
The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry Phase I - The Uinta Basin

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List of Acronyms & Abbreviations

BCF	Billion Cubic Feet
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
DOGM	Utah Division of Oil, Gas and Mining
E&P	Exploration and Production
MCF	Thousand Cubic Feet
MMCF	Million Cubic Feet
NAICS	North American Industry Classification System
NYMEX	New York Mercantile Exchange
PADD	Petroleum Administration for Defense District
SIC	Standard Industrial Codes
SITLA	School and Institutional Trust Lands Administration
UDOT	Utah Department of Transportation
USFS	U.S. Forest Service
WTI	West Texas Intermediate Crude

The Structure and Economic Impact of Utah's Oil and Gas Industry

1 Executive Summary

The Bureau of Economic and Business Research at the University of Utah has completed an economic impact study of the oil and gas exploration and production industry in the Uinta Basin in eastern Utah. The Uinta Basin, comprising Duchesne and Uintah Counties, is the center of the oil and gas industry in Utah. Rapidly rising energy prices in recent years have stimulated greater production of both crude oil and natural gas in the northern Rocky Mountains, and the Uinta Basin is an integral part of the oil and gas industry in the Rocky Mountain area. The 2006 crude oil production in the Uinta Basin of 11.4 million barrels was a 55 percent increase over a recent low of 7.3 million barrels in 2002. Natural gas production in the area has steadily increased over the past 10 years and reached an all-time high of 226 BCF in 2006.

The rise in production is causing an economic boom in the Uinta Basin. During 2006, the oil and gas exploration and production industry was directly responsible for 19.9 percent of employment and 34.8 percent of total wages in the Uinta Basin. When including indirect and induced impacts due to company and employee spending, the oil and gas industry accounted for 49.5 percent of employment and 60.1 percent of total wages paid in the Uinta Basin during 2006.

The industry also has a sizeable fiscal impact on local governments in the Uinta Basin. Property taxes paid on producing oil and gas wells were \$18.2 million in 2006 and accounted for 38.7 percent of all property taxes paid in the two counties. Federal mineral royalties distributed to the two counties by the Utah Department of Transportation during 2006 amounted to \$30.3 million.

2 Background

The recent rise in the price of gasoline has refocused attention on the energy markets with attention not seen since the collapse of oil prices in the mid 1980s. In contrast to the energy shortage of the 1970s, which was largely driven by constrained supply due to geopolitical issues, the recent runup is a result of increasing demand and decreasing supply to aging fields. Crude oil, and to a lesser extent natural gas, is a worldwide commodity with international supply and demand factors determining prices. Consumption of petroleum products is up worldwide, with developing countries driving the increase. Consumption of petroleum in China was up over 30 percent from 2002 to 2006. This rise in demand for petroleum products has resulted in a dramatic increase in the nominal price of crude oil (Figure 1).

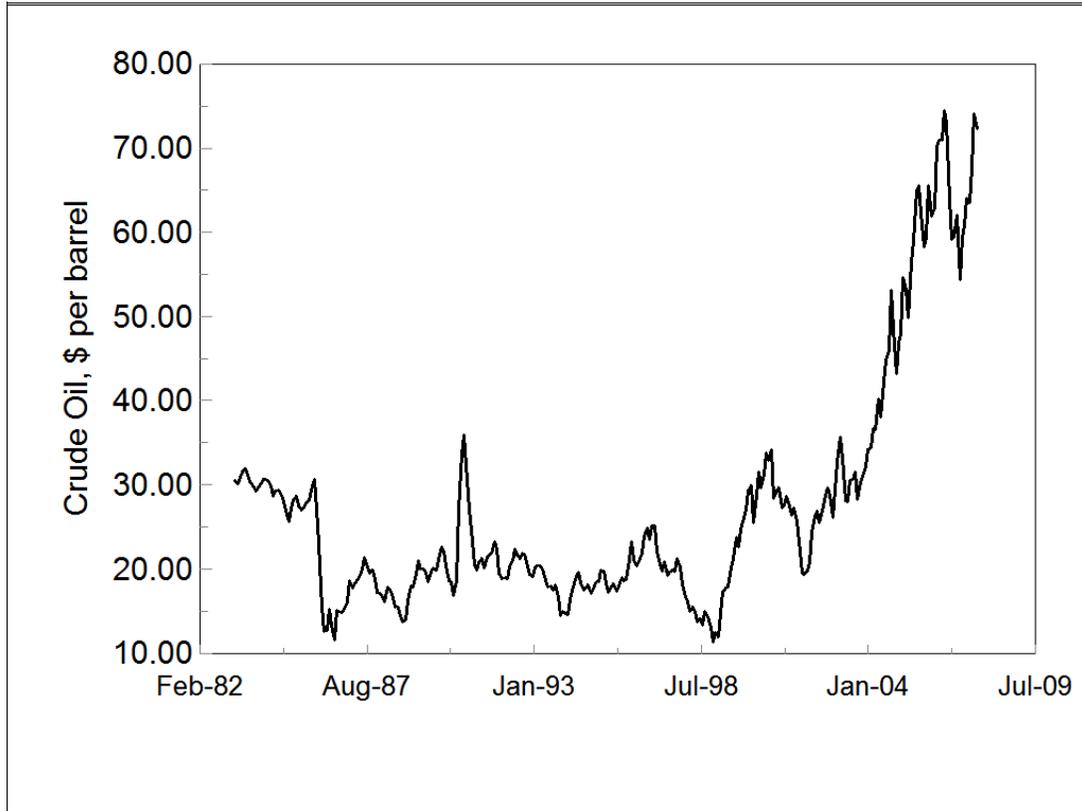


Figure 1 Crude Oil Price: NYMEX Near Month Contract for Light Sweet Crude
Source: Energy Information Administration

The price of crude oil was relatively flat during the 1990s with prices in the \$20 to \$30 range. Then, from a low of \$11.31 per barrel in December 1998, crude oil increased to over \$70 per barrel in April 2006 and reached \$79.63 in September 2007. Forecasts expect crude oil to remain near current levels in the future. In September 2007 the Energy Information Administration forecast the price of West Texas Intermediate Crude¹ would remain over \$71 per barrel through the end of 2008. At the same time, natural gas prices have increased from historically low values in the late 1990s to a current price of about \$7 per mcf, with increased volatility in recent years (Figure 2).

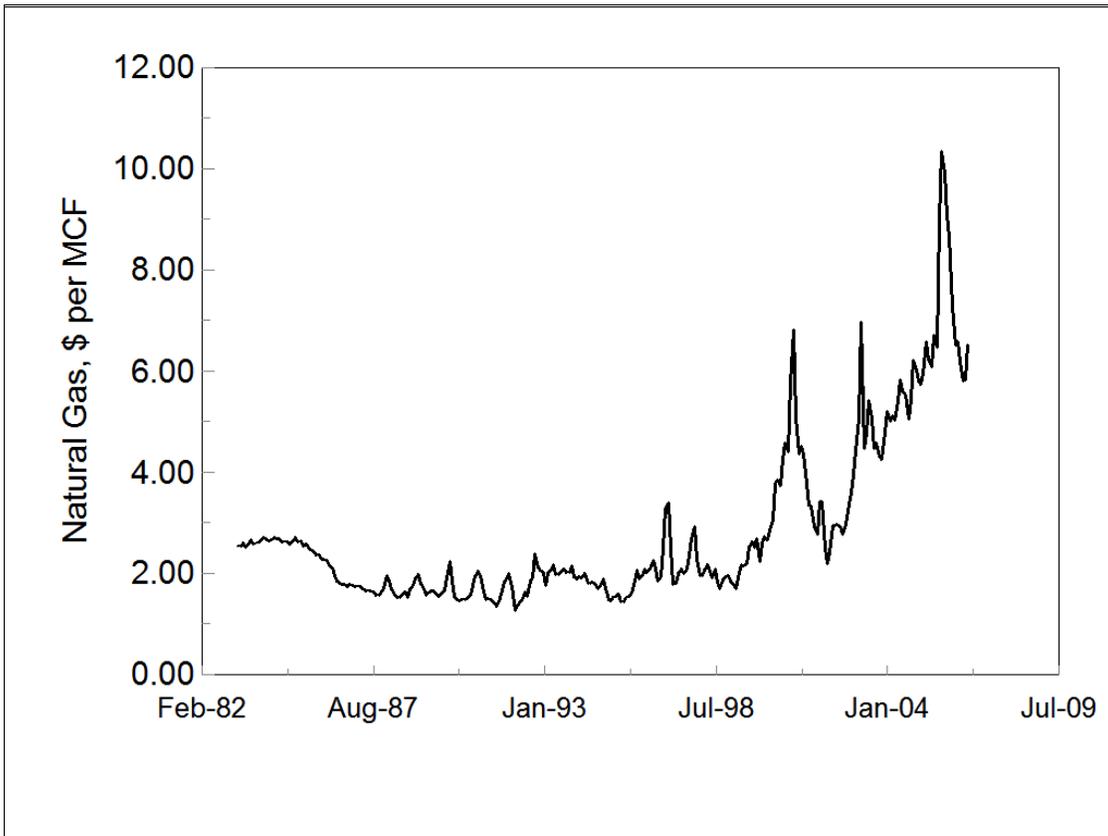


Figure 2 Average U.S. Wellhead Price of Natural Gas
Source: Energy Information Administration

¹West Texas Intermediate (WTI) refers to a crude stream produced in Texas and Oklahoma that is the most common reference or “marker” for pricing crude oil and, along with several other domestic and foreign crude streams, is acceptable for settling New York Mercantile Exchange contracts for light, sweet crude oil.

While increased demand in the Pacific Rim has driven petroleum prices, demand has also increased in the U.S. Domestic crude oil production has declined from a high value of 3.5 billion barrels in 1970 to 1.9 billion barrels in 2006. Even with additional drilling in response to higher prices, domestic crude oil production is



Figure 3 Petroleum Administration for Defense Districts (PADD)
 Source: Energy Information Administration

dropping due to geologic constraints. The Rocky Mountain states are the only area in the country currently experiencing significant increases in production of crude oil and natural gas. Of the five Petroleum Administration for Defense Districts (PADD) (Figure 3) used for analyzing petroleum data, crude oil and natural gas production are increasing only in PADD I (the East Coast) and in PADD IV (the Rocky Mountains).

The East Coast is responsible for less than one-half of one percent of domestic crude oil production and three percent of natural gas production. From 2002 to 2005, the amount of crude oil produced in the Rocky Mountains increased by 20.4 percent while production on the Gulf Coast (PADD III), the largest producing area in the country, dropped by 12.8 percent. The center for production of natural gas in the United States is also shifting from the Gulf Coast to the Rocky Mountains. In 1982, PADD III was responsible for 75.5 percent of U.S. natural gas production and PADD IV produced 4.2 percent. By 2005, the amount of domestic gas produced in PADD III had dropped to 62.5 percent of total production while the amount from

PADD IV had increased to 17.0 percent. Additionally, natural gas production in the Rocky Mountains is increasing approximately five percent annually. The increase in crude oil and natural gas production in the Rocky Mountain states is creating an economic boom in the producing areas.

Table 1 U.S. Crude Oil and Natural Gas Production by PADD, 2002-2005

	PADD I	PADD II	PADD III	PADD IV	PADD V	United States Total
Crude Oil, thousand barrels						
2002	7,458	164,635	1,174,305	102,982	947,745	2,097,124
2003	7,170	161,360	1,162,869	105,931	636,123	2,073,453
2004	6,941	159,309	1,103,743	113,069	600,239	1,983,302
2005	8,299	161,587	1,023,499	123,956	572,765	1,890,106
Percent Change, 2002-2005	11.3	(1.9)	(12.8)	20.4	(39.6)	(9.9)
Dry Natural Gas, MMCF						
2002	453,774	2,432,537	12,622,766	2,641,749	776,962	18,927,788
2003	521,824	2,336,271	12,662,381	2,797,202	780,866	19,098,544
2004	520,240	2,428,676	11,960,955	2,935,503	745,517	18,590,891
2005	522,997	2,413,736	11,298,362	3,075,234	763,907	18,074,237
Percent Change, 2002-2005	15.3	(0.8)	(10.5)	16.4	(1.7)	(4.5)
Source: Energy Information Administration						

Despite the common perception of being vertically integrated, the oil and gas industry is highly fragmented, especially at the exploration and production stage. Many companies concentrate exclusively on oil and gas production and have no interest in downstream operations such as pipelines, refineries and product distribution. Additionally, much of the work conducted in the producing fields is contracted to other companies that specialize in different aspects of drilling and maintaining the wells. Very few of the operating companies operate their own drill rigs but instead contract to companies that specialize in drilling. Other companies specialize in different operations such as grading well locations, well surveying, running and pulling well casings, cementing wells, and perforating well casings. The operating, drilling and service companies collectively constitute the oil and gas exploration and production industry.

Many other industries benefit from spending by the oil and gas industry. These include consulting geologists and engineering companies, environmental consultants, vendors of oil field equipment and pipeline and trucking companies. Spending by oil industry employees also benefits the local economy. These economic benefits beyond direct employment in the exploration and production industry are known as indirect and induced benefits, and are the source of the “multiplier” effect. This study examines the structure of the Utah oil and gas

exploration and production industry and the total economic impact on the producing areas.

3 Utah's Oil and Gas Industry

The Utah oil and gas industry started in 1891, when a water well being drilled in Farmington Bay near the Great Salt Lake encountered natural gas at a depth of 1,000 feet. Gas from several wells in this area was transported to Salt Lake City through wooden pipelines for several years until shifting sand in the lakebed plugged the wells. The first oil was found in the early 1900s near Rozel Point at the north end of the Great Salt Lake, near Mexican Hat in southeastern Utah and near the town of Virgin in southwestern Utah. The first large-scale commercial well was drilled near Vernal in 1948. Since the early 1960s, Utah has consistently ranked in the top 15 oil-producing states and in recent years has experienced a dramatic rise in natural gas production. During 2005, Utah ranked 15th in crude oil production out of 31 states and two Federal Offshore Areas and 11th in dry natural gas production out of 33 states and the Federal Offshore Area in the Gulf of Mexico.

Utah is contributing to the recent growth in crude oil and natural gas production taking place in the Rocky Mountain states (PADD IV). The state's 2006 crude oil production of 17.9 million barrels was a 37 percent increase over the recent low of 13.1 million barrels produced in 2003 (Figure 4). Although a substantial increase from the recent past, 2006's output was still only 44 percent of the all-time high of 41.1 million barrels produced in 1985.

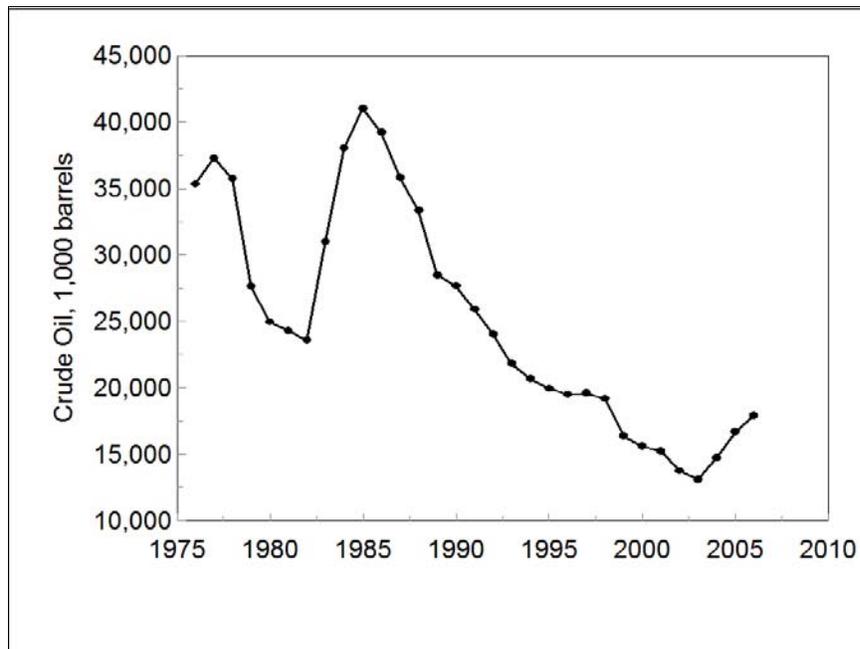


Figure 4 Utah Crude Oil Production
Source: Utah Division of Oil, Gas and Mining

There has been a similar rise in natural gas production in Utah. In 2006, Utah's natural gas production hit an all-time high of 356 BCF, up 31 percent from a near-term low of 273 BCF in 1997. The previous Utah record gas production was 348 BCF in 1994.

