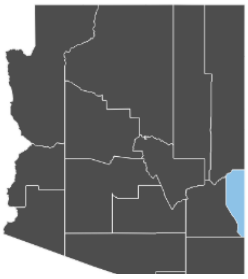
County Case Study: Copper
Greenlee County, Arizona



Greenlee County, Arizona

Copper is a major industrial metal used in building construction, electronics, transportation, industrial machinery, and consumer products. In 2012, the United States was the world's fourth largest copper producer, mining 1.15 million tons of copper worth a total value of approximately $9 billion.[1] Of the five major copper producing states (Arizona, Utah, New Mexico, Nevada, and Montana), Arizona's copper output (751 thousand metric tons) represented 68% of the national total.[2] Greenlee and Pima Counties generated the majority of that production.

History and Geology

Greenlee County has a long history of copper mining dating back to the mineral's discovery in the area during the 1870s. Initial recovery operations drew prospectors to the towns of Clifton, Morenci, and Metcalf, where underground mining methods targeted high-grade copper ores. In the 1920s, the Phelps Dodge Company became the single owner of mining operations in the jurisdiction and discovered huge reserves of low-grade ores in the area. However, when the price of copper collapsed during the Great Depression, mining in the region temporarily halted between 1932 and 1937, until Phelps Dodge converted its underground mining operations to open pit methods that could profitably harvest the lower-grade ores.[3] The modern Morenci mine was thus established and has been a significant economic driver in the county ever since.

[1] U.S. Geological Survey 2013 Copper Commodity Summary, http://minerals.usgs.gov/minerals/pubs/commodity/copper/mcs-2013-coppe.pdf

[2] Arizona State University, L. William Siedman Research Institute, The Economic Impact of Mining in the State of Arizona, http://www.azmining.com/uploads/AZMining%20FINAL%202011%20Economic%20Impact%20Study.pdf

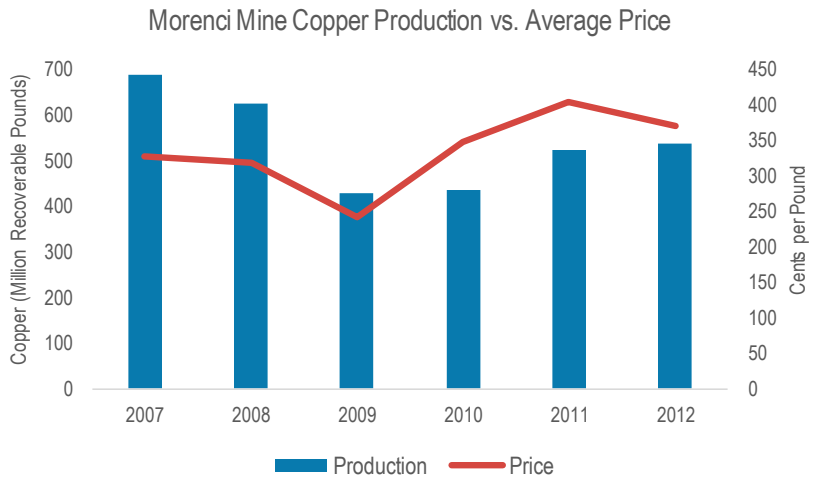
[3] Greenlee County, Morenci Mining District, http://www.co.greenlee.az.us/morencimining.aspx

Production

The single largest producing copper mine in North America is the privately-owned Morenci mine located in Greenlee County. In 2012, the Morenci mine produced 537 million pounds of recoverable copper.[4] This amount reflects a 22% decrease in production from its output five years prior as a result of the

Note that one ton = 2000 pounds and one metric ton = 2240 pounds.

To convert metric tons to tons, multiply the number by 1.1023. To convert tons to metric tons, multiply the number by 0.9072.



deleterious effects of the 2008 global recession and associated price drop.[5] However, production increased 19% between 2010 and 2011, reflecting a healthy rebound in production in conjunction with rising copper prices. Moreover, in 2012 the Morenci mine maintained a total output capacity of 420,000 metric tons of copper-molybdenum ore, which was greater than the combined output capacity of the next three largest copper mines in the state.[6]

Employment

Copper production employed 10,637 workers in 2011, comprising <1% of statewide private sector employment (2,004,000 workers).[7] [8] In Greenlee County, the ebbs and flows of employment strongly mirror trends in the copper industry. County unemployment reached 22% at the height of the recession before falling to around 7% in 2011 as global demand and prices stabilized.[9] Freeport-McMoRan Inc. owns and operates Greenlee County's Morenci mine, after merging with Phelps Dodge in 2007, and serves as the key copper mining

[4] Freeport-McMoRan Inc. Reports, 2011 Results, http://www.fcx.com/news/2013/012213.pdf
[5] United States Geological Survey, 2012 Copper Data, http://minerals.usgs.gov/minerals/pubs/commodity/copper/myb1-2012-coppe.pdf
[6] Ibid.
[7] Arizona State University, L. William Siedman Research Institute, The Economic Impact of Mining in the State of Arizona, http://www.azmining.com/uploads/AZMining%20FINAL%202011%20Economic%20Impact%20Study.pdf
[8] Bureau of Labor Statistics, Employment Data, 2011, http://www.bls.gov/cew/apps/data_views/data_views.htm#tab=Tables
[9] Ibid.

employer. Mining activities in the county employed approximately 2,296 workers in 2011 from a population of 8,594.[10]

Revenues

State revenues from copper extraction are directed back to Greenlee County primarily through the state's severance tax. Arizona levies this tax on metal minerals (including copper) set at 2.5% on 50% of the difference between the gross value of production and the production costs. While 20% of these revenues flow to the state's General Fund, the other 80% are distributed to cities and counties.[11]

Arizona also collects a transaction privilege tax (TPT) for the right to do business in the state at a rate of 3.125% on the total gross receipts of taxable business.[12] However, this tax pertains only to nonmetalliferous mineral products, such as oil and gas, and therefore does not apply to copper revenues.

In 2012, Greenlee County received $4,376,829 in transaction privilege and severance tax disbursements.[13] In publicly-available documents, the Arizona Department of Revenue reports these revenues as one sum, and does not specify what percentage of the tax stems from copper mining.

Greenlee County also collected $2,763,245 in local property taxes levied for general purposes, public health services, and flood control (out of a total $17.1 million in county revenues).[14] While some portion of property taxes stem from copper mining, the percentage is not specified in publicly-available data.

Costs

Copper mining activity is a key consideration in Greenlee County road planning.[15] No additional publically-available government sources delineating specific fiscal costs of copper mining in Greenlee County were found.

Data Availability

The table below highlights the data sources used to compile this county case study, as well as any gaps that exist in publicly-available data.

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[10] Arizona State University, L. William Siedman Research Institute, The Economic Impact of Mining in the State of Arizona, http://www.azmining.com/uploads/AZMining%20FINAL%202011%20Economic%20Impact%20Study.pdf; United States Census Bureau 2011 Greenlee County population

[11] State of Arizona 2013 Tax Handbook, http://www.azleg.gov/jlbc/13taxbook/13taxbk.pdf

[12] Ibid.

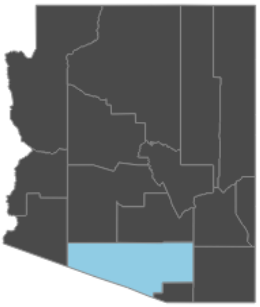
[13] Arizona Dept. of Revenue, June 2012 Tax Facts, http://www.azdor.gov/Portals/0/TaxFacts/0612Taxfact.pdf

[14] Greenlee County, Arizona Annual Financial Report, Fiscal Year 2012, http://azmemory.azlibrary.gov/cdm/ref/collection/statepubs/id/15685

[15] Southern Greenlee County Small Area Transportation Study, Addendum to Transportation Plan, http://www.co.greenlee.az.us/engineering/roads/Greenlee%20Addendum%20Final%20Report%200809.pdf

Measure	Data Availability	Data Gaps
Production	The U.S. Geological Survey published copper production data at the county level for 2012. Production information from a 2011 Freeport-McMoRan Inc. Report shed light on the 6-year trend of production at the largest copper mine in the county (and state). Data for 2013 was not found.	
Employment	The Bureau of Labor Statistics (BLS) provided Greenlee County copper mining employment data for 2011. The Arizona State University William Siedman Research Institute provided supplemental information on mining employment trends.	Neither the BLS nor the U.S. Census Bureau has 10-year employment trend data for the copper mining industry at the Greenlee County level for 2004 – 2013. There are several years and sub-industries without data.
Revenues	Revenue information was gathered from a range of Arizona state and county government sources for 2012 – 2013, including: State of Arizona 2013 Tax Handbook, Arizona Department of Revenue, Greenlee County Annual Financial Report 2012.	Data is unavailable on how sales and use taxes relate to extractive activities in the county.
Costs		Data is unavailable on the connection between county transportation, emergency services, remediation, and water infrastructure investments and the extractives industries.

County Case Study: Copper
Pima County, Arizona



Pima County, Arizona

Copper is a major industrial metal used in building construction, electronics, transportation, industrial machinery, and consumer products. In 2012, the United States was the world's fourth largest copper producer, mining 1.15 million tons of copper worth a total value of approximately $9 billion.[1] Of the five major copper producing states (Arizona, Utah, New Mexico, Nevada, and Montana), Arizona's copper output (751 thousand metric tons) represented 68% of the national total.[2] Greenlee and Pima Counties generated the majority of that production.

History and Geology

Pima County is one of the original four territorial counties of Arizona and, much like nearby Greenlee County, local copper mining began in the 1870s. Mining activity in Pima County flourished in the late 19th century, particularly as the arrival of the Southern Pacific Railroad brought increased commerce and traffic to the region. The copper mining industry followed a series of boom-and-bust cycles over the following decades, with particular spikes during the two World Wars as demand for the mineral soared. Today, copper output in Pima County is driven by operations at three open-pit mines: Sierrita, Mission Complex, and Silver Bell.

Production

Note that one ton = 2000 pounds and one metric ton = 2240 pounds.

To convert metric tons to tons, multiply the number by 1.1023. To convert tons to metric tons, multiply the number by 0.9072.

In 2012, the combined copper production from Pima County's three major mines totaled 152,700 metric tons.[3] This output constituted 89% of the county's total production capacity for that year.[4] Freeport-McMoRan Inc. manages the Sierrita mine, the top-producing operation in the county, while ASARCO owns both the Mission Complex and Silver Bell mines.[5]

Employment

Copper mining makes up a relatively small portion of Pima County's overall employment, largely as a result of the Tucson metropolitan area's more diversified economy and workforce. Of Pima's total 2012 private sector

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[1] U.S. Geological Survey 2013 Copper Commodity Summary, http://minerals.usgs.gov/minerals/pubs/commodity/copper/mcs-2013-coppe.pdf

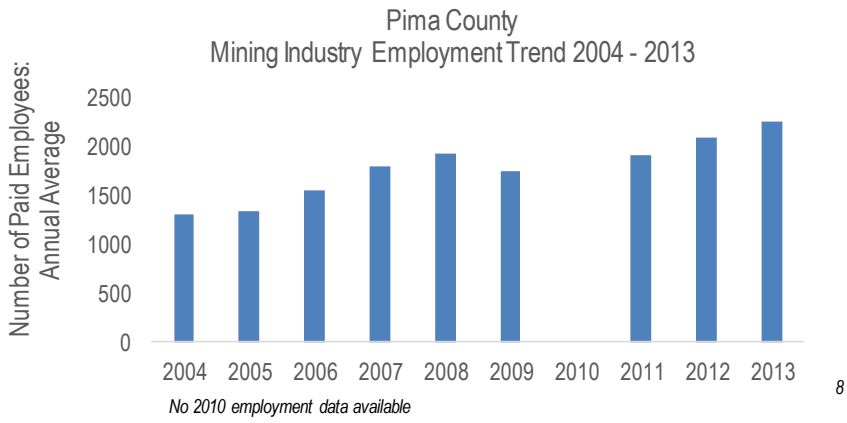
[2] Arizona State University, L. William Siedman Research Institute, The Economic Impact of Mining in the State of Arizona, http://www.azmining.com/uploads/AZMining%20FINAL%202011%20Economic%20Impact%20Study.pdf

[3] U.S. Geological Survey, 2012 Minerals Handbook, Copper, http://minerals.usgs.gov/minerals/pubs/commodity/copper/myb1-2012-coppe.pdf
Note: production data prior to 2012 is incomplete, so a multi-year perspective is unavailable

[4] U.S. Geological Survey, 2012 copper data

[5] U.S. Geological Survey, 2012 Minerals Handbook, Copper, http://minerals.usgs.gov/minerals/pubs/commodity/copper/myb1-2012-coppe.pdf

employment of 276,390, copper and nickel mining (and related support activities) constitute less than 1% (1,745 workers).[6] The county cites a 58% growth in employment in this sector from 2004 levels.[7] Data for mining and support activities for the entire mining industry shows an overall increase in employment in Pima County from 2004 through 2013.



[8]

Revenues

State revenues from copper extraction are directed back to Pima County primarily through the state's severance tax. Arizona levies this tax on metal minerals (including copper) set at 2.5% on 50% of the difference between the gross value of production and the production costs. While 20% of these revenues flow to the state's General Fund, the other 80% are distributed to cities and counties.[9]

Arizona also collects a transaction privilege tax (TPT) for the right to do business in the state at a rate of 3.125% on the total gross receipts of taxable business.[10] However, this tax pertains only to nonmetalliferous mineral products, such as oil and gas, and therefore does not apply to copper revenues.

Pima County derives substantial revenues from copper mining within its borders. In 2012, collections from transaction privilege and severance taxes disbursed to Pima County amounted to $92,723,932.[11] This amount represents 11% of the

[6] Bureau of Labor Statistics, 2012 employment data, http://www.bls.gov/cew/apps/data_views/data_views.htm#tab=Tables
[7] Pima County 2012 Comprehensive annual Financial Report, http://webcms.pima.gov/UserFiles/Servers/Server_6/File/Government/Finance%20and%20Risk%20Management/Reports/audited%20financial%20reports/CAFR/CAFR%202013.pdf
[8] Bureau of Labor Statistics, Quarterly Census of Employment and Wages for NAICS Codes 212 (Mining Except Oil and Gas) and 213 (Support Activities for Mining) 2004 – 2013
Note: No data available for 2010 and no 10-year trend data available specific to copper mining, http://www.bls.gov/cew/apps/data_views/data_views.htm#tab=Tables
[9] State of Arizona 2013 Tax Handbook, http://www.azleg.gov/jlbc/13taxbook/13taxbk.pdf
[10] Ibid.
[11] Arizona Department of Revenue, June 2012 Tax Facts, http://www.azdor.gov/Portals/0/TaxFacts/0612Taxfact.pdf

total revenues received by the county during that fiscal year.[12] However, it is unclear what percentage of the taxes stemmed from copper mining as compared to other commercial activities. Pima County also assessed $226,306,000 of property taxes from mining companies in 2012.[13] These funds are channeled towards public services and use, such as infrastructure development, public safety, and local schools.

Costs

No publically-available government sources delineating specific fiscal costs of copper mining in Pima County were found.

