

ANNUAL REPORT

ODNR DIVISION OF OIL AND GAS RESOURCES MANAGEMENT | 2019



The Division of Oil and Gas Resources Management, (“Division”), is a division within the Ohio Department of Natural Resources (ODNR). Its mission is to provide for safe and environmentally sound development and restoration of fossil fuel extraction sites with a vision to lead change in Ohio through innovation, excellence, and partnering in natural resources stewardship. The Division is governed by the authority of Chapter 1509 of the Ohio Revised Code (ORC) and Chapter 1501:9 of the Ohio Administrative Code (OAC), and regulates all oil and gas drilling, completion, production, underground injection, brine hauling, waste facilities, and plugging activities. The Division has sole and exclusive authority to regulate the permitting, location, and spacing of oil and gas wells within the state. The Division also plugs abandoned oil and gas wells through the Orphan Well program.

The Division’s organizational structure is comprised of multiple sections, composed of various program areas, each with oversight performed by the Division’s Administration section. Expertise is provided by a professional staff of geologists, soil scientists, radiologists, geoscientists and hydrogeologists. Program support services include permitting, bonding, underground injection control, hydrology, seismic, radiology, engineering, field inspection and enforcement, legal, and administration support. The expansion of the Division’s authority is directly correlated with the passage of many significant laws and rules over this time that have shaped Ohio’s oil and gas development.

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INTRODUCTION

This fifty-fifth edition of the Ohio Oil & Gas Summary (The McCormac Report) remains dedicated to accurately presenting statistics that may reflect trends important to Ohio's oil and gas industry, citizens and other governmental agencies. This report includes data submitted through October 15, 2020.

Horizontal shale activity slightly decreased in 2019; however, its impact on permitting, drilling and production was significant and is reflected throughout the report.

Highlights include:

- 6,097 registered well owners, including 4,648 domestic owners operating 65,122 wells.
- Issued 817 permits, including 463 drilling permits.
- Issued 61 urbanized area permits in six counties.
- Drilled an estimated 292 oil and gas wells in 28 of Ohio's 88 counties.
- 237 wells were drilled to the Utica/Point Pleasant Shale formations accounting for 81% of all wells drilled.
- Jefferson County was the most active county with 59 wells drilled.
- The horizontal rig count averaged 15 rigs per week; the vertical rig count averaged 13 per week.
- 330 wells were plugged, including 69 contracted by the Orphan Well Program.
- Produced a record 27,662,040 barrels of crude oil, at an average price of \$53.08 per barrel.
- Produced a record 2,616 billion cubic feet of natural gas, at an average price of \$2.21 per mcf.
- The combined market value of crude oil and natural gas production was \$5,781,853,897.

To make oil and gas well data more accessible, the division:

- Posts updated shale development activity weekly and cumulatively on our website.
- Operators of horizontal oil and gas wells in Ohio are required to submit production data quarterly. This information is posted on our website.
- An annual spreadsheet combining all four quarters of horizontal production was compiled and posted on our website.

Mike McCormac

PERMITTING

The permitting section includes geologists, environmental specialists and administrative professionals who review and approve permit applications for all oil and gas operations in Ohio. This requires an understanding of local stratigraphy, groundwater hydrology, petroleum geology, as well as knowledge of geographic information systems, cartography, potential hazards, and drilling and well construction practices. The technical review process ensures compliance with all applicable statutes and rules and includes approval of a casing program that protects all usable groundwater from contamination. The permitting section also designs and implements terms or conditions to the permit which can reasonably be expected to prevent violations that would present an imminent danger to public health, safety or the environment. Permitting geologists team with the division’s legal section and participate in monthly hearings during which shale company applicants present evidence in support of requests for unitization to form legal drilling units.

The Division issued 817 permits, a decrease of 20 (-2.4%) from 2018 (Figure 1). This total includes permits issued to convert, deepen, drill, plug back, plug and abandon, reissue and reopen.

Permits issued to drill for oil and gas totaled 463, a 10.8% increase (45 permits) from last year. These permits included 433 new permits and 30 reissued permits. Unconventional horizontal drilling permits far outnumber conventional vertical drilling permits issued each year in Ohio. There were 380 (82% of all permits) unconventional well drilling permits issued compared to 83 conventional well drilling permits. Utica/Point Pleasant shale permits increased by 45 for a total of 363, accounting for 78% of all drilling permits. Clinton sandstone permits increased by two for a total of 38 (8%). Deep well permits decreased by nine for a total of 24 (5%). Deep well permits are those issued to drill to formations below the Cambro-Ordovician Knox unconformity such as the Beekmantown dolomite, Rose Run sandstone, Trempealeau dolomite and to the Precambrian granite. There were 17 permits issued for the Marcellus shale. There were 8 permits issued for the Trenton/Black River formations.

Three hundred and twenty-five plugging permits were issued, a decrease of 61 (-15.8%) from 2018.

Notable permitting highlights for 2019 include:

- Issued 61 urbanized area drilling permits (an increase of 37) in six counties. All but five were horizontal permits. The top counties were Belmont (43) and Jefferson (13);
- Reviewed one mandatory pooling application;
- Participated in 42 unitization hearings;
- Processed 57,917 production reports for 2019.

Source: ODNR, Division of Oil and Gas

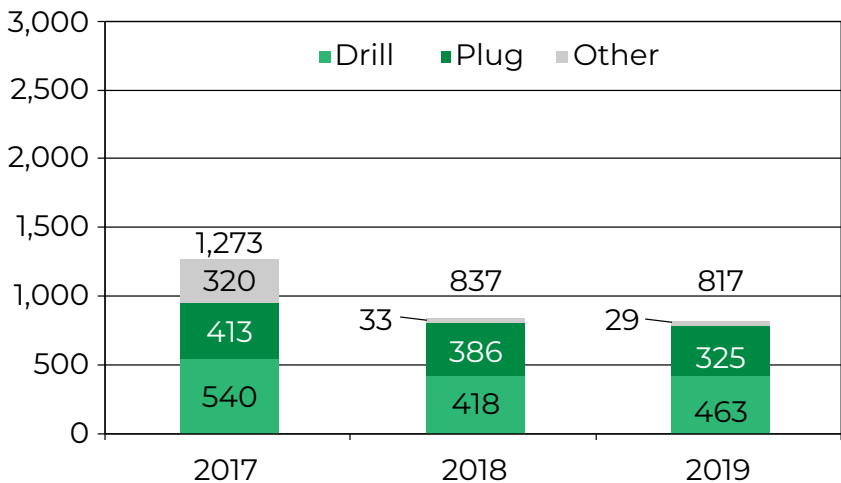


Figure 1. Oil and gas permits issued 2017 – 2019

DIRECTIONAL AND HORIZONTAL DRILLING PERMITS

This technology is used to access oil and gas under environmentally sensitive or densely populated areas, and to drill horizontally to enhance production. There were 310 horizontal permits and two directional drilling permits issued to drill oil and gas wells in 12 counties, an increase of 2 permits from 2018. Permits were issued to these formations: Utica/Point Pleasant Shale (293), Marcellus Shale (13), Clinton sandstone (4) and Rose Run Sandstone (2). The most active counties were Harrison (68), Jefferson (62), Belmont (59), Monroe (48) and Guernsey (40).

BONDING / OWNERSHIP

Oil and gas well bond release does not occur until an owner has successfully plugged and restored or transferred ownership and liability of all oil and gas wells under the owner's permits in Ohio. During 2019, 107 bonds were released, and 179 new owners were registered.

Section staff also manages all information and records concerning current well ownership and well transfers. During 2019, records were managed for 6,097 registered well owners, including 4,648 domestic owners and 1,449 commercial owners. Staff also recorded 3,476 changes in well ownership. There are 65,122 active wells in Ohio.

DRILLING

An estimated 292 oil and gas wells were drilled, which was a decrease of 10 wells (3%) from 2018 (Figure 2) (Appendix I). Drilling to the Utica/Point Pleasant shales accounted for 237 wells of the wells drilled in 2019. Wells were drilled in 28 of Ohio's 88 counties, an increase of two (Figure 3).