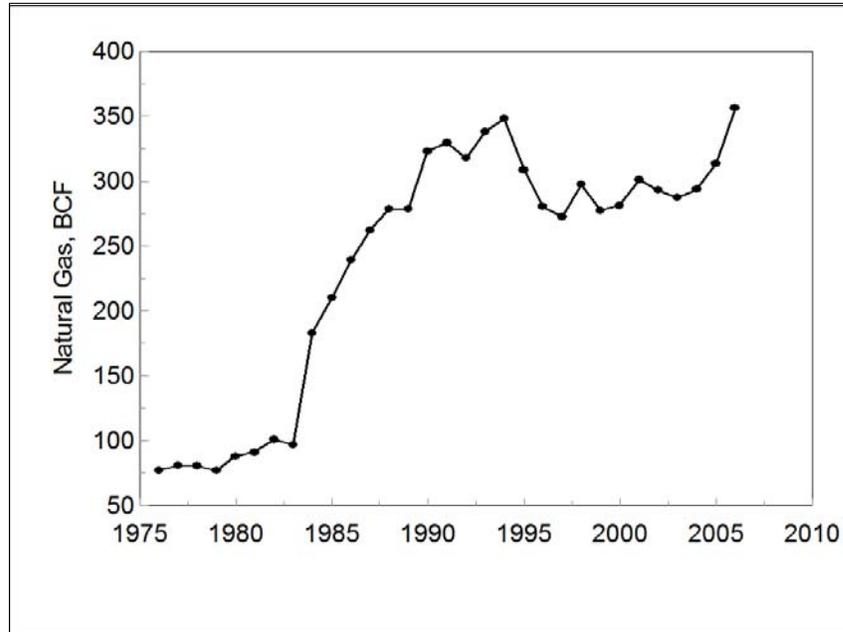


Figure 5 Utah Gross Withdrawals of Natural Gas
Source: Utah Division of Oil, Gas and Mining

During 2006, 129 different operating companies reported crude oil and natural gas production to the Utah Division of Oil, Gas and Mining. Production occurred in 11 of Utah's 29 counties. Duchesne County had the highest oil production with 6,401,299 barrels while Uintah County led natural gas production with gross withdrawals of 203,522,421 MCF.

Six different areas in Utah have significant production of oil or natural gas. These areas are defined by geology. Additionally, these areas are somewhat isolated from one another economically, especially in terms of the oil and gas exploration and production (E&P) industry. The major oil and gas producing area in Utah is the Uinta Basin in the northeastern part of the state. Vernal is a center of the oil and gas industry in the Uinta Basin, with many of the producing, drilling and service companies maintaining offices in the area. Other producing areas in Utah include coalbed methane plays in Carbon and Emery Counties, the Paradox Basin in San Juan County, the Uncompahgre Uplift in Grand County, the Thrust Belt in Summit County and the recently discovered Hingeline in the central part of the state.

The Paradox Basin, Uncompahgre Uplift, and Thrust Belts all extend over state lines to adjacent states. Many of the workers involved in operating wells in these areas are actually employed in other states. Additionally, coalbed methane operations in Carbon and Emery Counties and the Hingeline are fairly recent discoveries and an oil service industry has not developed in these areas.

Defining the oil and gas E&P industry is a key element for a study of this type. Economists use the North American Industry Classification System (NAICS) developed by the Office of Management and Budget for classifying industries for reporting employment and earnings. The NAICS codes have three industrial classifications that directly apply to the oil and gas E&P industry. These are NAICS 211 - Oil and Gas Extraction, NAICS 213111 - Drilling Oil and Gas Wells, and NAICS 213112 - Support Activities for Oil and Gas Operations. For purposes of this study, these three industries are collectively considered the oil and gas E&P industry. Additional information on the NAICS codes for these three industries is available in Section 6.

The following sections summarize the various oil and gas producing areas in Utah. Also included are economic data for Duchesne and Uintah Counties to place the oil and gas E&P industry in context.

3.1 Uinta Basin

The Uinta Basin in northeastern Utah is the largest oil and gas producing area in the state and a significant producer in the Rocky Mountains. Natural gas was first discovered in economic quantities in the Uinta Basin in 1925 at the Ashley Valley field. In 1949, oil was discovered in the Roosevelt field. Natural gas and crude oil have been produced in the Uinta Basin since then, although production and the accompanying economic impact have varied with prices. The Uinta Basin is currently experiencing a significant economic boom due to increased oil and gas activity and this boom should continue as long as energy prices remain at current levels.

Although the geologic area defined as the Uinta Basin extends into Colorado and includes portions of several other Utah counties (Carbon, Emery, Grand, Wasatch, and Utah), this study focuses on Duchesne and Uintah Counties, Utah. Economic data is released at the county level and almost all of the economic activity associated with E&P activities in the Uinta Basin occurs in these two counties. For this study, the term Uinta Basin refers to Duchesne and Uintah Counties, Utah collectively unless otherwise indicated.

The two counties contain just under five million acres (Table 2), with 54 percent of the land controlled by the federal government. After including land controlled by the

state government and Indian lands, only 21.8 percent of the Uinta Basin is privately owned. With such a large portion of the land controlled by the federal government, the oil and gas E&P industry is highly sensitive to changes in federal land management policy. The largest amount of federal land in the Uinta Basin is controlled by the Bureau of Land Management, which is responsible for 32.7 percent of the land in the two counties. An additional 14.6 percent is administered by the U.S. Forest Service. Lesser amounts are controlled by the U.S. Fish and Wildlife Service and the National Park Service.

The majority of the state land in the basin is controlled by the Utah School and Institutional Trust Lands Administration (SITLA). SITLA administers six percent of the land in the two counties. Lesser amounts are controlled by the Utah Division of Wildlife Resources and the Utah Division of State Parks and Recreation. Indian lands make up 16 percent of the Uinta Basin.

Table 2 Land Ownership in the Uinta Basin

	Duchesne County, acres	Uintah County, acres	Uinta Basin Total, acres	Percent of Total
Bureau of Land Management	206,552	1,411,944	1,618,496	32.7
US Forest Service	453,680	269,380	723,060	14.6
National Wildlife Refuge	0	8,975	8,975	0.2
USFS and BLM Wilderness	263,882	0	263,882	5.3
National Park Service	0	50,682	50,682	1.0
Total Federal	924,115	1,740,981	2,665,096	53.9
State Parks	3,723	956	4,679	0.1
State Wildlife Lands	76,206	9,707	85,913	1.7
State Trust Lands	54,357	240,602	294,959	6.0
Total State Lands	134,287	251,264	385,551	7.8
Indian Lands	395,848	423,353	819,201	16.6
Private	614,070	461,646	1,075,716	21.8
Total	2,068,318	2,877,244	4,945,562	100.0
Source: Utah Governor's Office of Planning and Budget				

Production of both crude oil and natural gas have increased in recent years in the Uinta Basin (Tables 3-4). From a low of 7.3 million barrels in 2002, crude oil production in the two counties increased to 11.4 million barrels in 2006. Production is rising faster in the Uinta Basin than in Utah as a whole. While crude oil production increased 55.5 percent in the basin from 2002 to 2006, Production in the state as a whole increased by 30.2 percent. This leading to the concentration of Utah production in the Uinta Basin. In 1997, 48.5 percent of the crude oil produced in Utah came out of the basin. By 2006, the amount of the state's crude oil production originating in the Uinta Basin had increased to 63.4 percent.

Table 3 Uinta Basin Crude Oil Production, 1997-2006

	Crude Oil, barrels			
	Duchesne County	Uintah County	Uinta Basin Total	State Total
1997	6,358,598	3,147,423	9,506,021	19,592,548
1998	6,268,634	2,940,615	9,209,249	19,223,542
1999	4,697,532	2,637,875	7,335,407	16,376,521
2000	4,772,096	2,788,908	7,561,004	15,609,030
2001	4,980,167	3,195,205	8,175,372	15,273,926
2002	4,291,457	3,016,376	7,307,833	13,770,860
2003	4,341,306	3,069,047	7,410,353	13,098,424
2004	5,838,429	3,776,762	9,615,191	14,799,208
2005	6,670,272	4,371,478	11,041,750	16,675,302
2006	6,401,299	4,959,425	11,360,724	17,926,580
Percent of State Total, 2006	35.7	27.7	63.4	100.00
Source: Utah Division of Oil, Gas and Mining				

The rise in natural gas production has been even more dramatic than that of crude oil. Over the past 10 years, gas production from the basin has steadily grown from 81 BCF in 1997 to 226 BCF in 2006, a 178 percent increase (Table 4). Uintah County has been the site of most of this growth. Production in Uintah County increased by 236 percent from 1997 to 2006, and the county was responsible for 57.1 percent of the natural gas produced in Utah during 2006.

Table 4 Uinta Basin Natural Gas Production, 1997-2006

	Natural Gas, MCF			
	Duchesne County	Uintah County	Uinta Basin Total	State Total
1997	20,631,221	60,599,426	81,230,647	272,553,774
1998	19,204,848	70,621,273	89,826,121	297,503,246
1999	15,352,521	72,154,481	87,507,002	277,494,312
2000	13,934,444	83,100,193	97,034,637	281,170,016
2001	13,933,698	93,909,207	107,842,905	300,975,578
2002	12,476,159	104,385,705	116,861,864	293,030,004
2003	11,954,655	111,241,438	123,196,093	287,141,238
2004	14,641,315	132,454,516	147,095,831	293,735,994
2005	20,089,535	163,830,925	183,920,460	313,465,305
2006	22,525,615	203,522,421	226,048,036	356,361,028
Percent of State Total, 2006	6.32	57.11	63.43	100.0
Source: Utah Division of Oil, Gas and Mining				

The rising production is reflected in increased drilling activity in Duchesne and Uintah Counties (Table 5). From a low of 150 oil and gas wells spudded in the basin during 1999, the number increased to 933 wells spudded in 2006. As with

production, drilling activity in Utah is focused in the Uinta Basin. During 2006, of a total of 1,056 oil and gas wells spudded in Utah, 88.3 percent were drilled in the Uinta Basin.

Table 5 Wells Spudded in the Uinta Basin, 1997-2006

	Wells Spudded			
	Duchesne County	Uintah County	Uinta Basin Total	State Total
1997	160	154	314	430
1998	123	186	309	430
1999	10	140	150	283
2000	63	289	352	540
2001	74	386	460	627
2002	44	226	270	391
2003	89	333	422	480
2004	166	441	607	659
2005	183	569	752	889
2006	279	654	933	1,057
Percent of State Total, 2006	26.4	61.9	88.3	100.00

Source: Utah Division of Oil, Gas and Mining

While production of both crude oil and natural gas is increasing in the Uinta Basin, this increase must be placed in the context of the total economy for the two counties.

The Uinta Basin had an estimated 2006 population of 43,332, up 6.1 percent from 2002 (Table 6). Major cities included Vernal, with an estimated 2006 population of 8,163, Roosevelt (4,681), Duchesne (1,506) and Naples (1,502). The 2000 Decennial Census determined that 39.3 percent of the population lives in the two urban areas of Vernal and Roosevelt. The remainder of the two counties is not densely enough populated to be considered urban.² Although they contained almost 40 percent of the population of the two counties, the two urban areas account for only 0.18 percent of the land area in the Uinta Basin.

²The Bureau of the Census defines urban areas as census blocks that have a population density of at least 1,000 persons per square mile and surrounding census blocks with a population density of 500 persons per square mile. Adjacent census blocks with a lower population density are also included if they meet additional criteria established by the Bureau of the Census.

Table 6 Uinta Basin Population, 2002-2006

	Population			
	Duchesne County	Uintah County	Uinta Basin Total	State Total
2002	14,856	25,984	40,840	2,358,330
2003	14,698	26,019	40,717	2,413,618
2004	14,933	26,224	41,157	2,469,230
2005	15,237	26,883	42,120	2,547,389
2006	15,585	27,747	43,332	2,615,129

Source: Utah Population Estimates Committee

The Uinta Basin is benefitting economically from the oil and gas boom; its unemployment rate has consistently been lower than the state average since August 2005. As energy prices have increased, employment in the Uinta Basin has been risen, from approximately 14,500 persons in 1997 to over 25,000 persons in mid-2007 (Figure 6). The unemployment rate in the area has declined since the middle of 2002 after reaching 10.1 percent in February 1999.

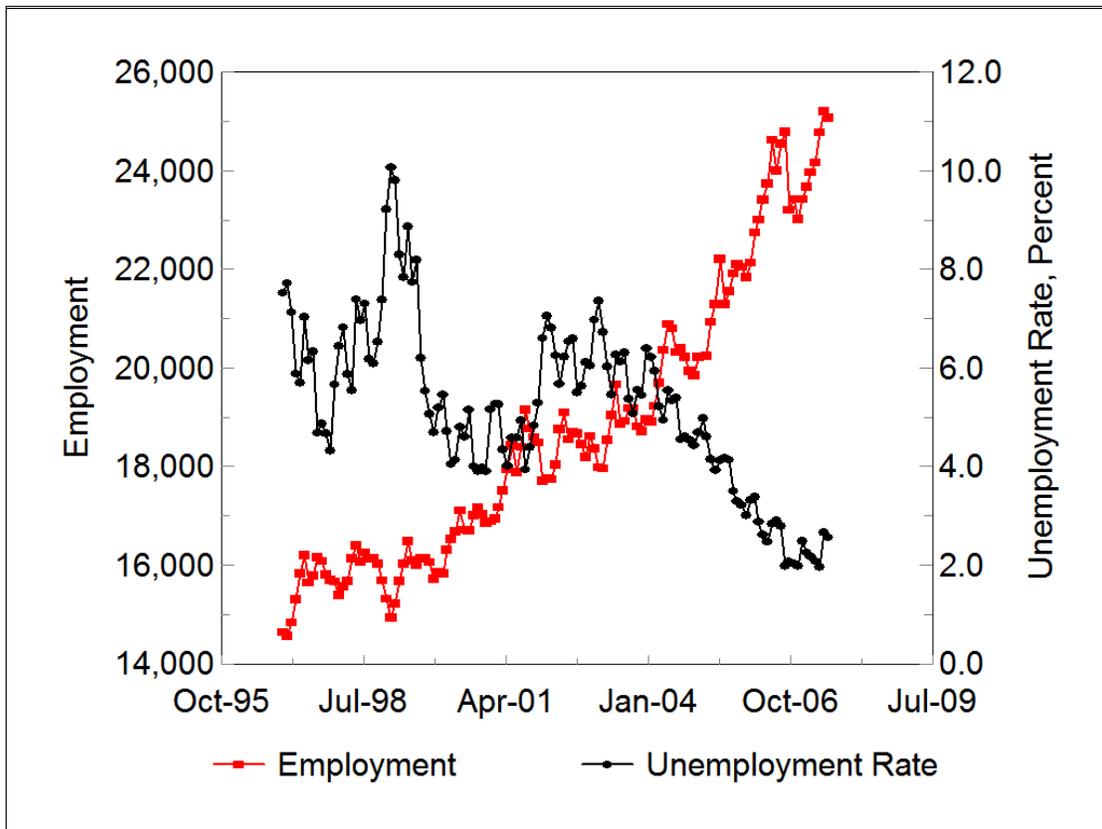


Figure 6 Employment and the Unemployment Rate in the Uinta Basin
 Source: BLS, Local Area Unemployment Statistics

The industrial structure of the basin is significantly different from that of the state of Utah (Table 7). Mining, which includes oil and gas production, is responsible for over 20 percent of the employment in the Uinta Basin, compared with 0.9 percent of employment in Utah. The Uinta Basin is nearly 25 times more dependent on the mining industry for employment than is Utah as a whole, as indicated by a location quotient of 24.9³. While the majority of mining employment in the basin is due to oil and gas production, there are other mining operations present. Significant mining operations in the Uinta Basin other than oil and gas extraction are the SF Phosphates Ltd. mine north of Vernal and three gilsonite operations by American Gilsonite, Lexco, Inc., and Ziegler Mineral and Chemical.

