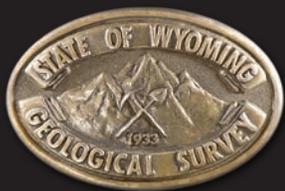


# Wyoming's Oil and Gas Resources Summary Report

By Ranie Lynds and Rachel Toner

## Wyoming State Geological Survey

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[www.wsgs.wyo.gov](http://www.wsgs.wyo.gov)

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*Photo courtesy of BLM.*

## Introduction

The year 2014 was one of growth for Wyoming's oil sector while natural gas continued at a steady decline. Oil and gas prices play a major role in drilling activity, often with a time lag of many months when it comes to production and economic impacts to industry and the state.

Wyoming is projected to have produced 75 million barrels of oil in 2014, compared to 63 million barrels in 2013. Projections for natural gas are at 1.9 trillion cubic feet produced in 2014, compared to 2 trillion cubic feet in 2013.

West Texas Intermediate (WTI) crude oil, used as a pricing benchmark, typically at about \$13 more than Wyoming crude oil, reached a high of \$107 a barrel in June but since then prices have dropped by 55 percent. Production of natural gas topped out at 183 million cubic feet in October, and monthly oil production reached a high of 7 million barrels.

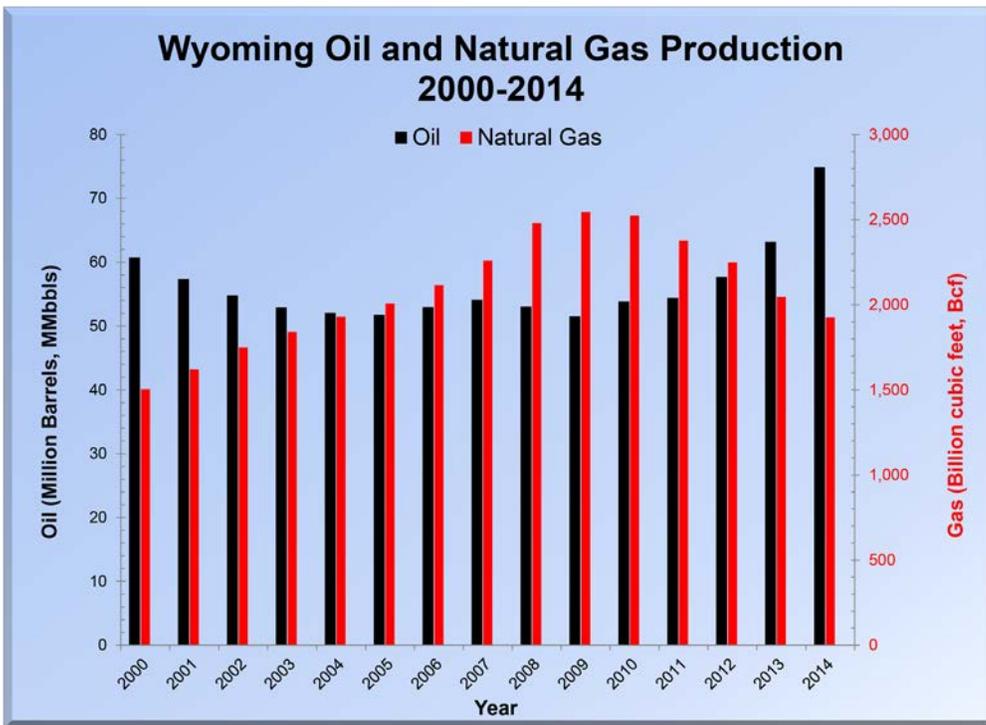
The total state oil production for 2014 is on track to reach levels not seen since 1996. Rig counts in Wyoming also peaked in October at 61 rigs. Operators focused their drilling efforts on horizontal oil wells in Campbell, Converse, and Laramie

counties, resulting in historic numbers of drilling permits and sharp increases in oil production in the Powder River and Denver basins. This momentum changed by late summer and fall when worldwide oil prices began declining. Economists attribute the drop in oil prices to higher supply and slowing growth around the world. WTI crude oil closed out the year at less than \$54 a barrel, and continued to fall below \$50 a barrel in January of 2015. The last time oil was traded at comparable prices was in 2009.

In response to declining oil prices, Wyoming drilling permits fell 57 percent from September to December. Average monthly rig counts also declined from 61 in late 2014 to 48 in January 2015.

Wyoming's oil and gas industry has experienced pricing highs and lows in the past. These swings naturally have an impact on the state's production of these resources, which then affects industry, employment, and ultimately the Wyoming economy. At this point, it is unclear what the specific long-term impacts will be from the recent price swings of oil and gas.