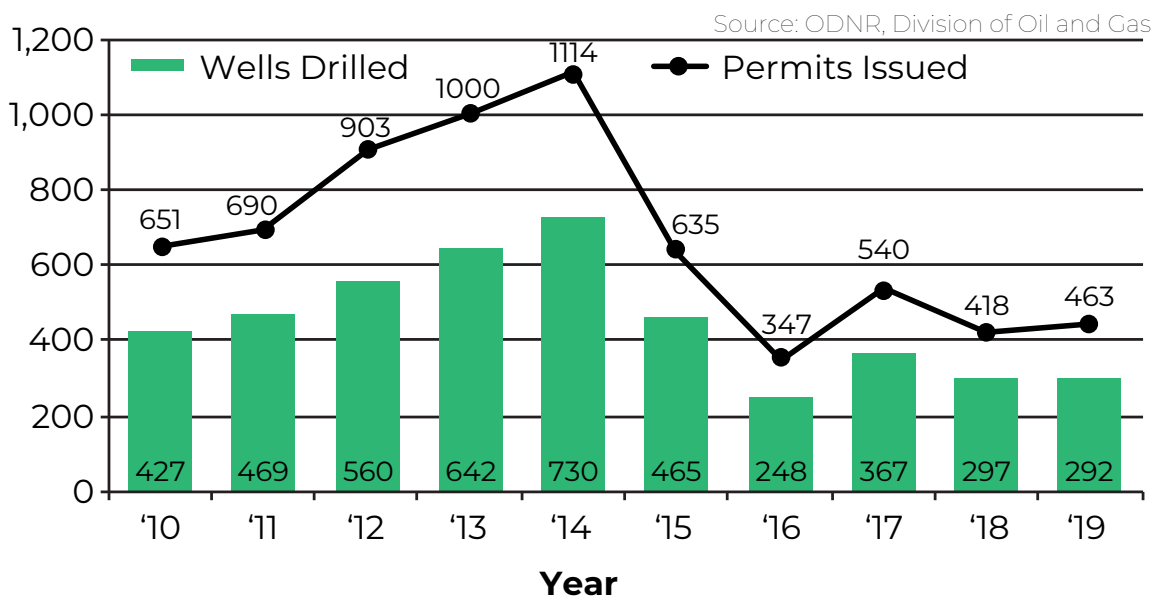


Figure 2. Wells drilled vs. permits issued 2010 – 2019

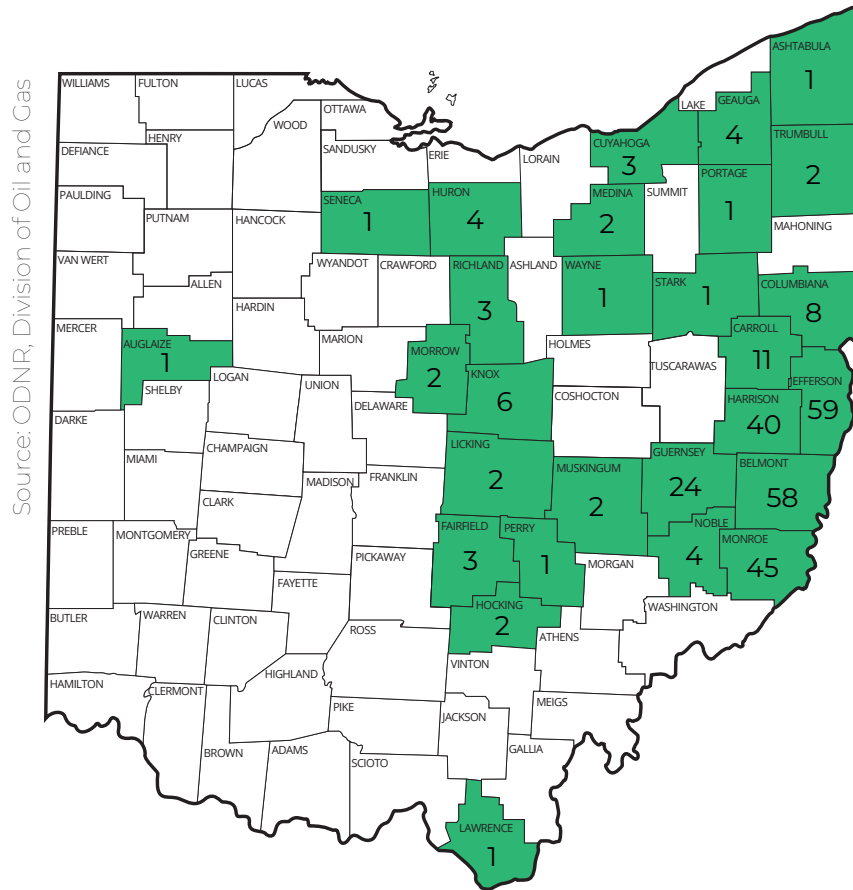


Figure 3. Wells drilled by county – 2019

COMPLETIONS

The majority of well completion reports had been submitted to the Division by July 2019 and an estimate was made for the missing reports in order to completely account for every well drilled. Of these, 280 were productive and 12 were dry holes, for a 96% productive rate (Table I).

- Total footage is estimated at 5,197,646 feet compared to 5,580,986 for 2018.
- The median well depth was 20,136 feet compared to 20,000 feet in 2018.
- Total depths ranged from 708 feet in the Berea Sandstone (Licking County) to 30,530 feet in the Utica/Point Pleasant Shale for a horizontal well (Monroe County).

A summary of oil and gas completion statistics by county appears in Table II.

Completion zones ranged from the Pennsylvanian Cow Run Sandstone to the Cambrian Trempealeau dolomite. Only five counties had wells drilled to two different geologic zones. The Clinton sandstone and Utica/Point Pleasant shales accounted for 91% of all wells drilled. A summary of oil and gas completion statistics by producing zones appears in Table III.

Source: ODNR, Division of Oil and Gas

TABLE I – DRILLING OPERATIONS BY TYPE OF WELL – 2019			
	DRILLED	CONVERTED	TOTAL FOOTAGE
PRODUCTIVE WELLS	280		5,156,844
DRY HOLES	12		40,802
REOPENED WELLS	0		0
LOST HOLES	0		0
GAS STORAGE WELLS	6	0	34,953
CONVENTIONAL BRINE INJECTION WELLS	2	0	13,835
STRATIGRAPHIC TEST WELLS	2		11,150
SOLUTION MINING WELLS	3	0	7,850
TOTAL	305	0	5,265,434

Source: ODNR, Division of Oil and Gas

TABLE II – OIL AND GAS COMPLETION STATISTICS BY COUNTY – 2019												
COUNTY	DEPTH RANGE OF RESERVOIRS		MAJOR TARGETED RESERVOIRS	DEVELOPMENT		EXPLORATORY		TOTAL WELLS	PERCENT PRODUCTIVE	DRILLED FOOTAGE		
	SHALLOW	DEEP		PRODUCTIVE	DRY	PRODUCTIVE	DRY			PRODUCTIVE	DRY	TOTAL
Ashtabula	5,800	5,825	Rose Run	0	1	0	0	1	0.00	0	5,716	5,716
Auglaize	1,388	1,443	Trenton	1	0	0	0	1	100.00	1,443	0	1,443
Belmont	8,498	28,870	Point Pleasant	55	0	3	0	58	100.00	1,276,947	0	1,276,947
Carroll	5,402	15,531	Clinton	11	0	0	0	11	100.00	91,911	0	91,911
Columbiana	5,530	15,868	Point Pleasant	7	0	1	0	8	100.00	109,235	0	109,235
Cuyahoga	2,578	2,690	Clinton	3	0	0	0	3	100.00	8,783	0	8,783
Fairfield	3,544	3,990	Rose Run	0	0	0	3	3	0.00	0	11,674	11,674
Geauga	4,222	4,289	Clinton	4	0	0	0	4	100.00	17,036	0	17,036
Guernsey	7,222	22,852	Point Pleasant	23	0	1	0	24	100.00	478,029	0	478,029
Harrison	7,707	26,744	Point Pleasant	40	0	0	0	40	100.00	858,818	0	858,818
Hocking	3,330	3,352	Clinton	2	0	0	0	2	100.00	6,969	0	6,969
Huron	3,252	3,440	Trempealeau	0	4	0	0	4	0.00	0	13,315	13,315
Jefferson	8,729	27,537	Point Pleasant	55	0	4	0	59	100.00	1,244,885	0	1,244,885
Knox	674	2,870	Clinton	6	0	0	0	6	100.00	15,656	0	15,656
Lawrence	705	716	Cow Run	0	1	0	0	1	0.00	0	800	800
Licking	705	3,832	Berea/Rose Run	1	1	0	0	2	50.00	708	3,832	4,540
Medina	5,194	5,240	Trempealeau	2	0	0	0	2	100.00	10,521	0	10,521
Monroe	1,978	30,530	Point Pleasant	41	0	4	0	45	100.00	913,494	0	913,494
Morrow	3,098	3,173	Trempealeau	1	0	0	1	2	50.00	3,112	3,160	6,272
Muskingum	2,927	3,005	Clinton	2	0	0	0	2	100.00	6,010	0	6,010
Noble	8,250	18,791	Point Pleasant	4	0	0	0	4	100.00	67,743	0	67,743
Perry	1,150	1,200	Berea	1	0	0	0	1	100.00	1,200	0	1,200
Portage	4,940	6,800	Clinton	1	0	0	0	1	100.00	6,992	0	6,992
Richland	4,456	4,606	Trempealeau	3	0	0	0	3	100.00	13,789	0	13,789
Seneca	2,014	2,110	Trempealeau	0	0	0	1	1	0.00	0	2,305	2,305
Stark	5,108	5,180	Clinton	1	0	0	0	1	100.00	5,326	0	5,326

TABLE II – OIL AND GAS COMPLETION STATISTICS BY COUNTY – 2019

COUNTY	DEPTH RANGE OF RESERVOIRS		MAJOR TARGETED RESERVOIRS	DEVELOPMENT		EXPLORATORY		TOTAL WELLS	PERCENT PRODUCTIVE	DRILLED FOOTAGE		
	SHALLOW	DEEP		PRODUCTIVE	DRY	PRODUCTIVE	DRY			PRODUCTIVE	DRY	TOTAL
Trumbull	4,010	6,520	Clinton	2	0	0	0	2	100.00	12,798	0	12,798
Wayne	5,354	5,374	Trempealeau	0	0	1	0	1	100.00	5,439	0	5,439
TOTAL				266	7	14	5	292	95.89%	5,156,844		5,197,646

