineers and Other Construction Equipment Operators	\$48,860	HS/GED, Moderate-Term OJT
47-2111	Electricians	\$49,670	HS/GED, Apprenticeship
47-2152	Plumbers, Pipefitters, and Steamfitters	\$51,780	HS/GED, Apprenticeship
47-5013	Service unit operators, oil, gas, and mining	\$34,280	Less than HS, Moderate-term OJT
49-1011	First-line supervisors of mechanics, installers, and repairers	\$60,240	HS/GED, 1-5 Years Experience
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	\$43,920	HS/GED, Long-Term OJT
49-3042	Mobile heavy equipment mechanics, except engines	\$47,480	HS/GED; Long-term OJT
49-9012	Control and valve installers and repairers, except mechanical door	\$64,950	HS/GED, Moderate-term OJT
49-9041	Industrial machinery mechanics	\$47,040	HS/GED, Long-term OJT
49-9071	Maintenance and Repair Workers, General	\$37,520	HS/GED, Long-Term OJT
51-1011	First-line supervisors of production and operating workers	\$55,490	Post-HS cert, 1-5 Years Experience
51-4121	Welders, Cutters, Solderers and Brazers	\$36,340	HS/GED, Moderate-Term OJT
51-8093	Petroleum pump system operators, refinery operators, and gaugers	\$61,590	HS/GED, Long-term OJT
51-9199	Production workers, all other	\$31,460	HS/GED, Moderate-Term OJT
53-3032	Heavy and Tractor-Trailer Truck Drivers	\$40,860	HS/GED, Short-Term OJT
53-7073	Wellhead Pumpers	\$33,850	Less than HS, Moderate-Term OJT

¹Annual wages have been calculated by multiplying the hourly mean wage by 2,080 hours.
Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics, May 2015.

STATEWIDE SHALE-RELATED EMPLOYMENT DATA

The Quarterly Workforce Indicators (QWI) are a set of economic indicators derived from state administrative records and basic demographic information from the Census Bureau. They can be examined based on geography, industry, gender and age of workers. Data presented are the most recent available. Because QWI data are not seasonally adjusted, the same quarter must be used when analyzing changes over time. This will ensure that seasonal factors are not influencing employment change. Therefore, in the table below and on the following page, 2011 Q4 data is presented with 2015 Q4 data.

The tables below and on the following page show Ohio shale-related employment. "Stable Employment" is an estimate of the number of jobs that were present at the beginning and end of a quarter. "All Hires" is the estimated number of workers who started a job during the quarter; it includes new and recalled employees. "Separations" is the estimated number of workers whose jobs with a given employer ended during a quarter.

Ohio	2011 Q4			2015 Q4		
	Stable Employment	All Hires	Separations	Stable Employment	All Hires	Separations
All industry groups	4,411,702	851,641	787,577	4,587,016	913,632	954,129
2111 Oil and Gas Extraction	2,885	187	180	1,629	233	312
2131 Support Activities for Mining	2,596	745	839	4,712	763	1,655
2371 Utility System Construction	9,420	2,211	3,436	11,161	3,517	6,695
4862 Pipeline Transportation of Natural Gas	337	14	3	449	7	3

Source: U.S. Census Bureau, Longitudinal Employer-Household Dynamics, Quarterly Workforce Indicators.

QWI are available only at the four-digit NAICS level. Consequently, although these industry groups contain some employment from non-shale-related core industries, they provide an indication of labor activity for these shale-related industries.

- Stable jobs, those present at the beginning and end of a quarter, increased in three core shale-related industries from 2011 Q4 to 2015 Q4: support activities for mining, utility system construction, and pipeline transportation of natural gas.
- The job market has significant turnover as demonstrated by the number of hires and separations.