## Wyoming Oil and Natural Gas Production 2000-2014



Oil and natural gas production in Wyoming, 2000-2014.

## Oil and Gas Resources

Wyoming's geologic history has resulted in the generation of large reserves of oil and natural gas. These reserves underlie the state's fault-bounded Laramide basins that formed between the mountain ranges during the Late Cretaceous to Early Eocene epochs (80 to 35 million years ago). The WSGS tracks and records Wyoming's oil and gas production by basin (Bighorn, Wind River, Greater Green, Hanna, Laramie, Denver, and Powder River basins).

## New Technologies

Since the early 2000s, the application and refinement of technologies have allowed industry to produce from previously uneconomic oil and gas resources trapped in tight sands and shales. These unconventional reservoirs require hydraulic fracturing, which involves pumping a mixture of primarily water, proppant (sand or an artificial proppant), and some chemicals under very high pressure into a hydrocarbon-rich formation to create a network of fractures. Hydraulic fracturing and horizontal drilling have allowed for the rapid development of new unconventional plays in Wyoming and across the nation.

## National Impact of Unconventional Plays

Unprecedented U.S. oil production from unconventional reservoirs such as the Bakken in North Dakota and the Eagle Ford and Permian Basin plays in Texas have contributed to a national surge in production. This additional unconventional production, combined with sustained output from conventional oil-producing nations, has led to sharp increases in the amount of oil available on world markets. The U.S. Energy Information Administration (EIA) predicts 2014 and 2015 world production of approximately 92 million barrels per day, with consumption just below that number.

The supply of oil is outpacing world demand, which the EIA expects to continue this year and next. This has resulted in a six-month crude oil price decline of more than 55 percent. With such market volatility, the forecast for 2015 crude oil prices remains uncertain. In early January, the EIA predicted an average WTI crude oil price of \$54.58 per barrel, approximately 41 percent lower than the 2014 average price of \$93.26. Although this exact value is difficult to forecast, predictions indicate crude oil prices will average significantly less than 2014 crude oil prices.

## Unconventional Plays in Wyoming

Horizontal drilling and hydraulic fracturing continue to boost Wyoming oil production, especially in the Powder River and Denver basins. In the Powder River Basin, operators have been producing from Cretaceous tight sands and shales such as the Frontier, Cody, and Mesaverde, whereas in the Denver Basin, the Niobrara and Codell formations are the primary reservoir targets.

Wyoming produced more than 63 million barrels of oil in 2013, with nearly half originating from the Powder River Basin. Campbell County led the state in 2013's oil production, with more than 13 million barrels. Converse County ranked second with more than 8 million barrels. Also in 2013, horizontal well permit applications nearly doubled in Campbell County to 416 and increased by 42 percent in Converse County to 464.

The upswing in oil production continued into 2014. Without even considering fourth quarter production numbers, oil production in the Powder River and Denver basins increased 19 and 133 percent, respectively, compared to 2013. Final 2014 numbers from these two basins are expected to be even higher.

Wyoming ranks **5th** in U.S. natural **GAS** production and **8th** in **OIL**

Wyoming's natural gas production continued to fall in 2013, dropping 9 percent from 2012. Low gas prices and a steady drop in Wyoming's coalbed natural gas production (22 percent between 2012 and 2013) are two factors contributing to the decline. One exception was the Denver Basin, where natural gas production associated with prolific horizontal oil wells increased 21 percent from 2012 to 2013.

## Update on BLM Development Areas

There are currently nine oil and gas development areas within the state seeking permits from the Bureau of Land Management (BLM), and a tenth slated to be listed in the Federal Register in early 2015. These projects range from infill drilling (wells added in between producing wells on a lease) in established fields, such as the Moxa arch in southwestern Wyoming, to large predominantly gas projects in Sweetwater, Carbon, and Fremont counties, to new oil and gas development in Converse and Campbell counties. Most projects are in the midst of scoping, environmental assessments, or preparation of environmental impact statements, and if approved will come online over the next decade.