Source: ODNR, Division of Oil and Gas

TABLE III - OIL AND GAS COMPLETION STATISTICS BY PRODUCING ZONE – 2019

PRODUCING ZONES	DEPTH RANGE OF RESERVOIRS		DEVELOPMENT		EXPLORATORY		TOTAL WELLS	PERCENT PRODUCTIVE	DRILLED FOOTAGE		
	SHALLOW	DEEP	PRODUCTIVE	DRY	PRODUCTIVE	DRY			PRODUCTIVE	DRY	TOTAL
"Pennsylvanian (Cow Run)"	705	716	0	1	0	0	1	0.00	0	800	800
"Mississippian (1st & 2nd Berea)"	674	1,200	3	0	0	0	3	100.00	3,086	0	3,086
"Devonian (Ohio Shale - Marcellus)"	1,978	3,990	3	0	0	0	3	100.00	9,569	0	9,569
"Devonian (Oriskany)"	-	-	0	0	0	0	0	0	0	0	0
"Silurian (Newburg)"	-	-	0	0	0	0	0	0	0	0	0
"Silurian (Clinton - Medina)"	2,578	6,800	29	0	0	0	29	100.00	129,756	0	129,756
"Ordovician (Utica/Point Pleasant)"	7,222	30,530	224	0	13	0	237	100.00	4,980,129	0	4,980,129
"Ordovician (Trenton-Black River)"	1,388	1,443	1	0	0	0	1	100.00	1,443	0	1,443
"Ordovician (Beekmantown)"	-	-	0	0	0	0	0	0	0	0	0
"Cambrian-Ordovician (Rose Run)"	3,544	5,825	0	2	0	3	5	0.00	0	21,222	21,222
"Cambrian (Trempealeau)"	2,014	5,374	6	4	1	2	13	53.85	32,861	18,780	51,641
"Cambrian (Mt. Simon)"	-	-	0	0	0	0	0	0	0	0	0
TOTAL			266	7	14	5	292	95.89%	5,156,844		5,197,646

FORMATION HIGHLIGHTS

The Utica/Point Pleasant shales were the most actively explored formations accounting for 81% of all wells drilled. Overall, 237 wells were drilled, a decrease of 16 wells from 2018. These wells were drilled in eight counties, the same as in 2018. Jefferson County (59) was the most active followed by Belmont (58), Monroe (42), Harrison (40) and Guernsey (24). The average depth per well was 21,013 feet, only a decrease of 13 feet per well. Production reports were submitted for 2,534 wells in 2019. Of these, 2,479 were commercial producing wells and 55 were waiting to be put into production (Appendix III). Additionally, 78 Point Pleasant wells were started in 2019 but will be completed in 2020.

The Clinton sandstone was the next most actively drilled zone accounting for ten percent of all wells drilled. Twenty-nine wells were drilled, fourteen more than the 15 wells drilled in 2018. Of these, three were drilled as horizontal wells. Clinton sandstone wells averaged 4,474 feet in depth, an increase of 253 feet per well. Clinton sandstone wells were drilled in ten counties, compared to six last year. The most active county was Carroll (8) followed by Knox (5) and Geauga (4).

Drilling to the Knox formations decreased by five wells to 18 wells drilled. Drilling occurred in these formations: Beekmantown (0), Rose Run (5) and Trempealeau (13). Drilling occurred in 9 counties with Huron (4) and Fairfield and Richland (3 each) the most active. The average depth was 4,108 feet.

There were three Ohio Shale wells drilled, one more than last year and no Marcellus Shale wells drilled. They were all drilled in Monroe County. The average depth was 3,190 feet.

There were three Berea Sandstone wells drilled, one more than last year. Drilling occurred in Knox, Licking and Perry Counties. The average depth was 1,029 feet.

WELLS COMPLETED BY MONTH AND OWNER

Drilling activity averaged 24 wells per month compared to 25 per month in 2018. May was the most active month with 33 wells (Figure 4).

Thirty-seven owners drilled wells in 2019, one less than in 2018. Eighty-four percent of these owners drilled less than 10 wells. The highest number of wells drilled by a single owner was 103 and the 10 most active operators drilled 80% (235) of all wells. Ten owners only drilled one well and 12 owners drilled horizontal shale wells.

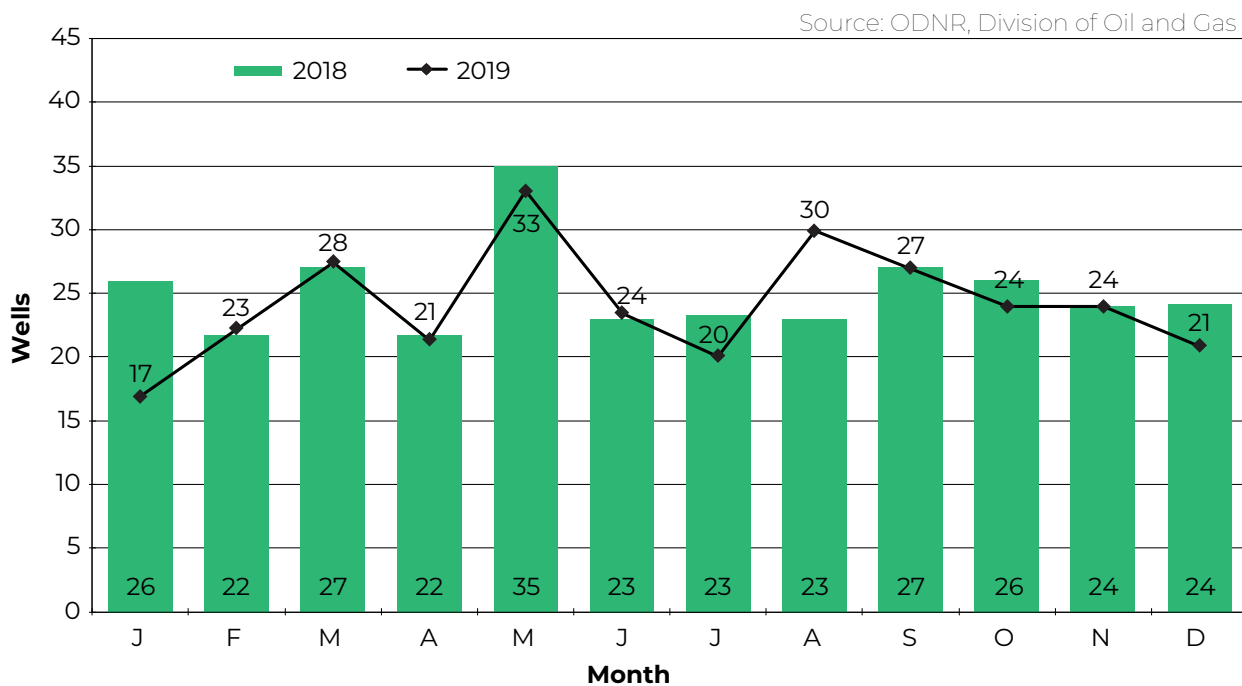


Figure 4. Wells completed by month – 2018 vs. 2019

WELLS COMPLETED BY TYPE OF TOOL AND RIG COUNT

Rotary tools drilled the majority of wells. Cable-tool rigs drilled seven wells and operated in four counties. Knox County (4) had the highest number of cable tool operations. Cable tool depths ranged from 708 feet (Licking County) to 2,900 feet (Knox County). These wells were drilled to the Berea sandstone (3), Clinton sandstone (3) and Trenton (1). The average depth per well drilled by cable tool was 1,885 feet, a decrease of 436 feet; rotary-drilled wells averaged 18,191 feet, a decrease of 305 feet per well.

The horizontal rig count for unconventional or shale wells averaged 15 rigs per week compared to 20 rigs per week in 2018. The vertical rig count for conventional wells averaged 13 rigs per week compared to 12 rigs per week in 2018 (Figure 5).

Source: ODNR, Division of Oil and Gas

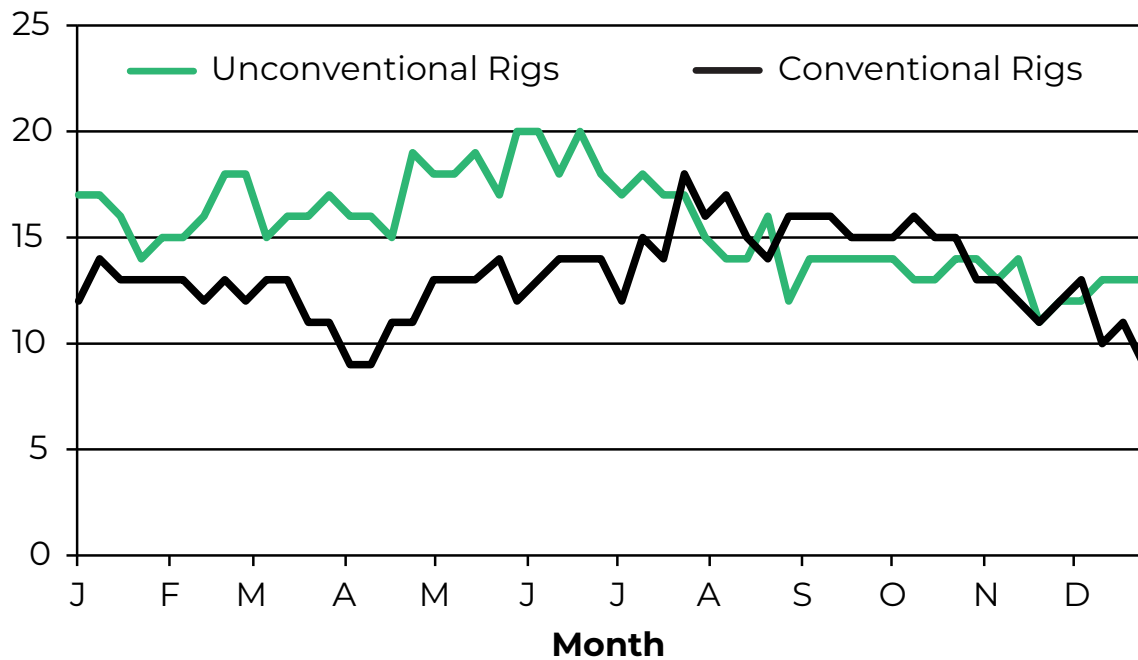


Figure 5. Horizontal (unconventional) vs. vertical (conventional) rig count by week – 2019

PLUG-BACK AND DEEPEN OPERATIONS

There were no wells plugged back to a shallower formation or drilled to a deeper formation.