JOB OHIO NETWORK SHALE-RELATED EMPLOYMENT

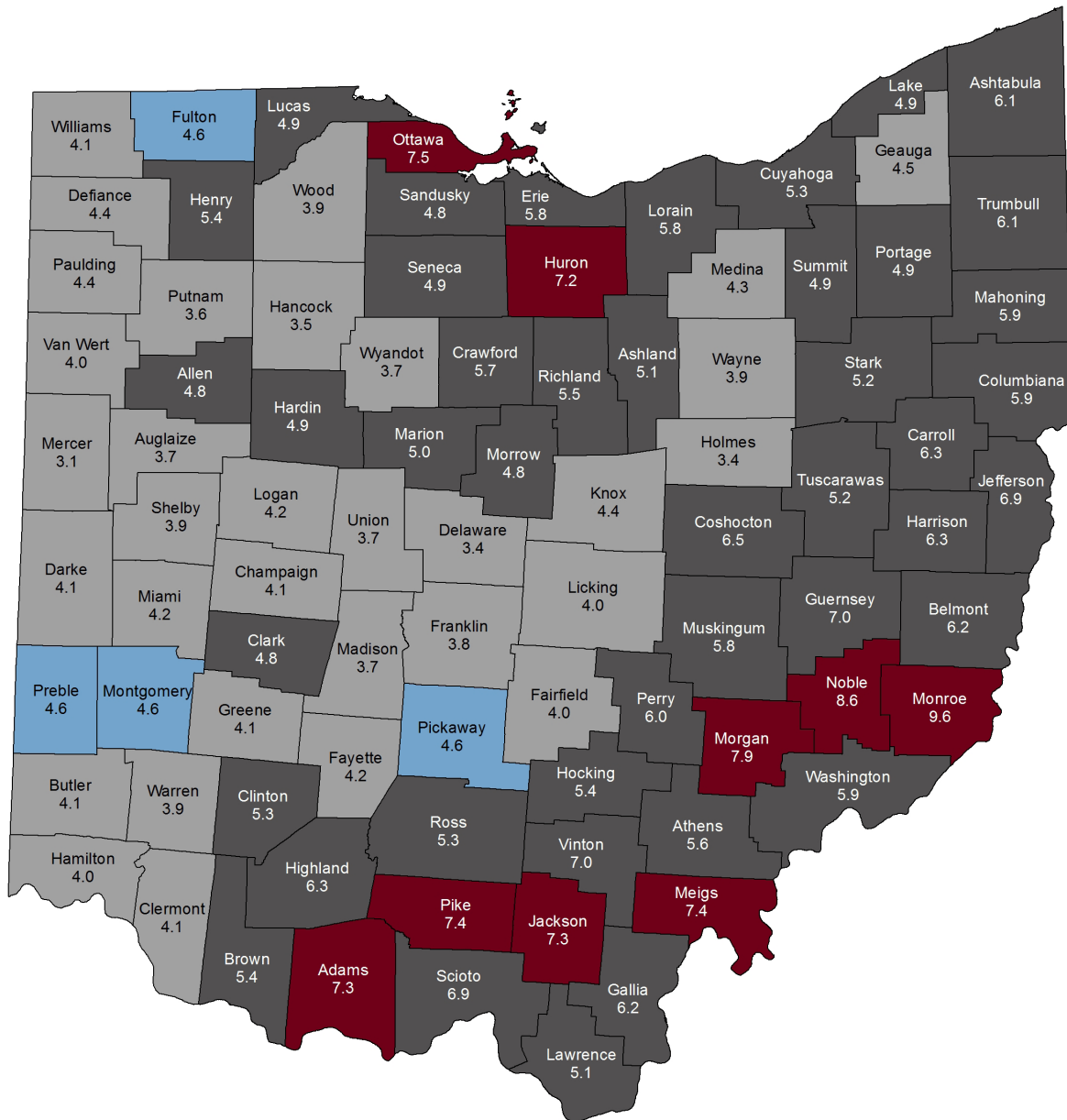
Central Ohio	2011 Q4			2015 Q4		
	Stable Employment	All Hires	Separations	Stable Employment	All Hires	Separations
All industry groups	879,445	183,069	162,707	932,802	209,581	211,735
2111 Oil and Gas Extraction	185	7	11	187	4	17
2131 Support Activities for Mining	202	51	140	266	18	63
2371 Utility System Construction	1,935	343	523	2,107	410	796
4862 Pipeline Transportation of Natural Gas	128	5	***	134	***	***
Northeast Ohio						
All industry groups	1,657,795	324,173	291,908	1,712,696	316,727	336,451
2111 Oil and Gas Extraction	661	74	72	753	99	98
2131 Support Activities for Mining	639	100	164	1,697	327	647
2371 Utility System Construction	3,301	848	1,416	3,819	1,216	1,806
4862 Pipeline Transportation of Natural Gas	95	4	0	107	***	0
Northwest Ohio						
All industry groups	459,479	97,572	86,379	475,060	92,965	97,310
2111 Oil and Gas Extraction	1,602	41	45	***	***	0
2131 Support Activities for Mining	15	27	56	39	11	12
2371 Utility System Construction	1,206	371	739	1,420	702	686
4862 Pipeline Transportation of Natural Gas	29	***	0	115	***	***
Southeast Ohio						
All industry groups	269,277	44,252	46,444	270,740	49,994	56,305
2111 Oil and Gas Extraction	405	60	46	681	127	198
2131 Support Activities for Mining	1,723	551	462	2,587	393	908
2371 Utility System Construction	705	260	226	998	762	2,699
4862 Pipeline Transportation of Natural Gas	71	***	0	79	***	***
Southwest Ohio						
All industry groups	677,944	126,617	127,461	723,747	150,058	157,424
2111 Oil and Gas Extraction	***	***	***	***	***	0
2131 Support Activities for Mining	6	10	***	66	***	8
2371 Utility System Construction	1,470	249	333	1,928	312	516
4862 Pipeline Transportation of Natural Gas	***	***	0	***	0	0
West Ohio						
All industry groups	467,761	75,958	72,678	471,970	94,308	94,904
2111 Oil and Gas Extraction	***	0	0	***	***	***
2131 Support Activities for Mining	10	7	15	58	12	16
2371 Utility System Construction	803	141	198	889	115	191
4862 Pipeline Transportation of Natural Gas	***	0	0	***	0	0

