

**Ohio**

**Department of  
Job and Family Services**

Mike DeWine, Governor  
Kimberly Hall, Director

# OHIO SHALE

QUARTERLY ECONOMIC TRENDS FOR OHIO OIL AND GAS INDUSTRIES



**OCTOBER 2019**



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## A Message from Director Hall

In 2011, we began tracking shale employment in Ohio. Since that time, opportunities in this field have nearly doubled. Core shale-related employment, such as oil and gas pipeline construction and well drilling, increased 95 percent from the first quarter of 2011 to the first quarter of 2019. Ancillary shale employment, including freight trucking and environmental consulting, also increased. Non-shale industries, such as food and retail businesses near drilling sites and the surrounding communities, also benefit from shale activity. The average wages of shale-related jobs are excellent: \$85,226 in core industries and \$70,002 in ancillary industries. In both cases, this is higher than the average wage in all Ohio industries: \$50,946.

The Ohio Department of Job and Family Services (ODJFS) Workforce Development team has been working hard to help more Ohioans take advantage of these opportunities. We work 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**.

Individuals can sign up for 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 are 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 "Kim Hall". The signature is written in a cursive, flowing style.

Kimberly Hall, Director  
Ohio Department of Job and Family Services



## EXECUTIVE SUMMARY

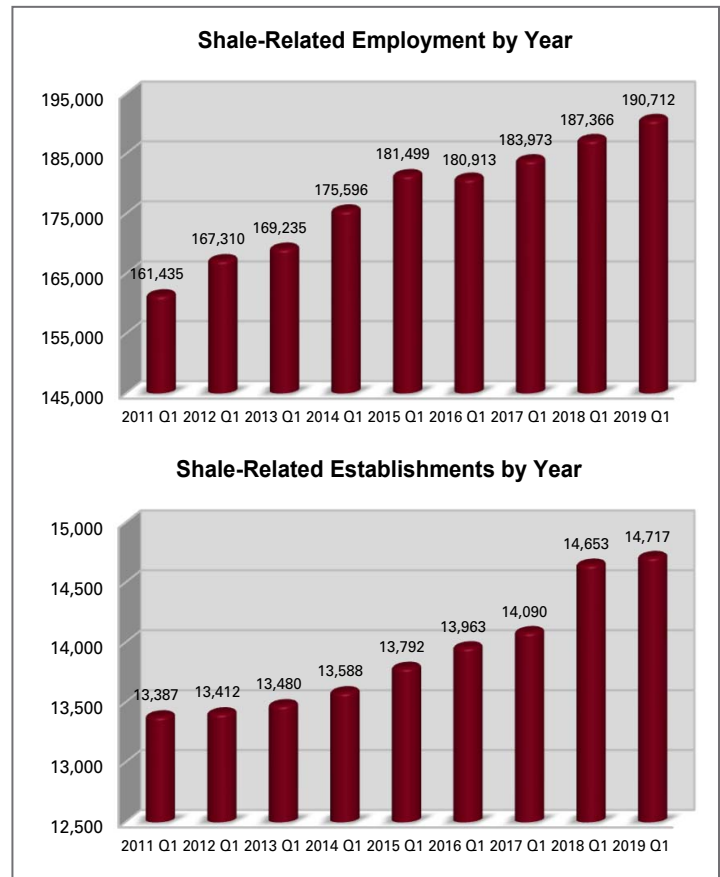
### Employment (2011 Q1 to 2019 Q1) See page 6.

- Core shale-related industry employment (such as pipeline construction and well drilling) was up by 5,922 (94.6 percent).
- Ancillary shale-related industry employment (such as freight trucking and environmental consulting) increased by 23,355 (15.1 percent).
- All industry employment was up by 501,463 (10.4 percent).

### Business Establishments (2011 Q1 to 2019 Q1)

See page 6.

- Core shale-related business establishments grew by 199 (34.0 percent).
- Ancillary shale-related establishments increased by 1,131 (8.8 percent).
- Over the same time period, Ohio experienced an increase of 13,019 (4.5 percent) business establishments in all industries.
- Shale-related business establishments totaled 14,717 during the first quarter of 2019.



### Wages (2018 Q2 through 2019 Q1) See page 9.

- The four-quarter average wage across all industries was \$50,946.
- The four-quarter average wage in core shale-related industries was \$85,226, which was \$34,280 greater than the average for all industries.
- The four-quarter average wage in ancillary shale-related industries was \$70,002, which was \$19,056 higher than the average for all industries.

### Online Job Postings (2019 Q3) See page 10.

- Ohio had 2,894 online job postings in core and ancillary shale-related industries in 2019 Q3.

### Stable Employment, All Hires and Separations (2011 Q3 to 2018 Q3) 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 12<sup>th</sup> 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 (Gartner TalentNeuron™ job posting analytics platform) 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 first quarter of 2019. 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, first quarter 2019 QCEW data are compared to first quarter 2011 QCEW data.

### Data Limitations

The North American Industry Classification System (NAICS), which is reviewed and revised every five years, 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." See page 20 for the impact the NAICS 2017 revision had on the shale-related industries.

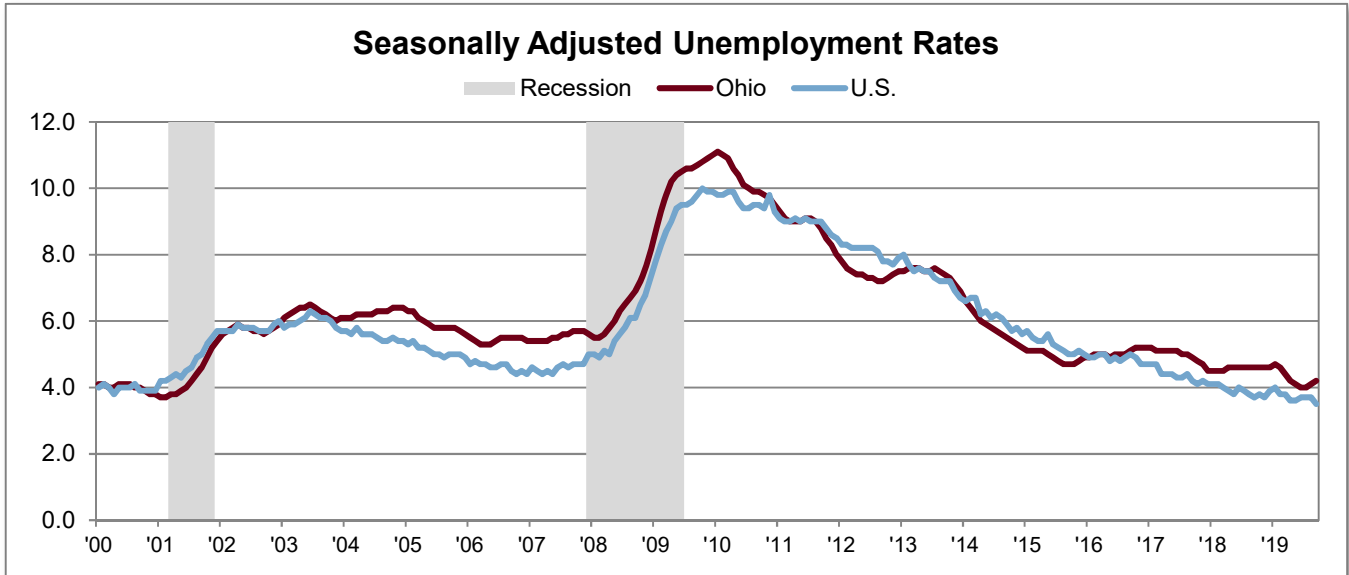
These data are meant to provide a barometer of shale-related economic activity and employment trends. While the vast majority of shale-related employment can be found in these industries, not all business establishments in these industries are involved in shale activity. For those that are, not all of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