TEN MOST ACTIVE COUNTIES

Jefferson County barely replaced Belmont County as the most active county with 59 wells drilled (Table IV). Belmont was second with 58 wells. Monroe was third with 45 wells followed by Harrison (40 wells). The focus of drilling to the Utica/Point Pleasant shales was clearly seen in these top-ten counties. All but three wells in the top five counties had these shales as the target. Wells in these top five counties also accounted for 77% of the wells drilled in 2019.

Nine of these counties were in the top-ten last year. The biggest decrease in drilling is reflected in the shale counties. They took place in Monroe (20) and Belmont (19) counties. The greatest increases were in Harrison (10) and Carroll (8) counties. Columbiana County was last in the top ten in 2017 and Geauga (2016).

Source: ODNR, Division of Oil and Gas

TABLE IV – TEN MOST ACTIVE COUNTIES – 2019					
2019 RANK	COUNTY	WELLS DRILLED	2018 RANK	AVG. DEPTH PER WELL	ESTIMATED FOOTAGE DRILLED
1	Jefferson	59	(3)	21,100	1,244,885
2	Belmont	58	(1)	22,016	1,276,947
3	Monroe	45	(2)	20,300	913,494
4	Harrison	40	(4)	21,470	858,818
5	Guernsey	24	(5)	19,918	478,029
6	Carroll	11	(10)	8,356	91,911
7	Columbiana	8	(17)	13,654	109,235
8	Knox	6	(7)	2,609	15,656
9	Geauga	4	(25)	4,259	17,036
9	Huron	4	(10)	3,329	13,315
9	Noble	4	(6)	16,936	67,743

EXPLORATORY WELLS

Exploratory drilling declined slightly in 2019. Nineteen wells (7%) were classified as exploratory which were 9 less than in 2018 (Figure 6). Of these, 14 were productive, representing a 74% success rate.

Exploration in the Utica/Point Pleasant Shales accounted for most of the wells with 13 wells compared to 11 in 2018. Drilling below the Knox unconformity decreased by one to 6 wells. Wells drilled to formations below the Knox unconformity such as the Beekmantown dolomite (0), Rose Run sandstone (3), Trempealeau dolomite (3), Pre-Cambrian (0), are almost always seismic prospects. Five of these wells were dry holes.

Wells were drilled in 9 counties. Jefferson and Monroe (4 each) were the most active counties, followed by Belmont and Fairfield (3 each).

Most exploratory wells were classified as ‘outposts’ (14) followed by ‘deeper pool wildcats’ and wildcats (2 each). Additionally, one other well was drilled as a ‘new pool wildcat.’

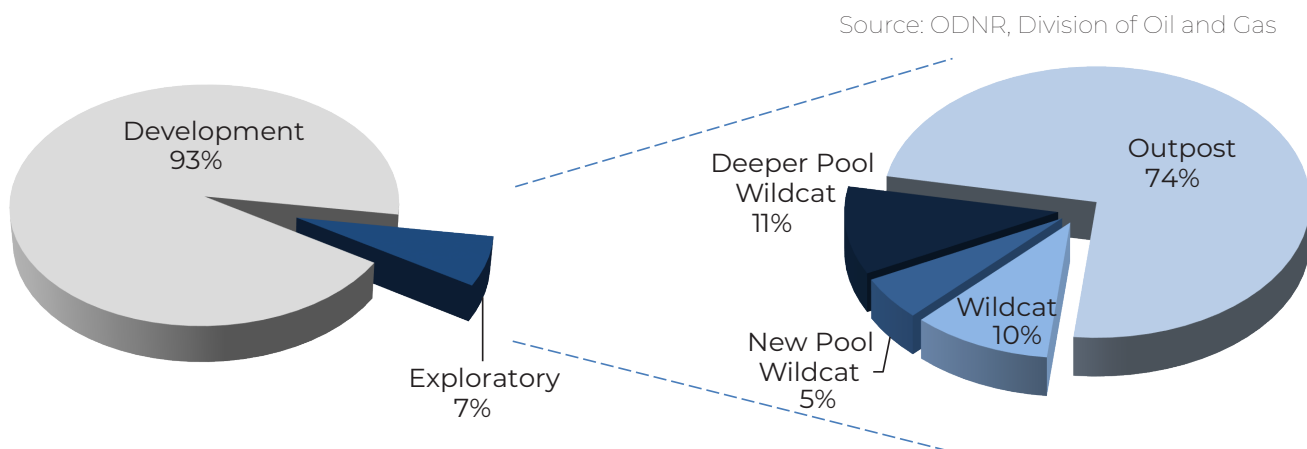


Figure 6. Development vs. exploratory wells – 2019

COUNTY DRILLING DEPTH RECORDS

There were no new drilling depth records in 2019 (Appendix II). Longer horizontal wells were continued to be drilled. There were 146 horizontal wells drilled greater than 20,000 feet, compared to 150 wells in 2018. In 2019, one well was drilled greater than 30,000 feet. In Monroe County, a horizontal well (Collectors Triangle #S U4H, Permit # 24845) was drilled 30,530 feet into the Point Pleasant Shale, making it the second longest well ever drilled in Ohio. The longest well is 30,676 feet in Monroe County in 2018.

PRODUCTION

Ohio's total reported crude oil production was 27,662,040 barrels, an increase of 4,906,288 barrels (21.6%) from 2018 (Figure 7, Table V). In 2019, daily production averaged 75,786 barrels compared to 62,345 barrels in 2018. Through 2019, Ohio wells have produced 1,287,848,827 barrels.

Ohio wells produced 2,616,223,483 mcf of natural gas, an increase of 218,524,712 mcf (9.1%) from 2018 (Figure 7, Table V). Gas production figures include an estimated 396,702 mcf of natural gas used on the lease. This is the record for natural gas produced; the previous record for natural gas production was 2,397,698,771 mcf last year. In 2019, daily production averaged 7,167,736 mcf compared to 6,569,038 mcf in 2018. Through 2019, Ohio wells have cumulatively produced 18,591,325,514 mcf of natural gas.

This year's production was influenced by the producing horizontal wells from the Marcellus and Utica/Point Pleasant shale formations. Wells producing from the Marcellus and Utica/Point Pleasant shale formations reported 24,906,277 barrels of oil (90.0% of total production) and 2,575,317,587 mcf of natural gas (98.4% of total production) (Appendix III).

The 2019 production numbers are an estimate based on available data reported to the Division of Oil & Gas Resources Management; oil reserve, gas reserve and gas consumption totals are based on data from the Department of Energy, Energy Information Administration.

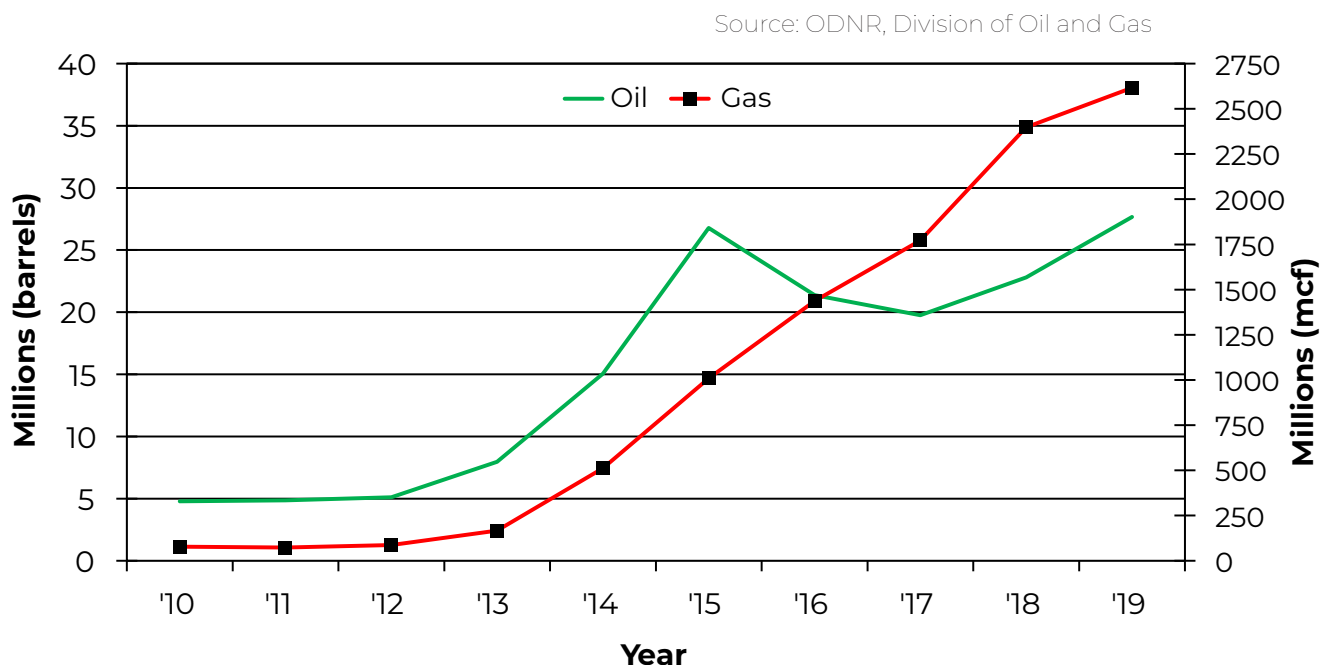


Figure 7. Oil and gas production 2010 – 2019

Source: ODNR, Division of Oil and Gas

TABLE V – CRUDE OIL & NATURAL GAS PRODUCTION, RESERVES & CONSUMPTION – 2010 – 2019					
	OIL (thousands of barrels)		GAS (mmcf)		
YEAR	PRODUCTION	RESERVES	PRODUCTION	RESERVES	CONSUMPTION
2010	4,785	42,000	78,122	832,000	784,293
2011	4,853	41,000	73,290	758,000	823,548
2012	4,974	39,000	86,700	1,233,000	842,959
2013	8,006	42,000	167,008	3,161,000	912,403
2014	15,061	78,000	512,777	6,723,000	1,002,345
2015	26,785	62,000	1,009,049	12,104,000	966,492
2016	21,367	38,000	1,437,006	15,143,000	928,492
2017	20,093	47,000	1,771,294	26,123,000	948,324
2018	22,795	80,000	2,398,387	23,759,000	1,162,745
2019	27,622	N/A	2,616,223	N/A	1,179,077

MARKET VALUE

Crude oil production valued at \$1,468,301,083 increased 7.3% (\$99,770,158) from its 2018 value. The average price per barrel was \$53.08, a decrease of \$7.06 from 2018's average price of \$60.14 per barrel (Table VI). Posted oil prices ranged from a low of \$41.41 (January 1st) to a high of \$62.30 (April 23rd) per barrel.