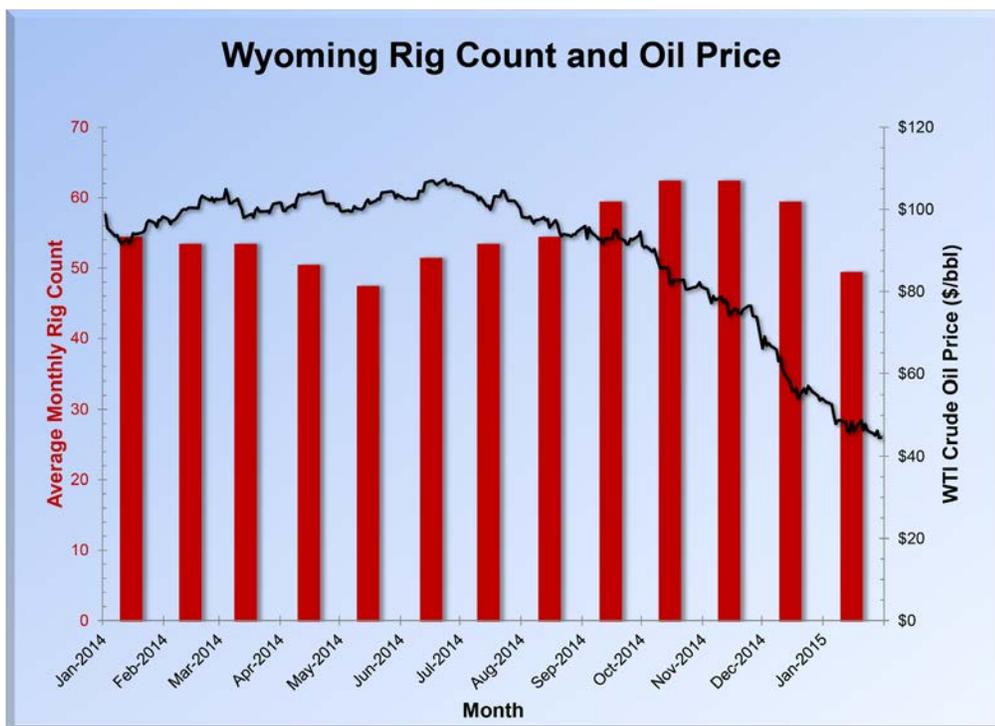
Additional information on BLM's oil and gas development areas, including a statewide clickable map, are available on the WSGS website at [www.wsgs.wyo.gov/development-areas/](http://www.wsgs.wyo.gov/development-areas/).

## Looking Ahead

Wyoming has begun reaping the benefits from the revived nation's oil and gas industry. Increases in oil production have created jobs and provided revenue, infrastructure, and financial security to the state and its residents.



Oil rig, near the Wind River Range, Sublette County, Wyo. Photo courtesy of BLM.



Wyoming monthly rig counts compared to the price of oil, 2013-2014.

New pipelines are coming online in Wyoming, specifically Meritage Midstream's Thunder Creek NGL pipeline, and a second extension to be completed in 2016 linking Powder River Basin hydrocarbon liquids to markets in Kansas and Texas. This infrastructure is expected to improve transportation efficiency in Wyoming by alleviating some of the pressure and cost of transporting hydrocarbons through increasingly congested rail systems.

The future of Wyoming's oil and gas production will continue to be impacted by national and world energy markets. Low oil prices, supply gluts, changes in federal policies, and import/export regulations may slow Wyoming's future hydrocarbon development. This could, in turn, affect the state's economy. Despite such impacts to Wyoming's oil and gas industry, new drilling techniques and resource plays have positioned the state to be a long-term leader in oil and gas production.

Sources: Wyoming Oil and Gas Conservation Commission, U.S. Energy and Information Administration, the U.S. Bureau of Land Management, and Baker Hughes.

Updated production numbers and other information on Wyoming's oil and gas resources, [www.wsgs.wyo.gov/research/energy/oil-gas](http://www.wsgs.wyo.gov/research/energy/oil-gas)



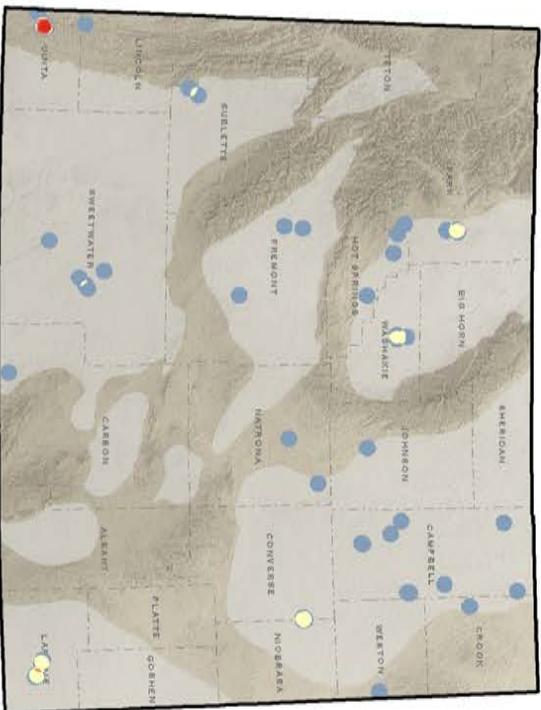
*Interpreting the past, providing for the future*