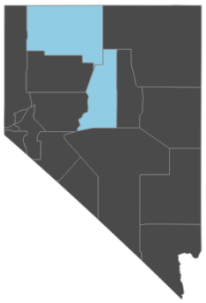
Data Availability

The table below highlights the data sources used to compile this county case study, as well as any gaps that exist in publicly-available data.

Measure	Data Availability	Data Gaps
Production	The U.S. Geological Survey published copper production data at the county level for 2012. Data for 2013 was not found.	
Employment	Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages publishes mining industry data at the Pima County level for NAICS Codes 212 (Mining Except Oil and Gas) and 213 (Support Activities for Mining) 2004 – 2013.	BLS is missing county-level mining employment data for 2010. BLS is also missing data for NAICS codes more specific to copper or metal mining prior to 2011. Historical employment data for the mining industry is unavailable from U.S. Census Bureau Censtats data on County Business Patterns (NAICS).
Revenues	Revenue information was gathered from a range of Arizona state and county government sources for 2012, including: Arizona Department of Revenue and Pima County 2012 Comprehensive Annual Financial Report.	Data is unavailable on how sales and use taxes relate to extractive activities in the county.
Costs		Data is unavailable on the connection between county transportation, emergency services, remediation, and water infrastructure investments and the extractive industries.

[12] Pima County 2012 Comprehensive Annual Financial Report, http://webcms.pima.gov/UserFiles/Servers/Server_6/File/Government/Finance%20and%20Risk%20Management/Reports/audited%20financial%20reports/CAFR/CAFR%202013.pdf
[13] Ibid.

County Case Study: Gold
Humboldt and Lander Counties, Nevada



Humboldt & Lander Counties, Nevada

Gold is a precious mineral, highly valued for its durability and beauty. It is used to make jewelry and art, and has technological uses such as memory chip conductors and reflective satellite coverings. In 2013, the United States was the third largest producer of gold, extracting 227 tons valued at $10.7 billion. The United States had the fifth largest gold reserves, with an estimated 3,000 tons.[1] Within the United States, the state of Nevada accounts for 75% of total gold production.[2]

History and Geology

Mineral mining in the state of Nevada began shortly after the onset of the California gold rush in 1849. The 1859 discovery of the Comstock Lode silver deposit in the Virginia Range of western Nevada was the first major discovery of silver ore in the country.[3] All told, the Great Basin geological region, which covers most of Nevada and crosses into Oregon, Utah, and California, has a total resource potential that exceeds 3,200 metric tons (100,000,000 ounces) of gold.[4]

Note that a ton and a metric ton are different units. One ton = 2000 pounds, whereas one metric ton = 2240 pounds. To convert metric tons to tons, multiply the number by 1.1023. To convert tons to metric tons, multiply the number by 0.9072. There are 16 ounces in one pound.

The major gold mines in Humboldt and Lander Counties represent more recent productive operations. Neither of the counties' two largest mines, the Twin Creeks Mine in Humboldt and the Pipeline/Cortez Hills Mine in Lander, started producing until the early 1990s. These mines are now two of the largest gold producers in the state.

Production

*According to the U.S. Geological Survey, mineral **resource potential** is the likelihood for the occurrence of undiscovered mineral resources in a defined area.*

***Proved reserves** are the portions of an identified resource from which a usable mineral or energy commodity can be economically and legally extracted at the time of determination.*

Nevada is currently experiencing the biggest gold boom in U.S. history, which began in 1981 and has produced over 240 million ounces, often on public lands.[5] This surge in production is largely the result of discoveries of deposits containing microscopic gold particles.[6] These deposits occur when gold is deposited quickly and disseminated into the surrounding rock.

The two major gold mining companies behind this development are Newmont Mining Corporation and Barrick Gold Corporation, which operate open pit mining

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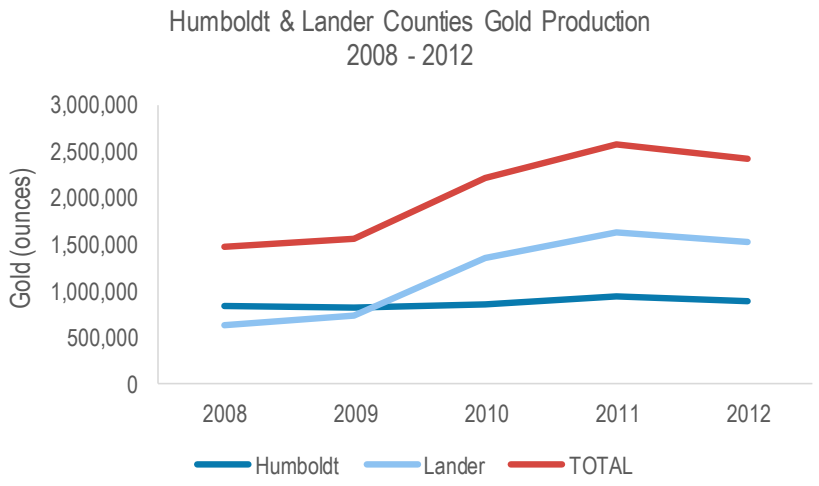
[1] U.S. Geological Survey, 2014 Gold Commodity Summary http://minerals.usgs.gov/minerals/pubs/commodity/gold/mcs-2014-gold.pdf
[2] U.S. Geological Survey, 2012 Gold Data, http://minerals.usgs.gov/minerals/pubs/commodity/gold/mcs-2012-gold.pdf
[3] U.S. Geological Survey, Western Region Gold Deposits, http://minerals.usgs.gov/west/projects/nngd.htm
[4] Ibid.
[5] Nevada Bureau of Mines and Geology, The Nevada Mineral Industry 2011, http://pubs.nbmg.unr.edu/The-NV-mineral-industry-2011-p/mi2011.htm
[6] Ibid.

operations.[7] Gold production in Humboldt and Lander Counties totaled 2,419,790 ounces in 2012, accounting for 43% of the state's total production that year.[8]



Employment

Gold extraction provided jobs for 3,704 workers and 2,156 contractors in 2012, which represents 25% of the county population of 22,981, and 58% of total employment in the two counties.[9] [10]

Revenues

Gold mining serves as a key driver of funding for local government across the state. In addition to various property and sales taxes, counties receive annual revenues from the gold industry largely from the state's Net Proceeds of Minerals Tax. This tax is considered to be an ad valorem property tax assessed on minerals produced in the state, applied at a rate of 5% on royalties and all other net proceeds exceeding $4 million. In 2012, Nevada counties received $117 million in revenues from minerals taxes.[11] Of that total, $33 million went to these two counties.[12]

Costs

A number of state-level resources, which are listed below, shed light on Humboldt and Lander County transportation systems, remediation procedures, and emergency services. While these government publications discuss costs to

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[7] Nevada Bureau of Mines and Geology, Major Mines of Nevada 2012, http://minerals.nv.gov/uploadedFiles/mineralsnvgov/content/Programs/Mining/Forms_Publications/mm2012.pdf
[8] U.S. Geological Survey, 2012 Gold Data, http://minerals.usgs.gov/minerals/pubs/commodity/gold/mcs-2012-gold.pdf
[9] Ibid.
[10] Nevada Bureau of Mines and Geology, Visher, Mike, "Major Mines of Nevada: 2012," 2013, http://minerals.nv.gov/uploadedFiles/mineralsnvgov/content/Programs/Mining/Forms_Publications/mm2012.pdf
[11] Nevada Department of Taxation, 2011-2012 Net Proceeds of Minerals Bulletin, http://www.unce.unr.edu/publications/files/cd/2013/fs1334.pdf
[12] Ibid.,http://www.unce.unr.edu/publications/files/cd/2013/fs1334.pdf, http://www.hcnv.us/comptroller/documents/HumboldtCountyFinalFinancialsFY12.pdf, http://nsla.nevadaculture.org/statepubs/epubs/105938-2011-2012.pdf

the state government, they do not explicitly discuss the fiscal costs of gold extraction to the Humboldt and Lander county governments.

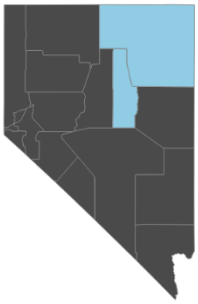
- Nevada Department of Transportation: Reports and Publications
- Nevada Bureau of Mining Regulation & Reclamation Cost Estimator
- Nevada Department of Health and Human Services EMS Assessment

Data Availability

The table below highlights the data sources used to compile this county narrative, as well as any gaps that exist in publicly-available data.

Measure	Data Availability	Data Gaps
Production	The U.S. Geological Survey published gold extraction data at the county level for 2008 – 2012.	
Employment	The Nevada Department of Taxation published Humboldt and Lander county gold mining industry employment totals for 2012.	Neither the Bureau of Labor Statistics nor the U.S. Census Bureau has 10-year employment trend data for the mining industry at the Humboldt or Lander county level for 2004 – 2013. There are several years and sub-industries without data.
Revenues	The Nevada Department of Taxation published revenue information.	The Nevada Department of Taxation does not have information on production taxes or sales and use taxes related to the extractive industries.
Costs		Government resources did not identify the connection between county transportation, emergency services, remediation, and water infrastructure investments and the extractive industries.

County Case Study: Gold
Elko and Eureka Counties, Nevada



Elko & Eureka Counties, Nevada

Note that a ton and a metric ton are different units. One ton = 2000 pounds, whereas one metric ton = 2240 pounds. To convert metric tons to tons, multiply the number by 1.1023. To convert tons to metric tons, multiply the number by 0.9072. There are 16 ounces in one pound.

Gold is a precious mineral, highly valued for its durability and beauty. It is used to make jewelry and art, and has technological uses such as memory chip conductors and reflective satellite coverings. In 2013, the United States was the third largest producer of gold, extracting 227 tons valued at $10.7 billion. The United States had the fifth largest gold reserves, with an estimated 3,000 tons.[1] Within the United States, the state of Nevada accounts for 75% of total gold production.[2]

History and Geology

Mineral mining in the state of Nevada began shortly after the onset of the California gold rush in 1849. The 1859 discovery of the Comstock Lode silver deposit in the Virginia Range of western Nevada was the first major discovery of silver ore in the country.[3] All told, the Great Basin geological region, which covers most of Nevada and also crosses into Oregon, Utah, and California, has a total resource potential that exceeds 3,200 metric tons (100,000,000 ounces) of gold.[4]

In 1962, Newmont Mining Corporation discovered large deposits of gold ore along the Carlin Trend, a mineral rich belt stretching 40 miles across Elko and Eureka Counties that soon became one of the largest gold producing regions in the world. This discovery was the beginning of a robust gold mining industry in Nevada. As of 2012, 87% of Nevada's total historical gold output had been generated since the Carlin Trend discovery.[5]

Production

Nevada is in the midst of the biggest gold boom in U.S. history, which began in 1981 and has produced over 240 million ounces, often on public lands.[6] This surge in production is largely the result of discoveries of sediment-hosted deposits containing microscopic gold particles.[7] These deposits occur when gold is deposited quickly and disseminated into the surrounding rock.

The two major gold mining companies driving this development are Newmont Mining Corporation and Barrick Gold Corporation, which operate both open pit and underground mining operations.[8] In 2012, gold production in Elko and

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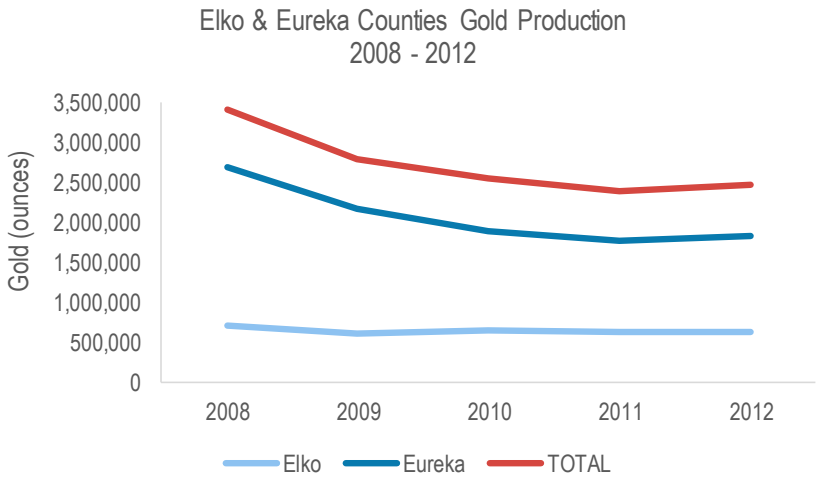
[1] U.S. Geological Survey, 2014 Gold Commodity Summary http://minerals.usgs.gov/minerals/pubs/commodity/gold/mcs-2014-gold.pdf
[2] U.S. Geological Survey, 2012 Gold Data, http://minerals.usgs.gov/minerals/pubs/commodity/gold/mcs-2012-gold.pdf
[3] U.S. Geological Survey, Western Region Gold Deposits, http://minerals.usgs.gov/west/projects/nngd.htm
[4] Ibid.
[5] Nevada Bureau of Mines and Geology, The Nevada Mineral Industry 2011, http://pubs.nbmg.unr.edu/The-NV-mineral-industry-2011-p/mi2011.htm
[6] Ibid.
[7] Ibid.
[8] U.S. Geological Survey, 2012 Gold Data, http://minerals.usgs.gov/minerals/pubs/commodity/gold/mcs-2012-gold.pdf

Eureka Counties totaled 2,474,623 ounces.[9] In Eureka County, the top-producing mine was the Eastern Nevada Operations (Newmont), while in Elko, the Meikle Mine (Barrick Goldstrike) led production.



Employment

Between these two counties, gold mining operations employed approximately 10% of the total population, or 5,196 workers and 1,121 contractors out of a two-county population of 52,957 in 2012.[10] Gold mining employment represented 26% of the total employment in the counties in 2012.[11]

Revenues

Gold mining serves as a key driver of funding for local government across the state. In addition to various property and sales taxes, counties receive annual revenues from the gold industry largely from the state's Net Proceeds of Minerals Tax. This tax is considered to be an ad valorem property tax assessed on minerals produced in the state, applied at a rate of 5% on royalties and all other net proceeds exceeding $4 million. In 2012, Nevada counties received $117 million in revenues from the Net Proceeds of Minerals Tax.[12] Of that, Elko and Eureka received $31 million via the Net Proceeds of Minerals Tax to spend on public services and infrastructure.[13]

Costs

A number of state-level resources, which are listed below, shed light on Elko and Eureka County transportation systems, remediation procedures, and emergency services. While these government publications discuss costs to the state

[9] Nevada Bureau of Mines and Geology, Major Mines of Nevada 2012, http://minerals.nv.gov/uploadedFiles/mineralsnvgov/content/Programs/Mining/Forms_Publications/mm2012.pdf
[10] Ibid.
[11] Ibid.
[12] Nevada Department of Taxation, 2011-2012 Net Proceeds of Minerals Bulletin, http://www.unce.unr.edu/publications/files/cd/2013/fs1334.pdf
[13] Ibid., http://www.co.eureka.nv.us/audit/Eureka%20FS%202012.pdf, http://www.elkocountynv.net/departments/fiscal_affairs/docs/Elko_County_2012_Audit1.pdf

government, they do not explicitly discuss the fiscal costs of gold extraction to the Elko and Eureka county governments.