The market value of natural gas decreased 17.4% (\$1,219,426,515) to \$5,781,853,897. The average price paid per mcf was \$2.21 in 2019, a decrease of \$.71 per mcf from 2018 (Table VI). The Appalachian price index ranged from a low of \$0.63 on October 5th to a high of \$4.09 on March 5th.

Ohio's combined oil and gas market value decreased by 13.4% (\$1,119,656,356). The total dollar value of \$7,250,154,981 is the second highest on record (Figure 8)..

Source: ODNR, Division of Oil and Gas

TABLE VI – AVERAGE WELLHEAD PRICE OF OIL AND GAS 2010 – 2019		
YEAR	OIL \$/Bbl	GAS \$/mcf
2010	\$74.42	\$4.68
2011	\$90.06	\$4.28
2012	\$92.05	\$2.86
2013	\$95.71	\$3.51
2014	\$79.92	\$3.78
2015	\$36.78	\$1.96
2016	\$39.36	\$2.36
2017	\$47.25	\$2.80
2018	\$60.14	\$2.92
2019	\$53.08	\$2.21

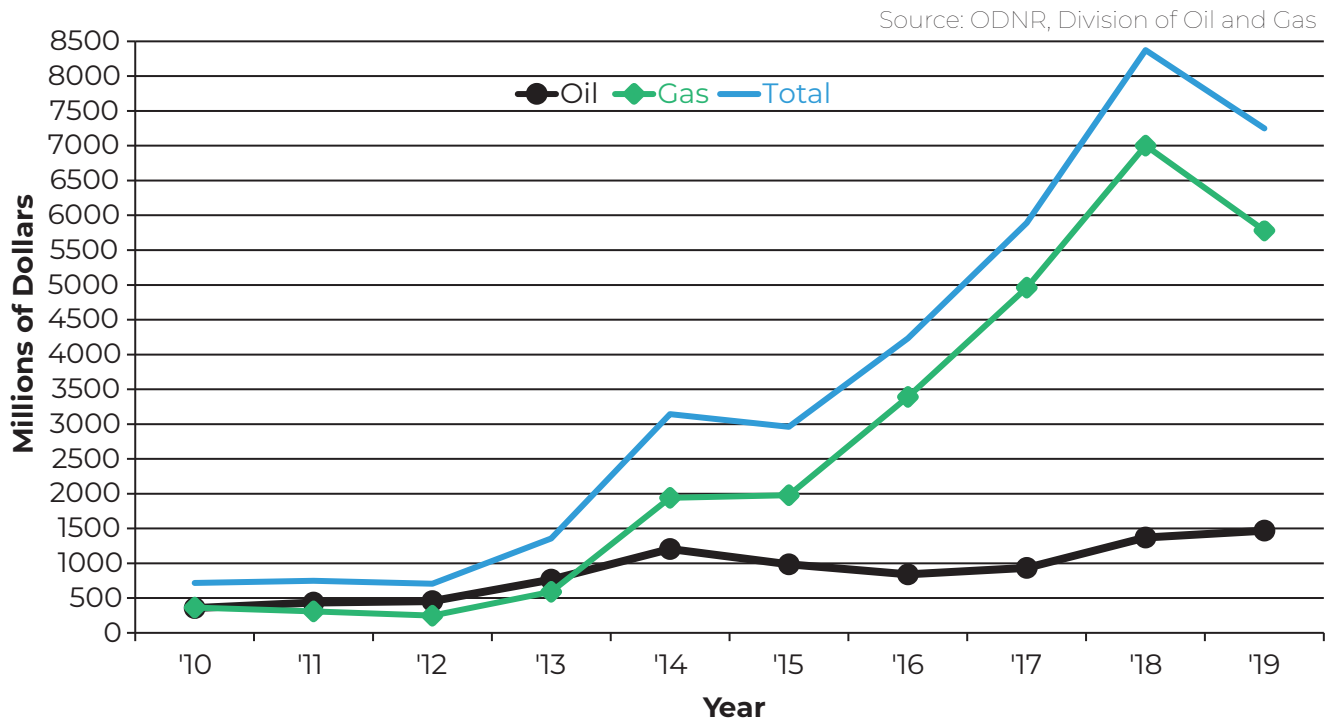


Figure 8. Dollar value of oil and gas 2010 – 2019

PLUGGING ACTIVITY

Plugging activity decreased by 4 wells. Figure 9 compares plugging and drilling activity. In 2019, 330 wells were plugged compared to 334 in 2018. This total does not include dry or lost holes that were plugged in 2019. Sixty-nine of these wells were plugged through the Orphan Well Program.

Wells were plugged in 48 counties (Figure 10). Licking County (22) was the most active plugging county followed by Trumbull (19), Knox and Washington (17 each), and Summit (16).