Other differences in industrial structure include a much lower reliance on Manufacturing and Educational Services for employment and a higher percentage of employment in Utilities, Transportation, Agriculture, Forestry, Fishing and Hunting, Real Estate and Government. The fairly high location quotient for Utilities, 2.60, is largely due to the presence of the Deseret Power Bonanza Power Plant south of Vernal. Transportation and Warehousing also has a high location quotient of 1.71. Much of the crude oil produced in the Uinta Basin contains a wax that solidifies below 105 F. This results in difficulties in shipping the crude oil to refineries via pipeline so the oil must be sent by tank truck. Government is commonly a significant employer in areas with large amounts of public land due to the presence of federal land-managing agencies.

Industries with low location quotients in the Uinta Basin include Manufacturing and Educational Services. Manufacturing has a location quotient of 0.18, indicating that the basin is only 18 percent as dependent on Manufacturing for employment as is the state of Utah. Similarly, the location quotient for Educational Services is 0.13, suggesting that there are few private educational facilities in the Uinta Basin.

Several major industries have employment data that is nondisclosable for Duchesne or Uintah Counties. This is done to protect individual company data. These industries are Management of Companies and Enterprises (NAICS 55), Administrative and Support Services (NAICS 56), Arts, Entertainment and Recreation (NAICS 71), and Accommodation and Food Services (NAICS 72). Since employment numbers are not available for these industries, location quotients can not be calculated.

³Location Quotients are the ratio of an industry's share of employment in a study area, in this case the Uinta Basin, to its share in a reference area, e.g., the state of Utah.

Table 7 Employment by Industry in the Uinta Basin, 2006

	Duchesne County	Uintah County	Uinta Basin	Distribution, Percent	Location Quotient
Private Employment					
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	37	77	114	0.6	1.51
Mining (NAICS 21)	981	3,248	4,229	21.3	24.92
Utilities (NAICS 22)	44	134	178	0.9	2.60
Construction (NAICS 23)	645	834	1,479	7.5	0.92
Manufacturing (NAICS 31-32)	151	224	375	1.9	0.18
Wholesale Trade (NAICS 42)	129	532	661	3.3	0.87
Retail Trade (NAICS 44-45)	752	1,471	2,223	11.2	0.93
Transportation and Warehousing (NAICS 48-49)	522	718	1,240	6.2	1.71
Information (NAICS 51)	172	143	315	1.6	0.59
Finance and Insurance (NAICS 52)	119	180	299	1.5	0.33
Real Estate (NAICS 53)	51	352	403	2.0	1.35
Professional, Scientific and Technical Services (NAICS 54)	79	339	418	2.1	0.40
Management of Companies and Enterprises (NAICS 55)	ND	ND	ND	ND	ND
Administrative and Support (NAICS 56)	ND	ND	ND	ND	ND
Educational Services (NAICS 61)	20	22	42	0.2	0.13
Health Care (NAICS 62)	446	831	1,277	6.4	0.74
Arts, Entertainment and Recreation (NAICS 71)	ND	59	ND	ND	ND
Accommodation and Food Services (NAICS 72)	ND	883	ND	ND	ND
Other Services (NAICS 81)	157	344	501	2.5	1.01
Government Employment	1,716	2,577	4,293	21.6	1.32
Total Employment	6,560	13,292	19,852	100.0	1.00
ND: Not disclosed to protect individual company information					
Source: BLS, Quarterly Census of Employment and Wages					

Direct employment in the oil and gas E&P industry has been rising in recent years as increased production was stimulated by higher energy prices (Table 8). The employment for oil and gas extraction is not disclosed for Duchesne County to protect individual company data. However, employment for this industry is estimated at 452 individuals for 2006⁴. Estimated employment by the oil and gas E&P industry is therefore estimated at 974 persons in Duchesne County and was 2,985 persons in Uintah County during 2006. The direct employment of 3,959 persons in the oil and gas E&P industry accounts for 19.9 percent of the total 2006 employment of 19,852 persons in the Uinta Basin.

Table 8 Oil and Gas E&P Employment in the Uinta Basin, 2001-2006

	NAICS 211 Oil and Gas Extraction	NAICS 213111 Drilling Oil and Gas Wells	NAICS 213112 Support Activities for Oil and Gas Operations	Total Oil and Gas Direct Employment
Duchesne County				
2001	ND	138	223	GT 361
2002	ND	140	203	GT 343
2003	ND	57	205	GT 262
2004	ND	58	237	GT 295
2005	ND	68	307	GT 375
2006	ND	102	420	GT 522
Uintah County				
2001	68	368	940	1,376
2002	76	278	973	1,327
2003	181	441	943	1,564
2004	186	508	1,136	1,830
2005	206	587	1,461	2,254
2006	278	913	1,794	2,985
GT: Greater Than				
ND: Not disclosable to protect individual company data.				
Source: BLS. Quarterly Census of Employment and Wages				

Total Uintah County employment in the three NAICS industries involved in oil and gas production increased by 117 percent from 2001 to 2006. Total employment for Duchesne County over time is difficult to discern due to employment for Oil and Gas Extraction (NAICS 211) not being nondisclosed. Duchesne County employment in

⁴For 2006, the BLS lists total Mining (NAICS 21) employment as 981. Of the three subcategories at the three-digit NAICS level, employment is nondisclosable for Oil and Gas Extraction (NAICS 211) and Mining, Other than Oil and Gas (NAICS 212). Employment for Support Activities for Mining (NAICS 213) is reported as 522. The Utah Department of Workforce Services reports only one firm, with an employment between 5 and 9 persons, in NAICS 212 operating in Duchesne County. By subtraction, employment for Oil and Gas Extraction is between 450 and 454 with an expected value of 452.

well drilling (NAICS 213111) and service companies (NAICS 213112) increased by 46 percent from 2001 to 2006. Well-drilling employment actually declined over the period, though it increased from 2003 to 2006.

The large percentage rise in the number of operating company employees in Uintah County indicates increased industry focus on the Uinta Basin. From 2001 to 2006, the number of persons working for operating companies (NAICS 211) in Uintah County increased by 309 percent. Over the same time frame, the number of establishments in the industry in Uintah County increased from 7 to 12. This is the number of companies reporting employment in the county and does not correspond to the number of companies operating wells in the area. Since much of the work in operating the wells is contracted out to different companies, there are many companies that have wells in the Uinta Basin that do not have full-time employees in the area. Therefore, although only 12 operating companies reported employment in the area during 2006, 54 companies reported production to the Utah Division of Oil, Gas and Mining.

The lack of vertical integration in the E&P industry is demonstrated by the distribution of employment through the three industries involved in oil and gas production. Most of the direct employment in oil and gas production is actually in the oil services industry (NAICS 213112). This industry accounted for 56 percent of E&P employment in the Uinta Basin in 2006. The drilling companies (NAICS 213111) employed 26 percent of the persons working in E&P in the basin during 2006. The operating companies that own the wells and production were responsible for only 18 percent of oil and gas production employment in the Uinta Basin in 2006.

In addition to accounting for a large portion of employment in the Uinta Basin, mining also offers some of the highest paying jobs in the area (Table 9). In both Duchesne and Uintah Counties, Mining jobs pay approximately \$63,000 per year on average. In the two counties, only Utilities in Uintah County pays a higher annual wage. The average Utility position in Uintah County paid \$82,676 in 2006. This is a result of the Deseret Power Bonanza Power Plant located south of Vernal. For comparison, the average Utility job in Duchesne County paid \$31,471 in 2006.

Mining jobs in the two counties pay significantly higher than the average wage in the area. In Duchesne County, the average mining job paid \$63,057 during 2006, 83 percent greater than the average annual wage in the county of \$34,538. Similarly, in Uintah County, the average person working in the mining industry earned \$63,963 during 2006, 64 percent higher than the average wage in the county of \$39,056.

The lowest paying industries in the two counties are Agriculture, Forestry, Fishing and Hunting, Educational Services, and Arts, Entertainment and Recreation. Each

of these industries pays an average wage of less than \$20,000 annually in the Uintah Basin.

Table 9 Average Annual Wages by Industry in the Uinta Basin, 2006

	Duchesne County	Uintah County
Private Employment		
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	\$18,232	\$17,530
Mining (NAICS 21)	63,057	63,963
Utilities (NAICS 22)	31,471	82,676
Construction (NAICS 23)	34,223	32,423
Manufacturing (NAICS 31-32)	33,950	25,420
Wholesale Trade (NAICS 42)	43,791	45,875
Retail Trade (NAICS 44-45)	19,062	21,257
Transportation and Warehousing (NAICS 48-49)	51,961	55,044
Information (NAICS 51)	33,893	25,369
Finance and Insurance (NAICS 52)	26,983	32,425
Real Estate (NAICS 53)	19,385	56,548
Professional, Scientific and Technical Services (NAICS 54)	37,440	36,420
Management of Companies and Enterprises (NAICS 55)	ND	ND
Administrative and Support (NAICS 56)	ND	ND
Educational Services (NAICS 61)	3,604	17,603
Health Care (NAICS 62)	31,236	23,552
Arts, Entertainment and Recreation (NAICS 71)	ND	7,411
Accommodation and Food Services (NAICS 72)	ND	10,044
Other Services (NAICS 81)	26,803	27,602
Government Employment	28,618	31,983
All Employment	34,538	39,056
ND: Not disclosed to protect individual company information.		
Source: BLS, Quarterly Census of Employment and Wages		

Wages in the E&P industry in the Uinta Basin are higher than the average wage and in line with mining wages in general. Of the three NAICS industries related to E&P, the highest wages are paid by the operating companies (Table 10). The average wage paid by companies in the Oil and Gas Extraction industry (NAICS 211) was \$84,795 in Uintah County during 2006. The data for Duchesne County is not disclosed, but the average wage should be similar to that paid in Uintah County. The oil service companies (NAICS 213112) pay the lowest wages of the three NAICS industries related to E&P activities. However, they are still noticeably above the average wage for the area.

Wages for the three NAICS industries involved in oil and gas E&P have been rising in recent years, reflecting increased demand for labor in the area related to rising production. Since a low in 2002 the average wage paid by the oil service companies increased by 44 percent in Uintah County and by 25 percent in Duchesne County. Similarly, the average wage paid by drilling companies rose by 54 percent in Uintah

County and by 9 percent in Duchesne County. Wages paid by the operating companies are also increasing, with a 59 percent rise from 2002 to 2006 in Uintah County.

Table 10 Oil and Gas E&P Average Annual Wages in the Uinta Basin, 2001-2006

	NAICS 211 Oil and Gas Extraction	NAICS 213111 Drilling Oil and Gas Wells	NAICS 213112 Support Activities for Oil and Gas Operations
Duchesne County			
2001	ND	\$61,423	\$44,412
2002	ND	54,949	42,709
2003	ND	49,464	43,903
2004	ND	51,245	43,270
2005	ND	62,037	48,194
2006	ND	59,726	53,585
Uintah County			
2001	\$98,933	\$46,287	\$44,948
2002	53,149	45,776	40,318
2003	61,838	48,404	44,230
2004	66,627	55,208	47,845
2005	75,598	65,041	49,770
2006	84,795	70,704	58,129
ND: Not disclosed to protect individual company data.			
Source: BLS. Quarterly Census of Employment and Wages			

4 Economic Impacts

While rising energy prices are translating into rising employment and wages in the producing areas, not all of the economic gains are occurring in the oil and gas industry. The total increase in local economic conditions due to oil and gas activity is greater than the direct gain in the industry. This is the “multiplier effect” often referred to in economics and is a result of local spending by the industry for goods and services and spending of wages by the industry’s employees. These additional economic benefits are known as the indirect and induced benefits.

In this study, economic impact is defined as the effect on employment and wages in the subject areas. Additional information on economic impact is available in Section 7 and in several listed references.

4.1 Uinta Basin

The Uinta Basin is the center of the oil and gas E&P industry in Utah. As such, the oil and gas industry is a major factor in the area’s economy and is responsible for a major portion of employment in the two counties. Direct employment in the E&P industry accounted for nearly 20 percent of total employment and 35 percent of total

wages paid during 2006 (Table 11)⁵. Uintah County is more dependent upon the oil and gas industry for employment than is Duchesne County. Many of the company offices are located in Vernal but they do business in both counties.

Table 11 Direct Employment and Wages in the E&P Industry in the Uinta Basin, 2006

	Duchesne County		Uintah County		Uinta Basin Total	
	Employment	Wages, 1,000	Employment	Wages, 1,000	Employment	Wages, 1,000
Total	6,560	\$226,561	13,292	\$519,112	19,852	\$745,683
E&P Industry, Direct	974	66,904	2,985	192,338	3,959	259,242
E&P Industry, percent of total	14.8	29.5	22.5	37.0	19.9	34.8
<i>Source: BLS, Quarterly Census of Employment and Wages; author's estimates.</i>						

In addition to the direct employment, additional jobs and wages due to spending by the industry and employees results in significant economic benefits to the Uinta Basin. Other employment due to spending by the E&P industry is not limited to the mining industry but is distributed throughout different industries. Total employment in the Uinta Basin due to the E&P industry, including direct, indirect, and induced, was estimated at 49.5 percent of total jobs in the area in 2006 (Table 12). When examining employment by industry, the oil and gas industry is shown to have significant effects on in several other industries.

The E&P industry is responsible for large portions of employment in Retail Trade, Transportation and Warehousing, Real Estate and Other Services. The model used to determine economic impacts calculates employment by industry irrespective of type of ownership, i.e., private or government employment. However, the BLS figures do segregate private and government employment. The employment due to the oil and gas industry given in Table 12 includes some government employment in the various industries, not just the private employment. Two of the listed industries have significant government employment in addition to the private employment shown Table 12. They are Educational Services and Health Care and Social Assistance. The model classifies employees in public education under Educational Services, so the total number of persons employed in this industry is much greater than the 42 persons in private employment listed in Table 12. Other industries with significant levels of public employment are Health Care and Social Assistance and, to a lesser extent, Utilities and Arts, Entertainment and Recreation.

⁵Total wages for Oil and Gas Extraction (NAICS 211) were not released by the BLS for Duchesne County. Total wages were estimated by multiplying the estimated employment of 452 (see Footnote 4) by the average wage for the industry in Uintah County of \$84,795.

Several industries have no government employment in the Uinta Basin. These industries are Agriculture, Forestry, Fishing and Hunting, Mining, Manufacturing, Wholesale Trade, Professional, Scientific and Technical Services, Management of Companies and Enterprises, and Accommodation and Food Services.