- Nevada Department of Transportation: Reports and Publications
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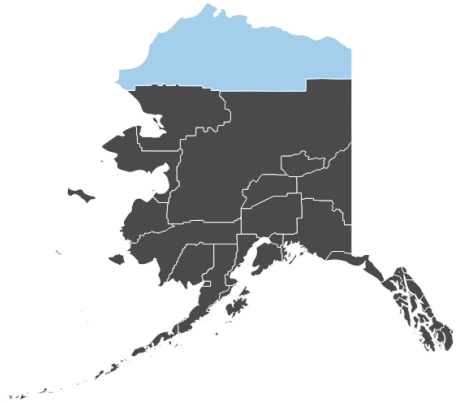
Revenues	The Nevada Department of Taxation published revenue information.	The Nevada Department of Taxation does not have information on production taxes or sales and use taxes related to the extractive industries.
Costs		Data on the connection between county transportation, emergency services, remediation, and water infrastructure investments and the extractive industries.

County Narrative: Oil
North Slope Borough, Alaska



North Slope Borough, Alaska

The United States has experienced something of a renaissance in domestic oil production since 2008, when crude oil production reached a low of 3.98 million bbl/day. [1] Fast forward five years, and the U.S. has nearly doubled its daily production output, with Texas and North Dakota driving much of the growth.[2] Alaska, the fourth largest state producer of crude oil in 2013, did not experience the same production boom, with crude oil output in steady decline over the past decade.[3] In spite of that downward trend, the nation's single largest producing county is Alaska's North Slope Borough.[4]

Geology and History

The North Slope Borough is the country's largest organized local jurisdiction, spanning over 94,000 miles north of the Arctic Circle. Its 9,686 residents, most of whom are Inupiat Alaskan Natives, are spread across eight separate communities.[5] The northern coast of Alaska was documented as a potential oil-producing region as early as 1900. However, the borough government was not formally incorporated until 1972, soon after the discovery of oil at Prudhoe Bay, the largest single oil field in North America.[6]

Oil production increased dramatically in 1977 with the opening of the Alaska Pipeline, which provided the first economically-viable way to transport large amounts of crude oil from the North Slope to market. In 1994, ARCO identified another significant deposit at the Alpine Field, located within the federally-administered National Petroleum Reserve of Alaska. The North Slope's Prudhoe Bay, Alpine Field, and Kuparuk River constitute the majority of the state of Alaska's oil production. Today, the borough's oil reserve base is extensive, with approximately six billion barrels of proved oil.[7]

Production

In 2013, the North Slope Borough produced 182.5 million bbl of oil, on both state-owned and federal land.[8] Since production at Prudhoe Bay commenced, all of

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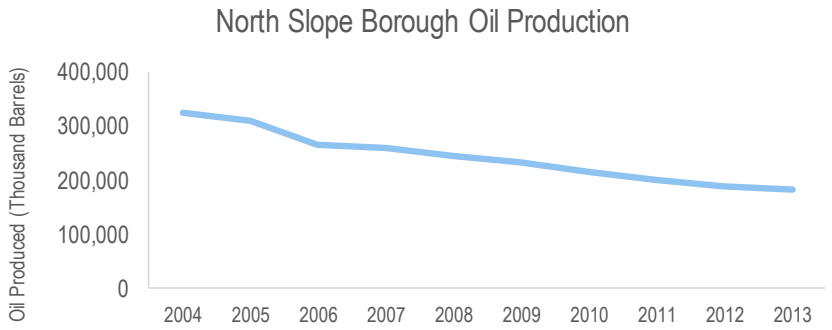
[1] Barrels noted as "bbl" when used as a unit of measure
[2] Department of Energy, U.S. Domestic Oil Production Exceeds Imports for First Time in 18 Years, http://energy.gov/articles/us-domestic-oil-production-exceeds-imports-first-time-18-years
[3] U.S. Energy Information Administration, Crude Oil Production, http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_a.htm
[4] In the state of Alaska, the county level governments are called boroughs
[5] U.S. Census Bureau, North Slope Borough 2013 population
[6] U.S. Geological Survey, The National Petroleum Reserve–Alaska (NPRA) Data Archive, 2001, http://pubs.usgs.gov/fs/fs024-01/fs024-01.pdf
[7] Oil and Gas Technical Report: Planning for Oil and Gas Activities in the National Petroleum Reserve – Alaska, 2013, http://www.north-slope.org/assets/images/uploads/NorthSlope_OG_Technical_report_CHAPTER3.pdf
[8] U.S. Energy Information Administration, Alaska North Slope Crude Oil Production, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MANFPAK1&f=A

the North Slope's extraction has taken place in the northern portion of the Colville-Canning province, administered by either the Alaska Dept. of Natural Resources or the Bureau of Land Management (BLM). Once exclusively dominated by three companies, North Slope exploration and extraction has diversified significantly, with 63 current lease holders from seven countries.[9] Annual oil production in the borough peaked in 1988 at 722 million bbl and has steadily declined since that time.[10]



Employment

The oil industry is a key driver of jobs throughout the borough. In 2013, oil and gas extraction provided 1,768 jobs on the North Slope, accounting for 14.3% of total private jobs (12,340).[11] Since the North Slope Borough's population is less than 10,000, however, it follows that many of the private jobs are filled by non-residents. In 2013, nonresidents accounted for 33.6% of oil industry workers in Alaska, up from 31.6% in 2012.[12] The North Slope Borough government itself remains the largest employer of local North Slope residents, along with the Arctic Slope Regional Corporation, school district, and local Native corporations.[13]

Revenues

Given the North Slope's relative geographic isolation, oil revenues are critical for supporting local schools, health centers, fire stations, water and sanitation facilities, and infrastructure. In 2013, the North Slope government received $470

[9] Oil and Gas Technical Report: Planning for Oil and Gas Activities in the National Petroleum Reserve – Alaska, 2013, http://www.north-slope.org/assets/images/uploads/NorthSlope_OG_Technical_report_CHAPTER3.pdf
[10] U.S. Energy Information Administration, Alaska North Slope Crude Oil Production, 2014, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MANFPAK1&f=A
[11] Bureau of Labor Statistics, Alaska North Slope Borough annual average employment for Oil and Gas Extraction, 2013, http://www.bls.gov/cew/apps/data_views/data_views.htm#tab=Tables; Note: BLS county employment data is not linked to county residency
[11] Alaska Department of Labor and Workforce Development, Non-Residents Working in Alaska, 2013, http://labor.alaska.gov/research/reshire/NONRES.pdf
[13] North Slope Regional Energy Plan, 2015, http://www.north-slope.org/assets/images/uploads/Feb2015_draft_NSB_Energy_Plan_2.6.15.pdf

million in revenues. Of those revenues, the borough received $332 million from local property taxes, 98% of which were levied on oil- and gas-related property.[14]

At the state level, the Alaskan government collects oil-related revenues for the benefit of the public via four mechanisms:[15]

Note: a mill rate is the amount of tax payable per dollar on the assessed value of a property. Each mill is worth one-tenth of a cent, or $.001.

- *Oil and gas production tax* at 35% of the net value of extracted oil and gas. Revenues are deposited in the state's General Fund, with payments received after a tax assessment deposited in the Constitutional Budget Reserve Fund (CBRE). In 2013, the state received over $4 billion in revenues from this tax.
- *Oil and gas property tax* on the value of taxable exploration, production, and pipeline transportation property, set at 20 mills or 2% of the assessed value. This revenue is also deposited in the state's General Fund, with payments received after a tax assessment deposited in the CBRE.
- *Royalties* assessed on state-owned land leased for oil production. In 2013, $856 million was deposited in the Alaska Permanent Fund and School Fund, and an additional $177 million flowed to the Constitutional Budget Reserve Fund from royalty settlements.[16]
- *Oil and gas corporate net income tax* is set at a maximum of 9.4% on Alaskan income over $90,000. In 2013, $434 million was deposited in the state's General Fund from this tax.

Alaskan residents also receive annual dividend payments from the state's Permanent Fund, based on a five-year average of the Fund's performance. The state established the Permanent Fund in 1976 as construction of the Alaska Pipeline concluded. Twenty-five percent of revenues from mineral leases on state-owned lands and from federal mineral revenue-sharing payments go into the Permanent Fund for investment. In 2013, Alaskan residents each received $900 as a result of this payout.[17]

Costs

Oil extraction also incurs certain fiscal costs. Oil exploration and development on the North Slope requires infrastructure investments ranging from airports, docks, pads and roads, to ports, production-related facilities, pipelines, and gravel islands.[18] The North Slope Borough is responsible for maintenance of

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[14] Comprehensive Annual Financial Report of the North Slope Borough, Alaska, 2013, http://www.north-slope.org/assets/images/uploads/2013_NSB_CAFR.pdf
[15] Alaska Department of Revenue, 2013 Annual Report, http://www.tax.alaska.gov/programs/documentviewer/viewer.aspx?1095r
[16] Alaska Department of Revenue Tax Division, Revenue Sources Book, 2014 Spring, http://www.tax.alaska.gov/programs/documentviewer/viewer.aspx?1048r
[17] Alaska Permanent Fund Corporation, Historical Annual Dividend Payouts, http://www.apfc.org/home/Content/dividend/dividendamounts.cfm
[18] Oil and Gas Technical Report: Planning for Oil and Gas Activities in the National Petroleum Reserve – Alaska, 2013, http://www.north-slope.org/assets/images/uploads/NorthSlope_OG_Technical_report_CHAPTER3.pdf

approximately 100 miles of roads, as well as boat ramps, boat landings, port facilities, nine public airports, and thousands of miles of winter trails and roads.[19]

In terms of transportation infrastructure in the borough, Dalton Highway is the only permanent road connecting the North Slope Borough to the main Alaska Highway system. Dalton Highway was originally financed and constructed by the oil and gas industry, and is still mainly used as an industrial road.[20] However, the Alaskan Department of Transportation reported spending approximately $15,260 per mile annually on maintenance for Dalton Highway at the time of the last comprehensive borough transportation plan.[21] Oil companies are required to maintain seasonal ice routes used for industry traffic in the winter, given that these routes cost approximately $100,000 per mile to construct in the Prudhoe Bay region.[22]

Unlike many other Alaskan municipalities, the North Slope Borough is responsible for its airports, which serve the local population as well as a range of commercial and recreational visitors.[23] Annual costs for airport maintenance across the North Slope are about $1.4 million per year, including spending on airports and landing strips that are labeled as "unrestricted," or permissible for oil and gas industry use.[24] It is unclear what percentage of the annual airport maintenance budget is spent specifically on support activities for the oil and gas industry.

Reclamation *is the cost of returning mines or oil and gas lands to their state prior to disturbance, including physical site stability and ecosystem functions, and long-term site monitoring*

The State also spends public dollars on reclamation services, including the management of contaminated drilling sites. The Oil and Hazardous Substance Release Prevention and Response Fund imposes a $.04 surcharge per barrel of oil for prevention and a $.01 surcharge per barrel of oil for response.[25] The operating budget, including expenditures and obligations, for the state Oil and Hazardous Substance Release Prevention and Response Fund was $21.5 million in fiscal year 2012, with $8.1 million going to spill prevention and response for contaminated sites.[26]

The North Slope Borough often responds to, and pays for, emergency services on the oilfield roads, such as the Kuparuk Oilfield roads.[27] The Alaskan state

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[19] North Slope Borough, Comprehensive Transportation Plan 2005, http://www.north-slope.org/assets/images/uploads/TransportationPlan_Final.pdf
[20] Ibid.
[21] Ibid.
[22] Ibid.
[23] Oil and Gas Technical Report: Planning for Oil and Gas Activities in the National Petroleum Reserve – Alaska, 2013, http://www.north-slope.org/assets/images/uploads/NorthSlope_OG_Technical_report_CHAPTER1.pdf
[24] North Slope Borough, Comprehensive Transportation Plan 2005, http://www.north-slope.org/assets/images/uploads/TransportationPlan_Final.pdf
[25] Alaska Department of Environmental Conservation, Spill Prevention and Response, https://dec.alaska.gov/spar/rfa/history.htm
[26] Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, 2011-2012, http://dec.alaska.gov/spar/rfa/docs/budget/biennial/OHSRPRF%202011-2012%20Report%20.pdf
[27] North Slope Borough, Comprehensive Transportation Plan 2005, http://www.north-slope.org/assets/images/uploads/TransportationPlan_Final.pdf

government also invests a significant amount of tax dollars to prevent and respond to oil and hazardous substance emergencies in the state. For example, the Office of Management and Budget appropriated $750,000 toward oil and hazardous substance first responder equipment and preparedness in 2013.[28]

Data Availability

The table below highlights the data sources used to compile this county case study, as well as any gaps that exist in publically-available data.

Measure	Data Availability	Data Gaps
Production	The U.S. Energy Information Agency publishes Alaska North Slope Crude Oil Production on a monthly and annual basis.	
Employment	The Bureau of Labor Statistics publishes Alaska North Slope Borough Annual Average Employment for Oil and Gas Extraction (NAICS Code 211).	Neither the Bureau of Labor Statistics nor the U.S. Census Bureau has 10-year employment trend data for the oil and gas industry at the North Slope Borough level for 2004 – 2013. There are several years and sub-industries without data.
Revenues	The Alaska Department of Revenue and the Alaska Permanent Fund Corporation publish annual financial reports with revenue information for the state and borough level.	Data on how sales taxes relate to extractive activities in the borough is not publicly-available.
Costs	The North Slope Department of Planning & Community Services, the Alaska Office of Management and Budget, and the Alaska Department of Environmental Conservation publish cost information related to public spending attributable to the extractives industries.	Data on the connection between borough water and sewer infrastructure investments and the extractives industries is not publicly available.

[28] Alaska Office of Management and Budget, 2012 Appropriations, https://www.omb.alaska.gov/ombfiles/13_budget/PDFs/Capital_Bill_SB0160Zrev.pdf

County Case Study: Oil
Kern County, California

Kern County, California

Kern County is situated in the southernmost regions of the San Joaquin Valley in California's interior. While Kern County has significant deposits of many different resources—including natural gas, geothermal steam, wind, gold, and other minerals—oil in particular has shaped Kern's local economy for well over a hundred years.

History and Geology

Starting in the 1850s and 1860s, companies began extracting oil at a commercial level in California, inspired by the oil rush in Pennsylvania and a growing market for oil-fueled lighting. In the 1860s, production began in Kern County, where extractors dug holes into oil seeps to remove the fuel. Towards the turn of the century, extraction in the county grew into commercial drilling, helped by the 1890 discovery of the Midway-Sunset field, still the largest producing oil field in California today.[1]

During the beginning of the 20th century, many other large oil discoveries occurred in Kern County, and continued at a lesser pace through the 1970s. As discoveries of new fields halted in the 1970s, refined steam injection techniques helped producers extract the substantial heavy oil—a more difficult and costly type of oil to extract and transport—from known Kern County fields.[2]

Production

In the United States, an oil barrel (bbl) is defined as 42 U.S. gallons.