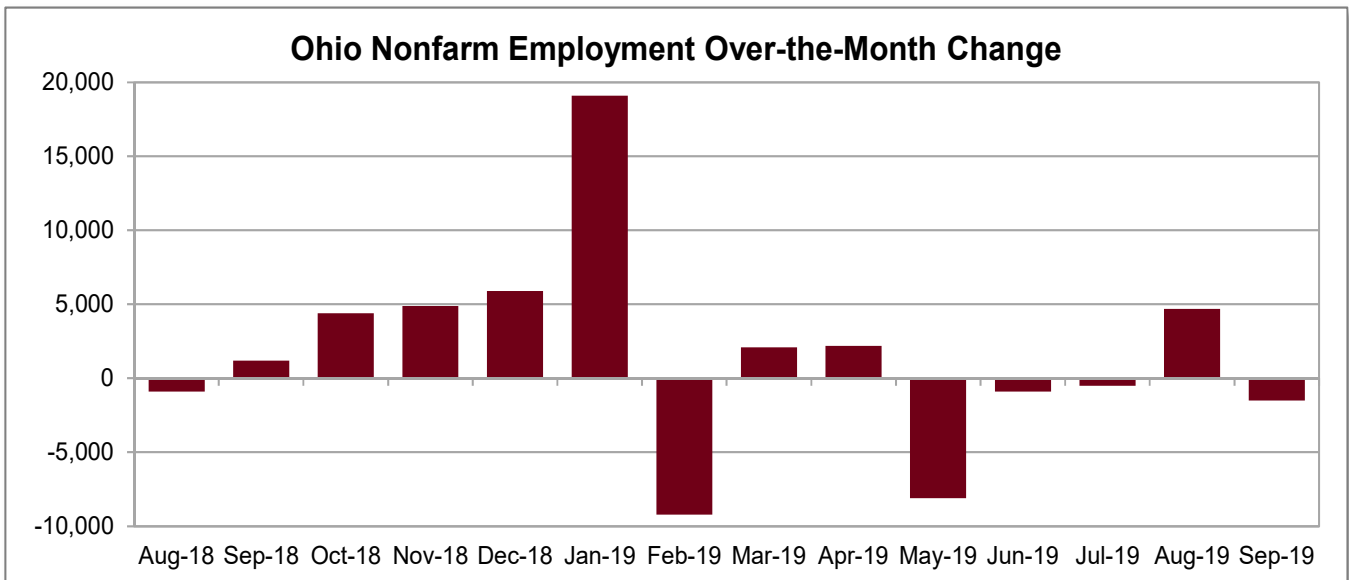
## Snapshot of Employment in Ohio

- Ohio's seasonally adjusted unemployment rate for September 2019 was 4.2 percent.
  - The rate was up 0.1 percentage points from August.



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

- Ohio had 5,591,200 seasonally adjusted nonfarm jobs in September 2019.
  - Total nonfarm employment decreased by 1,500 over the month.
  - Over the past 12 months, Ohio added 23,100 jobs.



- In September 2019, 12,500 workers were employed in the mining and logging industry.

## STATEWIDE SHALE-RELATED INDUSTRIES

- From 2011 Q1 to 2019 Q1, employment in core industries increased by 5,922 (94.6 percent). Over the same period, employment in ancillary industries increased by 23,355 (15.1 percent).
- From 2011 Q1 to 2019 Q1, the number of business establishments in the core industries grew by 199 (34.0 percent), while establishments in ancillary industries increased by 1,131 (8.8 percent).

### Number of Business Establishments and Employment in Shale-Related Industries (2011 Q1 - 2019 Q1)

Core Industries		2011 Q1		2019 Q1		Change	
NAICS	Title	Estab.	Empl.	Estab.	Empl.	Estab.	Empl.
2111**	Oil and gas extraction	197	2,775	122	1,059	-75	-1,716
213111	Drilling oil and gas wells	78	516	99	896	21	380
213112	Support activities for oil and gas operations	179	1,165	328	4,802	149	3,637
237120	Oil and gas pipeline construction	94	1,498	188	4,878	94	3,380
486210	Pipeline transportation of natural gas	37	309	47	550	10	241
<b>Core Industry Totals</b>		<b>585</b>	<b>6,263</b>	<b>784</b>	<b>12,185</b>	<b>199</b>	<b>5,922</b>
Ancillary Industries		2011 Q1		2019 Q1		Change	
NAICS	Title	Estab.	Empl.	Estab.	Empl.	Estab.	Empl.
221112	Fossil fuel electric power generation	83	5,326	87	3,161	4	-2,165
221210	Natural gas distribution	141	3,697	159	5,503	18	1,806
221310	Water supply and irrigation systems	247	6,007	258	5,834	11	-173
221320	Sewage treatment facilities	212	3,820	210	3,841	-2	21
237110	Water and sewer system construction	394	4,167	372	5,672	-22	1,505
237310	Highway, street, and bridge construction	721	10,906	739	12,832	18	1,926
238912	Nonresidential site preparation contractors	629	4,318	637	6,446	8	2,128
325110	Petrochemical manufacturing	5	358	4	ND	-1	ND
325120	Industrial gas manufacturing	45	737	41	ND	-4	ND
331110	Iron and steel mills and ferroalloy manufacturing	58	9,797	61	8,072	3	-1,725
331210	Iron, steel pipe and tube from purchase steel	52	3,051	39	3,301	-13	250
333131	Mining machinery and equipment manufacturing	12	451	13	404	1	-47
333132	Oil and gas field machinery and equipment	6	141	13	298	7	157
423810	Construction equipment merchant wholesalers	195	2,419	203	3,046	8	627
423830	Industrial machinery merchant wholesalers	1,695	15,107	2,052	19,085	357	3,978
423840	Industrial supplies merchant wholesalers	503	4,678	553	5,812	50	1,134
484110	General freight trucking, local	1,346	11,667	1,438	11,934	92	267
484220	Other specialized trucking, local	1,004	6,057	1,153	8,436	149	2,379
484230	Other specialized trucking, long-distance	283	4,412	358	6,112	75	1,700
531190	Lessors of other real estate property	301	858	292	934	-9	76
532412	Other heavy machinery rental and leasing	165	1,231	222	2,304	57	1,073
541330	Engineering services	2,247	26,920	2,426	30,050	179	3,130
541360	Geophysical surveying and mapping services	53	246	60	239	7	-7
541380	Testing laboratories	359	6,379	429	6,683	70	304
541620	Environmental consulting services	291	1,528	324	2,048	33	520
562910	Remediation services	170	2,222	225	4,348	55	2,126
811310	Commercial machinery repair and maintenance	1,111	7,014	1,110	9,558	-1	2,544
924110	Air, water, and waste program administration	164	6,089	154	6,023	-10	-66
924120	Administration of conservation programs	281	5,081	271	4,937	-10	-144
926130	Utility regulation and administration	29	488	30	523	1	35
<b>Ancillary Industry Totals</b>		<b>12,802</b>	<b>155,172</b>	<b>13,933</b>	<b>178,527</b>	<b>1,131</b>	<b>23,355</b>
<b>Core Industries and Ancillary Industries Totals</b>		<b>13,387</b>	<b>161,435</b>	<b>14,717</b>	<b>190,712</b>	<b>1,330</b>	<b>29,277</b>
<b>All Industries Totals</b>		<b>287,174</b>	<b>4,844,419</b>	<b>300,193</b>	<b>5,345,882</b>	<b>13,019</b>	<b>501,463</b>