Table 12 Employment Due to Oil and Gas E&P in the Uinta Basin, 2006

	Uinta Basin Total Employment	Employment Due to Oil and Gas E&P	Oil and Gas E&P Employment, percent of total
Private Employment			
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	114	14	12.2
Mining (NAICS 21)	4,229	4,020	95.1
Utilities (NAICS 22)	178	33	18.6
Construction (NAICS 23)	1,479	598	40.4
Manufacturing (NAICS 31-32)	375	185	49.3
Wholesale Trade (NAICS 42)	661	145	22.0
Retail Trade (NAICS 44-45)	2,223	1,558	70.1
Transportation and Warehousing (NAICS 48-49)	1,240	875	70.6
Information (NAICS 51)	315	59	18.8
Finance and Insurance (NAICS 52)	299	142	47.4
Real Estate (NAICS 53)	403	307	76.3
Professional, Scientific and Technical Services (NAICS 54)	418	229	54.8
Management of Companies and Enterprises (NAICS 55)	ND	16	NA
Administrative and Support (NAICS 56)	ND	80	NA
Educational Services (NAICS 61)	42	58	138.7
Health Care (NAICS 62)	1,277	626	49.0
Arts, Entertainment and Recreation (NAICS 71)	ND	49	NA
Accommodation and Food Services (NAICS 72)	ND	427	NA
Other Services (NAICS 81)	501	378	75.5
Households	NA	36	NA
Government Employment	4,293	NA	NA
All Employment	19,582	9,835	49.5
<p>Note: There is significant government employment in both Educational Services and Health Care and Social Assistance in the Uinta Basin. The employment calculated using the RIMS II model, which includes government employment, can exceed the private employment in these industries. ND: Nondisclosable, NA: Not Applicable. Source: BLS, Quarterly Census of Employment and Wages; author's calculations.</p>			

Oil and gas E&P accounts for over 60 percent of all wages paid in the Uinta Basin (Table 13). The industry is responsible for a higher percentage of wages than employment due to oil and gas E&P paying above average wages. In addition to mining, industries with a significant portion of wages due to oil and gas extraction include Manufacturing, Retail Trade, Finance and Insurance, Professional, Scientific and Technical Services, and Other Services. As with employment, the amount of wages reported in Educational Services is greater than the wages paid by private employers in that industry. This is due to public schools accounting for a major portion of the employment in the Educational Services. Public schools are not

private employment, but government employment, and so their wages are categorized separately in the BLS figures.

Table 13 Wages Due to Oil and Gas E&P in the Uinta Basin, 2006

	Uinta Basin Total Wages, \$1,000	Wages Due to Oil and Gas E&P, \$1,000	Oil and Gas E&P Wages, percent of total
Private Employment			
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	2,027	243	12.0
Mining (NAICS 21)	269,605	263,111	97.6
Utilities (NAICS 22)	12,473	2,959	23.7
Construction (NAICS 23)	49,123	24,547	50.0
Manufacturing (NAICS 31-32)	10,808	7,897	73.1
Wholesale Trade (NAICS 42)	30,033	6,886	22.9
Retail Trade (NAICS 44-45)	45,603	35,053	76.9
Transportation and Warehousing (NAICS 48-49)	66,650	34,377	51.6
Information (NAICS 51)	9,457	3,257	34.4
Finance and Insurance (NAICS 52)	9,058	5,683	62.7
Real Estate (NAICS 53)	20,894	11,872	56.8
Professional, Scientific and Technical Services (NAICS 54)	15,049	11,553	76.8
Management of Companies and Enterprises (NAICS 55)	ND	852	NA
Administrative and Support (NAICS 56)	ND	1,836	NA
Educational Services (NAICS 61)	466	1,195	256.5
Health Care (NAICS 62)	33,508	19,975	59.6
Arts, Entertainment and Recreation (NAICS 71)	ND	892	NA
Accommodation and Food Services (NAICS 72)	ND	5,830	NA
Other Services (NAICS 81)	13,690	9,651	70.5
Households	NA	578	NA
Government Employment	131,529	NA	NA
All Employment	745,683	448,246	60.1
<p>Note: There is significant government employment in both Educational Services and Health Care and Social Assistance in the Uinta Basin. The wages calculated using the RIMS II model, which includes government wages, can exceed the private wages in these industries. ND: Not disclosed, NA: Not Applicable. Source: BLS, Quarterly Census of Employment and Wages; author's calculations.</p>			

5 Fiscal Impacts

The oil and gas industry also has fiscal impacts on the local areas. Fiscal impacts refer to impacts on government finances and tax collections. The oil and gas industry is subject to the tax laws common to all business. There are also impacts unique to the industry. Production on federal land is subject to a royalty payment under the Mineral Lands Leasing Act of 1920. This royalty is paid to the Minerals Management Service, an agency within the U.S. Department of Interior. A portion of the federal mineral royalties is returned to the state of origin. Generally, one-half of federal mineral royalties are returned to the states of origin, after the federal government deducts an administrative fee. Royalties from production on Indian lands are returned to the appropriate tribe, not to the state government. Since a

large portion of the crude oil production in Utah occurs on Indian lands, especially in San Juan County, the amount of crude oil royalty returned to the state government is significantly less than one-half of the amount paid to the Minerals Management Service. The states have full discretion as to the distribution of federal mineral royalties as long as priority is given to areas with economic and/or social impacts from leasing activities. The Minerals Management Service does not release federal mineral royalty data at the county level, but statewide data are available.

Federal mineral royalties due to oil and gas production in Utah have dramatically increased in recent years, to \$299 million in 2006, a 228 percent rise from \$91 million in 2001 (Table 14). Oil and gas production accounted for 91.3 percent of the royalties paid for mineral production on federal land in Utah during 2006. There was also an additional \$103 million paid in bonus and rents on federal mineral leases prior to commencing production. These are fees associated with awarding federal mineral leases and maintaining the leases until production is initiated. Of the nearly \$300 million paid in federal mineral royalties by the oil and gas industry in Utah, \$109 million was returned to the state government.

Table 14 Federal Mineral Royalty Payments and Disbursements for Utah, 2001-2006

	Oil		Natural Gas		Total	
	Royalties	Disbursements	Royalties	Disbursements	Royalties	Disbursements
2001	\$32,799,794	\$4,392,667	\$58,553,527	\$26,210,621	\$91,353,321	\$30,603,288
2002	26,028,911	3,493,794	37,653,050	11,921,373	63,681,961	15,415,167
2003	37,462,357	5,575,810	55,369,036	26,040,706	92,831,293	31,616,515
2004	45,743,590	7,235,629	87,075,857	38,228,494	132,819,447	45,464,122
2005	66,900,212	10,405,687	118,132,687	53,647,636	185,032,900	64,053,323
2006	106,457,298	21,866,066	193,416,183	87,551,457	299,873,481	109,417,522

Note: Years are federal fiscal years. Natural gas includes natural gas liquids from gas processing plants.
Source: Minerals Management Service

In Utah, federal mineral royalties are distributed to several different accounts according to state law (Table 15). The largest recipients of federal mineral royalties in Utah are the Permanent Community Impact Fund and the Department of Transportation. The funds distributed to the Department of Transportation are then distributed to local governments to fund local highways in proportion to the amount of mineral lease money generated by each county. The Permanent Community Impact Fund makes loans and grants to state agencies and subdivisions of state government impacted by mineral resource development on state lands. Unlike the funds administered by the Department of Transportation, which are distributed in proportion to royalties generated in the county, the Permanent Community Impact Fund is distributed by a state-appointed board in response to proposals submitted by local governments. Therefore, the distribution of funds by the Permanent

Community Impact Fund to the various counties may vary from the amount of royalty generated. The payments in lieu of taxes cited in Table 15 are not the payments in lieu of taxes made by the federal government for federal land in Utah but are payments made by the state government to counties for lands controlled by the School and Institutional Trust Lands Administration, state Division of Parks and Recreation and the state Division of Wildlife Resources.

Table 15 Distribution of Federal Mineral Royalties in Utah

	Percent
Permanent Community Impact Fund	32.50
State Board of Education	2.25
Utah Geological Survey	2.25
Water Research Laboratory	2.25
Department of Transportation	40.00
Department of Community and Culture	5.00
Payments in Lieu of Taxes	52 cents per acre
Permanent Community Impact Fund	Remainder
Note: The amount paid for Payments in Lieu of Taxes has been adjusted annually since 1994 according to the Consumer Price Index. Source: Utah State Code, Title 59, Chapter 21.	

The School and Institutional Trust Lands Administration (SITLA) controls mineral rights on approximately 4.5 million acres in Utah. These lands are held in trust for the public schools in Utah and 11 other beneficiaries and were established at statehood. During 2006, royalties paid for oil and gas extraction on SITLA lands were \$82.7 million. This was 51.0 percent of total SITLA revenue for 2006. These funds are not returned to the county of origin, but are placed in a permanent fund managed by the state treasurer. The income from this fund is distributed to the 12 beneficiaries of the trust lands.

5.1 Uinta Basin

The largest direct fiscal impacts on the Uinta Basin due to oil and gas operations in the area are property taxes paid by the operating companies and federal mineral royalties distributed to the local governments by the Utah Department of Transportation. The Utah State Tax Commission centrally assesses oil and gas properties using a net present value approach applied to future production. The local county treasurers bill and collect the taxes. Property taxes are levied by numerous units of local government, including county and city governments, school districts, and special service districts.

Property taxes paid on oil and gas properties are a significant portion of total property taxes in the Uinta Basin (Table 16). During 2006, the oil and gas industry paid nearly 40 percent of total property taxes in the two Uinta Basin counties. Table 16 refers to all property taxes paid to various government entities in the two

counties, not just the county governments. As prices of crude oil and natural gas have increased in recent years, the net present value of future production has increased. This, coupled with rising production, has resulted in the amount of property taxes paid by the oil and gas industry in the Uinta Basin increasing by nearly four times over the past 10 years, not adjusting for inflation. Oil and gas property taxes have been rising faster in Uintah County than in Duchesne County, reflecting rising natural gas production in the county. Property taxes paid on oil and gas production increased by 440 percent in Uintah County from 1997 to 2006, and by 122 percent in Duchesne County. Given the rising production and expected continuation of current energy prices, the property taxes paid by the oil and gas production industry in the Uinta Basin should continue to rise into the future.

Table 16 Oil and Gas Property Tax Payments in the Uinta Basin, 1997-2006

	Duchesne County		Uintah County		Uinta Basin Total	
	Oil & Gas Property Tax	Percent of Total Property Tax	Oil & Gas Property Tax	Percent of Total Property Tax	Oil & Gas Property Tax	Percent of Total Property Tax
1997	\$2,412,970	27.2	\$2,389,667	15.7	\$4,802,637	20.0
1998	2,353,888	27.9	2,858,447	18.1	5,212,335	21.5
1999	1,561,466	21.3	2,309,639	15.6	3,871,105	17.5
2000	1,749,689	19.7	2,579,728	16.9	4,329,417	17.9
2001	2,221,385	23.1	3,449,316	20.8	5,670,701	21.7
2002	1,773,249	18.4	4,054,227	22.5	5,827,476	21.1
2003	1,739,101	17.2	4,276,125	21.9	6,015,226	20.3
2004	2,407,040	21.8	5,985,003	25.3	8,392,043	24.2
2005	3,640,044	27.8	8,241,224	33.0	11,881,268	31.2
2006	5,358,661	33.9	12,895,362	41.1	18,254,024	38.7

Source: Utah State Tax Commission, Property Tax Division Annual Reports

The funds generated through federal mineral royalties that are returned to the Uinta Basin through the Utah Department of Transportation are also a significant source of revenue for the local governments. These funds actually exceed the amount of property tax paid by the oil and gas industry. During 2006, Duchesne and Uintah Counties collectively received \$30 million dollars in federal mineral royalties returned to them by the Department of Transportation. This was a 296 percent increase over the amount returned in 2001.

Table 17 Federal Mineral Royalties Returned by UDOT to the Uinta Basin, 2001-2006

	Duchesne County	Uintah County	Uinta Basin Total
2001	\$789,854	\$6,856,410	\$7,646,264
2002	718,112	3,031,081	3,749,193
2003	678,705	6,893,486	7,572,192
2004	931,428	11,767,611	12,699,038
2005	1,903,292	16,704,532	18,607,824
2006	2,750,055	27,500,128	30,250,182
Note: Years are state fiscal years.			
Source: Utah Department of Transportation			

Royalties paid to SITLA due to production of oil and gas in the Uinta Basin rose significantly from 2005 to 2006 (Table 18). In 2005, oil and gas production in the Uinta Basin resulted in \$23 million in SITLA royalties. Rising production and prices resulted in a 54 percent increase in 2006, with over \$34 million in SITLA royalties paid.

Table 18 Royalties Paid for Production on SITLA Lands, 2005-2006

	Duchesne County	Uintah County	Uinta Basin Total
2005	\$2,976,668	\$19,990,367	\$22,967,035
2006	2,686,706	32,720,101	35,407,575
Note: Years are state fiscal years.			
Source: School and Institutional Trust Lands Administration			

6 Technical Notes and Methodology

Industries are classified by economists according to the North American Industry Classification System (NAICS), which was developed by the Office of Management and Budget in cooperation with other federal agencies and foreign governments (Office of Management and Budget, 2002). The NAICS codes replaced the Standard Industrial Classification (SIC) Codes that had been used since the 1930s. This change was prompted by structural changes in the U.S. economy, with the services sector becoming a much larger portion of the economy and more complex than when the SIC codes were developed. In the switch, the 10 major industrial sectors under the SIC codes were replaced with 20 major sectors under the NAICS Codes. Many of the industrial sectors under the SIC codes were split among two or more of the redefined sectors under the NAICS codes, making comparisons difficult. The NAICS codes better explain the structure of the current economy but make time series data difficult to compile.

Under the NAICS system, companies are classified under 20 major industrial categories and the categories are further subdivided as needed. There are three classifications directed related to the oil and gas exploration and production industry. These are NAICS 211 – Oil and Gas Extraction, NAICS 213111 – Drilling Oil and

Gas Wells, and NAICS 213112 – Support Activities for Oil and Gas Operations. These three classifications cover the operating companies, drilling companies, and service companies, respectively. For this study, we are considering them collectively as the oil and gas E&P industry.

Other local businesses and industries benefit from E&P activities. Examples of these are seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and utilities providing electricity. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. These types of effects are referred to as the indirect and induced impacts. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses using input-output economic models.

6.1 NAICS Codes Related to Oil and Natural Gas Production

For this study, we are considering the following three NAICS classifications collectively as the oil and gas E&P industry. The definitions listed are those developed by the Office of Management and Budget.

NAICS 211 – Oil and Gas Extraction Industries in the Oil and Gas Extraction subsector operate and/or develop oil and gas field properties. Such activities may include exploration for crude petroleum and natural gas; drilling, completing, and equipping wells; operation of separators, emulsion breakers, desilting equipment and field gathering lines for crude petroleum and natural gas; and all other activities in the preparation of oil and gas up to the point of shipment from the producing property. The subsector includes the production of crude petroleum, the mining and extraction of oil from oil shale and oil sands, and the production of natural gas, sulfur recovery from natural gas, and recovery of hydrocarbon liquids.

Establishments in this subsector include those that operate oil and gas wells on their own account and for others on a contract or fee basis. Establishments primarily engaged in providing support services, on a fee or contract basis, required for the drilling or operation of oil and gas wells (except geophysical surveying and mapping, mine site preparation, and construction of oil/gas pipelines) are classified in Subsector 213, Support Activities for Mining.

NAICS 213111 – Drilling Oil and Gas Wells This U.S. industry comprises establishments primarily engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, re-drilling, and directional drilling.

NAICS 213112 – Support Activities for Oil and Gas Operations This U.S. industry comprises establishments primarily engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related activities). Services included are exploration (except geophysical surveying and mapping); excavating slush pits and cellars; well surveying; running, cutting, and pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells.

6.2 Economic Impact Modeling

Economic impacts on an economy arise from exogenous sources or activities that result in new funds being injected into the economy. Examples include products that are exported and new construction funding. It is important for outside funds to be injected into a regional economy for economic impacts to occur. If an activity is financed by funds from inside a regional economy, known as residentiary spending, then the funds are diverted from one industrial sector to another and there is no net multiplier effect or economic impact. Crude oil and natural gas from the producing areas in Utah are exported to refineries and markets in other portions of the country. Exporting oil and gas results in an inflow of funds which creates a positive economic impact on the area.