Source: U.S. Census Bureau, Longitudinal Employer-Household Dynamics, Quarterly Workforce Indicators.

***Indicates data cannot be disclosed due to confidentiality restrictions or data quality standards.

Quarterly Workforce Indicators are available only at the four-digit NAICS level. Consequently, although these industry groups contain some employment from non-shale-related core industries, they help provide an indication of labor activity for these shale-related industries.

COUNTY UNEMPLOYMENT RATES IN DECEMBER 2016 (Not Seasonally Adjusted)



Unemployment Rates

Not Seasonally Adjusted Seasonally Adjusted

United States

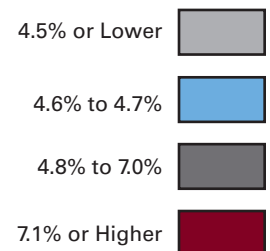
4.5%

4.7%

Ohio

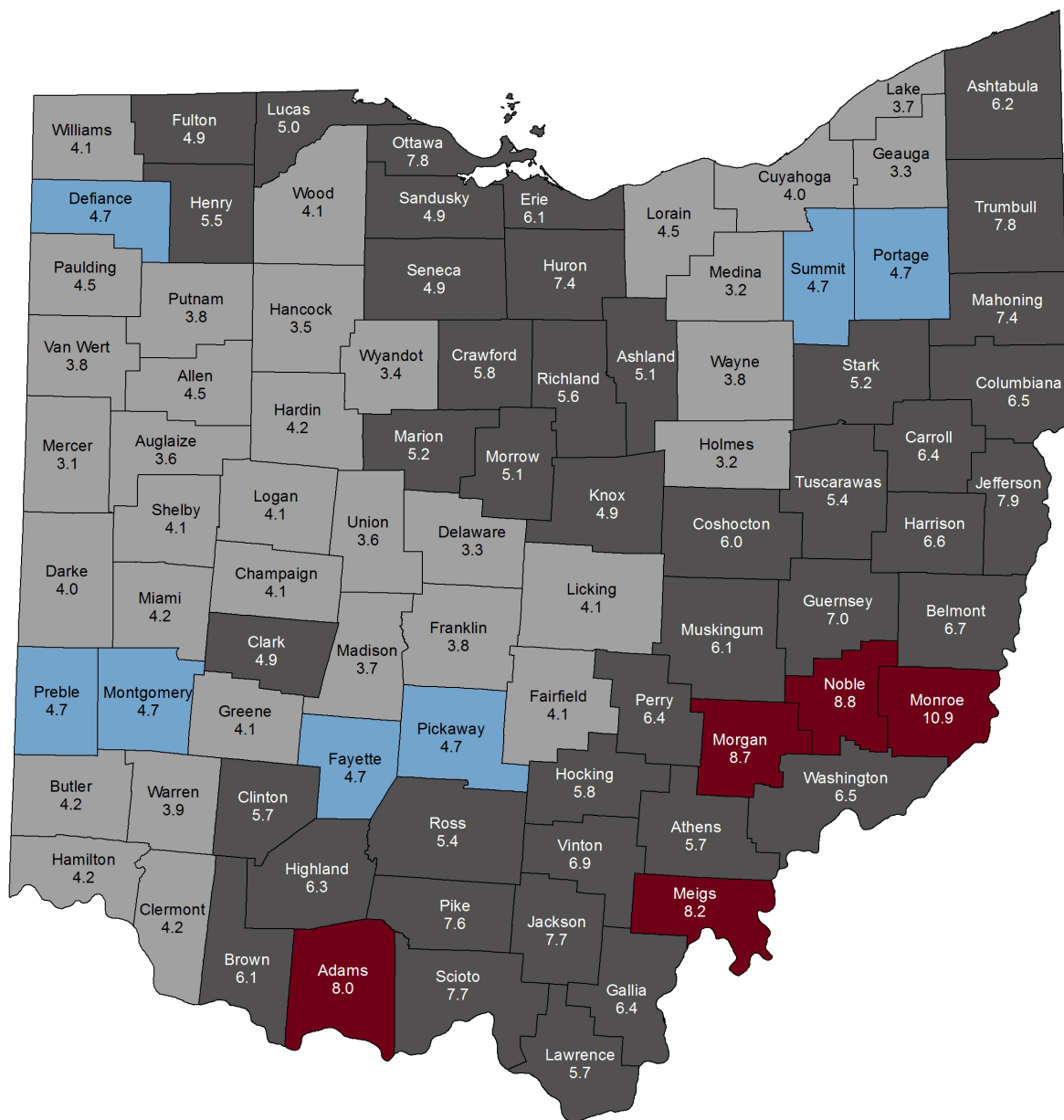
4.7%

4.9%



Source: Ohio Department of Job and Family Services
Office of Workforce Development
Bureau of Labor Market Information
*Data are preliminary and subject to revision.

COUNTY UNEMPLOYMENT RATES IN DECEMBER 2015 (Not Seasonally Adjusted)



Unemployment Rates

Not Seasonally Adjusted Seasonally Adjusted

United States

4.8%

5.0%

Ohio

4.6%

4.8%

4.6% or Lower

4.7% to 4.8%

4.9% to 7.9%

8.0% or Higher

Source: Ohio Department of Job and Family Services
Office of Workforce Development
Bureau of Labor Market Information
*Data based on 2015 benchmark.

DEFINITIONS

OHIO LABOR FORCE STATISTICS*

Source: Ohio Department of Job and Family Services' Bureau of Labor Market Information, Local Area Unemployment Statistics (LAUS)

The labor force and unemployment data are based on the same concepts and definitions as those used for the official national estimates obtained from the Current Population Survey (CPS). The LAUS program measures employment and unemployment on a place-of-residence basis and produces estimates using equations based on regression techniques. This method uses data from several sources, including the CPS, the Current Employment Statistics (CES) program and state unemployment insurance programs. The LAUS program does not produce estimates for any demographic groups.

Employment – A count of all persons who, during the week that includes the 12th day of the month, (a) did any work as paid employees, worked in their own businesses or professions or on their own farm, or worked 15 hours or more as unpaid workers in enterprises operated by members of their families, or (b) were not working but who had jobs from which they were temporarily absent. Each employed person is counted only once, even if the person holds more than one job. Included are the self-employed, unpaid family workers, agricultural workers and private household workers, who are excluded by the CES survey.