In terms of oil production, Kern County has long been a leading locality both nationally and within California. In 2013, Kern County produced 141,040,000 oil barrels (bbls).[3] For the year 2012, the largest producing oil fields in the state were privately-owned oil fields in Kern County, including the Midway Sunset field (29.3 m bbls), the Kern River Field (26.2 m bbls), and the Belridge South Field (23.6 m bbls).[4] As of 2009, the two top oil producing companies in California, excluding offshore production, were Chevron USA and Aera Energy LLC, both of which have operations in Kern County.[5]

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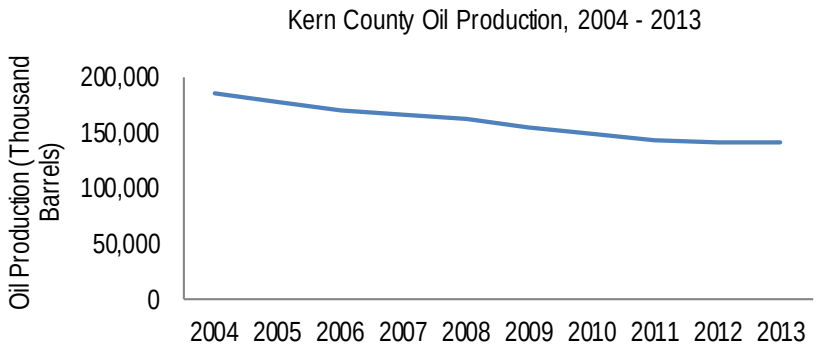
[1] Oil and Gas Production, History in California, ftp://ftp.consrv.ca.gov/pub/oil/history/History_of_Calif.pdf
[2] Ibid.
[3] California Department of Conservation Online Production and Injection, http://opi.consrv.ca.gov/opi/opi.dll
[4] The total state-wide production was 197.5 m bbls, including offshore production. California Department of Conservation, Division of Oil, Gas, and Geothermal Resources, "2012 Preliminary Report of California Oil and Gas Production Statistics," April 2013, ftp://ftp.consrv.ca.gov/pub/oil/annual_reports/2012/PR03_PreAnnual_2012.pdf
[5] Chevron and Aera both individually produce roughly four times as much oil as the next largest producer. California Department of Conservation, Division of Oil, Gas, and Geothermal Resources, "2009 Annual Report, Oil and Gas Statistics" ftp://ftp.consrv.ca.gov/pub/oil/annual_reports/2009/0102stats_09.pdf.

Since peaking in 1985, California's oil production has trended downwards. As illustrated in the chart below, from 2004 – 2013, Kern County is no exception to this trend.



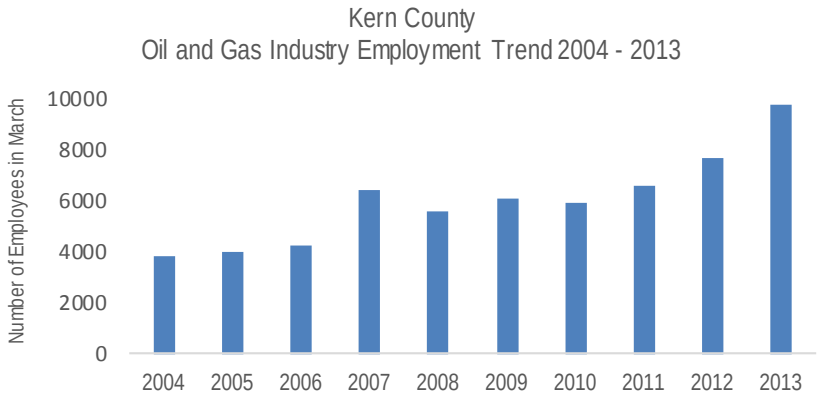
[6]

While oil production is declining, the State of California estimates as of December 31, 2009, a total of 3.0 billion bbl of proved oil reserves within the state.[7]

Employment

In 2013 oil and gas extraction employed upwards of 10,000 of Kern County's 865,923 residents, or between 1 – 2% of the population and 3.3% of total employment.[8] [9] In particular, 3,309 were employed in oil and gas extraction, and 8,039 in extractives support activities (1,748 in drilling for oil and gas and 6,289 in support activities for oil and gas operations).[10] While oil production in the county has been decreasing, oil and gas industry employment at large increased from 2010 – 2013 based on the introduction of hydraulic fracturing methods used to extract natural gas.

[6] California Department of Conservation Online Production and Injection, http://opi.consrv.ca.gov/opi/opi.dll
[7] California Department of Conservation, Division of Oil, Gas, and Geothermal Resources, "2009 Annual Report, Oil and Gas Statistics" ftp://ftp.consrv.ca.gov/pub/oil/annual_reports/2009/0102stats_09.pdf.
[8] The U.S. Census Bureau, State & County QuickFacts, http://quickfacts.census.gov/qfd/states/06/06029.html
[9] Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2013 annual averages, http://www.bls.gov/cew/apps/data_views/data_views.htm#tab=Tables
[10] Ibid.



Revenues

California does not levy a statewide severance tax on oil and gas production, as counties in the state collect ad valorem or property taxes on oil and gas resources and equipment owned in their jurisdictions. However, the state does levy an annual assessment on oil and gas production to fund the Department of Conservation's Oil, Gas, and Geothermal Resources Division. The Division oversees the drilling, operation, maintenance, and plugging and abandonment of oil, natural gas, and geothermal wells.[11]

Like other counties in the state, Kern County collects property taxes for oil and gas properties, the total amount of which fluctuates with changes in the price of these resources over time. Along with sales and use taxes, the county relies on property taxes for the General Fund for the county government's operations. Sales and use taxes accounted for approximately 12% of General Fund revenues in FY2011 – 2012, whereas property taxes accounted for 46%.[12]

According to the Kern County Treasurer-Tax Collector, the top payer of property taxes in the county from FY 2014 – 2015 was Chevron USA Inc. The company received a bill for more than $90 million in taxes, or 9.39% of the county's $964 million in total property taxes owed. All of the top ten property tax payers were associated with either the extractive or energy sectors, and received bills for a combined $323 million, or 33.5% of total property taxes due to the county.[13]

Costs

A number of resources, which are listed below, shed light on Kern County's transportation systems, water infrastructure, remediation procedures, and

[11] California Department of Conservation, Division of Oil, Gas & Geothermal Resources, http://www.conservation.ca.gov/DOG/Pages/Index.aspx
[12] County of Kern, FY 2012 – 2013 recommended budget, https://www.co.kern.ca.us/cao/budget/fy1213/rec/RecommendedbudgetFinal.pdf
[13] Kern County Treasurer, Top Ten Secured Billing Tax Payers, https://www.kcttc.co.kern.ca.us/forms/topten.pdf

emergency services. However, these government publications do not explicitly discuss the fiscal costs of oil extraction to the Kern County government.

- County of Kern Adopted Budget 2013 - 2014
- 2011 Final Regional Transportation Plan
- County of Kern Environmental Health Services Department, Site Characterization and Remediation
- Kern County Policy and Administrative Procedures Manual: Emergency Preparedness

Data Availability

Measure	Data Availability	Data Gaps
Production	The California Department of Conservation publishes annual oil production data at the county level.	
Employment	The U.S. Census Bureau Censtats data on County Business Patterns (NAICS) provides annual county-level employment data for the following industries (NAICS codes): 211, 21311, and 213112. For any employment estimates identified using the letter-coded ranges (e.g., "a" = 0 – 19 employees), the average number was used (e.g., "a" = 9.5 employees).	Censtats employment data is collected in March of each year, and thus does not take seasonal employment trends into account. In addition, the data does not separate out employment related to oil extraction from the broader oil and gas sector.
Revenues	The County of Kern budget documents and the Kern County treasurer provide annual revenue information.	Publicly-available government data on how sales and use taxes relate to extractive activities was not found for this county.
Costs	The County of Kern Environmental Services Health Department and State Controller publish general information on county activities and expenditures.	Publicly-available government data on how public expenditures for water infrastructure, transportation, emergency services, or remediation are tied to the extractives industries was not found for this county.

County Case Study: Iron Ore
Marquette County, Michigan

Marquette County, Michigan

Iron ore is the primary mineral substance for the world's iron and steel industries. Michigan is the second largest producer of iron ore in the country behind Minnesota. All of Michigan's iron production operations are located in the northern reaches of the state, in Marquette County.

History and Geology

Marquette County generated 20% of the national iron output in 2012. This iron ore is located in the Marquette Iron Range, a narrow basin of iron formations running approximately 33 miles through the towns of Negaunee and Ishpeming. Discovered in 1844, this range represents the oldest of Michigan's iron mining operations: the Jackson Mining Company began extraction here in 1848. In the following decades, the development of critical infrastructure—including roads, railroads, and a canal connecting Lake Superior and Lake Huron—spurred additional mining activity. It was iron mining that originally drew settlers to the area.

Although increased production costs and a diversified global supply of iron drove down output in the first half of the 20th century, the development of new technology in the 1950s made production of lower grade taconite economically feasible, and output increased.[1]

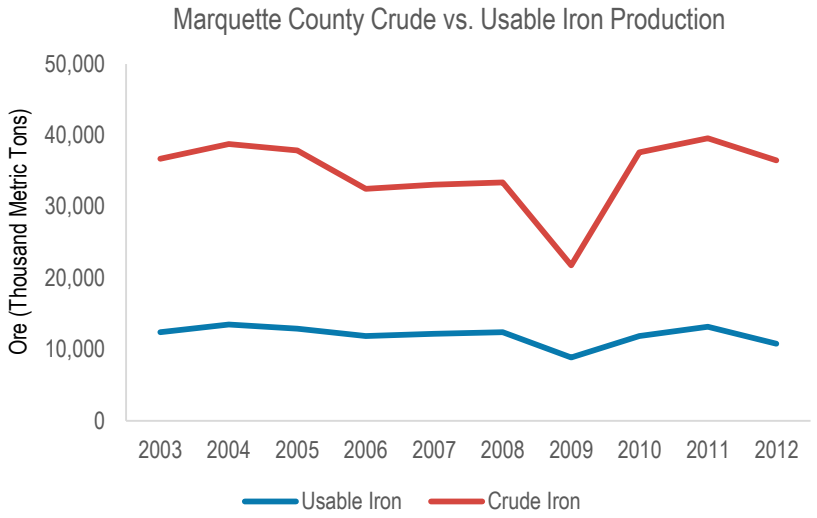
Production

Note that a ton and a metric ton are different units. One ton = 2000 pounds, whereas one metric ton = 2240 pounds.

To convert metric tons to tons, multiply the number by 1.1023. To convert tons to metric tons, multiply the number by 0.9072.

Today's iron mining along the Marquette Iron Range is centered on the Empire and Tilden Mines, operated by Cliffs Natural Resources. In 2012, these two mines generated a combined 10.8 million metric tons of usable iron ore, which produced a total of 6.6 million metric tons of iron.[2] Marquette County's usable iron ore output had remained relatively constant over the preceding ten years, averaging 12 million metric tons out of a total annual capacity of 13 million metric tons.[3] As seen in the chart, the 2009 economic crisis drove down iron ore production, though it rebounded the following year.

[1] Economy Chapter of the Marquette County Comprehensive Plan, 2012, http://www.co.marquette.mi.us/departments/planning/docs/Economy_Plan__updated_format.pdf
[2] United States Geological Survey, Iron Ore data, 2012, http://minerals.er.usgs.gov/minerals/pubs/commodity/iron_ore/myb1-2012-feore.pdf
[3] United States Geological Survey, Iron Ore data, 2003-2012, http://minerals.er.usgs.gov/minerals/pubs/commodity/iron_ore/



Major corporate landowners own a significant portion of the land used for natural resource extraction in Marquette County; lands in public ownership make up only 25% of the county.[4]

Employment

According to the Bureau of Labor Statistics, total private sector employment in Marquette County stood at 21,988 in 2012.[5] Within that group, the iron mining industry employed 1,500 individuals (7% of total private sector employment). Iron ore reserve estimates project a ~30-year supply at Tilden Mine, suggesting continued employment opportunities there for the near-term future.[6] Empire Mine production, on the other hand, was slated to halt in 2014 until a partnership agreement with ArcelorMittal extended the mine's operations (and employment potential) through 2016.[7]

Revenues

The state of Michigan assesses mining operations in Michigan under the same state and local taxes as other commercial ventures in the state (e.g., sales, use, and property taxes). However, the state does collect a specific tax on low-grade iron ore at a rate of 1.1% of the value per gross ton produced.[8] In 2013, Marquette County collected $3,049,250 from that tax, comprising 12.8% of the

[4] Marquette County Michigan, Chapter of the Marquette County Comprehensive Plan, 2009, http://www.co.marquette.mi.us/departments/planning/docs/LUVO_Chapter_Adopted_4_01_09.pdf
[5] Bureau of Labor Statistics, Marquette County private employment total, 2012, http://www.bls.gov/cew/apps/data_views/data_views.htm#tab=Tables
[6] Marquette County Michigan, Economy Chapter of the Marquette County Comprehensive Plan, 2012, http://www.co.marquette.mi.us/departments/planning/docs/Economy_Plan__updated_format.pdf
[7] Cliffs Natural Resources Inc., Cliffs Natural Resources Inc. Announces Extended Supply Agreement with ArcelorMittal USA Inc., http://ir.cliffsnaturalresources.com/English/investors/news-releases/news-releases-details/2014/Cliffs-Natural-Resources-Inc-Announces-Extended-Supply-Agreement-with-ArcelorMittal-USA-Inc/default.aspx
[8] Michigan House of Representatives Fiscal Agency, State of Michigan Revenue, State Source and Distribution, http://www.house.michigan.gov/hfa/PDF/Revenue_Forecast/Source_and_Distribution_2014.pdf

total $23,834,433 General Fund operating budget for that year.[9] The low-grade iron ore tax revenues constituted an increase of $767,000 from 2012.[10] These funds supported public services, such as law enforcement, healthcare, childcare, aging services, and the county's international airport.[11]

Costs

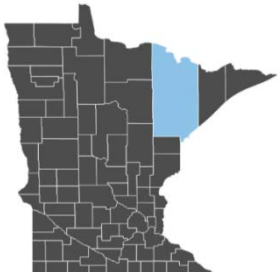
No publically-available government sources delineating specific fiscal costs of iron ore mining in Marquette County were found.

Data Availability

Measure	Data Availability	Data Gaps
Production	The U.S. Geological Survey published iron ore extraction data at the county level for 2003 – 2012. Data for 2013 was not found.	
Employment	The Bureau of Labor Statistics (BLS) published Marquette County private employment totals for 2012. Data from the Marquette County Comprehensive Plan and a public press release from Cliffs Natural Resources Inc. shed light on future employment prospects in the local iron ore industry.	Neither the BLS nor the U.S. Census Bureau has 10-year employment trend data for the mining industry at the Marquette County level for 2004 – 2013. There are several years and sub-industries without data.
Revenues	Revenue information was gathered from a range of state and county government sources for 2012 – 2013, including: Michigan House of Representatives Fiscal Agency and Marquette County Administrator's Budget.	
Costs		Data is unavailable on the connection between county transportation, emergency services, remediation, and water infrastructure investments and the extractive industries.