In this study, economic impact is used to mean the impact of oil and gas E&P activities on the amount of employment and wages paid in the various producing regions in Utah. Many similar studies present the total economic output of an activity as the economic impact; this is the sum of all transactions in a supply chain and can be much larger than the value of the final good or service provided to the end consumer. Similarly, many authors apply economic output multipliers to all spending related to an activity, with no distinction between export-based and residentiary spending. The result is often termed “economic contribution” and presented as economic impact. As with all economic output calculations, the result is much larger than the value of the final product delivered to an end consumer.

The oil and gas exploration and production industry has a direct impact on the local economy through employment and wages paid. In addition, there are additional indirect and induced impacts. Indirect impacts result from local spending by the E&P industry and induced impacts arise from employees of the E&P industry spending their earnings.

Examples of indirect impacts are employment and wages at seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and utilities providing electricity. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. The indirect and induced

impacts can be calculated from the value of transactions between the E&P industry and these other businesses.

The RIMS II input-output model developed by the Bureau of Economic Analysis was used to determine the indirect and induced economic impacts of the oil and gas exploration and production industry in the Uinta Basin. The RIMS II model is based on an accounting framework called an input-output table. From each industry, an input-output table shows the industrial distribution of inputs purchased and outputs sold. The Bureau of Economic Analysis has developed a national input-output table (Bureau of Economic Analysis, 1997). To develop region-specific input-output tables, the national input-output table is modified using regional economic data. The producer portion of the input-output table is modified using location quotients at the six-digit NAICS level based on personal income data for service-producing industries and wage and salary data for nonservice-producing industries. Household data is modified to account for commuting across regional boundaries and savings and taxes. Once the national input-output table is regionalized, the multipliers are estimated through use of matrix algebra. The RIMS II model estimates the employment and wage impacts by major NAICS industry.

Data on spending by the E&P industry in the Uinta Basin was obtained via a survey of operating, drilling and service companies operating in the area. Personnel with the Bureau of Economic and Business Research at the University of Utah cooperated with the Independent Petroleum Association of the Mountain States (IPAMS) to develop survey forms with input from several representatives of the petroleum industry. IPAMS distributed the survey forms to operating, drilling and service companies operating in the Uinta Basin and the forms were returned to the Bureau of Economic and Business Research. Data from returned survey forms was totaled by spending category. Using data on total production of oil and gas, number of wells spudded and employment reported by government agencies, the total spending reported by responding companies was expanded to total industry spending in the region. The multipliers from the RIMS II model were then applied to the total spending by category to determine the indirect and induced employment and wages.

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The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry Phase I - The Hingeline

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List of Acronyms & Abbreviations

BCF	Billion Cubic Feet
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
CDP	Census Designated Place
DOGM	Utah Division of Oil, Gas and Mining
E&P	Exploration and Production
IPAMS	Independent Petroleum Association of the Mountain States
MCF	Thousand Cubic Feet
MMCF	Million Cubic Feet
MW	Megawatts
NAICS	North American Industry Classification System
NYMEX	New York Mercantile Exchange
PADD	Petroleum Administration for Defense District
SIC	Standard Industrial Code
SITLA	School and Institutional Trust Lands Administration
RIMS II	Regional Input-Output Modeling System
UDOT	Utah Department of Transportation
USFS	U.S. Forest Service
WTI	West Texas Intermediate Crude

The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry The Hingeline

1 Executive Summary

The Bureau of Economic and Business Research at the University of Utah has completed an economic impact study of the oil and gas exploration and production industry in the Hingeline area of central Utah, comprised of Sevier, Sanpete and Piute Counties. While a number of wildcat wells have been drilled over the years in the three counties, production was minor and limited to the Joe's Valley Field in Sanpete County until the Kings Meadow Ranch 17-1 discovery well at the Covenant Field in early 2004. Covenant wells produce good-quality, 40-degree gravity crude and show a very low gas-to-oil ratio. Production from each of the field's first wells now averages 850 barrels per day. The play is an extension of the Overthrust, a prolific producing trend in northern Utah and Wyoming. The geology of the Overthrust is complex and drilling targets are best defined by a 3-D seismic survey.

The federal government is the largest land owner in the three counties that comprise the Hingeline area, owning 66.6% of the land. Total oil production in 2006 was 2,056,995 barrels, comprising 11% of the state total.

Oil and gas production in the Hingeline has a positive economic impact, however it is somewhat localized because almost all of the production is in Sevier County. Oil and gas property taxes in Sevier County were \$254,483, which was 2.13% of the county total. Federal mineral royalty money returned to the counties in 2006 was \$5,162,657. SITLA royalties were \$31,329 during that period. Mineral royalties generated from federally-exchanged land totaled \$777,469; almost all of it was remitted to Sevier County.

Presently, the economic impact of the oil and gas industry in the three-county area is small and concentrated entirely in Sevier County. In 2006, direct, indirect and induced employment generated by E&P activities totaled 29 workers. Direct, indirect and induced wages totaled \$710,518. However, given the high price of oil exploration is expected to increase in the area, which will have an increasing and positive economic impact in the future.

2 Background

The recent rise in the price of gasoline has refocused attention on energy markets with an intensity not seen since the collapse of oil prices in the mid 1980s. In contrast to the energy shortage of the 1970s, which was largely driven by constrained supply due to geopolitical issues, the recent run up in prices is a result of increasing demand and decreasing supply from aging fields, as well as the decreasing value of the dollar against foreign currencies. Crude oil, and to a lesser extent natural gas, is a worldwide commodity with international supply and demand factors determining prices. Consumption of petroleum products is up worldwide, with developing countries driving the increase. Consumption of petroleum in China grew over 30 percent from 2002 to 2006. This rise in demand has resulted in a dramatic increase in the nominal price of crude oil (Figure 1).

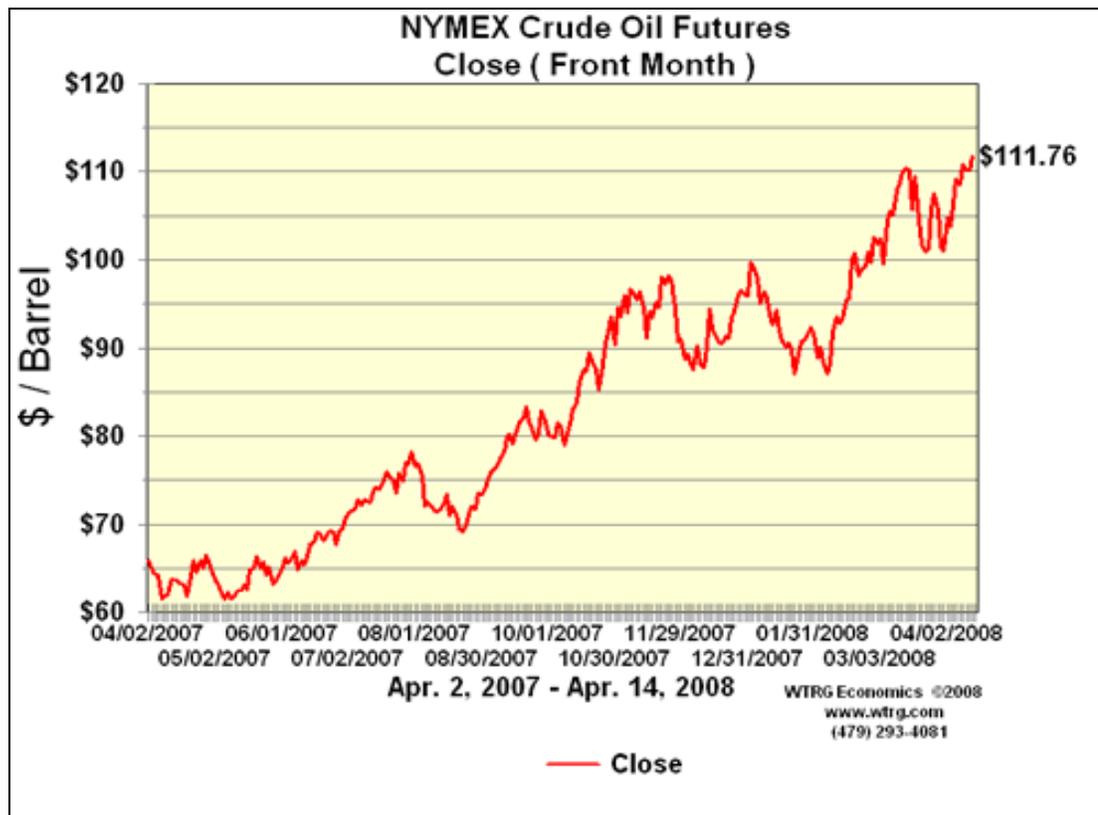


Figure 1 Crude Oil Futures: NYMEX

Source: WTRG Economics.

The price of crude oil was relatively flat during the 1990s, with per barrel prices in the \$20 to \$30 range. Then, from a low of \$11.31 per barrel in December 1998, crude oil increased to more than \$70 per barrel in April 2006 and reached \$79.63 in

September 2007. The price of crude has risen steadily since then, reaching a price of over \$111 per barrel as of April 15, 2008.

At the same time, natural gas prices have increased from historically low values of around \$2 per MCF in the late 1990s to a current price of about \$10 per MCF, with increased volatility in recent years (Figure 2). Natural gas is more of a regional commodity than is crude oil, with more dependence on local supply and demand factors. The necessity of transporting natural gas by pipeline means that transportation infrastructure has a large influence on regional prices. Currently, there is a shortage of pipeline capacity in the Rocky Mountain region and wellhead natural gas prices in the area are depressed compared to the rest of the country.

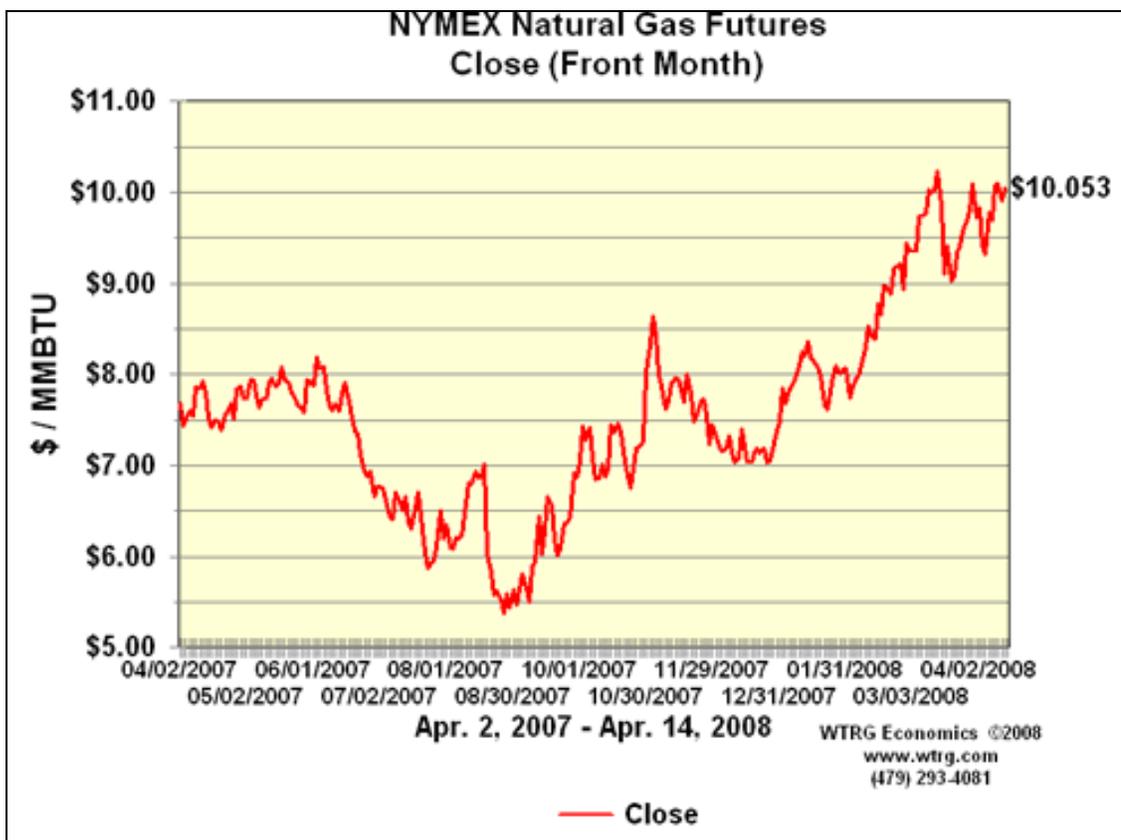


Figure 2 NYMEX Natural Gas Futures

Source: WTRG Economics.

While growing demand in the Pacific Rim has been a primary driver of petroleum prices, increased demand in the U.S. has also contributed to price increases. In addition, domestic crude oil production has declined from a high value of 3.5 billion barrels in 1970 to 1.9 billion barrels in 2006. Even with additional drilling in

response to higher prices, domestic production is dropping due to geologic constraints. The Rocky Mountain region is the only area in the country currently experiencing significant increases in production of crude oil and natural gas. As shown in Figure 3, of the five Petroleum Administration for Defense Districts (PADD) used for analyzing petroleum data, production of crude oil and natural gas is increasing only in PADD I (the East Coast) and in PADD IV (the Rocky Mountains).



Figure 3 Petroleum Administration for Defense Districts (PADD)

Source: Energy Information Administration

Although crude oil production increased 11.3 percent and natural gas 15.3 percent on the East Coast from 2002 to 2005, the region is responsible for less than one-half of one percent of domestic crude oil production and three percent of natural gas production. Over the same period, the amount of crude oil produced in the Rocky Mountains increased by 20.4 percent and production on the Gulf Coast (PADD III), the largest producing area in the country, dropped by 12.8 percent.

The center for production of natural gas in the United States is also shifting from the Gulf Coast to the Rocky Mountains. In 1982, PADD III was responsible for 75.5 percent of U.S. natural gas production and PADD IV supplied only 4.2 percent. By 2005, the amount of natural gas produced in PADD III had dropped to 62.5 percent of total production while the amount from PADD IV had increased to 17.0 percent.

Additionally, natural gas production in the Rocky Mountains is increasing approximately five percent annually. The increase in crude oil and natural gas production in the Rocky Mountain region is creating an economic boom in the producing areas.

Table 1
U.S. Crude Oil and Natural Gas Production by PADD, 2002-2006

	PADD I	PADD II	PADD III	PADD IV	PADD V	United States Total
Crude Oil, thousand barrels						
2002	7,458	164,635	1,174,305	102,982	947,745	2,097,124
2003	7,170	161,360	1,162,869	105,931	636,123	2,073,453
2004	6,941	159,309	1,103,743	113,069	600,239	1,983,302
2005	8,299	161,587	1,023,499	123,956	572,765	1,890,106
2006	8,062	167,298	1,035,904	130,466	520,829	1,862,259
% Change 2002-2006	8.1	1.6	(11.8)	26.7	(45.1)	(11.2)
Dry Natural Gas, MMCF						
2002	453,774	2,432,537	12,622,766	2,641,749	776,962	18,927,788
2003	521,824	2,336,271	12,662,381	2,797,202	780,866	19,098,544
2004	520,240	2,428,676	11,960,955	2,935,503	745,517	18,590,891
2005	522,997	2,413,736	11,298,362	3,075,234	763,907	18,074,237
2006	536,184	2,533,780	11,311,563	3,371,822	722,476	18,475,826
% Change 2002-2006	18.2	4.2	(10.2)	27.6	(7.0)	(2.4)

Source: Energy Information Administration.

Despite a common perception that the oil and gas industry is vertically integrated, the industry is actually highly fragmented, especially at the exploration and production stage. Many companies concentrate exclusively on oil and gas production and have no interest in downstream operations such as pipelines, refineries and product distribution. Additionally, much of the work conducted in the producing fields is contracted to other companies that specialize in different aspects of drilling and maintaining the wells. Few operating companies operate their own drill rigs but instead contract with companies that specialize in drilling. Other companies specialize in different operations such as grading well locations, well surveying, running and pulling well casings, cementing wells, perforating well casings and reservoir treatment and stimulation. The operating, drilling and service companies collectively constitute the oil and gas exploration and production industry.