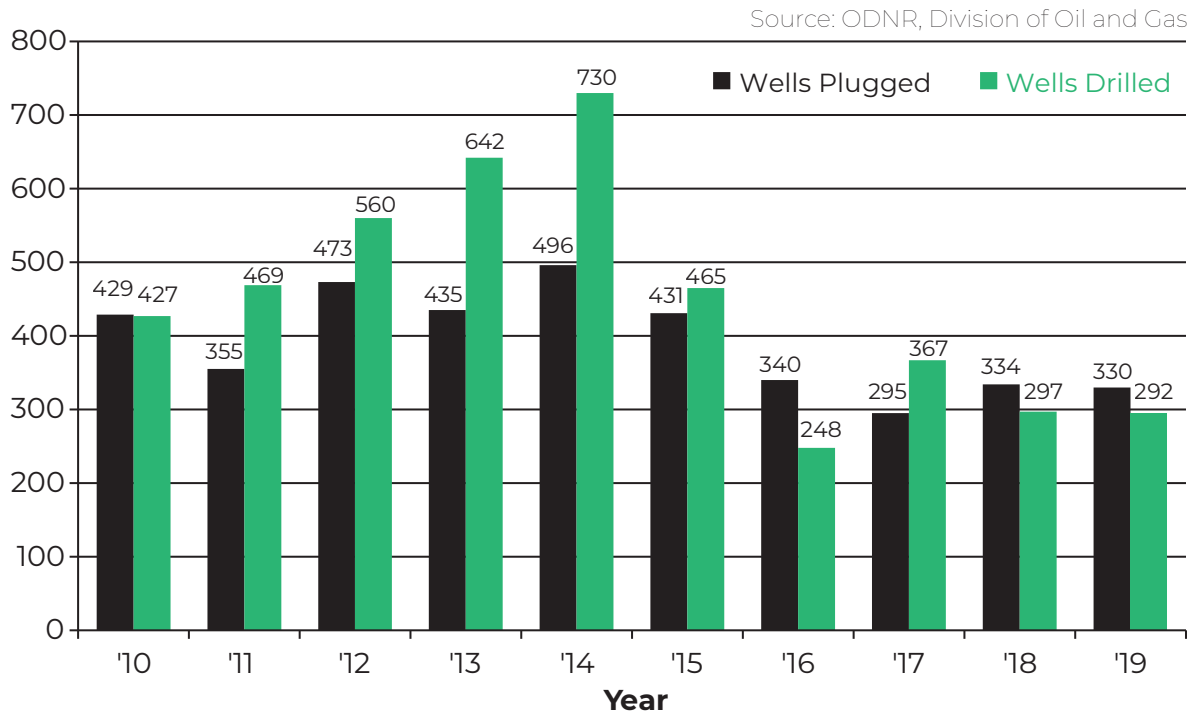


Figure 9. Wells plugged vs. wells drilled 2010 –2019

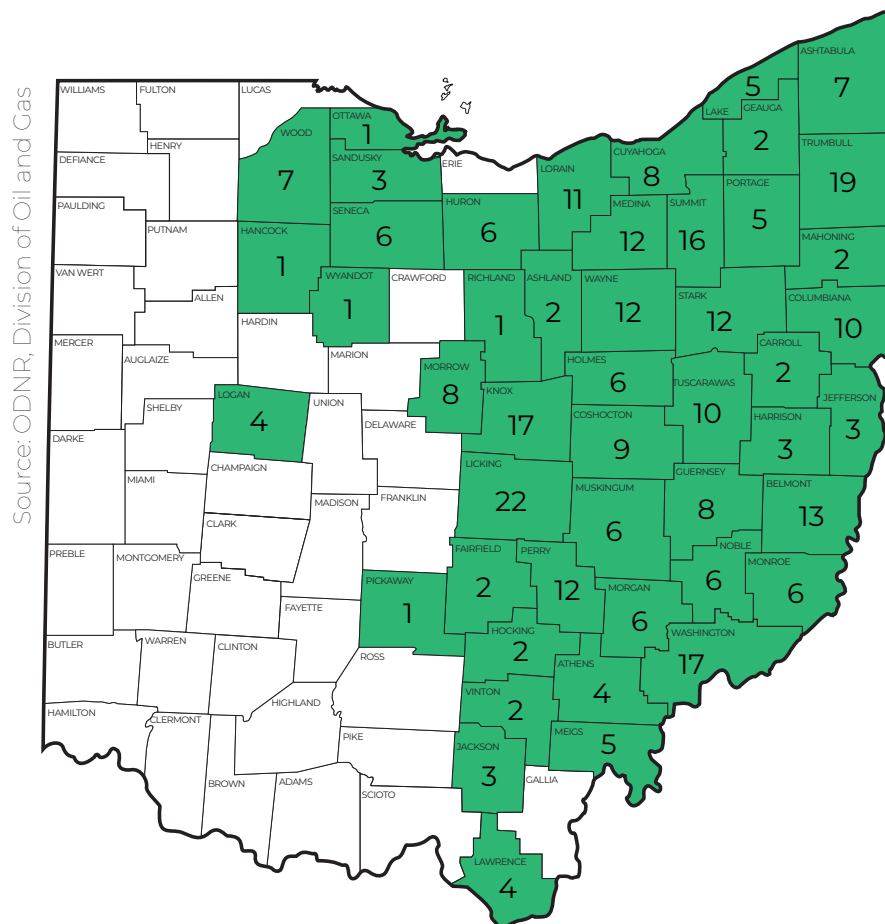


Figure 10. Wells plugged by county – 2019

Source: ODNR, Division of Oil and Gas

APPENDIX I – WELLS DRILLED IN OHIO 1888 – 2019										
YEAR	PRODUCTIVE	DRY	TOTAL	BEREA	OHIO SHALE	CLINTON	UTICA/ POINT PLEASANT	TRENTON	ROSE RUN	CAMBRIAN
Prior (a) 1888 (b)	6,022	---	6,022					2,234		
1888 (l)	617	---	617					542		
1889	1,590	132	1,722					702		
1890	2,497	96	2,593					2,151		
1891	1,709	56	1,765					1,572		
1892	1,551	38	1,589					1,465		
1893	2,067	46	2,113					1,877		
1894 (c)	3,216	85	3,301					3,001		
1895	6,020	127	6,147					5,559		
1896 (d)	5,600	856	6,456					4,339		
1897	3,442	300	3,742			987		2,755		
1898	3,338	172	3,510			132		2,852		
1899	6,399	408	6,807			151		4,469		
1900	6,098	457	6,555			116		5,013		
1901	4,559	573	5,132			148		3,524		
1902	5,651	649	6,300			306		4,213		
1903	5,880	777	6,657			352		4,072		
1904	4,974	858	5,832			382		3,141		
1905	3,027	680	3,707			400		1,578		
1906	2,903	681	3,584			388		1,535		
1907	2,146	611	2,757			521		890		
1908	2,083	695	2,778			522		848		
1909	2,881	966	3,847			694		873		
1910	2,059	670	2,729			668		572		
1911	2,270	507	2,777			641		527		
1912	3,527	956	4,483			926		551		
1913	2,560	603	3,163			643		972		
1914	2,371	534	2,905			943		861		
1915	1,672	498	2,170			952		260		
1916	2,028	525	2,553			469		699		
1917	1,864	504	2,368			587		535		
1918	1,708	446	2,154			605		466		
1919	2,486	585	3,071			940		385		
1920	2,421	722	3,143			1,240		565		
1921	1,675	620	2,295			853		461		
1922	1,989	607	2,596			906		522		
1923	1,779	537	2,316			642		697		
1924	1,704	439	2,143			605		592		
1925	1,680	414	2,094			434		627		
1926	1,722	382	2,104			522		460		

APPENDIX I – WELLS DRILLED IN OHIO 1888 – 2019										
YEAR	PRODUCTIVE	DRY	TOTAL	BEREA	OHIO SHALE	CLINTON	UTICA/ POINT PLEASANT	TRENTON	ROSE RUN	CAMBRIAN
1927	1,286	337	1,623					262		
1928	1,305	395	1,700					204		
1929	1,936	634	2,570					191		
1930	1,562	572	2,134					205		
1931	789	287	1,076					148		
1932	546	224	770					124		
1933	496	183	679					123		
1934	883	276	1,159					103		
1935	544	192	736					94		
1936	754	246	1,000					81		
1937	813	432	1,245							
1938	622	288	910							
1939	713	319	1,032							
1940	818	410	1,228							
1941	1,034	527	1,561							
1942	652	356	1,008							
1943	625	391	1,016							
1944	647	393	1,040							
1945	649	385	1,034							
1946	885	408	1,293							
1947	899	484	1,383							
1948	921	534	1,455							
1949	626	426	1,052							
1950 (2)	666	476	1,142	436	8	418		25		3
1951	626	435	1,061	394	10	406		18		6
1952	670	470	1,140	368	15	459		47		2
1953 (e)	711	386	1,097	359	21	402		30		6
1954	788	407	1,195	441	13	395		25		2
1955	898	336	1,234							
1956	878	367	1,245	364	13	663		32		5
1957	773	268	1,041	260	12	579		21		2
1958	852	316	1,168	303	13	650		19		5
1959	843	315	1,158	300	11	672		20		13
1960	707	309	1,016	218	5	597		7		20
1961	809	295	1,104	257	10	619		4		42
1962	820	326	1,146	358	2	542		10		72
1963 (f)	748	407	1,155	266	2	443		14	4	302
1964	1,075	1,579	2,654	197	2	499		34	9	1,800
1965 (g)	904	801	1,705	195	2	635		53	16	729
1966	872	399	1,271	227	4	692		18	8	261
1967	953	258	1,211	170	17	853		18	4	132

APPENDIX I – WELLS DRILLED IN OHIO 1888 – 2019										
YEAR	PRODUCTIVE	DRY	TOTAL	BEREA	OHIO SHALE	CLINTON	UTICA/ POINT PLEASANT	TRENTON	ROSE RUN	CAMBRIAN
1968	988	229	1,217	136	66	832		21	6	81
1969	926	183	1,109	104	17	863		13	10	56
1970	1,165	190	1,355	84	15	1,146		5	6	42
1971	1,065	173	1,238	98	11	1,038		5	5	37
1972	1,125	168	1,293	112	21	1,082		3	10	32
1973	1,337	166	1,503	76	31	1,345		5	5	26
1974	1,601	167	1,768	91	13	1,587		3	8	31
1975	1,105	115	1,220	62	6	1,103		5	17	22
1976	1,774	164	1,938	165	30	1,631		38	18	16
1977	2,455	171	2,626	390	34	2,083		33	11	15
1978 (h)	3,132	283	3,415	430	22	2,834		22	27	12
1979	3,480	179	3,659	542	131	2,848		22	29	23
1980	4,935	165	5,100	867	78	3,734		1	24	31
1981	5,685	400	6,085	733	543	4,366			16	50
1982	4,488	342	4,830	756	458	3,426			11	4
1983	4,000	299	4,299	557	533	3,203		1	7	51
1984	4,593	370	4,963	612	329	3,827			9	65
1985	3,546	214	3,760	345	315	3,042			19	94
1986	1,725	125	1,850	185	76	1,482			28	62
1987	1,721	161	1,882	153	40	1,454			70	55
1988	1,267	156	1,423	112	43	1,037			94	62
1989	1,153	159	1,312	69	145	890			92	77
1990	1,147	180	1,327	61	97	863			143	102
1991	1,001	170	1,171	89	89	794			116	108
1992	710	165	875	100	51	465			139	87
1993	643	180	823	60	35	330		2	260	89
1994	601	182	783	26	13	301		9	269	75
1995	507	163	670	25	11	253		2	202	94
1996	559	166	725	35	42	253		1	219	90
1997	620	178	798	33	20	277		0	223	110
1998	383	135	518	66	16	154		0	161	61
1999	407	95	502	32	65	177		5	106	55
2000	455	112	567	18	14	281		3	124	77
2001	599	100	699	36	29	396		1	113	58
2002	432	72	504	8	48	265		0	88	47
2003	455	65	520	30	60	258		2	82	40
2004 (i)	534	55	589	32	97	319		1	66	24
2005	658	69	727	48	116	409		7	45	50
2006	915	45	960	90	134	636		8	18	23
2007	1,022	46	1,068	90	157	672		7	35	32
2008	1,028	61	1,089	124	155	662		1	21	38

APPENDIX I – WELLS DRILLED IN OHIO 1888 – 2019										
YEAR	PRODUCTIVE	DRY	TOTAL	BEREA	OHIO SHALE	CLINTON	UTICA/ POINT PLEASANT	TRENTON	ROSE RUN	CAMBRIAN
2009	517	46	563	43	97	320		2	30	25
2010 (j)	382	45	427	47	40	228		5	18	42
2011 (k)	443	26	469	52	51	222	25	2	26	47
2012 (l)	522	38	560	40	76	169	198	8	14	40
2013	622	20	642	39	35	111	390	4	12	26
2014	713	17	730	27	18	92	535	4	10	33
2015	447	18	465	13	2	30	375	10	14	17
2016	243	5	248	8	1	14	207	3	5	9
2017	360	10	370	3	1	22	327	2	4	11
2018	290	12	302	2	3	15	253	5	9	14
2019	280	12	292	3	3	29	237	1	5	13
TOTAL (m)	225,124	42,728	267,852	13,074	4,693	81,069	2,547	71,159	3,140	5,923

REFERENCES

1. Years 1888-1950: Alkire, Robert L., 1951, Oil and Gas Production, History, Regulation, Secondary Recovery and Bibliography, 8, part 2 of Ohio Division of Geological Survey Report of Investigations: 45-46 pp.
2. Years 1950-2019: Statistics from Annual Oil & Gas Statistical Reports published by Ohio Divisions of Oil & Gas Resources Management and Geological Survey. Numbers were not available for blank formation fields.