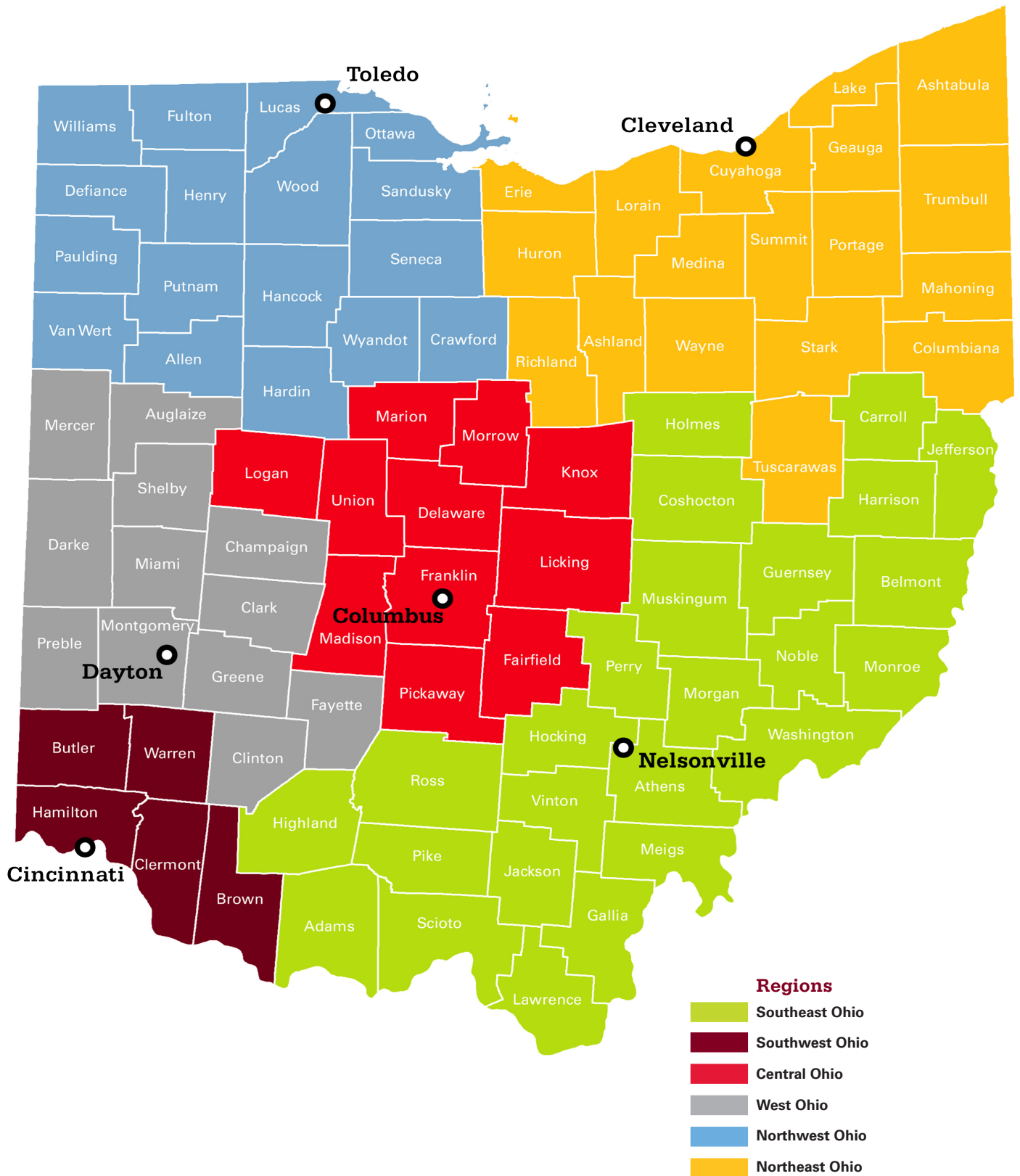
Source: Quarterly Census of Employment and Wages.

ND - Not Disclosable.

\*\*See page 20 for explanation of 2111.



# JOBSOHIO NETWORK REGIONS

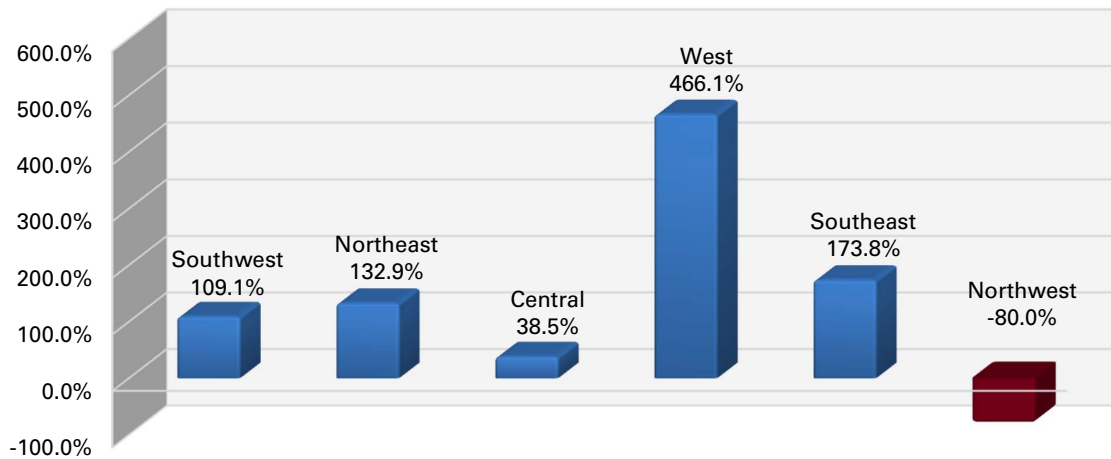


## REGIONAL SHALE-RELATED INDUSTRIES

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.