Labor Force – The population of people either working or looking for work, or classified as employed or unemployed.

Unemployment – A count of all persons age 16 and older who had no employment during the reference week (the week containing the 12th day of the month), who were available for work (except for temporary illness), and who had made specific efforts to find employment sometime during the four-week period ending with the reference week. This includes those waiting to be recalled to jobs from which they had been laid off.

Unemployment Rate – The number of unemployed workers as a percent of the labor force.

JOB DATA*

Source: Ohio Department of Job and Family Services' Bureau of Labor Market Information, Current Employment Statistics

Each month the CES program surveys about 140,000 national businesses and government agencies to provide detailed industry data on employment, hours and earnings of workers on non-farm payrolls. This is a collaborative effort between the U.S. Bureau of Labor Statistics (BLS) and the states. CES produces a count of jobs, not of people.

Nonfarm Jobs – The total number of persons on established payrolls employed full- or part-time who received pay for any part of the pay period that includes the 12th day of the month. Temporary and intermittent employees are included, as are any employees who are on paid sick leave, on paid holiday, or who worked during only part of the specified pay period. A striking employee who works only a small portion of the survey period, and is paid, is included as employed. Those on payrolls of more than one establishment are counted in each establishment. Data exclude proprietors, self-employed workers, unpaid family or volunteer workers, farm workers, and domestic workers. Those on layoff, strike or leave without pay for the entire pay period, or who have not yet reported for work, are not counted as employed. Government employment covers only civilian employees.

QUARTERLY WORKFORCE INDICATORS

Source: U.S. Census Bureau

The Quarterly Workforce Indicators are data that can be examined by region, industry, gender and age of workers. These indicators are built on wage records in the unemployment insurance system and information from state Quarterly Census of Employment and Wages (QCEW) data.

*THESE DATA ARE SEASONALLY ADJUSTED. Seasonal adjustment removes changes in employment due to normal seasonal hiring or layoffs (such as holidays, weather, etc.).

DEFINITIONS

QUARTERLY CENSUS OF EMPLOYMENT AND WAGES

Source: Ohio Department of Job and Family Services' Bureau of Labor Market Information, Quarterly Census of Employment and Wages

Business Establishment – An establishment is the location of a certain economic activity, such as a factory, store, office or mine, which produces goods or services. It is typically at a single physical location and engaged in one, or predominantly one, type of economic activity. An employer may have one or more establishments.

Employment – Employment data include all employment covered under federal and Ohio unemployment insurance laws for each of the three months in a quarter. The employment count represents the number of full- and part-time employees who worked during or received pay for the payroll period including the 12th day of the month. The employment totals for each month are averaged for the quarter employment count. Those on paid vacations or paid sick leave are included. Workers temporarily earning no wages due to labor-management disputes, layoffs or other reasons are not reported as employed. Those on the payroll of more than one employer during the same reference week are reported more than once.

Wages – Wages include total compensation paid during a calendar quarter, including bonuses. Average wages are calculated by dividing total wages for a quarter by average employment in that quarter.

STAFFING PATTERNS

Source: Ohio Department of Job and Family Services' Bureau of Labor Market Information

A staffing pattern is a list of the occupations most commonly found within a particular industry. This information comes from the biennial Long-Term Occupational Employment Projections data.

Annual Median Wage – The annual median wage earned by workers in an occupation, assuming 40 hours of work per week, 52 weeks a year. Wage data is derived from the annual Occupational Employment Statistics survey.

Typical Education, Training and Experience – To assist with career planning, the BLS has determined the typical education needed for entry into an occupation, years of commonly needed work experience in a related occupation, and typical on-the-job training needed to attain competency in the occupation. For definitions of available categories, see bls.gov/emp/ep_education_tech.htm.