Many other industries benefit from spending by the oil and gas industry. These include consulting geologists and engineering companies, environmental consultants, vendors of oil field equipment, and pipeline and trucking companies.

Spending by oil industry employees also benefits the local economy. These secondary benefits are the indirect and induced impacts known in common parlance as the “multiplier” effects. This study examines the structure of the Utah oil and gas exploration and production industry and the total economic impact on the producing areas.

3 Utah’s Oil and Gas Industry

The Utah oil and gas industry started in 1891, when a water well being drilled in Farmington Bay near the Great Salt Lake encountered natural gas at a depth of 1,000 feet. Gas from several wells in this area was transported to Salt Lake City through wooden pipelines for several years until shifting sand in the lakebed plugged the wells. The first oil was found in the early 1900s near Rozel Point at the north end of the Great Salt Lake, near Mexican Hat in southeastern Utah, and near the town of Virgin in southwestern Utah. The first large-scale commercial oil well was drilled near Vernal in 1948. Since the early 1960s, Utah has consistently ranked in the top 15 oil-producing states and in recent years has experienced a dramatic rise in natural gas production. During 2005, Utah ranked 15th in crude oil production out of 31 states and two Federal Offshore Areas and 11th in dry natural gas production out of 33 states and the Federal Offshore Area in the Gulf of Mexico.

Utah is contributing to the recent growth in crude oil and natural gas production taking place in the Rocky Mountain states (PADD IV). The state’s 2006 crude oil production of 17.9 million barrels was a 37 percent increase over the recent low of 13.1 million barrels produced in 2003 (Figure 4). Although a substantial increase from the recent past, output in 2006 was only 44 percent of the all-time high of 41.1 million barrels produced in 1985.

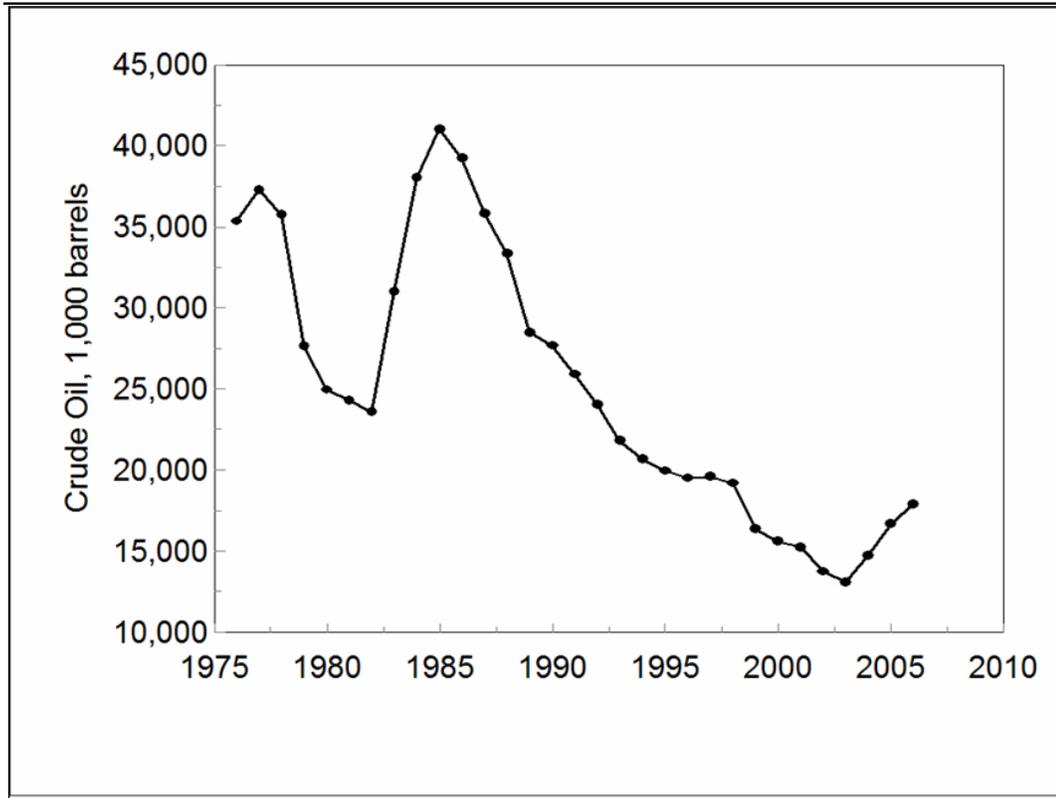


Figure 4 Utah Crude Oil Production

Source: Utah Division of Oil, Gas and Mining.

There has been an even greater rise in natural gas production in Utah. In 2006, Utah's marketed natural gas production hit an all-time high of 343 BCF, up 502 percent from a total of 57 BCF produced in 1976 (Figure 5).

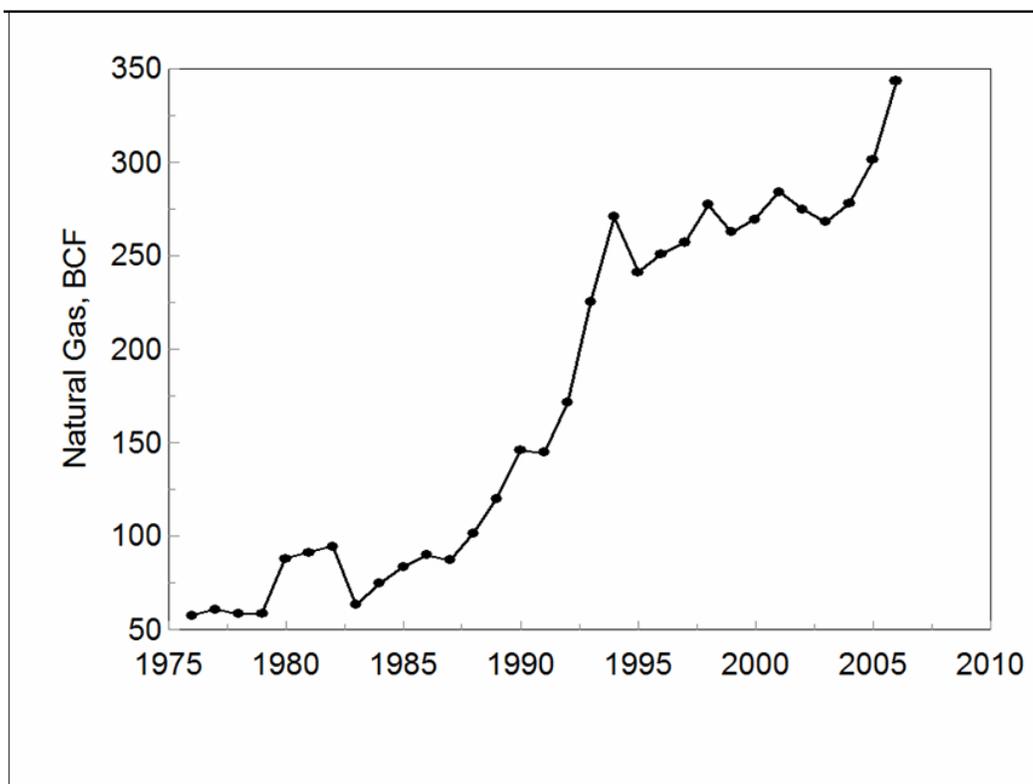


Figure 5 Utah Marketed Natural Gas Production

Source: Utah Division of Oil, Gas and Mining.

Not all gross withdrawals of natural gas are marketed to consumers. Due to low prices of natural gas during the late 1980s and early 1990s, much of the gas produced in Utah during that time was not marketed. Instead, a large portion of the gas withdrawn from wells in Utah during this period was reinjected into the geologic formations to maintain pressure and oil production. The amount of gas used for repressuring in Utah reached a high in 1983, when 65 percent of gross withdrawals were reinjected to maintain pressure. Currently, approximately 95 percent of natural gas withdrawals in Utah are marketed. Most of the gas that is not marketed is used for fuel at the production site or is accounted for by non-hydrocarbon gases that are removed from the production stream prior to marketing.

Although natural gas production has been steadily rising and crude oil production in Utah has rebounded in recent years, production per individual well has been declining. Natural gas production per gas well peaked at 740 MMCF in 1962. Production per well steadily declined to 67 MMCF in 2000 before rising to 84 MMCF in 2006. Similarly, crude oil production per oil well peaked at 57,330 barrels in 1959, then dropped to 6,727 barrels in 2003. Crude oil production per well in Utah averaged 7,308 barrels during 2006.

During 2006, 129 operating companies reported crude oil and natural gas production to the Utah Division of Oil, Gas and Mining. Production occurred in 11 of Utah's 29 counties. Duchesne County had the highest oil production with 6,401,299 barrels while Uintah County led natural gas production with gross withdrawals of 204 BCF.

Six areas in Utah currently have significant production of oil and/or natural gas. These areas are defined by geology. Additionally, these areas are somewhat isolated from one another economically, especially in terms of the oil and gas exploration and production (E&P) industry. The major oil and gas producing area in Utah is the Uinta Basin in the northeastern part of the state. Vernal is a center of the oil and gas industry in the Uinta Basin with many of the producing, drilling and service companies maintaining offices in the area. Other producing areas in Utah include both conventional coal-bed methane plays in Carbon and Emery Counties, the Paradox Basin in San Juan County, the Uncompahgre Uplift in Grand County, the Thrust Belt in Summit County as well as the recently discovered Hingeline in the central part of the state.

The Paradox Basin, Uncompahgre Uplift, and Thrust Belt all extend over state lines into adjacent states. Many of the workers involved in operating wells in these areas are actually employed outside Utah. Expanded gas operations in Carbon and Emery Counties and new oil production in the Hingeline are fairly recent discoveries and an oil service industry has not developed in these areas.

Defining the oil and gas E&P industry is a key element for a study of this type. Economists use the numerical North American Industry Classification System (NAICS) developed by the Office of Management and Budget to classify industries for reporting employment and earnings. The two-digit NAICS codes are divided into 20 major industrial sectors. These major sectors are then further subdivided as necessary to provide additional industry detail.

The NAICS codes have three industrial subdivision classifications that directly apply to the oil and gas E&P industry. These are NAICS 211111–Oil and Gas Extraction, NAICS 212111– Drilling Oil and Gas Wells, and NAICS 213111–Support Activities for Oil and Gas Operations. For purposes of this study, these three industries are collectively considered the oil and gas E&P industry. Additional information on the NAICS codes for these three industries is available in Section 6.

The following section summarizes oil and gas production in the three-county Hingeline area. Also included are economic data for the three counties to place the oil and gas E&P industry in context.

3.1 The Hingeline

This study focuses on the Hingeline area of central Utah. The term hingeline refers to the geologic structure separating the Colorado Plateau from the Basin and Range Province. The Hingeline is actually a part of the western Overthrust Belt that has been a prolific producer in Utah and Wyoming. Although the geologic structure extends most of the length of Utah (as shown in Figure 6) in this report the Hingeline refers to Piute, Sanpete, and Sevier Counties, collectively. All current production is from Sanpete and Sevier Counties, although drilling has occurred in Piute County.

There has been sporadic industrial interest in the Hingeline for decades. The 1970 Minerals Yearbook published by the U.S. Bureau of Mines stated, "Several major oil companies acquired lease blocks in central Utah in the "hinge line" separating the Colorado Plateau from the Basin and Range Province. The leasing activity may be the forerunner of exploratory drilling in the area of rock deformation separating the geologic provinces." Despite this interest, significant production did not materialize until the end of 2004, when Wolverine Gas and Oil brought in the Covenant Field with the Kings Meadow Ranch 17-1 discovery well. Covenant Field has been extremely productive, producing approximately 500 barrels per day during 2007. Covenant wells produce good-quality, 40-degree gravity crude and show a very low gas-to-oil ratio. Production from each of the field's first wells now averages 850 barrels per day. The play is an extension of the Overthrust, a prolific producing trend in northern Utah and Wyoming. The geology of the Overthrust is complex and normally requires a 3-D seismic survey to decipher and locate optimal drilling targets. Extravagant projections of the ultimate recovery of the play, up to a billion barrels of recoverable oil, have been widely circulated; however, up to now, no additional major discoveries have been made.

Figure 6 shows the location of Covenant Field in the context of the Hingeline trend, illustrated in yellow, and the overthrust production to the north in Utah and Wyoming. The Hingeline trend continues northward across Sanpete County; however, it just touches the corner of Piute County. The potential for additional future discoveries in Sevier or Sanpete Counties is reasonably optimistic but it does not appear that Piute County has a high probability of hingeline-type discoveries.

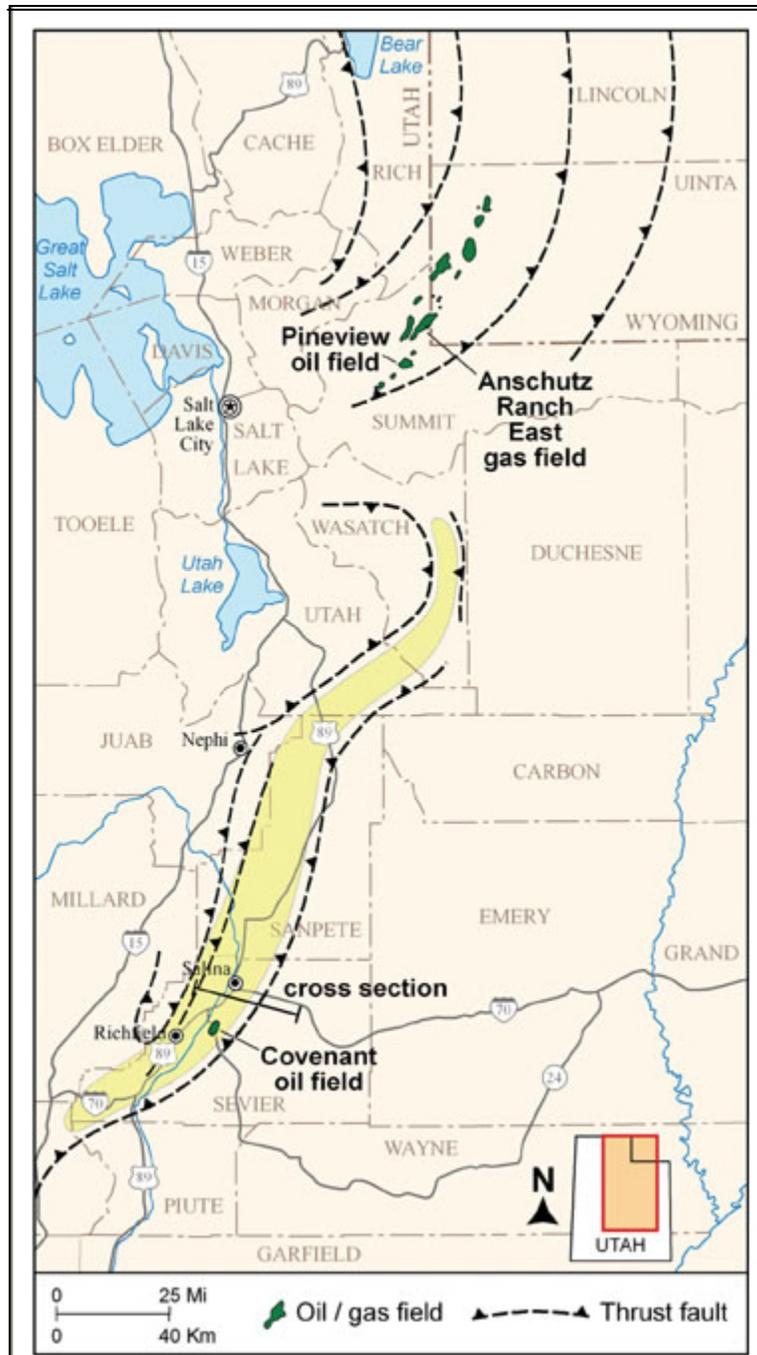


Figure 6 Overthrust Play and Covenant Field Location

Source: Utah Geological Survey.