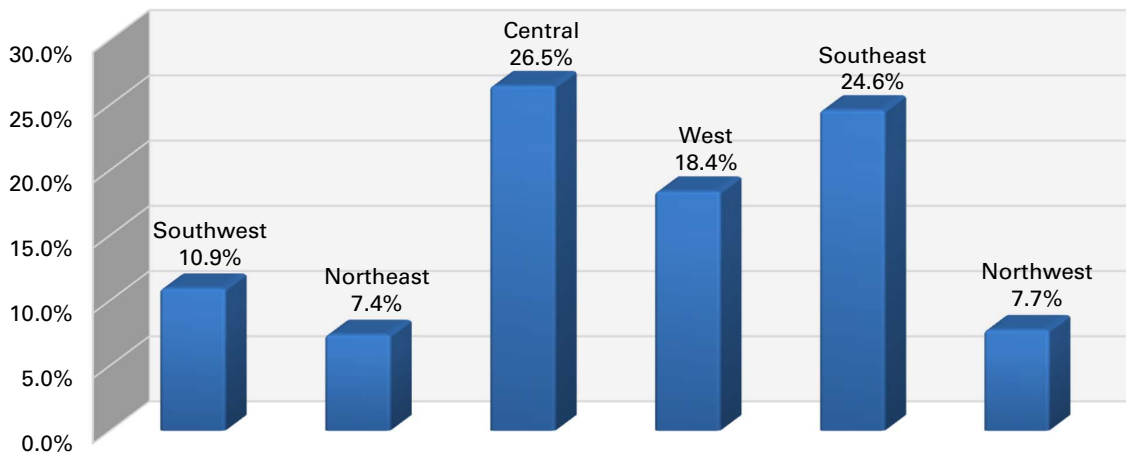
Large percentage increases and decreases in employment may be the result of a change in industry classification following a routine NAICS assignment review. Changes in NAICS assignments are typically done with the publication of the first-quarter data.

**Core Shale-Related Industries  
Percent Employment Change (2011 Q1 - 2019 Q1)**



- The largest percent growth in employment for core shale-related industries was in the West region (466.1 percent), followed by the Southeast region (173.8 percent).

**Ancillary Shale-Related Industries  
Percent Employment Change (2011 Q1 - 2019 Q1)**



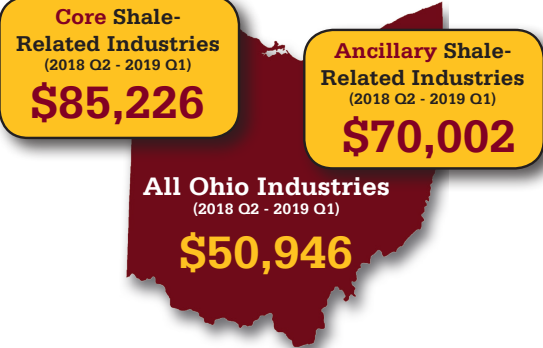
- For ancillary shale-related industries, the largest percent growth in employment was in the Central region (26.5 percent), followed by the Southeast region (24.6 percent).

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

## WAGES FOR OHIO SHALE-RELATED CORE AND ANCILLARY INDUSTRIES

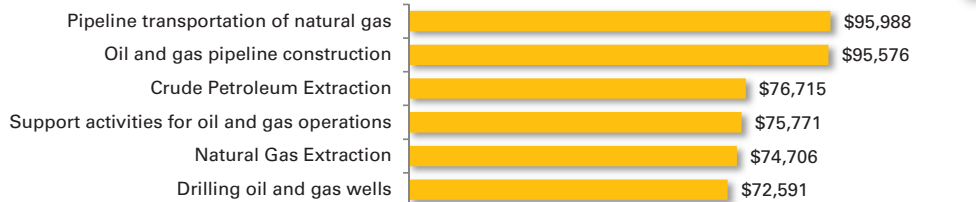
- The four-quarter average wage across all industries for 2018 Q2 through 2019 Q1 was \$50,946.
- The four-quarter average wage in the core industries was \$34,280 greater than the average wage for all industries.
- The four-quarter average wage in the ancillary industries was \$19,056 higher than the 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.