[9] Marquette County Administrator's 2013 Budget Summary, http://www.co.marquette.mi.us/departments/administrator/docs/Budget2013/ADM_SUMMARY.pdf
[10] Ibid.
[11] Ibid.

County Case Study: Iron Ore
St. Louis County, Minnesota



St. Louis County, Minnesota

Note that a ton and a metric ton are different units. One ton = 2000 pounds, whereas one metric ton = 2240 pounds.

To convert metric tons to tons, multiply the number by 1.1023. To convert tons to metric tons, multiply the number by 0.9072.

Iron ore is the primary mineral substance for the world's iron and steel industries. The United States is estimated to possess iron ore reserves of 110 billion tons, which can produce approximately 27 billion tons of metallic iron.[1] In 2012, the United States was the world's eighth largest producer of iron ore, generating an output of 54 million metric tons.[2] [3] More than three-fourths of that output came from the iron mines located in a single county of the state of Minnesota: St. Louis County.[4]

History and Geology

All of the iron mining in St. Louis County takes place along the Mesabi Iron Range. The Mesabi Range is a narrow, 120-mile long iron deposit stretching from Babbitt to Grand Rapids that has shaped the economic development of the region over the past century. Iron ore was first discovered in the Mesabi Range in 1866; extractive operations began in the 1890s, focused on exploiting the rich reserves of high-grade natural ore that could be processed into steel with little change. However, after extracting approximately 2.5 billion tons of this natural ore, the industry largely exhausted the supply by the 1950s, and began pivoting to a lower-grade iron ore alternative: taconite. Taconite mining targets chert-magnetite ores that are processed and upgraded into higher-grade iron pellets to feed steel mill blast furnaces. To date, the industry has produced approximately 1.6 billion tons of these iron pellets from Mesabi Range ore.[5]

Production

In 2012, eight iron mines were operational in St. Louis County, producing 41.8 million metric tons of ore.[6] Production rates have remained relatively constant over the preceding ten years, averaging 37.8 million metric tons with a compound annual growth rate of 2%.[7] As seen in the chart, St. Louis County's iron production drives the majority of national iron production, mirroring its rises and falls. The abnormally low production rate in 2009 was broadly the result of the global economic recession and weak demand from Chinese steel mills.

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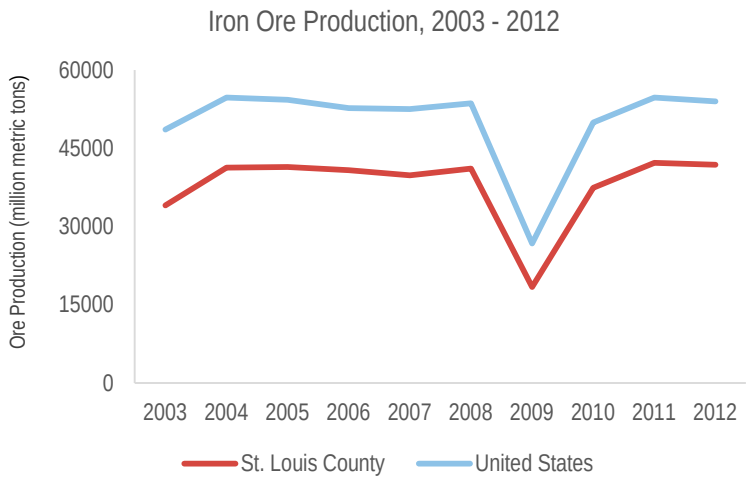
[1] United States Geological Survey, Mineral Commodities Summary 2014, http://minerals.usgs.gov/minerals/pubs/mcs/2014/mcs2014.pdf
[2] United States Geological Survey, Iron Ore data, 2012, http://minerals.er.usgs.gov/minerals/pubs/commodity/iron_ore/myb1-2012-feore.pdf
[3] 1 metric ton = 1.1023 tons
[4] Ibid.
[5] *Explore Minnesota: Iron Ore*, March 2014. http://mn.gov/irrrb/images/2014%2520Explore%2520IRON%2520ORE.pdf
[6] United States Geological Survey, Iron Ore data, 2012, http://minerals.er.usgs.gov/minerals/pubs/commodity/iron_ore/myb1-2012-feore.pdf
[7] Ibid.



In Minnesota, the state is the largest owner of mineral rights. It owns approximately 12 million acres of mineral rights, which is equivalent to 24% of the mineral rights in the state.[8] The state has a policy never to sell state-owned mineral rights, although the state does lease its lands and mineral rights for exploration and development.[9]

Employment

The iron industry serves as a strong source of employment in St. Louis County. The three major iron companies that operate the county's iron mines and processing facilities are Cliffs Natural Resources, ArcelorMittal, and the United States Steel Corporation. The eight mines operated by these and other companies provided 3,970 jobs in 2012, comprising 4% of the county's total 94,933 private sector jobs.[10] [11]

Revenues

Annually, the iron ore industry in Minnesota takes in over three billion dollars in revenue.[12] Various state and county tax mechanisms funnel a portion of these dollars back into the counties. The taconite production tax is the largest tax paid by the mining industry in Minnesota, levied on concentrates or pellets produced by taconite companies. Counties receive 26.05 cents per ton of iron ore from the

[8] Minnesota Department of Natural Resources, Public Land and Mineral Ownership in Minnesota: A Guide for Teachers, 2000, http://files.dnr.state.mn.us/lands_minerals/PLteachersguide.pdf
[9] Ibid.
[10] United States Geological Survey, Iron Ore data, 2012, http://minerals.er.usgs.gov/minerals/pubs/commodity/iron_ore/myb1-2012-feore.pdf
[11] Bureau of Labor Statistics, St. Louis County employment total, Dec. 2012 http://data.bls.gov/pdq/SurveyOutputServlet;jsessionid=C15C887321FE73C1AEAEA21E3ABB03C8.tc_instance4
[12] United States Geological Survey, *2012 Minerals Yearbook*, Iron Ore. http://minerals.usgs.gov/minerals/pubs/commodity/iron_ore/myb1-2012-feore.pdf

taconite production tax, which amounted to $11.6 million for St. Louis County out of $102 million collected from this tax across the state in 2012.[13]

This tax is distributed to a variety of recipients for the benefit of public use, including school districts, cities and townships, and the Iron Range Resources & Rehabilitation Board (IRRRB). The IRRRB splits its disbursements between infrastructure improvement projects and cooperative community projects (e.g., parks, public trails).[14]

St. Louis County also collects revenues from various ad valorem and property taxes, including the tax on unmined taconite ($265,107 collected in 2013) and the ad valorem tax on taconite railroads ($2,981 collected in 2013).[15] Taken together with the taconite production tax, these revenues act as an important source of revenue for the county's schools, infrastructure, and public services.

Costs

Mining operators in Minnesota rely heavily on the state's multimodal transportation system, which includes trucks, trains, ports, and barges. In fact, taconite makes up more than half the tonnage moved on rail across the state.[16] However, keeping the railroads running requires significant financial investment. The Minnesota Department of Transportation projects that it will need between $125 million to $433 million from Minnesota state and local governments over the next 20 years to fulfill the freight rail improvement component of its State Rail Plan.[17] The State does not itemize how much of that money, if any, is specified for rail improvements that support the mining industry.

The Port of Duluth/Superior is the busiest port on the Great Lakes, and handles over 40 million tons of taconite shipments per year.[18] Historically, the Port's highest volume commodity was iron ore mined in the nearby Mesabi Range. Since 1996, the Minnesota state government has committed $25 million for 37 projects to increase port efficiency and preserve infrastructure, both for the mining industry and other commercial sectors.[19]

In Minnesota, the Department of Natural Resources has the authority to regulate the reclamation of lands subject to metallic mining operations.[20] The finances for

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[13] Minnesota Revenue, *Mining Tax Guide*, November 2013. http://www.revenue.state.mn.us/businesses/mineral/Documents/2013_mining_guide.pdf
[14] Iron Range Resources & Rehabilitation Board (IRRRB), Biennial Report Fiscal Years 2013-2014, http://mn.gov/irrrb/images/2013-2014%2520Biennial%2520Report.pdf
[15] Minnesota Revenue, *Mining Tax Guide*, November 2013. http://www.revenue.state.mn.us/businesses/mineral/Documents/2013_mining_guide.pdf
[16] Minnesota Department of Transportation, Annual Transportation Performance Report, 2012, http://www.dot.state.mn.us/measures/pdf/2012ReportBook4-15.pdf
[17] Minnesota Comprehensive Statewide Freight and Passenger Rail Plan, 2010, http://www.dot.state.mn.us/planning/railplan/finalreport/MNRailPlanFinalReportFeb2010.pdf
[18] Ibid
[19] Ibid
[20] Minnesota Department of Natural Resources, Mineland Reclamation, http://www.dnr.state.mn.us/lands_minerals/mineland_reclamation/index.html

any publicly-funded reclamation activities come from a variety of sources, including: the General Fund, annual fees directly from the permit holders, application and supplemental fees for permits, and industry and other governmental agencies.[21] In fiscal year 2012 – 2013, the Minnesota Department of Natural Resources Land and Minerals Program spent $4.4 million, or 6% of its budget, on mine land reclamation.[22] Generally, the mining operation permit holder bears the cost of reclamation, except in cases where the mine is abandoned and there is no party under legal obligation to reclaim the site, or where the mine operator is in fiscally insolvent.

Data Availability

The table below highlights the data sources used to compile this county case study, as well as any gaps that exist in publicly-available data.

Measure	Data Availability	Data Gaps
Production	The U.S. Geological Survey published iron ore production data at the county level for 2003 – 2012. Data for 2013 was not found.	
Employment	The Bureau of Labor Statistics published St. Louis County employment data for 2012.	Neither the Bureau of Labor Statistics nor the U.S. Census Bureau has 10-year employment trend data for the mining industry at the St. Louis County level for 2004 – 2013. There are several years and sub-industries without data.
Revenues	Revenue information was gathered from a range of Minnesota state government sources for 2013, including: Iron Range Resources & Rehabilitation Board (IRRRB) and Minnesota Revenue.	Data is unavailable on how sales and use taxes relate to extractive activities in the county.
Costs	Cost information was gathered from a range of Minnesota state government sources for 2013, including: Minnesota Department of Transportation and Minnesota Department of Natural Resources.	Data is unavailable on the connection between county emergency services and water infrastructure investments and the extractives industries.

[21] Ibid
[22] Minnesota Department of Natural Resources, Where Funds are Spent, 2012, http://files.dnr.state.mn.us/aboutdnr/budget/fy12-13/budget_spent.pdf

County Case Study: Natural Gas
Tarrant & Johnson Counties, Texas

Tarrant & Johnson Counties, Texas

Texas leads the country in natural gas production, generating more gas on an annual basis than the next three highest producing states combined (Louisiana, Oklahoma, and Wyoming).[1] Tarrant and Johnson Counties contribute significantly to natural gas production due to their geographic positioning atop the rich reserves of the Barnett Shale field in the Bend Arch-Fort Worth Basin.

Geology and History

The Barnett Shale reserve spans approximately 5,000 square miles of sedimentary clay and quartz rock, with much of the productive portion of the rock located beneath Tarrant and Johnson Counties. Containing an estimated 43 trillion cubic feet of proved reserves of natural gas, the Barnett Shale is one of the largest onshore natural gas formations in the country.[2] For many years, the Barnett Shale acted as an important sealing cap rock for conventional oil and gas development, but was not regarded as a legitimate source for economic drilling. However, technological advances in the 1980s allowed Mitchell Energy to drill its first well, and drilling activity increased with rising gas prices in the 1990s. Specifically, horizontal drilling and hydraulic fracturing techniques allowed producers to access more natural gas from relatively thin shale deposits. The number of horizontal wells in the Barnett Shale grew from approximately 400 in 2004 to 10,860 in 2011.[3]

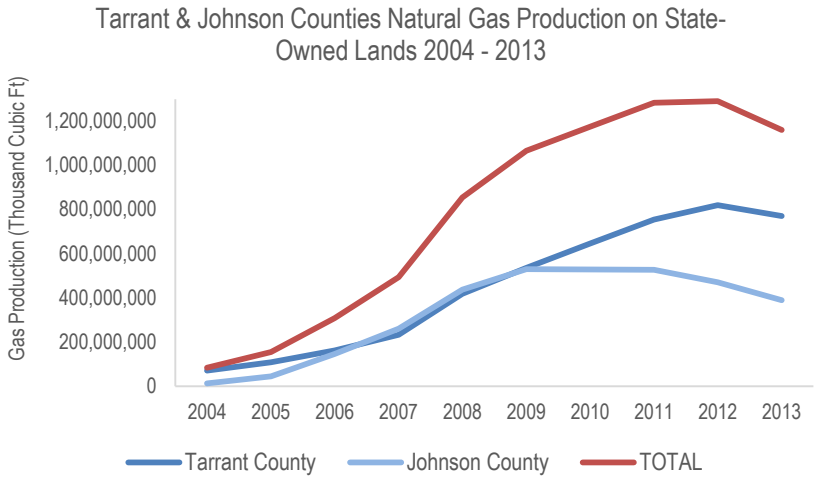
[1] U.S. Energy Administration, Natural Gas Gross Withdrawals and Production, http://www.eia.gov/dnav/ng/ng_prod_sum_a_EPG0_VGM_mmcf_a.htm

[2] U.S. Energy Administration, Review of Emerging Resources: U.S. Shale Gas and Shale Oil Plays, 2011, http://www.eia.gov/analysis/studies/usshalegas/

[3] U.S. Energy Administration, Technology drives natural gas production growth from shale gas formations, 2011, http://www.eia.gov/todayinenergy/detail.cfm?id=2170, and U.S. Energy Administration, Barnett Shale Play, Fort Worth Basin, Texas, 2011, http://www.eia.gov/oil_gas/rpd/shaleusa1_letter.pdf

Production

In 2013, Tarrant and Johnson counties produced a combined 1.16 trillion cubic feet of natural gas from state-owned lands, constituting a significant portion of



Texas' total 7.73 trillion cubic feet output.[4] Almost all other drilling in the state occurs on private lands, as only 1.8% of the acreage in the state of Texas is federal land.[5] This output is particularly remarkable given that only ten years prior, the two counties were producing 7% of their 2013 amount.[6] However, production began to drop in 2013 with falling natural gas prices and strong global supplies.