HISTORICAL FOOTNOTES

- a Ohio lays claim to the first discovery of oil from a drilled well. In 1814, saltwater well drillers struck oil in Olive Township of Noble County at 475 feet.
- b Ohio's first commercial oil and gas well was put into production in 1860 at Macksburg in Washington County.
- c Alkire notes that the statistics for years 1894-1904 were incomplete and estimated that the total number of wells not accounted for during those years is approximately 12,000.
- d Ohio was the nation's leading oil producer in 1896.
- e Widespread acceptance of the hydraulic fracture method for increasing production in 1953.
- f Morrow County Oil Boom in 1963.
- g Creation of Ohio Division of Oil and Gas in 1965.
- h Natural Gas Policy Act tax credit in 1978.
- i Urbanized Drilling Law (HB 278) went into effect September 16, 2004.
- j Senate Bill 165 went into effect June 30, 2010.
- k The first horizontal Utica/Point Pleasant shale well was drilled and put into production June 14, 2011.
- l Senate Bill 315 went into effect September 10, 2012.
- m Total number of wells may actually be 279,852 (see footnote c).

Source: ODNR, Division of Oil and Gas

APPENDIX II – COUNTY DRILLING DEPTH RECORDS – 2019									
COUNTY	TOWNSHIP	PERMIT NO.	OPERATOR	WELL NO.	LEASE NAME	COMPLETION DATE	TOTAL DEPTH	FORMATION AT T.D.	WELL CLASS
ADAMS	FRANKLIN	11	OXFORD OIL CO.	1	J. RUSSELL & M. TENER	07/07/79	3,886	GRANITE WASH	FWC
ALLEN	SPENCER	64	ALCO OIL CO.	2	POHLMAN, FRUEND, ETZ HORN	12/31/65	3,266	GRANITE	FWC
ASHLAND	GREEN	4199	CABOT OIL & GAS CORP.	001V	T. KAMENIK	07/08/18	5,500	ROME	DPWC
ASHTABULA	NEW LYME	2272	POI ENERGY	1	LAUTANEN	09/01/85	7,124	GRANITE	DPWC
ATHENS	DOVER	3062	QUAKER STATE	2	MILLFIELD COAL & MINING	07/17/84	6,525	ROSE RUN	FWC
AUGLAIZE	ST. MARYS	71	WEST OHIO OIL & GAS	1	D. & B. HOELSCHER	12/05/70	3,067	GRANITE	DPWC
BELMONT	PEASE	611	DAVID R. HILL INC.	1	GEORGETOWN MARINE	12/06/10	13,727	GRANITE	DPWC
BROWN	STERLING	6	SPENCER PETROLEUM CORP.	1	GRIFFITH	03/13/93	3,350	GRANITE	FWC
BUTLER	LEMON	4	ARMCO STEEL CORP.	1	ARMCO STEEL CORP.	03/12/67	3,296	"MIDDLE RUN"	IWDW
CARROLL	LEE	2059	ANSCHUTZ EXPLOR. CORP.	1	WHITE	09/15/10	9,503	ROSE RUN	DPWC
CHAMPAIGN	WAYNE	20	INDUSTRIAL GAS ASSOC.	1	P. & C. HOFFMAN	06/26/78	3,325	MT. SIMON	FWC
CLARK	MADISON	D 2	T. D. FRIEND	1	MATTISON	06/14/26	4,647	PRE MT. SIMON	FWC
CLERMONT	STONELICK	3	CONTINENTAL OIL CO.	1	C. WIKOFF	07/03/60	3,435	MT. SIMON	FWC
CLINTON	WILSON	10	STOCKER & SITLER INC.	1	COY	01/18/83	3,603	GRANITE	FWC
COLUMBIANA	HANOVER	648	MANAGEMENT CONTROL	3	F. MURRAY	07/28/70	10,242	GRANITE	DPWC
COSHOCTON	CRAWFORD	6397	LAKE REGION OIL INC.	2	LEVI M. TROYER	07/23/92	7,950	MT. SIMON	DPWC
CRAWFORD	VERNON	6	HAYNES O&G ENTERPRISES	1	DON D. CRUM	01/09/63	3,879	EAU CLAIRE	FWC
CUYAHOGA	MAYFIELD	1625	BASS ENERGY CO. INC.	1	MARCONI MEDICAL SYSTEMS	03/07/01	6,550	GRANITE	DPWC
DARKE	GREENVILLE	13 A	UNKNOWN	1	EDWARD BARNES	05/26/06	2,850	CAMBRIAN	FWC
DEFIANCE	MARK	28	S. E. BROWN	1	P. HAVER	10/22/62	3,606	MT. SIMON	FWC
DELAWARE	TRENTON	354	R.C. POLING CO. INC.	1	COCKRELL-GODSHALL UNIT	01/22/91	4,873	GRANITE	DPWC
ERIE	FLORENCE	19	SUN OIL CO.	1	A. HERMAN ETAL.	05/01/67	4,466	GRANITE	SWIW
FAIRFIELD	RUSH CREEK	1136	HOPEWELL O. & G. DEV. CO.	1	R. BIGHAM	06/16/94	5,924	GRANITE	DPWC
FAYETTE	UNION	1	KEWANEE OIL CO.	1	E. HOPKINS	07/12/57	4,708	GRANITE	FWC
FRANKLIN	PLEASANT	7	BARNWELL PRODUCING CO.	1	OAKHURST COUNTRY CLUB	08/08/64	3,753	MT. SIMON	FWC
FULTON	CHESTER-FIELD	47	LIBERTY PETR. CORP.	1	CLYDE JOHNSTON	03/21/69	3,793	MT. SIMON	FWC
GALLIA	HARRISON	985	BAKERWELL INC.	1	JARRELL UNIT	03/24/04	7,146	TREMPEALEAU	FWC
GEAUGA	TROY	1534	LOMAK PETROLEUM	1	J. VOYTKO	07/01/88	6,888	TREMPEALEAU	DPWC
GREENE	ROSS	4	TATUM PETR. CO. LLC.	1	KELLY GREENE	08/17/10	3,347	GRANITE	FWC

APPENDIX II – COUNTY DRILLING DEPTH RECORDS – 2019

COUNTY	TOWNSHIP	PERMIT NO.	OPERATOR	WELL NO.	LEASE NAME	COMPLETION DATE	TOTAL DEPTH	FORMATION AT T.D.	WELL CLASS
GUERNSEY	CENTER	4473	CLEARWATER THREE LLC.	1	BO	06/27/15	9,268	ROME	SWIW
HAMILTON	CROSBY	1	CONTINENTAL OIL CO.	1	WALTER C. BRISBIN	11/01/59	2,730	EAU CLAIRE	FWC
HANCOCK	UNION	139	FRANK M. DEVER	1	C. & M. FRAZIER	06/02/64	3,017	GRANITE	FWC
HARDIN	DUDLEY	79	MCMAHON BULLINGTON	1	WOLF	01/07/64	3,002	KNOX	FWC
HARRISON	GREEN	355	STOCKER & SITLER INC.	1	CHARLENE SCHANEY ETAL.	07/30/79	10,288	TREMPEALEAU	DPWC
HENRY	HARRISON	36	CALLANDER & KIMBREL	1	K. HALL	10/10/73	3,480	GRANITE	DPWC
HIGHLAND	FAIRFIELD	7	OHIO VALLEY OIL & GAS	1	COURTNEY	01/20/72	3,610	GRANITE	FWC
HOCKING	STARR	1222	E. J. DUNIGAN	1	M. & H. HOCKMAN	06/30/66	6,495	MT. SIMON	FWC
HOLMES	SALT CREEK	1283	G.C. & J.A. PARKER	1	DAN D. TROYER	11/12/63	7,369	TREMPEALEAU	FWC
HURON	WAKEMAN	103	APPALACHIAN EXPLOR. INC.	1	WOLF	10/05/81	4,574	GRANITE WASH	FWC
JACKSON	FRANKLIN	76	WORTHINGTON OIL CO.	1	G. & I. WOOD	07/08/64	6,320	GRANITE	FWC
JEFFERSON	WARREN	536	CHESAPEAKE EXPL., LLC	25-5-2	CREAMER	10/10/12	10,320	TRENTON	ST
KNOX	PIKE	1413	DAVID L. CANTWAY	1	E. CUNNINGHAM	08/07/61	5,745	GRANITE	FWC
LAKE	LEROY	1094	GREAT PLAINS EXPL. LTD.	1	VROOMAN	01/24/04	6,355	GRANITE	DPWC
LAWRENCE	SYMMES	174	J. STANLEY GOLDBERG	1	A. PAYNE	04/01/66	7,002	GRANITE	FWC
LICKING	PERRY	4792	RONALD F. MORAN	1	RON MORAN	03/08/84	6,237	GRANITE	SWIW
LOGAN	JEFFERSON	86	WORTHINGTON OIL CO.	1	LENA COMER	05/11/76	3,402	MT. SIMON	FWC
LORAIN	GRAFTON	1370	KENOIL/KEN R. MILLER	1	LAWRENCE PALL	08/24/91	5,018	TREMPEALEAU	DPWC
LUCAS	HARDING	60	LIBERTY PETR. CORP.	1	KETRING UNIT	08/24/72	3,915	GRANITE	FWC
MADISON	FAIRFIELD	3	AMERADA PETR. CORP.	1	J. HUME	11/01/65	3,631	GRANITE	FWC
MAHONING	BEAVER	3158	D & L ENERGY, INC.	4	NORTHSTAR LUCKY	10/21/11	10,088	GRANITE	SWIW
MARION	CLARIDON	8	UNITED PRODUCING	1	H. & M. MITCHELL	03/14/62	3,672	GRANITE	FWC
MEDINA	HINCKLEY	1143	WISER OIL CO.	1A	F. L. SMITH	01/03/59	7,040	GRANITE	FWC
MEIGS	LEBANON	3651	MURPHY OIL CO.	3	M. MCKELVEY	02/10/09	9,082	TREMPEALEAU	DPWC
MERCER	CENTER	141	HARNER UNION OIL CO.	2	M. & M. YEWEY	02/09/71	3,215	GRANITE	DPWC
MIAMI	LOST CREEK	3	NATIONAL ASSOC. PETR.	1	E. WALKER	10/30/58	3,513	GRANITE	FWC
MONROE	OHIO	4305	PROTÉGÉ ENERGY II, LLC	1	DANGEL	01/18/12	10,980	TRENTON	ST
MONTGOMERY	MAD RIVER	D 2	DAYTON	M	DAYTON	01/1887	2,440	EAU CLAIRE	ST
MORGAN	CENTER	4533	ARTEX OIL COMPANY	1	BICKFORD UNIT	08/20/05	8,222	ROSE RUN	DPWC
MORROW	PERRY	3737	STAR EXPL. CORP.	1	R. & W. BREWER	12/19/86	5,000	GRANITE	DPWC