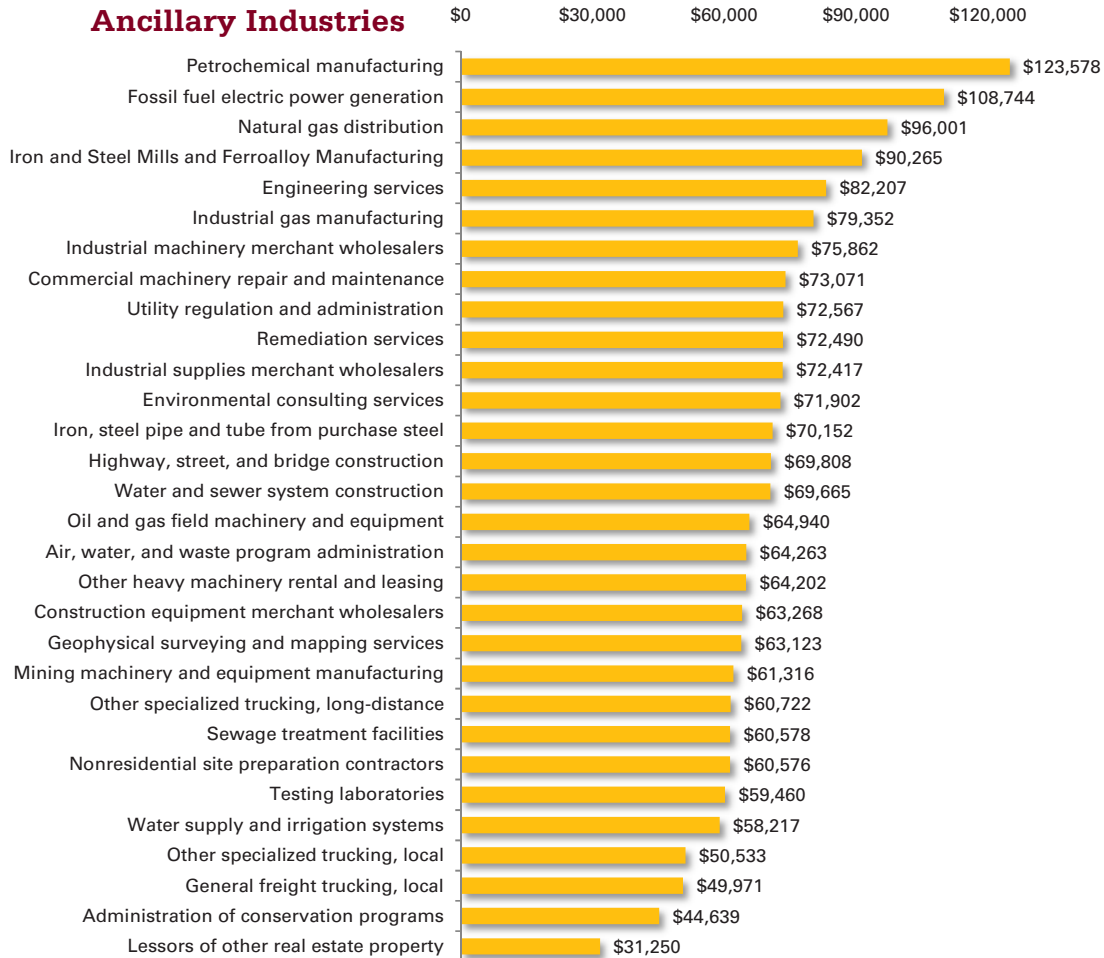


### Four-Quarter Average Wage by Industry

#### Core Industries



#### Ancillary Industries



Source: Quarterly Census of Employment and Wages.

\* NAICS codes are reviewed and revised every five years to keep the classification system current with changes in economic activities. Due to the 2017 NAICS revision, there is a series break. For more information on the 2017 NAICS revision, please visit [https://www.bls.gov/cew/bls\\_naics/v2/bls\\_naics\\_app.htm#tab=transition](https://www.bls.gov/cew/bls_naics/v2/bls_naics_app.htm#tab=transition).

## OHIO SHALE-RELATED ONLINE JOB POSTINGS

### Statewide Online Job Postings

	2018 Q3	2019 Q3	% Change
Core Industries	157	72	-54.1%
Ancillary Industries	2,862	2,822	-1.4%
<b>Total: ALL Industries</b>	<b>126,075</b>	<b>136,484</b>	<b>8.3%</b>

### Regional Online Job Postings

Core and Ancillary Combined	2018 Q3	2019 Q3	% Change
Southwest Ohio	0	0	0.0%
Northeast Ohio	789	722	-8.5%
Central Ohio	689	619	-10.2%
West Ohio	518	578	11.6%
Southeast Ohio	220	162	-26.4%
Northwest Ohio	219	295	34.7%
<b>Total*</b>	<b>3,019</b>	<b>2,894</b>	<b>-4.1%</b>

Source: Gartner TalentNeuron™. New unique ads only. Data are subject to revision. Not seasonally adjusted.

### Statewide Online Job Postings

- Total job postings across all Ohio industries increased in 2019 Q3 compared to 2018 Q3.
- Overall, job postings decreased in core (-54.1 percent) and ancillary (-1.4 percent) shale-related industries.

### Regional Online Job Postings

- Job postings increased in the West Ohio (11.6 percent) and Northwest Ohio (34.7 percent) JobsOhio Network Regions in 2019 Q3 compared to 2018 Q3.

\* Data are not directly comparable to data in reports published prior to 2019 Q3 due to methodological improvements that have become available over time.

\* The total includes job ads that may have listed Ohio as the only 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.

# WELL ACTIVITY STATUS AS OF OCTOBER 12, 2019

## HORIZONTAL OIL AND GAS WELLS IN THE UTICA/POINT PLEASANT AND MARCELLUS FORMATIONS OHIO DEPARTMENT OF NATURAL RESOURCES 2019

ODNR OFFICE OF INFORMATION TECHNOLOGY  
October 2019

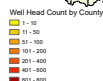
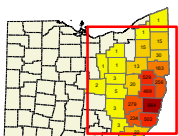
### Horizontal Wells Activity Status at end of Saturday 10/12/2019:

**Wells Permitted To Date:**  
Utica: 3177  
Marcellus: 75

**Wells Drilled To Date:**  
Utica: 2708  
Marcellus: 47

**Wells Producing To Date:**  
Utica: 2340  
Marcellus: 25

### Utica/Point Pleasant and Marcellus Horizontal Well Head Counts by County



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**

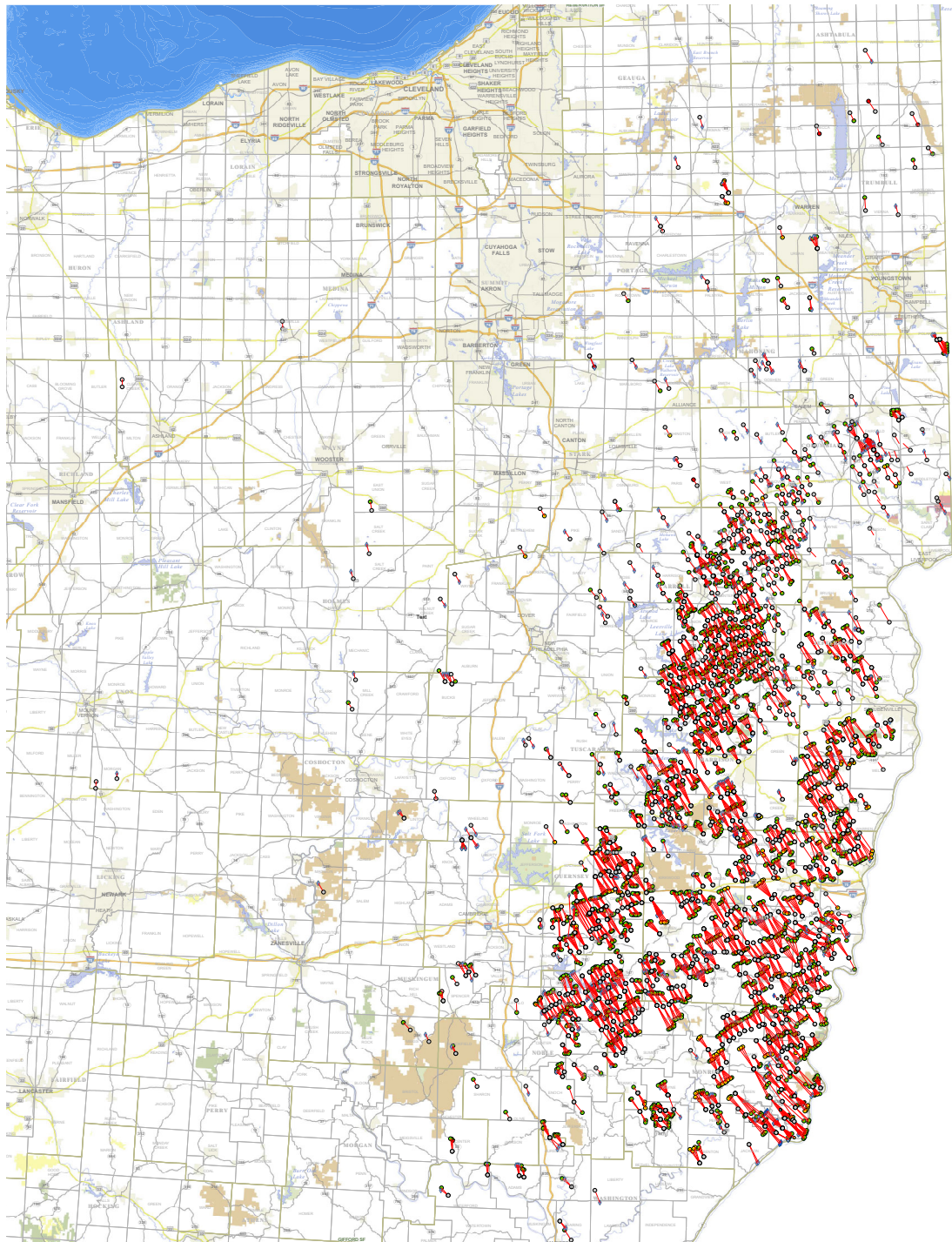
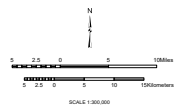
- PERMITTED-(Permitted, Not Drilled, Canceled)
- DRILLED-(Drilling, Well Drilled)
- PRODUCING-(Producing, Plugged Back)
- INACTIVE-(Drilled inactive, Shut in)
- Lost Hole or Final Restoration
- Dry and Abandoned
- Plugged and Abandoned