Figure 7 is an idealized, simplified cross-section of Covenant Field that shows the complexity of the faulting and structure. This complexity is the reason that exploration is difficult and requires high-definition 3-D seismic data to determine where potential drilling targets may be located.

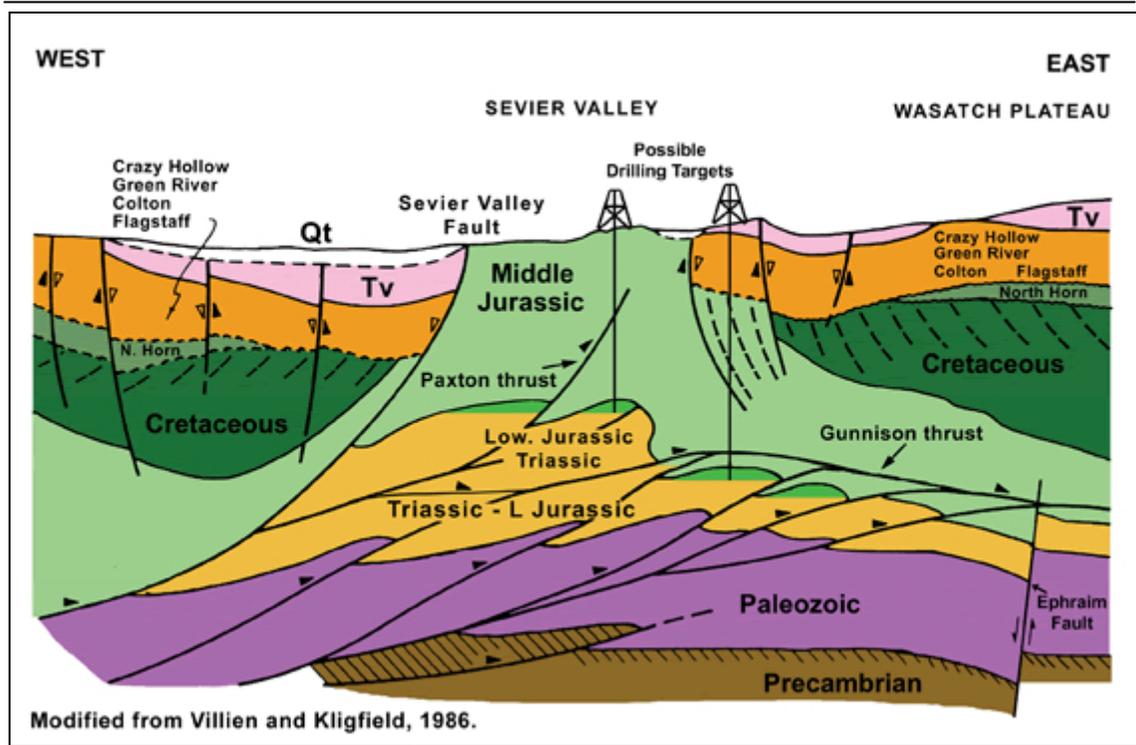


Figure 7 Covenant Field Cross-Section

Source: Utah Geological Survey.

The Utah Division of Oil, Gas and Mining reports a total of 9 producing wells in Covenant field, all operated by Wolverine Gas and Oil. One additional Wolverine well is reported as shut-in. Including dry holes and plugged and abandoned wells, a total of 62 well have been drilled in Sevier County. Recent reports indicate a new field discovery by Wolverine in Sevier County; however, details are not available.

The only field historically developed in Sanpete County is Joe’s Valley Field; however, no wells in the county are currently reported as producing. A total of 52 wells have been drilled in Sanpete County.

Only two wells have been drilled in Piute County, both were wildcats that were plugged and abandoned.

State-owned land in the three-county area comprises 6.3 percent of the area's total land. The majority of the state land is controlled by the Utah School and Institutional Trust Lands Administration (SITLA), with much smaller amounts controlled by State Parks and State Wildlife. By far, the greatest amount of land is owned by the Federal government; with the Forest Service controlling 66.5 percent, the Bureau of Land Management controlling 18.6 percent, and the National Park Service controlling 4,420 acres. Indian lands in the county comprise 1,213 acres.

Table 2
Land Ownership in the Three Counties

	Piute County	Sanpete County	Sevier County	Three- County Total	Percent of Total
Bureau of Land Management	163,947	136,952	207,482	508,381	18.6
US Forest Service	196,026	390,869	716,521	1,303,416	47.8
Military	0	769	0	769	0.0
USFS and BLM Wilderness	0	0	0	0	0.0
National Park Service	0	0	4,420	4,420	0.2
Total Federal	359,973	528,591	928,423	1,816,987	66.6
State Parks	0	48	0	48	0.0
State Wildlife Land	2,642	27,560	3,375	33,577	1.2
State Trust Lands	49,679	32,305	55,922	137,906	5.1
Total State Lands	52,371	59,914	59,297	171,582	6.3
Indian Lands	0	0	1,213	1,213	0.0
Private	61,745	434,105	233,175	729,025	26.7
Total	484,652	1,022,609	1,222,107	2,729,368	100.0
Source: Utah Governor's Office of Planning and Budget.					

Crude oil production in the three counties has been nominal until the discovery of Covenant Field in Sevier County in 2004 (Table 3). Crude oil production in Sevier County was 164,508 barrels in 2004 and increased to 2,056,995 barrels by 2006. This comprised 11.5 percent of the state's total production.

Table 3
Three-County Crude Oil Production, 1997-2006

	Crude Oil, barrels				
	Piute County	Sanpete County	Sevier County	Three-County Total	State Total
1997	0	83	0	83	19,592,548
1998	0	0	0	0	19,223,542
1999	0	72	0	72	16,376,521
2000	0	0	0	0	15,609,030
2001	0	20	0	20	15,273,926
2002	0	0	0	0	13,770,860
2003	0	0	0	0	13,098,424
2004	0	21	164,508	164,529	14,799,208
2005	0	30	884,604	884,634	16,675,302
2006	0	8	2,056,987	2,056,995	17,926,580
% of State Total, 2006	0.0	0.0	11.5	11.5	100.00

Source: Utah Division of Oil, Gas and Mining

Only slight natural gas production is reported in the three-county area, all of it from Sanpete County (Table 4). A total of only 538 MCF has been produced over the past 10 years. This is compared to a state total of over 356 BCF for the state.

Table 4
Three-County Natural Gas Production, 1997-2006

(Gross Withdrawals)

	Natural Gas, MCF				
	Piute County	Sanpete County	Sevier County	Three-County Total	State Total
1997	0	425	0	425	272,553,774
1998	0	0	0	0	297,503,246
1999	0	0	0	0	277,494,312
2000	0	0	0	0	281,170,016
2001	0	100	0	100	300,975,578
2002	0	0	0	0	293,030,004
2003	0	0	0	0	287,141,238
2004	0	9	0	9	293,735,994
2005	0	10	0	10	313,465,305
2006	0	3	0	3	356,361,028
% of State Total, 2006	0.0	0.0	0.0	0.0	100.0

Source: Utah Division of Oil, Gas and Mining

Although production has been declining over the past 10 years, rising prices have stimulated additional drilling in recent years (Table 5). No wells were spudded in the area from 2001 to 2003, but 11 were spudded in 2005, 6 were spudded in 2006 and another 6 in and 2007.

Table 5
Wells Spudded in The Hingeline, 1997-2007

	Wells Spudded				
	Piute County	Sanpete County	Sevier County	Three-County Total	State Total
1997	0	0	0	0	430
1998	0	2	0	2	430
1999	0	1	0	1	283
2000	0	0	0	0	540
2001	0	0	0	0	627
2002	0	0	0	0	391
2003	0	0	1	1	480
2004	0	0	2	2	659
2005	0	1	10	11	889
2006	0	3	3	6	1,068
2007	1	3	2	6	1,120
% of State Total, 2007	0.1	0.3	0.2	0.5	100.00
Source: Utah Division of Oil, Gas and Mining					

3.1.1 Three-County Economy

Sevier County

Sevier County has over 50,000 acres of cropland. Important businesses include livestock raising, coal and rock salt mining, gypsum manufacturing, bentonite and clay mills, turkey processing, trucking, and tourism.

Sevier County's non-farm growth rate between September 2006 and September 2007 grew by 3.3% with the addition of 270 new jobs. Retail trade produced most of the jobs followed by business services and construction. Government and wholesale trade employment dropped slightly.

Unemployment is historically low at 2.9 percent. New home permits were down 7 percent for the January to November period; however, nonresidential permitting jumped by 400 percent. Permitted values rose 35 percent in the first 11 months of

2007. Gross taxable sales grew at only 1 percent between the third quarters of 2006 and 2007.

Sanpete County

Much of Sanpete County's employment is in agriculture activities. Just recently, data from the Agricultural Census showed that the number of farm operators with a primary occupation other than farming surpassed that of individuals who primarily farm for a living. Snow College, the regional prison in Gunnison, and two school districts combine to make government the largest major industry in Sanpete County. The public sector accounts for 36 percent of Sanpete County's employment. Roughly 52 percent of Sanpete County firms have fewer than five employees.

Sanpete County's non-farm growth rate between September 2006 and September 2007 grew by 7.0%, almost double the state average. Retail trade produced most of the jobs with some help from manufacturing and private healthcare/social services. The only decrease was in the leisure/hospitality industry. Unemployment is historically low at only 3.5 percent. New home permits were up 1 percent for the first two months of 2007. Nonresidential permitting also increased, resulting in a rise of permitted values by 12 percent. Gross taxable sales for the third quarter of 2007 were up 9 percent over the same quarter in 2006.

Piute County

The major source of income is from beef cattle. Dairy cattle and sheep also contribute to the economy of the county. There is considerable summer range in the high mountains and spring and winter range in the low hills. Recreation, including deer hunting and fishing is another prime staple of the economy.

Piute County at one time held a vast mineral wealth, including uranium, gold, alunite, and talc. Piute County has the world's largest alunite deposits and was the largest producer of primary-type uranium ore in the United States.

Because of its small population, Piute County's non-farm growth rate fluctuates greatly from month-to-month; however it is generally up. Mining, construction, local government and private healthcare/social services all contributed to the overall job increase. Piute County's gross taxable sales in the third quarter of 2007 were 11 percent higher than the third quarter of 2006. A summary of economic growth factors is given in Table 6.

Table 6
Summary of Economic Growth Factors

	Unadjusted Employment Rate		Job Growth	Perm. Const. Values	Sales
	Rate	Change	Change	Change	Change
	December 2007		September 2007	January-November 2007	3 rd Qtr 2007
Sevier	3.5	0.6%	3.3%	26.4%	1.7%
Sanpete	3.8	0.6%	6.6%	-1.5%	9.4%
Piute	3.3	0.8%	1.9%	ND	32.4%

ND: Not disclosed

The combined three counties had an estimated 2007 population of 48,271, up 6.4 percent from 2002 (Table 7).

Table 7
Hingeline Population, 2002-2007

	Population				
	Piute County	Sanpete County	Sevier County	Three-County Total	State Total
2002	1,409	24,521	19,232	45,162	2,358,330
2003	1,358	24,787	19,318	45,463	2,413,618
2004	1,366	25,043	19,415	45,824	2,469,230
2005	1,368	25,454	19,649	46,471	2,547,389
2006	1,373	25,799	19,984	47,156	2,615,129
2007	1,385	26,464	20,422	48,271	2,699,554

Source: Utah Governor's Office of Planning and Budget.

The majority of the population in the three counties lives in small cities and towns. The population of Sevier County as of July, 2006 was 19,984 and the three largest cities are Richfield (7,104), Salina (2,399) and Monroe (1,842). The population of Sanpete County was 24,521 and the four largest cities are Ephraim (5,085), Manti (3,180), Gunnison (2,717) and Mount Pleasant (2,698). The population of Piute County was 1,373 and the three largest towns are Circleville (466), Marysvale (342) and Junction (164).

After a rise in unemployment in the early 2000's, unemployment in the area began to drop in 2002, and is currently at very low levels ranging from 2 to 3 percent. Of the three counties, Piute County has the lowest unemployment rate, perhaps because of its small population and lack of an industrial base, and Sanpete County has the

highest unemployment rate at slightly over 3 percent. Total employment and unemployment rates are shown in Figures 8A, 8B, and 8C.

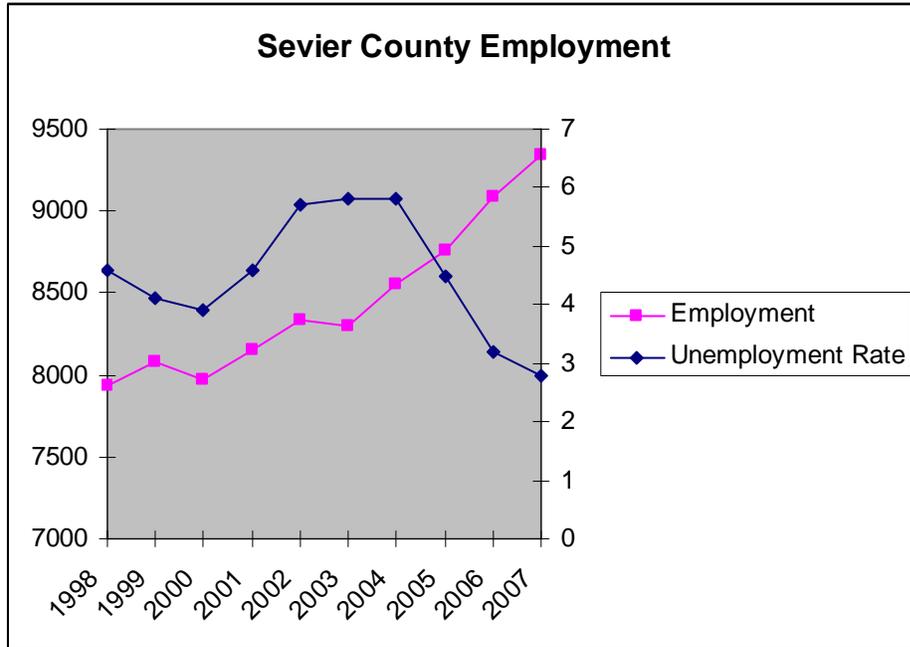


Figure 8A Employment and the Unemployment Rate in Sevier County

Source: BLS, Local Area Unemployment Statistics.

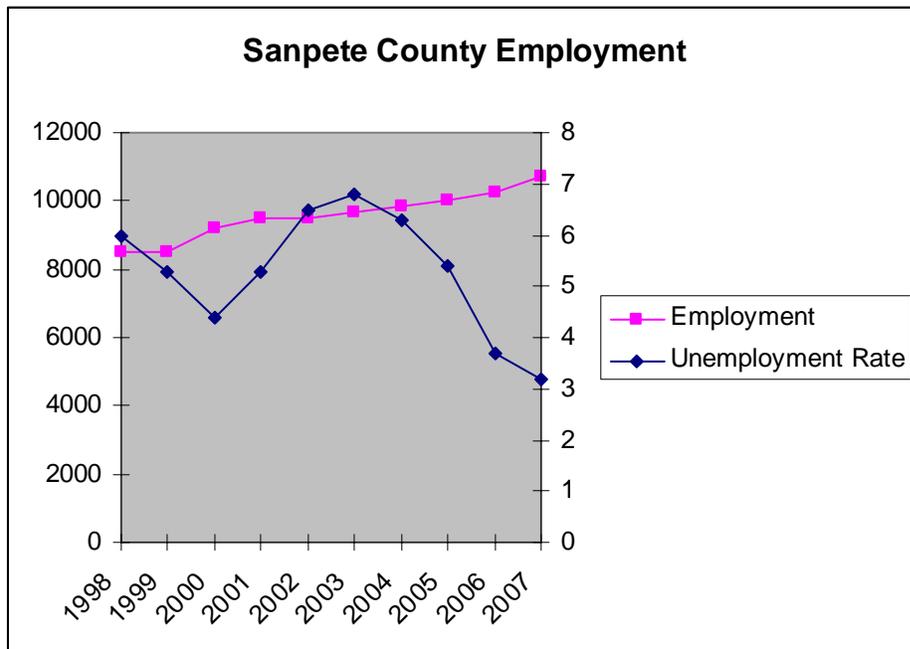


Figure 8B Employment and the Unemployment Rate in Sanpete Count

Source: BLS, Local Area Unemployment Statistics.