Typical Education Levels

- Less than high school
- High school diploma or equivalent (HS/GED)
- Postsecondary non-degree award (Post-HS Cert.)
- Associate's degree
- Bachelor's degree
- Master's degree
- Doctoral or professional degree

Work Experience in a Related Occupation

- Five years or more
- One to five years
- Less than one year

Typical On-The-Job (OJT) Training

- Long-term OJT – More than 12 months OJT or combined work experience and formal classroom instruction
- Moderate-term OJT – One to 12 months OJT and informal training
- Short-term OJT – Less than one month OJT

ONLINE JOB POSTINGS

Source: The Conference Board Help Wanted OnLine™ Data Set

The Conference Board HWOL data set provides real-time insight into the employment marketplace through the world's largest database of online job ads. Job ads can be classified by industry, occupation, employer and geographic area. Data are analyzed for employment trends and to forecast economic conditions. The underlying data for The Conference Board HWOL are provided by Wanted Technologies Corporation.

DEFINITIONS

NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CHANGES

NAICS, established in 1997, is reviewed for potential revisions every five years. The latest revision, in 2012, was implemented by BLS in the QCEW program with the release of first quarter 2011 data. As part of this revision, the NAICS code of only one shale-related industry was impacted: NAICS 331111 (Iron & Steel Mills). The NAICS 2012 structure eliminated NAICS 331111, combining it with NAICS 331112 (Electrometallurgical Ferroalloy Product Manufacturing) to form NAICS 331110 (Iron & Steel Mills and Ferroalloy Manufacturing).

Core Shale-Related Industries (NAICS):

Crude Petroleum & Natural Gas Extraction (211111); Natural Gas Liquid Extraction (211112); Drilling Oil & Gas Wells (213111); Support Activities for Oil & Gas Operations (213112); Oil & Gas Pipeline & Related Structures Construction (237120); and Pipeline Transportation of Natural Gas (486210).

Ancillary Shale-Related Industries (NAICS):

Fossil Fuel Electric Power Generation (221112); Natural Gas Distribution (221210); Water Supply & Irrigation Systems (221310); Sewage Treatment Facilities (221320); Water & Sewer Line & Related Structures Construction (237110); Highway, Street, and Bridge Construction (237310); Nonresidential Site Preparation Contractors (238912); Petrochemical Manufacturing (325110); Industrial Gas Manufacturing (325120); Iron & Steel Mills & Ferroalloy Manufacturing (3311101); Iron & Steel Pipe & Tube Manufacturing from Purchased Steel (331210); Mining Machinery & Equipment Manufacturing (333131); Oil & Gas Field Machinery & Equipment Manufacturing (333132); Construction and Mining (except Oil Well) Machinery and Equipment Merchant Wholesalers (423810); Industrial Machinery and Equipment Merchant Wholesalers (423830); Industrial Supplies Merchant Wholesalers (423840); General Freight Trucking, Local (484110); Specialized Freight Trucking, Local (484220); Specialized Freight Trucking, Long-Distance (484230); Lessors of Other Real Property (531190); Construction, Mining & Forestry Machinery & Equipment Rental & Leasing (532412); Engineering Services (541330); Geophysical Surveying & Mapping Services (541360); Testing Laboratories (541380); Environmental Consulting Services (541620); Remediation Services (562910); Commercial & Industrial Machinery & Equipment

Repair & Maintenance (811310); Administration of Air and Water Resource and Solid Waste Management Programs (924110); Administration of Conservation Programs (924120); and Regulation and Administration of Communications, Electric, Gas, and Other Utilities (926130).

WORKFORCE INFORMATION EXCHANGE

Source: Governor's Office of Workforce Transformation
(workforce.ohio.gov)

The Governor's Office of Workforce Transformation deployed a statewide jobs forecasting tool to the top companies of predefined industry clusters. These companies represent small, medium and large businesses with at least 10 employees and at least one Ohio location. Through the forecasting tool, businesses identify the top five critical, difficult-to-fill job needs over the next one, three and five years. The information from the forecast tool is aggregated with current job postings and occupation projections from ODJFS to better align the in-demand jobs with education and training providers and Ohio's workforce development system.

John R. Kasich, Governor
State of Ohio

Cynthia C. Dungey, Director
Ohio Department of Job and Family Services

January 2017

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