**Marcellus Bottom Hole**

- PERMITTED-(Permitted, Not Drilled, Canceled)
- 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-BUS1<SUB>-</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 lake 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, the 2018 base employment count within these industries was above 50.

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 <sup>1</sup>	Typical Education, Work Experience, On-the-Job Training (OJT)
17-2171	Petroleum engineers	\$82,760	Bachelor's degree
19-2042	Geoscientists, except hydrologists and geographers	\$75,140	Bachelor's degree
37-3011	Landscaping and groundskeeping workers	\$27,500	No formal educational credential, Short-term OJT
43-4171	Receptionists and information clerks	\$26,630	HS/GED, Short-term OJT
47-1011	First-line supervisors of construction trades and extraction workers	\$64,680	HS/GED, 5+ Years Experience
47-2011	Boilermakers	\$73,040	HS/GED, Apprenticeship
47-2071	Paving, surfacing, and tamping equipment operators	\$47,940	HS/GED, Moderate-term OJT
47-2151	Pipelayers	\$47,310	No formal educational credential, Short-term OJT
47-3015	Helpers--pipelayers, plumbers, pipefitters, and steamfitters	\$30,480	HS/GED, Short-term OJT
47-5011	Derrick operators, oil and gas	\$47,086	No formal educational credential, Short-term OJT
47-5012	Rotary drill operators, oil and gas	\$45,320	No formal educational credential, Moderate-term OJT
47-5013	Service unit operators, oil, gas, and mining	\$49,340	No formal educational credential, Moderate-term OJT
47-5021	Earth drillers, except oil and gas	\$43,090	HS/GED, Moderate-term OJT
47-5071	Roustabouts, oil and gas	\$35,630	No formal educational credential, Moderate-term OJT
47-5081	Helpers--extraction workers	\$36,820	HS/GED, Moderate-term OJT
49-9012	Control and valve installers and repairers, except mechanical door	\$67,010	HS/GED, Moderate-term OJT
49-9096	Riggers	\$43,930	HS/GED, Moderate-term OJT
49-9098	Helpers--installation, maintenance, and repair workers	\$28,620	HS/GED, Short-term OJT
49-9099	Installation, maintenance, and repair workers, all other	\$38,430	HS/GED, Moderate-term OJT
51-8092	Gas plant operators	\$70,020	HS/GED, Long-term OJT

<sup>1</sup>Annual wages have been calculated by multiplying hourly median wage by 2,080 hours.  
Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics, May 2018.

## 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 July 2017. 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. While the occupations below are not exclusive to the core shale-related industries, the 2018 base employment count within these industries was above 20.

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

SOC Code	SOC Title	Median Annual Wage <sup>1</sup>	Typical Education, Work Experience, On-the-Job Training (OJT)
11-1021	General and Operations Managers	\$96,110	Bachelor's degree, 5+ Years Experience
11-3031	Financial Managers	\$118,100	Bachelor's degree, 5+ Years Experience
11-9021	Construction Managers	\$91,130	Bachelor's degree, Moderate-term OJT
11-9041	Architectural and Engineering Managers	\$128,580	Bachelor's degree, 5+ Years Experience
13-1051	Cost Estimators	\$60,640	Bachelor's degree, Moderate-term OJT
13-1199	Business Operations Specialists, All Other	\$65,930	Bachelor's degree
13-2011	Accountants and Auditors	\$64,630	Bachelor's degree
15-1121	Computer Systems Analysts	\$84,100	Bachelor's degree
43-3031	Bookkeeping, Accounting and Auditing Clerks	\$38,470	HS/GED, Moderate-term OJT
43-4051	Customer Service Representatives	\$33,650	HS/GED, Short-term OJT
43-6011	Executive Secretaries and Executive Administrative Assistant	\$56,140	HS/GED, 1-5 Years Experience
43-6014	Secretaries and Administrative Assistants, Ex. Legal, Medical and Executive	\$35,550	HS/GED, Short-term OJT
43-9061	Office Clerks, General	\$32,730	HS/GED, Short-term OJT
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	\$64,680	HS/GED, 5+ Years Experience
47-2031	Carpenters	\$46,240	HS/GED, Apprenticeship
47-2061	Construction Laborers	\$39,970	Less than HS, Short-term OJT
47-2073	Operating Engineers and Other Construction Equipment Operators	\$53,060	HS/GED, Moderate-term OJT
47-2152	Plumbers, Pipefitters and Steamfitters	\$55,330	HS/GED, Apprenticeship
49-1011	First-Line Supervisors of Mechanics, Installers and Repairers	\$63,180	HS/GED, 1-5 Years Experience
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	\$54,640	HS/GED, Long-term OJT
49-9041	Industrial Machinery Mechanics	\$51,650	HS/GED, Long-term OJT
51-1011	First-Line Supervisors of Production and Operating Workers	\$59,700	HS/GED, 1-5 Years Experience
51-4121	Welders, Cutters, Solderers and Brazers	\$39,390	HS/GED, Moderate-term OJT
51-9061	Inspectors, Testers, Sorters, Samplers and Weighers	\$38,500	HS/GED, Moderate-term OJT
53-3032	Heavy and Tractor-Trailer Truck Drivers	\$42,970	Post-sec non-degree, Short-term OJT

<sup>1</sup>Annual wages have been calculated by multiplying hourly median wage by 2,080 hours.  
Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics, May 2018.