Employment

The boom in natural gas production in the Barnett Shale over the past decade increased employment in the sector. In 2013, the oil and gas industry, including extraction, drilling, and support services, employed an estimated 7,371 residents, or <.01% of the two counties' total population of 2.07 million.[7] Based on data from the U.S. Census Bureau, this employment number has more than quadrupled in the past decade.[8]

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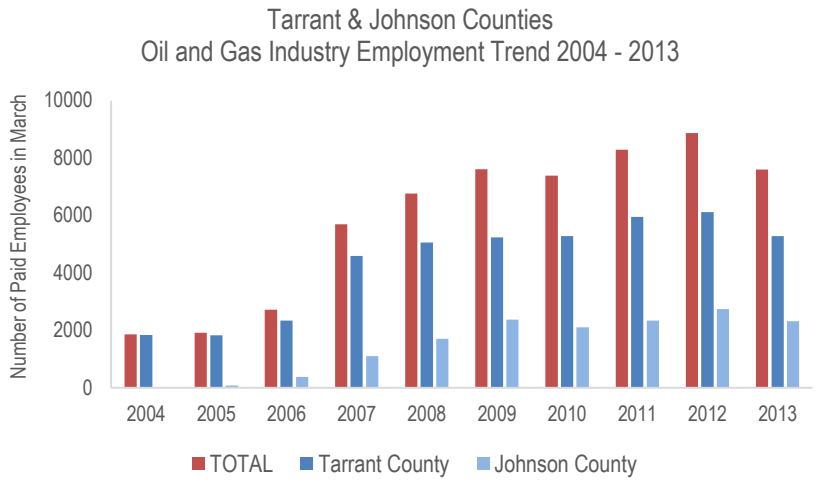
[4] Note: data excludes private and federal land; Texas Railroad Commission Natural Gas Production Data, 2004-2013, http://webapps2.rrc.state.tx.us/EWA/productionQueryAction.do; Natural Gas Production and Well Counts http://www.rrc.state.tx.us/oil-gas/research-and-statistics/production-data/historical-production-data/natural-gas-production-and-well-counts-since-1935/

[5] Congressional Research Service, Federal Land Ownership: Overview and Data, 2012, http://fas.org/sgp/crs/misc/R42346.pdf

[6] Ibid.

[7] United States Census Bureau, Censtats County Business Patterns (NAICS), mid-March employment data for NAICS codes 211, 21311, and 213112 in Johnson and Tarrant counties 2004 – 2013 using averages for letter-coded ranges (a – f), http://censtats.census.gov/

[8] Ibid.



Revenues

Fiscally, the state of Texas levies a natural gas production tax at 7.5% of the market value of the gas, but with the various allowable exemptions and reductions, the effective tax rate hovers below 2%.[9] In 2013, the state government collected $1.5 billion from this tax, earmarking 25% for investment in the Permanent School Fund (PSF) and directing the rest to the state's Economic Stabilization Fund.[10] The interest earned on the PSF investments is distributed by the State Board of Education to every school district on a per-pupil basis.[11]

The state also collects royalties from the natural gas produced on state-owned land. The Texas General Land Office typically receives a royalty worth 20-25% of the value of the resource extracted from state land. This can be paid in the form of cash or actual oil and gas for resale to public entities. Oil and gas leases on state-owned lands generate more revenue than any other source of income for the public education endowment. In its history, the Texas General Land Office has deposited over $12.3 billion into the PSF from oil and gas production revenues.[12]

Tarrant and Johnson Counties derive additional revenue from extractive industries through local property and mineral taxes. In Tarrant County, thousands of homeowners own very small interests in gas units located under large residential developments.[13] The value of all real property in a given county is assessed by the County Appraisal District, and property taxes are levied based

[9] State of Texas Legislative Budget Board, Overview of Natural Gas Tax Structures, http://www.lbb.state.tx.us/Other_Pubs/Natural%20Gas%20Tax%20Overview.pdf
[10] Texas Comptroller of Public Accounts, 2013, http://www.texastransparency.org/State_Finance/Budget_Finance/Reports/Revenue_by_Source/revenue_hist.php#2013
[11] Texas General Land Office, Permanent School Fund, http://www.glo.texas.gov/what-we-do/state-lands/permanent-school-fund/index.html
[12] Texas General Land Office, Oil & Natural Gas, http://www.glo.texas.gov/what-we-do/energy-and-minerals/oil_gas/
[13] Tarrant County Texas, FAQ's – Property Tax and Mineral Tax, http://access.tarrantcounty.com/en/tax/property-tax/FAQs-Property-Tax.html

on applicable mill rates for the locality. Property tax revenue for Tarrant and Johnson Counties totaled $367 million in 2013, which constituted a 48% increase from 2004. In its 2012 annual report, the Tarrant County Auditor's Office cited the development of Barnett Shale gas resources as providing significant employment and business opportunities, helping offset the reduction in other property values, and providing additional taxable value.[14]

Costs

Texas leaves the siting and permitting for natural gas development to its municipalities, and while benefits accrue to these communities, extraction does come with costs. During well construction and drilling, heavy truck traffic causes wear on roads and bridges that can significantly reduce their service life. This problem is particularly pronounced on roadways that were not originally designed to support industrial traffic. According to the Texas Department of Transportation, the volume of truck traffic required to bring one gas well into production is equivalent to the impact of approximately eight million cars; truck traffic required to maintain that well is equivalent to another two million cars. Constructing such a well reduces highway service life by as much as 53%.[15]

In its 2012 State Water Report, the Texas Water Development Board recommended $400 million in public expenditures on statewide water management strategies related to the mining sector. These expenditures ranged from mining conservation outreach efforts to water quality monitoring and related policy work. While fracturing and total mining water use continues to represent less than 1% of statewide water use in Texas, percentages can be significantly larger in some localized areas and the use of water for hydraulic fracturing operations is expected to increase significantly through 2020.[16] Various cities in Texas have accepted tens of thousands of gallons of wastewater from extractive industries into their municipal water treatment plants. For example, as of June 2010, Fort Worth's wastewater system treated 19,000 barrels of oil and gas wastewater.[17]

In Texas, the Texas Railroad Commission requires operators to remove water from extraction pits and refill with sediment within set time frames, as well as complete the appropriate paperwork for any dry or inactive wells that will remain

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[14] Johnson and Tarrant Counties Financial Reports, 2012, http://www.johnsoncountytx.org/webadmin/uploads/fy12-cafr_001.pdf; http://access.tarrantcounty.com/content/dam/main/auditor/FinancialAccountingReports/Annual%20Financial%20Reports/CAFR/FY2013_Comprehensive_Annual_Financial_Report.pdf

[15] Texas Department of Transportation, Impact of Energy Development Activities on the Texas Transportation Infrastructure, http://ftp.dot.state.tx.us/pub/txdot-info/energy/testimony_062612.pdf

[16] Texas Water Development Board, Water For Texas 2012 State Water Plan, http://www.twdb.texas.gov/publications/state_water_plan/2012/2012_SWP.pdf

[17] Specific fiscal costs to municipalities not specified. Texas Railroad Commission, Oil and Gas FAQ's, Water Use in Association with Oil and Gas Activities, http://www.rrc.state.tx.us/about-us/resource-center/faqs/oil-gas-faqs/faq-water-use-in-association-with-oil-and-gas-activities/

offline for more than a year.[18] However, in cases where operators do not comply, the state of Texas relies on its Oil and Gas Regulation Cleanup Fund to reclaim oil and gas wells.[19] In fiscal year 2013, fund paid $54,263,532 for well plugging, site remediation, monitoring and inspections, oil and gas permitting, and administration.[20] A combination of industry permitting fees, production taxes, enforcement penalties, reimbursements, proceeds from the sale of salvaged equipment and hydrocarbons, and federal money from the Coastal Impact Assistance Program (CIAP) finance the Fund.[21]

Data Availability

The table below highlights the data sources used to compile this county narrative, as well as any gaps that exist in publically-available data.

Measure	Data Availability	Data Gaps
Production	The Texas Railroad Commission publishes annual natural gas production data at the county level for state-owned lands.	
Employment	The U.S. Census Bureau Censtats data on County Business Patterns (NAICS) provides annual employment data for specific industries at the county level. Employment in the industry is defined as employment in the following NAICS codes: 211, 21311, and 213112. For any employment estimates identified using the letter-coded ranges (e.g., "a" = 0 – 19 employees), the average number was used (e.g., "a" = 9.5 employees).	Censtats employment data is collected in March of each year, and does not take seasonal employment trends into account. In addition, the data does not separate out employment related to natural gas extraction from the broader oil and gas sector.
Revenues	The State of Texas Legislative Budget Board, Texas General Land Office (Permanent School Fund), and Tarrant and Johnson County Financial Reports provide annual revenue information.	Data on how sales and use taxes relate to extractive activities is not publicly available for either county.
Costs	The Texas Department of Transportation, Texas Water Development Board, and Texas Railroad Commission publish publicly-available cost information reports.	Data on how public expenditures for emergency services relate to extractive activities is not publicly available for either county.

[18] Texas Railroad Commission, Oil & Gas Filing Checklist from Prospect to Production, http://www.rrc.texas.gov/oil-gas/forms/oil-gas-filing-checklist-from-prospect-to-production/#COMPLETION

[19] Texas Railroad Commission, Oil and Gas Commission, http://www.rrc.texas.gov/about-us/organization-activities/divisions-of-the-rrc/oil-gas-division/

[20] Texas Railroad Commission, Oil and Gas Regulation and Cleanup Program, Annual Report – Fiscal Year 2013, http://www.rrc.texas.gov/media/18795/ofcu2013.pdf

[21] Specific fiscal costs to municipalities not specified. Ibid.

County Case Study: Gas
DeSoto Parish, Louisiana

DeSoto Parish, Louisiana

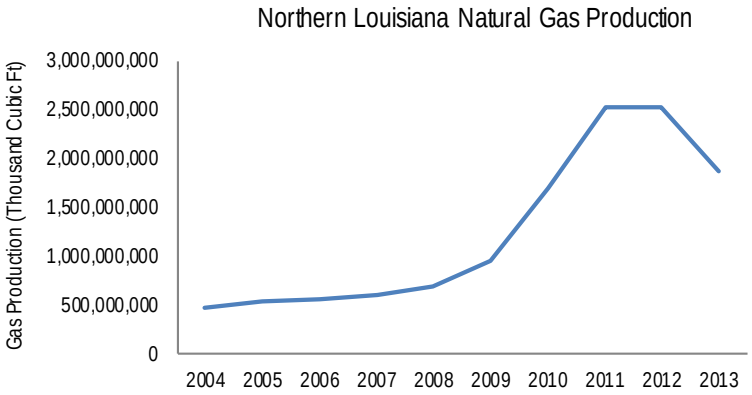
For years, natural gas production in the Haynesville Shale was too difficult and costly. However, in the mid to late 2000s, advances in hydraulic fracturing and horizontal drilling techniques, as well as rising natural gas prices, made extracting natural gas in the region both technically feasible and profitable for the extractive industries. In the U.S., about one-third of natural gas resources go to residential and commercial uses, such as heating and cooking; one-third to industrial uses; and one-third to electric power production.[1]

History and Geology

The Haynesville sedimentary rock formation rests 10,000 – 13,000 ft. below the surface of northwestern Louisiana, eastern Texas, and southwestern Arkansas. DeSoto Parish, home to 27,112 residents, sits at the center of the Haynesville Shale. In the early 2000s, DeSoto Parish's economy consisted primarily of cattle and dairy farming, and timber extraction. However, DeSoto's economy transformed when the Chesapeake Energy Co. drilled the first exploratory well in the Haynesville Shale in 2007, setting off a natural gas boom in the Parish in 2008.[2]

Production

From 2007 to 2011, natural gas production in northern Louisiana, where DeSoto Parish is situated, quadrupled. However, more recently, declining natural gas prices have resulted in lower production numbers. In 2013, northern Louisiana



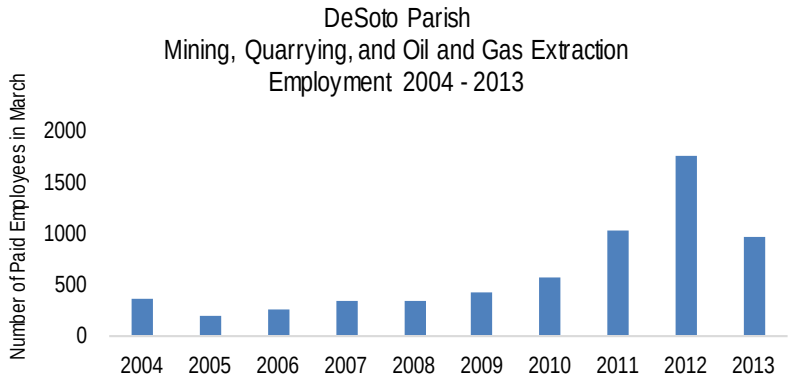
[1] U.S. Department of Energy, Alternative Fuels Data Center: Natural Gas Fuel Basics, http://www.afdc.energy.gov/fuels/natural_gas_basics.html
[2] Nolan, Bruce, "DeSoto parish's instant millionaires hold on to their humble roots," *The Times Picayune*, 27 March 2011, http://www.nola.com/politics/index.ssf/2011/03/desoto_parishs_instant_million.html

produced a total of 1,863,325,756 thousand cubic ft. (MCFs) of natural gas.[3]

In 2013, the U.S. Energy Information Administration estimated proved reserves in the Haneysville/Bossier Shale in Texas and Louisiana to be 16.1 trillion cubic feet.[4]

Employment

Out of DeSoto's nearly 28,000 residents, 548 people (or about 2% of the population) are employed in support activities for mining, which includes oil and gas extraction.[5] Out of this group, 271 people are employed specifically in support activities for oil and gas extraction.[6] Employment data for the complete oil and gas industry in the Parish is unavailable. The chart below shows the more than three-fold increase in employment in the extractive industries in DeSoto Parish between 2009 and 2012.



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Revenues

The Haynesville Shale natural gas boom has increased revenues for the State of Louisiana and DeSoto Parish alike, through state severance taxes and royalties, as well as parish property and sales and use taxes.

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[3] Louisiana Department of Natural Resources, Louisiana State Gas Production, Wet After Lease Separation, Natural Gas and Casing Head Natural Gas, Excluding OCS, http://dnr.louisiana.gov/index.cfm?md=navigation&tmp=iframe&pnid=0&nid=336

[4] Energy Information Administration, U.S. Crude Oil and Natural Gas Proved Reserves, http://www.eia.gov/naturalgas/crudeoilreserves/

[5] Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2013 Annual Averages, http://www.bls.gov/cew/apps/table_maker/v3/table_maker.htm#type=2&st=22&year=2013&qtr=A&own=5&ind=213&supp=0

Note: Data for those employed in oil and gas extraction (NAICS 211) is not publicly available.

[6] Ibid.