WYOMING STATE GEOLOGICAL SURVEY

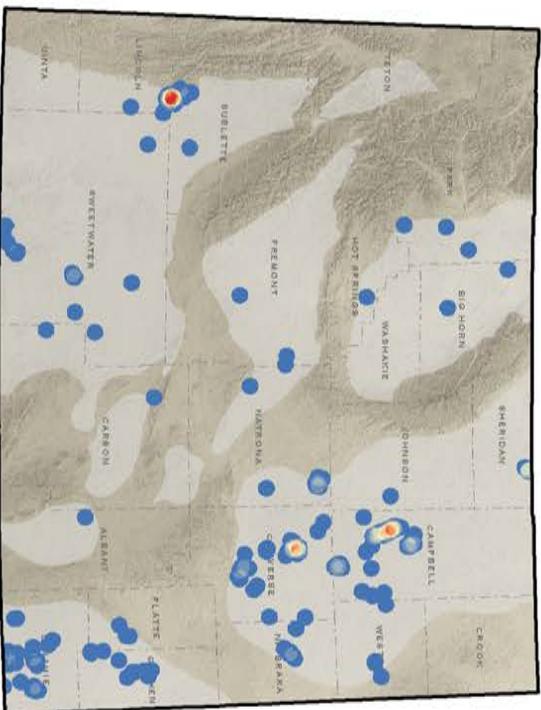
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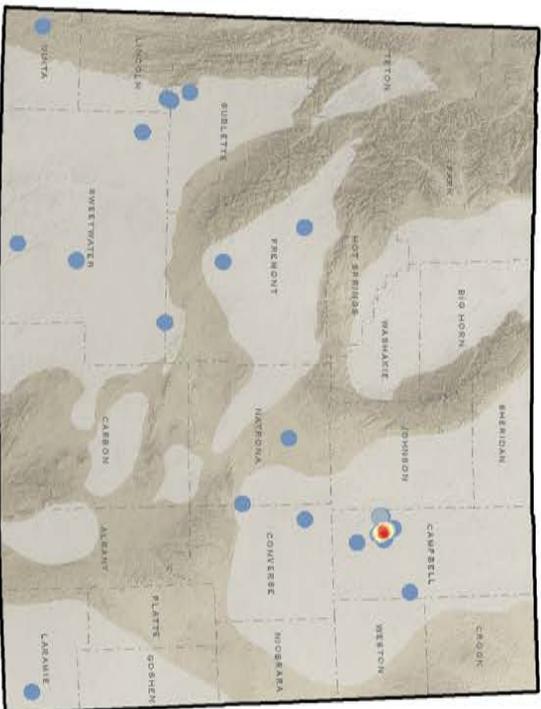
1996 to 2000



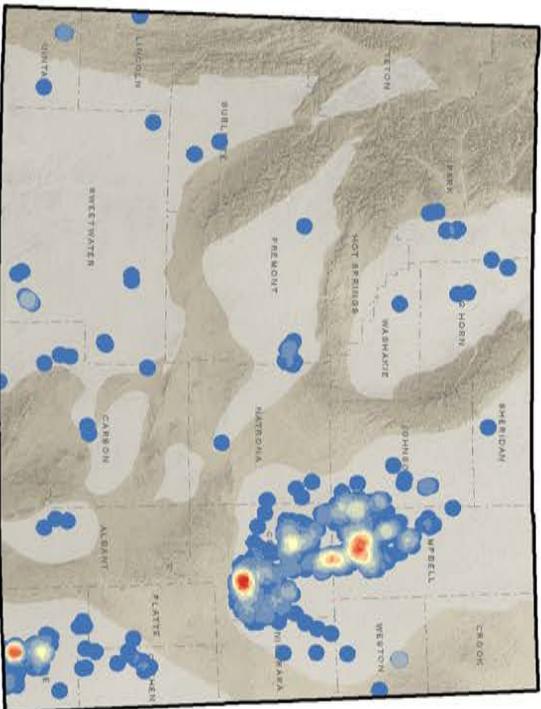
2006 to 2010



2001 to 2005



2011 to Present



**EXPLANATION**

Energy basin

Increasing density of horizontal wells spudded (drilled)

County boundary