## 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 Q3 data is presented with 2018 Q3 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 Q3			2018 Q3		
	Stable Employment	All Hires	Separations	Stable Employment	All Hires	Separations
All industry groups	4,333,714	789,343	801,597	4,637,063	958,893	991,023
2111 Oil and Gas Extraction	2,804	213	245	1,031	145	137
2131 Support Activities for Mining	2,641	823	599	5,678	1,770	1,899
2371 Utility System Construction	9,930	3,762	3,012	15,857	6,366	7,766
4862 Pipeline Transportation of Natural Gas	326	9	7	563	22	14

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 Q3 to 2018 Q3: 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.



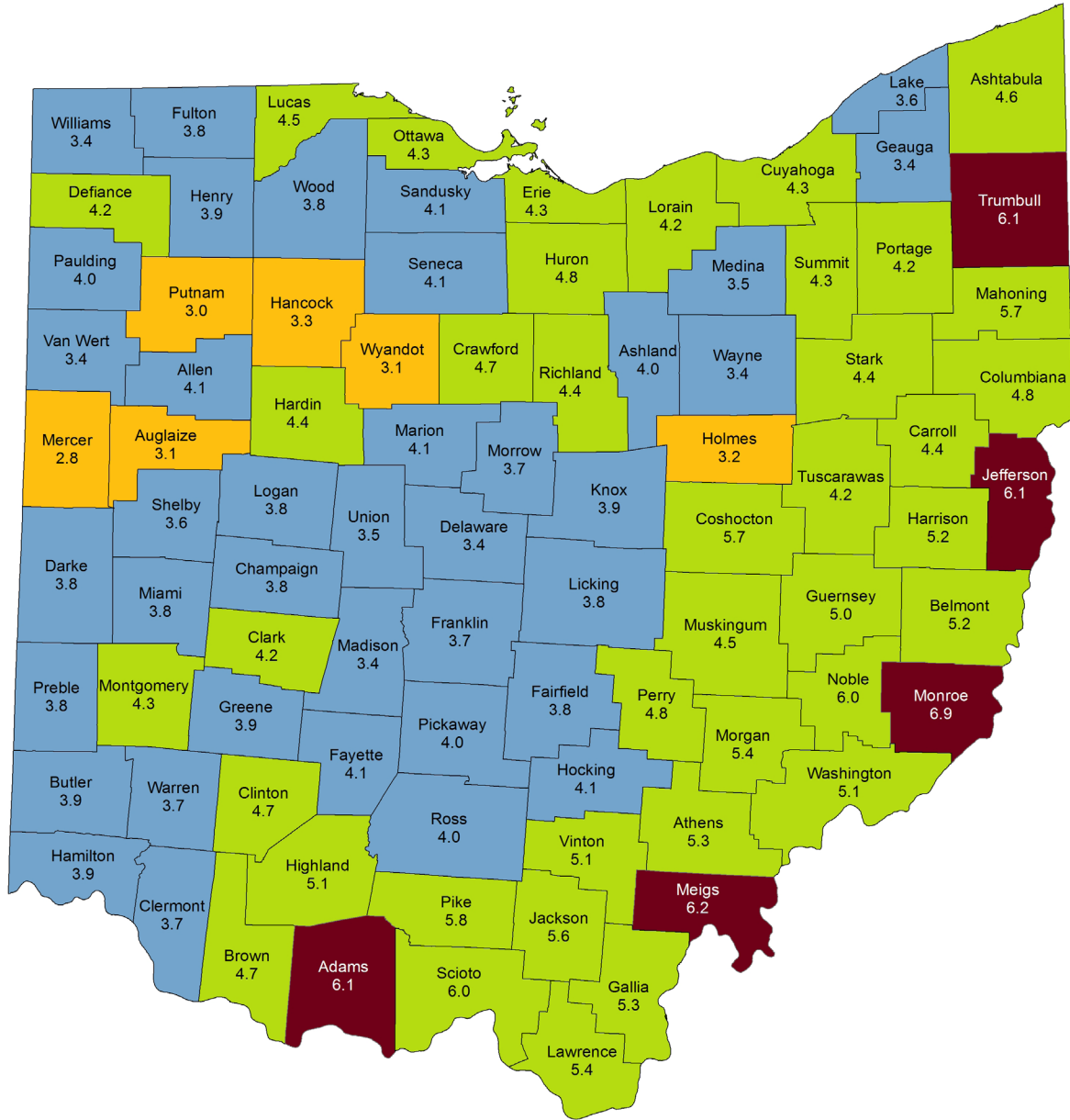
## JOB SOHIO NETWORK SHALE-RELATED EMPLOYMENT

Central Ohio	2011 Q3			2018 Q3		
	Stable Employment	All Hires	Separations	Stable Employment	All Hires	Separations
All industry groups	851,791	166,289	161,880	973,116	205,566	207,478
2111 Oil and Gas Extraction	170	21	22	70	6	6
2131 Support Activities for Mining	257	110	82	228	39	46
2371 Utility System Construction	1,891	535	461	3,867	1,291	1,324
4862 Pipeline Transportation of Natural Gas	124	4	***	241	12	6
<b>Northeast Ohio</b>						
All industry groups	1,652,577	297,442	305,639	1,702,907	341,577	359,593
2111 Oil and Gas Extraction	621	49	62	549	66	66
2131 Support Activities for Mining	693	166	102	2,096	583	633
2371 Utility System Construction	3,521	1,188	839	4,547	1,616	1,903
4862 Pipeline Transportation of Natural Gas	89	***	***	103	***	***
<b>Northwest Ohio</b>						
All industry groups	446,424	80,154	82,038	476,162	97,625	103,314
2111 Oil and Gas Extraction	1,573	98	98	***	***	0
2131 Support Activities for Mining	8	3	3	63	15	18
2371 Utility System Construction	1,546	1,029	921	1,708	829	763
4862 Pipeline Transportation of Natural Gas	26	***	***	34	***	0
<b>Southeast Ohio</b>						
All industry groups	261,881	46,069	47,012	268,448	57,730	60,318
2111 Oil and Gas Extraction	413	38	55	377	44	55
2131 Support Activities for Mining	1,661	542	406	3,176	1,122	1,189
2371 Utility System Construction	687	276	262	2,144	1,400	2,544
4862 Pipeline Transportation of Natural Gas	73	***	***	88	***	3
<b>Southwest Ohio</b>						
All industry groups	669,482	121,506	126,498	740,966	155,997	161,134
2111 Oil and Gas Extraction	***	***	***	***	***	***
2131 Support Activities for Mining	5	0	***	***	0	0
2371 Utility System Construction	1,586	552	382	2,462	641	678
4862 Pipeline Transportation of Natural Gas	***	0	0	94	6	5
<b>West Ohio</b>						
All industry groups	451,559	77,883	78,530	475,463	100,399	99,186
2111 Oil and Gas Extraction	***	0	***	***	***	***
2131 Support Activities for Mining	17	3	4	113	10	12
2371 Utility System Construction	699	182	146	1,129	589	554
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 SEPTEMBER 2019 (Not Seasonally Adjusted)