[7] United States Census Bureau, Censtats County Business Patterns (NAICS), mid-March employment data for NAICS code 21 in DeSoto Parish 2004 – 2013 using averages for letter-coded ranges (a – g), http://censtats.census.gov/cgi-bin/cbpnaic/cbpdetl.pl

The State of Louisiana levies a severance tax on natural gas owners at a rate of $0.163 per MCF produced.[8] In 2013, Louisiana received $99.45 million from gas severance taxes across the state,[9] as well as $157.42 million from gas royalties for production on state-owned lands.[10] The state distributes some of these revenues to the parishes where extraction took place. For severance taxes, one-fifth of taxes return to the parish, so long as the total is not more than $750,000.[11] In the case of royalties, 10% return to the parish.[12] In 2013, royalties, rents, and bonuses accounted for 2% of DeSoto Parish's total revenues, while taxes from any source made up 66%.[13]

In addition to the state, DeSoto Parish also collects revenue from natural gas production, most notably in the form property taxes. Revenues from property taxes increase with the assessed value of the property. Starting in 2008, the discovery of shale gas increased property values in DeSoto Parish, according to the parish school board. From FY2008-09 to FY2012-13, the taxable value of property within the Parish increased from $291,745,028 to $655,148,947, or 125%. [14]

Natural gas exploration and development also spurred revenues from sales and use taxes (according to the parish school board), which increased from $8,068,875 in FY2003-04 to $73,086,778 in FY2010-11. This trend reversed in FY2011-12, when revenues from sales and use taxes decreased by 34.1%.[15]

The DeSoto Parish School Board reports receiving the largest percentage of its annual revenues from sales and use taxes, which flow into the General Fund, the School Lunch Fund, the Debt Service Fund, and the Capital Projects Fund.[16] While sales and use taxes are not solely attributable to the natural gas industry, there is a noticeable decline in this revenue stream when the industry faces slowdowns. For example, sales and use taxes were expected to decline by $12.3 million or 20.2% in FY 2012-23 as compared to the prior fiscal year as exploration for oil and natural gas moved to other parts of the country.[17]

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[8] Louisiana Department of Revenue, http://rev.louisiana.gov/SeveranceTaxes/Gas
[9] Louisiana State Mineral Severance Tax Revenue, http://dnr.louisiana.gov/index.cfm?md=navigation&tmp=iframe&pnid=0&nid=336
[10] Louisiana State Mineral Royalty Revenue, http://dnr.louisiana.gov/index.cfm?md=navigation&tmp=iframe&pnid=0&nid=336
[11] The Louisiana Division of Administration, Program 22-917, Severance Tax Dedication, http://www.doa.louisiana.gov/opb/pub/FY02/22-non/22-917.pdf
[12] The Louisiana Division of Administration, Program 22-918, Parish Royalty Fund, http://www.doa.louisiana.gov/opb/exec-bud00/22-non/22-918.html
[13] DeSoto Parish Policy Jury, Primary Government Financial Statements, Year Ended December 31 2013, http://www.lla.state.la.us/PublicReports.nsf/B10816DD1188B8CB86257D1600778492/$FILE/00001B92.pdf
[14] Annual Operating Budget of the DeSoto Parish School Board, Through the Period July 1, 2013 through June 30, 2014, http://dps-la.schoolloop.com/file/1268489502929/5003326637698939138.pdf
[15] Ibid.
[16] Annual Operating Budget of the DeSoto Parish School Board, For the Period July 1, 2012 through June 30, 2013, http://dps-la.schoolloop.com/file/1268489502929/1283494361523/4193536947732735890.pdf
[17] Ibid.

Property taxes also contribute substantially to the school board revenues, funding employee salaries, operations, and debt service payments on capital bonds for the local education system.[18] The DeSoto Parish School Board estimated that 26.8% of the school budget would come from property taxes and 48.1% from sales and use taxes in FY2012-13.[19] State tax documents do not specify exactly what percentage of property taxes come from the gas industry.

Costs

Since 2008, Louisiana has invested $1.1 billion in transportation projects in the seven parishes located in the Northwest Region of the state, including DeSoto Parish.[20] While Louisiana's latest comprehensive state transportation plan acknowledges that the state must pay adequate attention to the transportation needs of the rapidly expanding oil and gas industry, it does not specify the types or costs of projects supported.[21]

Note: A millage tax is the amount of tax payable per dollar on the assessed value of a property. Each mil is worth one-tenth of a cent, or $.001.

Louisiana completed a Hydraulic Fracturing State Review in March 2011, which explains the state's policies around industrial water use and wastewater reuse and/or disposal. However, the review does not itemize public expenditures on water-related infrastructure for industrial activities.[22]

The DeSoto Parish Emergency Medical Services (EMS) Department formed in 2001, funded by a four percent millage tax.[23] Since then, the DeSoto EMS has worked closely with gas companies on safety measures, including answering numerous calls related to gas well sites incidents. The county isn't bearing the full burden of these calls, however; the county has received donations from private companies to offset its equipment costs.[24] The frequency and value of the donations is not published.

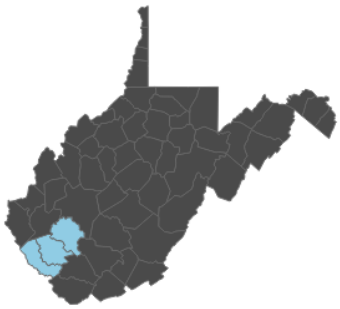
Data Availability Table

Measure	Data Availability	Data Gaps
Production	The Louisiana Department of Natural	

[18] Ibid.
[19] Ibid.
[20] Louisiana Department of Transportation and Development, Accomplishments 2008 – 2014, http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Administration/Documents/DOTD%20Accomplishments_cover.swf
[21] Louisiana Statewide Transportation Plan, Chapter 7: Transportation Plan Development, 2003, http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Multimodal/Transportation_Plan/2003%20Statewide%20Transportation%20Plan/10%20Chapter%207%20-%20Transportation%20Plan%20Development.pdf
[22] Louisiana Department of Natural Resources, Louisiana Hydraulic Fracturing State Review, 2011, http://dnr.louisiana.gov/assets/OC/haynesville_shale/071311_stronger_review.pdf
[23] DeSoto Parish EMS, Our History, http://www.desotoparishems.com/#!our-history/c17ox
[24] Ibid.

	Resources publishes annual natural gas production data at the parish level.	
Employment	The Bureau of Labor Statistics' Quarterly Census of Employment and Wages published employment data for extractive industries support activities for 2013. The U.S. Census Bureau Censtats data on County Business Patterns (NAICS) provided historical employment data for the complete mining industry (NAICS code: 21) for the Parish. For any employment estimates identified using the letter-coded ranges (e.g., "a" = 0 – 19 employees), the average number was used (e.g., "a" = 9.5 employees).	The Bureau of Labor Statistics data does not include employment in the oil and gas industry more broadly, only in support activities. For the DeSoto Parish, Censtats did not have employment data specifically for the oil and gas industry (NAICS codes: 211, 213111, 213112), only for mining industry at large (NAICS code: 21). In addition, the data did not separate out employment related to natural gas extraction from the broader oil and gas sector.
Revenues	The Louisiana Department of Revenue, Louisiana Department of Natural Resources, Louisiana Division of Administration, DeSoto Parish Policy Jury, and the DeSoto Parish School Board publish information on revenues related to the extractive industries.	
Costs	The Louisiana Department of Transportation and Development, Louisiana Department of Natural Resources, and DeSoto Parish website publish publicly-available cost information related to natural gas extraction.	Data on public expenditures for gas-related site remediation is not publicly-available for the Parish.

County Case Study: Coal
Boone, Logan, & Mingo Counties, West Virginia



Boone, Logan, & Mingo Counties, West Virginia

The U.S. possesses the largest estimated recoverable coal reserves in the world. This resource abundance has allowed coal to serve as the single largest source of domestic electricity generation for over six decades.[1] However, coal production has declined since 2007 due to increased competition from natural gas and renewable energy technologies as well as the impact of various new federal regulations. One of the resource's most productive basins is the Central Appalachian Coal Basin, supplying the numerous surface and underground mines of West Virginia. The counties in the southern half of the state maintain estimated recoverable coal reserves of 1.2 billion tons.[2] In particular, the contiguous Boone, Logan, and Mingo Counties have long been a center of coal exploration and extraction.

History and Geology

Coal has driven economic development across Boone, Logan, and Mingo Counties for many decades. Bituminous coal was first discovered by explorer John Peter Salley in 1742, in what would later become Boone County. Although timber was the first major industry that took off in the region, large-scale coal mining began in Boone County in the 1880s. The arrival of the Norfolk & Western Railroad in the 1890s and the Chesapeake & Ohio Railroad soon thereafter launched a coal extraction boom in all three counties. The early decades of the twentieth century witnessed a frenzied pace of development in these counties. Even as coal continued to drive the counties' economies in the decades that followed, population numbers declined as mechanization and a shift to greater surface mining reduced the need for labor.[3]

Production

In 2013, 37 underground mines and 31 surface mines were operating across the three counties.[4] In all three counties, the top ten landowners own at least 50% of private land.[5] Notable operations include Boone County's Twilight MTR Surface Mine (2.5 million tons in 2013) and Mingo County's Coal-Mac Inc. Holden #22

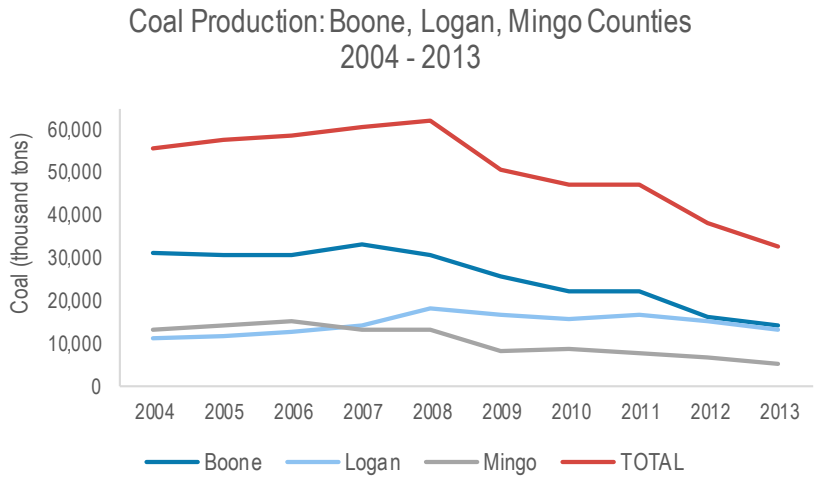
[1] U.S. Energy Information Administration, What is the Role of Coal in the United States?, http://www.eia.gov/energy_in_brief/article/role_coal_us.cfm
[2] U.S. Energy Information Administration, Recoverable Coal Reserves and Average Recoverable Percentage at Producing Mines by State, 2013 and 2012, http://www.eia.gov/coal/annual/pdf/table14.pdf
[3] West Virginia Encyclopedia, Entries for Boone, Logan, and Mingo Counties, www.wvencyclopedia.org
[4] U.S. Energy Information Administration, Coal Production and Number of Mines by State, County and Mine Type, 2013, http://www.eia.gov/coal/annual/pdf/table2.pdf
[5] West Virginia Center on Budget & Policy, Who Owns West Virginia in the 21st Century: Executive Summary, http://www.wvpolicy.org/wp-content/uploads/2013/12/Land-Study-Executive-Summary.pdf

Surface Mine (2.8 million tons in 2013).[6] Most underground mining in southern West Virginia is completed with a continuous mining technology, using room and pillar removal methods. About one quarter of extraction is done with long wall mining, where a large strip of coal known as a long wall panel is removed from a coal seam in a single slice.

Cumulatively, mines in Boone, Logan, and Mingo produced 32.7 million tons of coal, constituting 29% of West Virginia's annual output.[7] Coal production in these counties reached a high of 62.3 million tons in 2008, but dropped 27.9 million tons (52.5%) to their 2013 output level of 32.7 million tons.[8] Logan is the only one of the three counties whose production total in 2013 was greater than it had been ten years prior.

Note that one ton = 2000 pounds and one metric ton = 2240 pounds.

To convert metric tons to tons, multiply the number by 1.1023. To convert tons to metric tons, multiply the number by 0.9072.

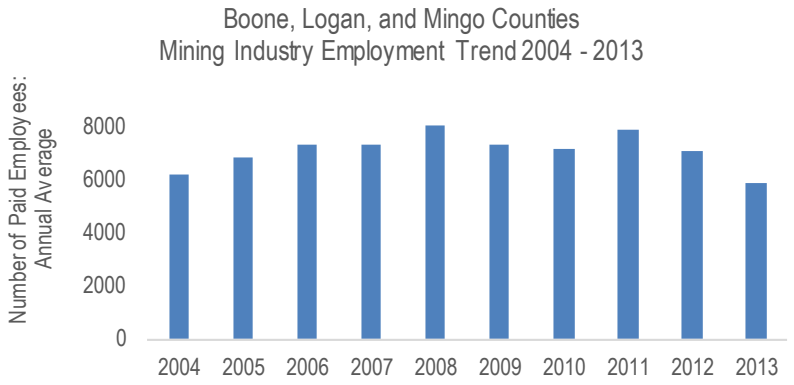


Employment

Coal extraction provided employment in these communities for the past century, but is declining in tandem with the region's dropping production levels and the industry's increased mechanization. In 2013, the combined population of the three counties stood at 88,211.[9] During that same year, 3,427 people were employed at underground mines and 1,601 people were employed at surface mines across the three counties.[10] This translates to 19% of the total employed population, or six percent of the total population. These numbers constitute a 20% drop in the sector's employment from 2007 totals.[11] The following graph

[6] U.S. Energy Information Administration, Coal Data Browser, http://www.eia.gov/beta/coal/data/browser/
[7] U.S. Energy Information Administration, Coal Production Data, http://www.eia.gov/coal/data.cfm#production
[8] Ibid.
[9] U.S. Census Bureau, County Population, 2013, Boone, Logan, Mingo Counties, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk
[10] West Virginia Office of Miners' Health, Safety, and Training, 2013 Statistical Report and Directory of Mines, http://www.wvminesafety.org/2013%20Annual/2013%20COMPLETE%20REPORT.pdf
[11] West Virginia Office of Miners' Health, Safety, and Training, WV Coal Production and Employment by County by Month – 2007, http://www.wvminesafety.org/PDFs/CNTYMOEMP07.pdf

illustrates changes in mining employment broadly across these three counties from 2004 – 2013.



[12]

Revenues

Note that the sale price does not always equate to the market price of the commodity.

West Virginia levies three primary state tax mechanisms to collect and distribute coal revenues down to the county level. The most significant of these mechanisms is the Coal Severance Tax, which amounts to 5% of the sale price of mined coal. Seventy five percent of net proceeds are distributed to coal-producing counties, while the remaining 25% is divided amongst all counties and municipalities in the state. In 2013, Boone, Logan, and Mingo Counties received $7.7 million out of a total $32.5 million collected by the State from this tax.[13]

Boone, Logan, and Mingo also benefit from the Coal County Reallocation Severance Tax (an additional coal severance tax specifically for the counties in which the coal was located at the time it was extracted) as well as the Waste Coal Tax (a severance tax on coal produced from refuse, gob piles, and slurry ponds). Between these two taxes, the county cluster derived $1 million out of a total $4.5 million collected across all counties in 2013.[14]

Costs

The West Virginia Department of Transportation consists of three operating sections, including the Coal Resource Transportation System (CRTS). The CRTS manages, among other items, the permit system for coal haulers that would like to use designated CRTS roads. As of 2003, coal haulers must purchase a permit that allows for a gross vehicle weight of up to 120,000 pounds

[12] Bureau of Labor Statistics, Quarterly Census of Employment and Wages, NAICS Code 212 (Mining Except for Oil and Gas), 2004 – 2013, http://www.bls.gov/cew/datatoc.htm#NAICS_BASED
Note: Does not include employment in mining support activities due to missing data points
[13] West Virginia State Treasurer's Office, FY2013 State of the Treasury Report, https://www.wvsto.com/Portals/wvtreasury/content/About%20the%20Office/Financial%20Reports/SotTR/State%20of%20the%20Treasury%20Report%20-%202013.pdf
[14] West Virginia State Treasurer, Coal County Reallocation Severance Tax, http://www.wvtreasury.com/Banking-Services/Revenue-Distributions/Coal-County-Reallocation-Severance-Tax; Waste Coal Tax, http://www.wvtreasury.com/Banking-Services/Revenue-Distributions/Waste-Coal-Tax

depending on their truck configuration.[15] Fees collected through that permitting process are used by the Commissioner of Highways to match funds provided by coal companies and other parties for repairs and improvements to CRTS roads and bridges. Exact information on how much money the state collects and/or spends on industry-related transportation maintenance and repairs was not found in publicly-availably government sources.