APPENDIX II – COUNTY DRILLING DEPTH RECORDS – 2019

COUNTY	TOWNSHIP	PERMIT NO.	OPERATOR	WELL NO.	LEASE NAME	COMPLETION DATE	TOTAL DEPTH	FORMATION AT T.D.	WELL CLASS
MUSKINGUM	UNION	8776	1960 WELL SERVICES, LLC.	1	GOFF SWD	05/14/13	8,014	MT. SIMON	SWIW
NOBLE	ELK	1278	AMERADA PETR. CORP.	1	R. ULLMAN	02/01/67	11,442	GRANITE	DPWC
OTTAWA	CARROLL	50	FRED E. FITZGERALD	1	RAYMOND ARNDT	08/07/68	2,287	ST. PETER	FWC
PAULDING	JACKSON	13	MT. PLEASANT MINES LTD.	1	H. & E. AREND	10/30/76	3,440	GRANITE	FWC
PERRY	JACKSON	6595	R.C. POLING CO. INC.	1	RUSH CREEK PARTNERS, ETAL.	04/20/85	6,395	GRANITE	SWIW
PICKAWAY	PICKAWAY	24	RAMCO OIL & GAS CORP.	1	M. KERNS	01/17/85	4,500	GRANITE	FWC
PIKE	BEAVER	1	FRANK D. STAHLER	1	R. BAPST	06/14/50	4,227	ST. PETER?	FWC
PORTAGE	DEERFIELD	2860	VIKING RESOURCES CORP.	1	VIKING RESOURCES CORP.	05/24/82	8,800	GRANITE WASH	DPWC
PREBLE	WASHINGTON	D 3	DOC TOLLIVER	3	A. H. CHRISTMAN	06/01/29	1,750	ST. PETER	FWC
PUTNAM	LIBERTY	31	OHIO OIL CO.	1	L. BARLAGE	03/21/44	3,377	GRANITE	FWC
RICHLAND	WASHINGTON	431	TRI STATE PRODUCING CO.	2	C. & K. SCOTT	09/05/66	5,503	GRANITE	DPWC
ROSS	GREEN	8	WELL SUPERVISION INC.	1	M. IMMELL	08/24/64	4,168	MT. SIMON	FWC
SANDUSKY	TOWNSEND	77	EAST OHIO GAS CO.	2	V. & I. HAFF	11/17/60	3,128	GRANITE	FWC
SCIOTO	GREEN	212	USS CHEMICALS/ US STEEL	1	USS CHEMICALS/ US STEEL	07/05/68	5,617	GRANITE	IWDW
SENECA	ADAMS	128	ASHLAND OIL	1	W. STIGAMIRE	01/24/65	3,175	MT. SIMON	FWC
SHELBY	SALEM	13	GUMP OIL CO.	1	J. & B. FOGY	11/10/56	3,360	GRANITE	FWC
STARK	PARIS	5052	VIKING RESOURCES CORP.	1	HANNA UNIT	09/02/97	8,292	ROSE RUN	POOL
SUMMIT	TWINSBURG	1591	K.S.T. OIL & GAS CO.	5	K.S.T. OIL & GAS CO.	07/18/84	7,225	GRANITE WASH	SWIW
TRUMBULL	LIBERTY	4043	D & L ENERGY, INC.	2	NORTHSTAR UNITED	08/21/11	9,038	GRANITE	SWIW
TUSCARAWAS	OXFORD	5465	RED HILL DEVELOPMENT	1	GENERAL CLAY	01/23/11	8,720	GRANITE	DPWC
UNION	DOVER	69	FUNK EXPLORATION	1	YODER	08/15/84	3,500	GRANITE	FWC
VAN WERT	JENNINGS	44	WEST OHIO GAS CO.	5	A. & M. MILLER	01/05/73	3,242	GRANITE	DPWC
VINTON	VINTON	924	COLUMBIA NAT. RES. INC.	723984	MORRIS	03/25/00	5,700	TREMPEALEAU	FWC
WARREN	WAYNE	C 2627	OHIO GEOLOGICAL SURVEY	DS 2	AMERICAN AGGREGATES CORP.	04/26/89	5,380	"MIDDLE RUN"	CORE
WASHINGTON	GRANDVIEW	9717	FLAT ROCK DEV. LLC	19	COLLINS	10/17/12	10,220	TRENTON	ST
WAYNE	CHIPPEWA	71	EAST OHIO GAS CO.	2	N. STEINER	08/12/61	6,919	GRANITE	DPWC
WILLIAMS	BRIDGEWATER	46	COLUMBIA GAS TRANS.	11061	COOK	12/31/71	4,497	GRANITE WASH	FWC
WOOD	LIBERTY	D 6	J. S. BRAILEY	1	S. KILLIAN	08/25/37	2,927	GRANITE	DPWC
WYANDOT	JACKSO	D 8	DIBBLE & MILLER	1	P. PARSELL	03/07/47	5,632	GRANITE	FWC

HORIZONTAL SHALE PRODUCTION BY COUNTY

Quarterly production reports for all horizontal wells drilled and completed in the Marcellus and Utica/Point Pleasant formation(s) have been combined into an annual report. The combined report and quarterly shale reports and can be found at: oilandgas.ohiodnr.gov (keyword oil and gas production).

The number of wells in production increased from 2,277 in the first quarter to 2,534 in the 4th quarter. Each quarter had production reports submitted on wells that were shut in and had not produced yet. Oil production increased from 5,073,536 barrels for the first quarter to 6,818,682 barrels for the fourth quarter. Natural gas production increased from 609,451,574 mcf for the first quarter to 677,685,505 mcf for the fourth quarter. Gas reporting totals include Natural Gas Liquids (NGL) as Ohio law does not require the separate reporting of them. Total horizontal shale production for 2019 was 24,906,277 barrels of oil and 2,575,317,587 mcf of natural gas.

Eighteen counties submitted production reports for 2019. The totals by county are listed in Appendix III. The top 3 counties for oil production were: Guernsey, Harrison, and Carroll. The top 3 counties for gas production were: Belmont, Monroe and Jefferson.

It is very unlikely that the wells are being produced at anything near full capacity. Wells produced at high initial rates have the potential of being permanently damaged. Additionally, some wells that were previously reported as productive have been shut-in temporarily as a safety precaution due to simultaneous operations occurring on the well pad.

Source: ODNR, Division of Oil and Gas

APPENDIX III – 2019 HORIZONTAL SHALE PRODUCTION BY COUNTY				
COUNTY	NUMBER OF WELLS	OIL TOTAL (bbls.)	GAS TOTAL (mcf)	BRINE TOTAL (bbls.)
BELMONT	534	717,607	932,941,074	11,302,988
CARROLL	475	2,525,261	98,526,219	1,101,827
COLUMBIANA	94	34,408	40,816,717	476,057
COSHOCTON	1	339	30,420	514
GUERNSEY	230	13,556,178	91,078,704	2,868,511
HARRISON	400	6,481,336	215,577,438	3,175,021
JEFFERSON	215	11	533,605,775	3,356,321
MAHONING	13	9,021	1,320,985	75,496
MONROE	368	757,131	564,465,665	9,715,296
MORGAN	2	8,004	179,896	3,126
MUSKINGUM	1	815	40,662	1,048
NOBLE	170	747,947	92,722,329	1,221,051
PORTAGE	3	341	53,347	250
STARK	2	2,301	98,144	1,092
TRUMBULL	7	4,111	443,632	4,947
TUSCARAWAS	7	30,361	427,703	8,603
WASHINGTON	11	31,017	2,958,453	48,708
WAYNE	1	88	30,424	136
TOTALS	2,534	24,906,277	2,575,317,587	33,360,992

**ODNR DIVISION OF OIL AND GAS RESOURCES
MANAGEMENT 2019**

**GOVERNOR MIKE DEWINE
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