### Unemployment Rates

Not Seasonally Adjusted      Seasonally Adjusted

United States

3.3%

3.5%

3.3% or Lower



Ohio

4.1%

4.2%

3.4% to 4.1%



4.2% to 6.0%

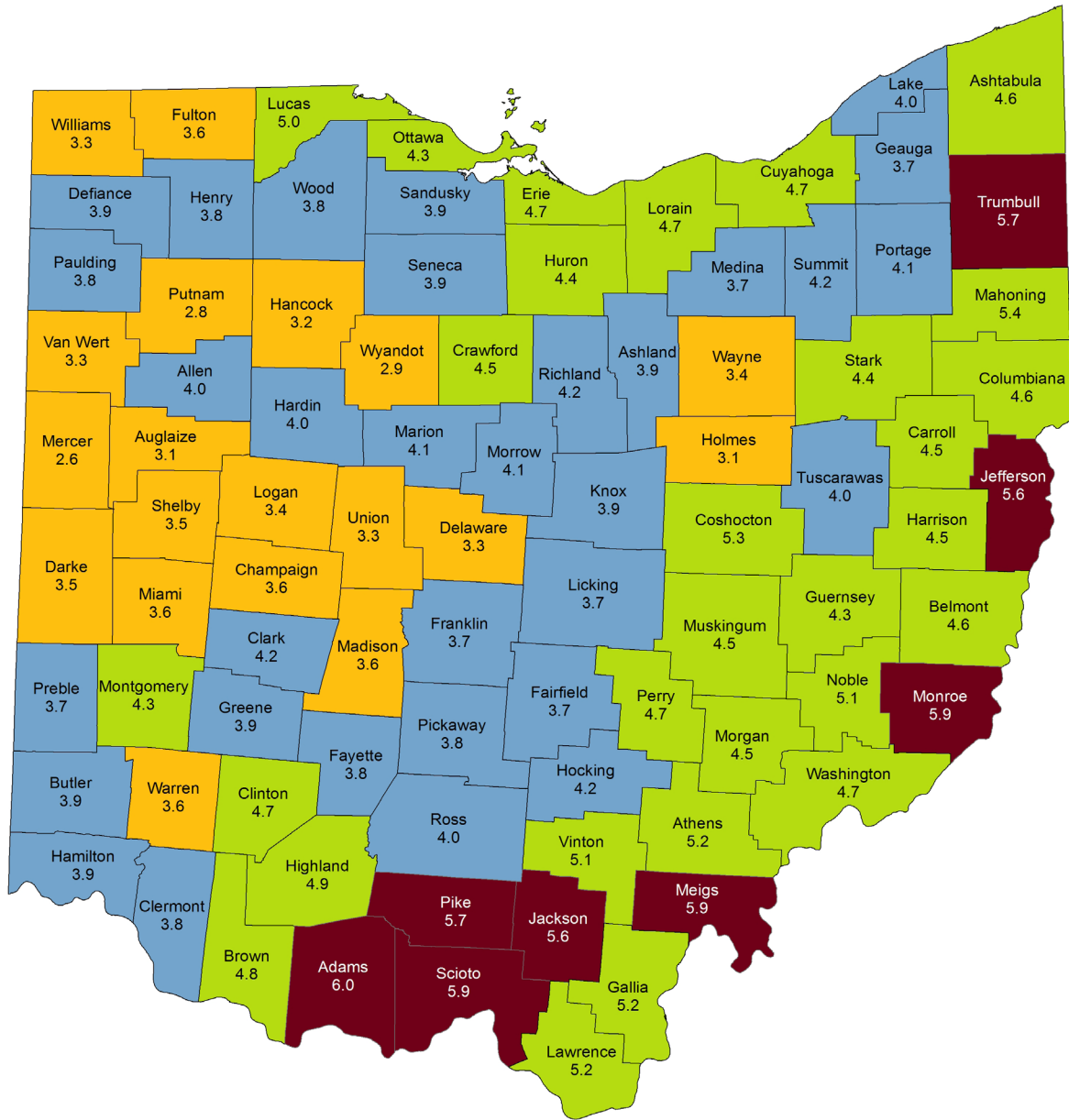


6.1% or Higher



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 SEPTEMBER 2018 (Not Seasonally Adjusted)



### Unemployment Rates

Not Seasonally Adjusted    Seasonally Adjusted

United States

3.6%

3.7%

3.6% or Lower



Ohio

4.2%

4.6%

3.7% to 4.2%



4.3% to 5.5%



5.6% or Higher



Source: Ohio Department of Job and Family Services  
Office of Workforce Development  
Bureau of Labor Market Information  
\*Data based on 2018 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 12<sup>th</sup> 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 12<sup>th</sup> 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 142,000 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 12<sup>th</sup> 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 12<sup>th</sup> 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](https://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:** Gartner TalentNeuron™

Gartner TalentNeuron™ provides real-time insight into the employment marketplace through its 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.

## DEFINITIONS

### NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CHANGES

NAICS, established in 1997, is reviewed for potential revisions every five years. The latest revision, in 2017, was implemented by BLS in the QCEW program with the release of first quarter 2017 data. As part of this revision, the NAICS code of two core shale-related industries were impacted: NAICS 211111 (Crude Petroleum and Natural Gas Extraction) and NAICS 211112 (Natural Gas Liquid Extraction). The NAICS 2017 structure regrouped those NAICS into 211120 (Crude Petroleum Extraction) and 211130 (Natural Gas Extraction). A portion of the former 211111 was moved to 211120; while 211130 contains all of 211112 and a portion of 211111. These data are comparable at the 4-digit level, as all are contained within 2111 (Oil and Gas Extraction), but they are not comparable at 5- or 6-digit level. Because the employment from year 2011 is not defined in NAICS 2017 codes and year 2017 employment is not defined under old codes, we provide only the 4-digit level data for NAICS 2111 on page 6.

#### Core Shale-Related Industries (NAICS):

Crude Petroleum Extraction (211120); Natural Gas Extraction (211130); 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](http://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.

**Mike DeWine, Governor**  
State of Ohio

**Kimberly Hall, Director**  
Ohio Department of Job and Family Services

**October 2019**

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