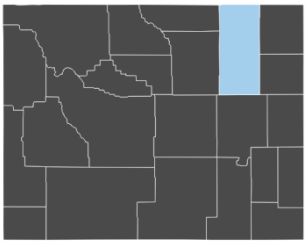
The West Virginia Office of Miners' Health, Safety, and Training (WVOMHST) is the lead state agency for incidents involving coal mine emergencies. In 2013, the state agency's expenditures totaled $15,346,893.[16] Of that total, $12 million came from a general revenue fund, $2.2 million from industry fees, and the remainder from consolidated federal funds.[17] The West Virginia Emergency Operations Plan sheds light on the range of WVOMHST tasks, which range from coordinating all rescue-related activities, to maintaining the Mine and Industrial Accident Emergency Operations Center, to keeping the coal mine emergency contact list up-to-date.[18] Publicly-available government documents do not clarify how much Campbell County spends on coal mine-related emergency services.

Data Availability

Measure	Data Availability	Data Gaps
Production	The U.S. Energy Information Administration publishes coal production data.	
Employment	The Bureau of Labor Statistics publishes Boone, Logan, and Mingo County mining industry employment data for 2004 – 2013.	The Bureau of Labor Statistics data did not isolate employment in the coal mining industry in particular. It also omitted data on employment in mining support services. The U.S. Census Bureau did not have 10-year employment trend data for the mining industry for these counties.
Revenues	The West Virginia State Treasurer's Office provides annual revenue information.	
Costs	The West Virginia Department of Transportation and the West Virginia Office of Miners' Health, Safety, and Training publish documents with cost information.	Publicly-available data on the connection between county remediation and water infrastructure investments and the extractives industries was not found.

[15] West Virginia Department of Transportation, Coal Resource Transportation System Roads, http://www.transportation.wv.gov/highways/programplanning/preliminary_engineering/Pages/CRTS.aspx
[16] West Virginia Office of Miners' Health, Safety, and Training, FY2013 Annual Report and Directory of Mines, 2014, http://www.wvminesafety.org/PDFs/FY2013%20REPORT.pdf
[17] Ibid.
[18] State of West Virginia Emergency Operations Plan, 2008, http://www.dhsem.wv.gov/Resources/Documents/WV%20Emergency%20Operations%20Plan.pdf

County Case Study: Coal
Campbell County, Wyoming



Campbell County, Wyoming

Coal has long been used as an energy resource for generating electricity. Most of the coal consumed in the U.S. fuels the country's electricity needs, and constitutes 39% of all electricity generated in the U.S.[1] The state of Wyoming leads domestic coal production, accounting for two-fifths of the national output.[2] Wyoming extracts more coal than the next six largest producing states combined, with eight of the nation's largest mines located in the state's Powder River Basin.[3] Campbell County, in the northeast corner of the state, supplies more coal for electricity generation than any other county in the U.S.

History and Geology

Campbell County's geographic position atop the Powder River Basin came with such plentiful coal deposits that early cattle ranchers in the area could dig their own coal.[4] Significant mining operations in the region began in the early twentieth century, with the Peerless and Wyodak Mines near the city of Gillette. Further coal development and the discovery of oil spurred population growth in the county in the following decades.

Most Campbell County coal is sub-bituminous, meaning that it contains 35%-45% carbon. Although sub-bituminous coal has the second lowest energy content of the four main types of coal, it is often found in thick deposits near the surface, which results in lower mining costs.[5] The low sulfur content of the coal in the Campbell County deposits became an advantage in the market after the 1990 revision of the Clean Air Act, which required reduced sulfur emissions from coal-fired power plants.[6] Today, the Power River Basin's economically-recoverable coal resources are estimated at 25 billion tons.[7]

Production

In 2013, Campbell County produced 343 million tons of coal, accounting for 88% of the state's total production.[8] Wyoming coal mines operate largely on federal lands administered by the Bureau of Land Management under the U.S.

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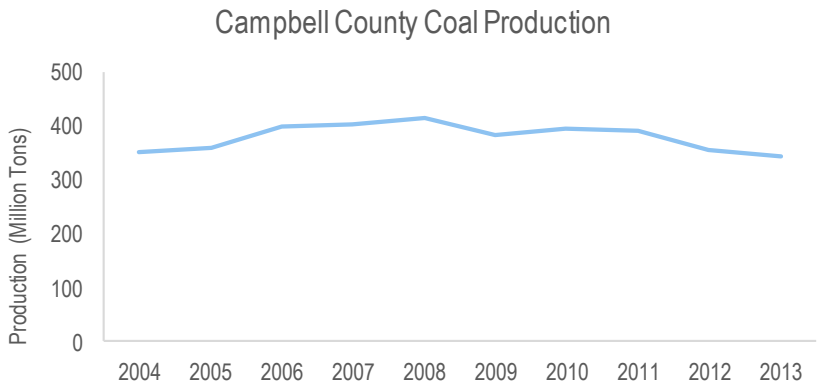
[1] U.S. Energy Information Administration, Use of Coal, http://www.eia.gov/energyexplained/index.cfm?page=coal_use
[2] Ibid.
[3] Ibid.
[4] Wyoming State Historical Society, Campbell County, http://www.wyohistory.org/encyclopedia/campbell-county-wyoming
[5] U.S. Energy Information Administration, Subbituminous and bituminous coal dominate U.S. coal production, http://www.eia.gov/todayinenergy/detail.cfm?id=2670
[6] Wyoming State Historical Society, Campbell County, http://www.wyohistory.org/encyclopedia/campbell-county-wyoming
[7] U.S. Geological Survey, Assessment of Coal Geology, Resources, and Reserve Base in the Powder River Basin, Wyoming and Montana, 2013, http://pubs.usgs.gov/fs/2012/3143/fs-2012-3143.pdf
[8] U.S. Energy Information Administration, Annual coal data, 2013, http://www.eia.gov/coal/data.cfm#production

Department of the Interior.[9] In fact, Wyoming produces more coal on federal and Indian land than any other state in the U.S., constituting 80% of the total coal production on federal and Indian lands in FY2014.[10]

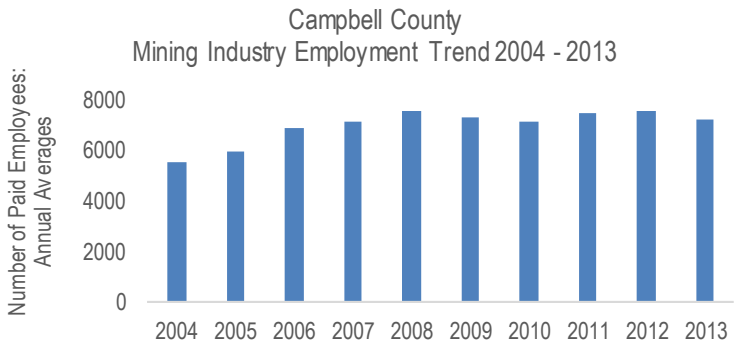
Production levels rose and fell over the past decade, settling at 3% below 2004 levels, partially due to lower natural gas prices that prompted some power companies to abandon coal use.[11] While there is no longer underground mining in Campbell County, eleven of Wyoming's seventeen open pit coal mines are located in the state. The Peabody North Antelope Rochelle Mine and Arch Coal's Black Thunder Mine, both in Campbell County, are the two largest coal mines in the U.S.



Employment

The coal mining industry provides employment for 5,195 workers from a total population of 48,176. This represents approximately 11% of county residents and 24% of total employment.[12] The chart below shows the county employment trend in the broader mining industry over the past ten years, including all mining and mining support activities.[13]

[9] Wyoming State Geological Survey, Wyoming Coal Mine Reclamation, Safety, and Environmental Considerations, http://www.wsgs.wyo.gov/research/energy/coal/Reclamation.aspx
[10] Energy Information Administration, Sales of Fossil Fuels Produced from Federal and Indian Lands FY 2003 through FY 2014, http://www.eia.gov/analysis/requests/federallands/pdf/eia-federallandsales.pdf
[11] Wyoming State Geological Survey, Coal Production & Mining, http://www.wsgs.wyo.gov/research/energy/coal/Production-Mining.aspx
[12] Bureau of Labor Statistics, 2013 Coal Mining All Counties Wyoming, http://www.bls.gov/cew/apps/table_maker/v3/table_maker.htm#type=2&st=56&year=2013&qtr=A&own=5&ind=2121&supp=1, U.S. Census Bureau 2013 Campbell County Population
[13] Bureau of Labor Statistics, Quarterly Census of Employment and Wages, NAICS Codes 213 (Mining Except for Oil and Gas) and 213 (Support Activities for Mining), 2004 – 2013, http://www.bls.gov/cew/datatoc.htm#NAICS_BASED



Revenues

With $120 million in total government revenues for 2013, Campbell County is the wealthiest county in Wyoming.[14] This is largely due to the revenues it brings in from coal extraction. In 2013, Campbell County valued its own coal production at $3.5 billion.[15] The state of Wyoming applies a severance tax on the value of extracted surface coal at a rate of 7%.[16] Between 2011 and 2012, Wyoming collected $587 million in severance tax revenues from coal production.[17] More than 90% of the severance tax revenues flow to the state's Severance Tax Distribution Account, which allocates 62% of its funding to the General Fund, 9% to cities and towns, 4% to counties, and the rest to various infrastructure development accounts. The state mineral revenue report does not specify what percentage of those revenues were directed to Campbell County.

Note: A mill levy is calculated by determining how much revenue each taxing jurisdiction will need for the upcoming year, then dividing that projection by the total value of the property within the area.

Campbell County further generates coal-related revenues via a gross products tax, an ad valorem property tax based on the taxable value of the coal produced the previous year. Campbell County bills and collects this tax directly, based on the applicable tax district mill levy, and uses the revenue to fund local schools, infrastructure, and public services.[18] In 2013, Campbell County collected $64.7 million from this, and other, property taxes, accounting for 70% of total tax

[14] State of Wyoming Department of Revenue, 2014 Annual Report, https://0ebaeb71-a-84cef9ff-s-sites.googlegroups.com/a/wyo.gov/wy-dor/2014AnnualReport.pdf?attachauth=ANoY7crOmXCUrSiDkw4ikseFj14NbOMRZVn4xibexnCskSYl_peydi5m7diS_5eds8sUsJ15CktLIC0rbJJqMZNK5KPX3VrKJcDjqRAUovkWSdLeQE1x0VVHHWCs9lepnylV0pLPUeynVVq5isvOSGXPw9rr_e5CJZlQNIY3wL8HX4N4qIlMo24quD9Q2GvBNi8_CjJ0ongipI0gebsUX-xYTE_TRUOxgq%3D%3D&attredirects=1
Note: Wealthiest county by gross revenue distribution

[15] State of Wyoming Department of Revenue, 2013 Annual Report, https://0ebaeb71-a-84cef9ff-s-sites.googlegroups.com/a/wyo.gov/wy-dor/2013DORAnnualReport.pdf?attachauth=ANoY7coHPZ3yPZyNoXc8Yt1ihby6gNimgpfsqwNHfLhC1zjloQpsxo2e3VVrUL6PxhBNU7VR1avLNVZMGwRpsg6osLZywoxoa1NhNv6KXWbyCghq1uwMRntWY6162XOHrhWOtfB2hDkTZbA6le1dQED7o12YApTGMbKNhxoD5Y5ARRRoWDqwzr3KSTedmjUNZKe1RjZYPb3cDwCrwZW0d0d66YO7eo6bSq%3D%3D&attredirects=0

[16] Wyoming Legislative Service Office, Wyoming Severance Taxes and Federal Mineral Royalties, 2010, https://legisweb.state.wy.us/budget/wyosevtaxes.pdf

[17] State of Wyoming Department of Administration and Information, Mineral Revenue Report, 2015, http://eadiv.state.wy.us/creg/EAD_MinRev_Mar2015.pdf

[18] Wyoming Legislative Service Office, Wyoming Severance Taxes and Federal Mineral Royalties, 2010, https://legisweb.state.wy.us/budget/wyosevtaxes.pdf

revenue.[19] Eighty-five percent of property taxes for the fiscal year ending in 2013 came from natural resource production taxes.[20]

Local communities in Wyoming also benefit from federal mineral royalties and coal lease bonuses. Between 2011 and 2012, the state received $850 million in coal-related royalties and bonuses.[21] These revenues help fund public programs such as the state's school foundation, highway fund, city budgets, and the University of Wyoming. The exact distribution formulas for these funds among the various public programs is outlined in the state's Mineral Revenues Report.[22]

Costs

Campbell County and the Wyoming Department of Transportation published the Campbell County Coal Belt Transportation Study in 2010.[23] The report documents recommendations for roadway network improvements in the near and long term, discusses coal industry impacts to the system, and identifies funding options. While Campbell County is expected to be the primary funding source for new transportation improvements, the study includes a wide variety of collaborative funding efforts, including Abandoned Mine Lands (AML) funds, road impact fees, a sinking fund account, and direct state and federal appropriations.[24] The study estimates $43.9 million in spending on county roads used by the coal industry between 2010 and 2015, but does not appropriate those costs to the county government as compared to other stakeholders.[25]

No publicly-available government data discussing the emergency services, remediation, or water infrastructure costs of coal mining on Campbell County was found.

Data Availability

The table below highlights the data sources used to compile this county case study, as well as any gaps that exist in publicly-available data.

Measure	Data Availability	Data Gaps
Production	The U.S. Energy Information Administration publishes county-level 2013 coal production data, while the Wyoming State Geological Survey produced the historical production trend from 2004 – 2013.	

[19] Campbell County 2013 Financial Report, http://www.ccgov.net/DocumentCenter/View/54
[20] Ibid.
[21] State of Wyoming Department of Administration and Information, Mineral Revenue Report, 2015, http://eadiv.state.wy.us/creg/EAD_MinRev_Mar2015.pdf
[22] Ibid.
[23] Campbell County and Wyoming Department of Transportation, Campbell County Coal Belt Transportation Study, 2010, http://www.ccgov.net/DocumentCenter/Home/View/1910
[24] Ibid.
[25] Ibid.

Employment	The Bureau of Labor Statistics published Campbell County mining industry employment data for 2004 – 2013.	Neither the Bureau of Labor Statistics nor the U.S. Census Bureau has 10-year employment trend data for the coal mining industry in particular at the Campbell County level.
Revenues	Revenue information gathered from a range of Wyoming state government sources for 2010 – 2013, including: State of Wyoming Department of Revenue, Wyoming Legislative Service Office, Wyoming Department of Administration and Information, and Campbell County 2013 Financial Report.	Data on how sales and use taxes relate to extractive activities in the county.
Costs		Data on the connection between county transportation, emergency services, remediation, and water infrastructure investments and the extractive industries.