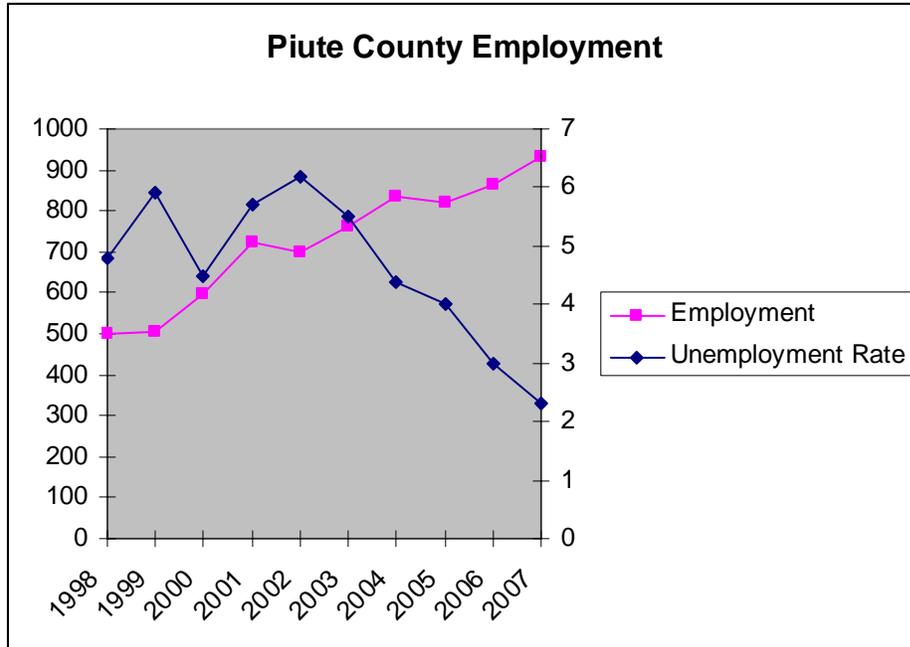


Figure 8C Employment and the Unemployment Rate in Piute County

Source: BLS, Local Area Unemployment Statistics.

Employment statistics by industry do not show any remarkable trends, although retail trade appears to be a strong component of employment in all three counties. (Table 8) Mining is significant in Sevier County, with a location quotient of 14.34 but is not disclosed in the other two counties (Table 9). Transportation and housing are important in all three counties, with location quotients of 3.88, 1.04, and 5.97 in Sevier, Sanpete, and Piute Counties, respectively. Construction and manufacturing also appear strong in Sevier and Sanpete counties, but not in Piute County.

Although there is significant employment in the mining industry in Sevier County, it is largely comprised of mining activities not related to oil and gas exploration and production. Of the 489 jobs in the mining sector in Sevier County in 2006, just 14 were in the oil and gas industry. According to data maintained by the Utah Department of Workforce Services, a total of 12 workers were employed in the mining industry in Sanpete County in 2006 and no employees worked in the mining industry in Piute County.

**Table 8
Employment by Industry in the Three-County Area, 2006**

NAICS	Number of Employees by County by Industry	Sevier County	Sanpete County	Piute County
21	Mining	489	ND	ND
22	Utilities			
23	Construction	414	453	ND
31-33	Manufacturing	467	841	ND
42	Wholesale Trade	ND	ND	ND
44-45	Retail Trade	1297	882	ND
48-49	Transportation and Warehousing			
51	Information	80	179	
52	Finance and Insurance	145	166	ND
53	Real Estate	30	68	ND
54	Professional, Scientific and Technical Services	185	142	ND
55	Management of Companies and Enterprises	ND	ND	
56	Administrative and Support	ND	ND	ND
61	Educational Services	ND	ND	
62	Health Care	ND	ND	ND
71	Arts, Entertainment and Recreation	13	34	ND
72	Accommodation and Food Services			
81	Other Services			
	Government Employment	495	876	21
	All Employment	6,232	4,558	184

ND: Not disclosed.

Source: BLS, Quarterly Census of Employment and Wages.

Table 9
Employment Location Quotients for the Three-County Area, 2006

Industry	Sevier County	Sanpete County	Piute County
Private Employment			
Agriculture, Forestry, Fishing and Hunting	0.9	ND	ND
Mining	14.34	ND	ND
Utilities	ND	ND	NC
Construction	0.98	1.47	ND
Manufacturing	0.60	1.47	ND
Wholesale Trade	ND	ND	ND
Retail Trade	1.53	1.42	ND
Transportation and Warehousing	3.88	1.04	5.37
Information	0.48	1.46	NC
Finance and Insurance	0.44	0.68	ND
Real Estate	0.25	0.78	NC
Professional, Scientific and Tech. Services	0.45	0.48	ND
Management of Companies and Enterprises	ND	ND	NC
Administrative and Support	ND	ND	NC
Educational Services	ND	ND	NC
Health Care	ND	ND	ND
Arts, Entertainment and Recreation	0.12	0.44	NC
Accommodation and Food Services	1.41	0.99	2.86
Other Services	0.52	0.83	ND
Government Employment			
All Employment	1.0	1.0	1.0
ND: Not disclosed to protect individual company information. Source: BLS, Quarterly Census of Employment and Wages.			

The Utah Department of Workforce Services lists one company, Wolverine Oil and Gas Corporation, as operating in Sevier County. Conversations with Wolverine indicated that most of their work is contracted from outside the county.

The average annual wage in Sevier County during 2006 was \$26,872, compared to \$35,130 for the state of Utah (Table 10). It was \$23,614 in Sanpete County and \$21,718 in Piute County. A major reason for the relatively low annual wages in these counties relative to the state annual average wage, is the rural character of the area and the lack of an industrial base in any of the three counties.

Table 10
Average Annual Wages by Industry in the Three-County Area, 2006

Industry	Sevier County	Sanpete County	Piute County
Private Employment			
Agriculture, Forestry, Fishing and Hunting	\$21,214	ND	ND
Mining	40,966	ND	ND
Utilities	ND	ND	
Construction	24,311	ND	ND
Manufacturing	29,915	24,097	ND
Wholesale Trade	ND	ND	ND
Retail Trade	19,908	16,089	ND
Transportation and Warehousing	36,503	33,212	33,798
Information	28,213	34,081	
Finance and Insurance	34,362	28,814	ND
Real Estate	24,235	24,228	ND
Professional, Scientific and Tech. Services	36,027	13,893	ND
Management of Companies and Enterprises	ND	ND	
Administrative and Support	ND	ND	ND
Educational Services	ND	ND	
Health Care	ND	ND	ND
Arts, Entertainment and Recreation	7,389	9,798	ND
Accommodation and Food Services	9,136	6,026	7,084
Other Services	21,497	13,544	ND
Government Employment	50,646	29,330	25,788
All Employment	26,872	23,614	21,718
ND: Not disclosed to protect individual company information. Source: BLS, Quarterly Census of Employment and Wages			

Total annual wages for each county are provided in Table 11, and show that transportation and warehousing in Sevier County is the largest single source of wages in the three counties, followed by retail trade and mining.

Table 11
Total Annual Wages by Industry in the Three-County Area, 2006

Dollars in Thousands

Industry	Sevier County	Sanpete County	Piute County
Private Employment			
Agriculture, Forestry, Fishing and Hunting	\$1,232	ND	ND
Mining	20,025	ND	ND
Utilities	ND	ND	ND
Construction	10,065	\$11,992	ND
Manufacturing	13,955	20,275	ND
Wholesale Trade	ND	ND	ND
Retail Trade	25,822	14,197	ND
Transportation and Warehousing	32,913	5,851	\$1,397
Information	2,264	6,100	ND
Finance and Insurance	4,971	4,781	ND
Real Estate	731	1,645	ND
Professional, Scientific and Tech. Services	6,668	1,966	ND
Management of Companies and Enterprises	ND	ND	ND
Administrative and Support	ND	ND	ND
Educational Services	ND	ND	ND
Health Care	ND	ND	ND
Arts, Entertainment and Recreation	94	335	ND
Accommodation and Food Services	7,910	2,690	370
Other Services	2,700	1,991	ND
Government Employment	46,775	63,451	3,281
All Employment	\$209,624	\$160,240	\$6,779

ND: Not disclosed.

Source: BLS, Quarterly Census of Employment and Wages.

4 Economic Impacts

While rising energy prices are translating into rising employment and wages in the producing areas, not all of the economic gains are occurring in the oil and gas industry. The total increase in local economic conditions due to oil and gas activity is greater than the direct gain in the industry. This is the “multiplier effect” often referred to in economics and is a result of local spending by the industry for goods and services and spending of wages by the industry’s employees. These additional economic benefits are known as the indirect and induced benefits.

In this study, economic impact is defined as the effect on employment and wages in the subject areas. Additional information on economic impact is available in Section 6 and in several listed references.

4.1 Hingeline Area

Currently, exploration and production of oil and gas is clearly not a major economic driver in the three-county Hingeline area. The only producing wells (nine) are located in Sevier County in one field, Covenant Field. Drilling, field support and other E&P activities are largely done by out-of-state entities. The only oil and gas E&P employment reported in the three-county area in 2006 was in Sevier County with a total of 14 jobs and \$557,182 in nonfarm wages in NAICS 213.

In addition to the direct employment, are the secondary impacts that result from oil and gas exploration and production. These secondary impacts include jobs and wages received by employees working in many other industries in the area.

The total economic impact of the oil and gas industry on the region was 29 jobs and \$710,518 in wages. These impacts include direct employment of 14 workers and direct wages \$557,182. The indirect and induced impacts included 15 workers and \$153,336 in additional wages (Table 12).

Table 12
Economic Impact of the Oil and Gas Industry
In the Hingeline Area, 2006

	Hingeline Area	
	Employment	Wages (1000s)
Total, Nonfarm	15,343	\$375,428.4
E&P Direct	14	\$557.2
E&P Indirect	15	\$153.3
E&P Total	29	\$710.5

Source: Utah Department of Workforce Services.

As the price of oil continues to rise, an increase in exploration activity in the area is expected, including additional leasing, increased cost of leases, seismic exploration (particularly 3D seismic) and support activities. The geological complexity of exploration targets in the Hingeline makes them difficult to find, thereby discouraging investment; however, the same factor supports the belief that there may be a number of undiscovered oil deposits in the region.

5 Fiscal Impacts

The oil and gas industry also provides some fiscal benefit to the three-county area. Fiscal benefits refer to tax collections, rents and royalties generated from gas and oil production refer to impacts on government finances and tax collections.

The oil and gas industry is subject to the tax laws common to all businesses. There are also impacts unique to the industry. Production on federal land is subject to a royalty payment under the Mineral Lands Leasing Act of 1920. This royalty is paid to the Minerals Management Service, an agency within the U.S. Department of Interior. A portion of the federal mineral royalties is returned to the state of origin, generally one-half of the royalty payment. Royalties from production on Indian lands are returned to the appropriate tribe, not to the state government. Since a large portion of the crude oil production in Utah occurs on Indian lands, especially in Duchesne and San Juan Counties, the amount of crude oil royalty returned to the state government is significantly less than one-half of the amount paid to the Minerals Management Service. The states have full discretion as to the distribution of federal mineral royalties as long as priority is given to areas with economic and/or social impacts from leasing activities. The Minerals Management Service does not release federal mineral royalty data at the county level, but statewide data are available.

Federal mineral royalties due to oil and gas production in Utah have increased dramatically from \$91 million in 2001 to nearly \$300 million in 2006, a 228 percent rise (Table 12). Oil and gas production accounted for 91.3 percent of the royalties paid for mineral production on federal land in Utah during 2006. There was also an additional \$103 million paid in bonuses and rents on federal mineral leases. These are fees associated with awarding federal mineral leases and maintaining the leases until production is initiated.

Table 13 includes royalties paid on oil and gas production, but does not include bonus or rent payments for federal oil and gas leases. Of the nearly \$300 million paid in federal mineral royalties by the oil and gas industry in Utah, \$109 million was returned to the state government.

Table 13
Federal Mineral Royalty Payments and Disbursements for Utah, 2001-2006

	Oil		Natural Gas		Total	
	Royalties	Disbursements	Royalties	Disbursements	Royalties	Disbursements
2001	\$32,799,794	\$4,392,667	\$58,553,527	\$26,210,621	\$91,353,321	\$30,603,288
2002	26,028,911	3,493,794	37,653,050	11,921,373	63,681,961	15,415,167
2003	37,462,357	5,575,810	55,369,036	26,040,706	92,831,293	31,616,515
2004	45,743,590	7,235,629	87,075,857	38,228,494	132,819,447	45,464,122
2005	66,900,212	10,405,687	118,132,687	53,647,636	185,032,900	64,053,323
2006	106,457,298	21,866,066	193,416,183	87,551,457	299,873,481	109,417,522

Note: Years are federal fiscal years. Natural gas includes natural gas liquids from gas processing plants.
Source: Minerals Management Service.

In Utah, federal mineral royalties are distributed to several different accounts according to state law (Table 14). The largest recipients of federal mineral royalties in Utah are the Permanent Community Impact Fund and the Department of Transportation. The funds distributed to the Department of Transportation are then distributed to local governments to fund local highways in proportion to the amount of mineral lease money generated by each county. The Permanent Community Impact Fund makes loans and grants to state agencies and subdivisions of state government impacted by mineral resource development. Unlike funds administered by the Department of Transportation, which are distributed in proportion to royalties generated in the county, the Permanent Community Impact Fund is distributed by a state-appointed board in response to proposals submitted by state agencies and local governments. Therefore, the distribution of funds by the Permanent Community Impact Fund to the various counties may vary from the amount of royalty generated. The payments in lieu of taxes cited in Table 13 are not the payments in lieu of taxes made by the federal government for federal land in Utah but are payments made by the state government to counties for lands controlled by the School and Institutional Trust Lands Administration, state Division of Parks and Recreation and the state Division of Wildlife Resources.

Table 14
Distribution of Federal Mineral Royalties in Utah

	Percent
Permanent Community Impact Fund	32.50
State Board of Education	2.25
Utah Geological Survey	2.25
Water Research Laboratory	2.25
Department of Transportation	40.00
Department of Community and Culture	5.00
Payments in Lieu of Taxes	52 cents per acre
Permanent Community Impact Fund	Remainder
Note: The amount paid for Payments in Lieu of Taxes has been adjusted annually since 1994 according to the Consumer Price Index. Source: Utah State Code, Title 59, Chapter 21.	

The School and Institutional Trust Lands Administration (SITLA) controls mineral rights on approximately 4.4 million acres in Utah. These lands are held in trust for the public schools in Utah and 11 other beneficiaries. They were established at statehood and through land exchanges with the federal government. During 2006, royalties paid for oil and gas extraction on SITLA lands totaled \$82.7 million. This was 51.0 percent of total SITLA revenue for 2006. These funds are not returned to the county of origin, but are placed in a permanent fund managed by the state

treasurer on behalf of the public schools or distributed to the appropriate beneficiary as mandated. Dividends and interest from the Public School Fund are distributed annually to all Utah public schools based on an established formula.

In addition to royalties, there is an Oil and Gas severance tax in Utah and an Oil and Gas Conservation Fee that are levied on all production in the state. Revenue from the Oil and Gas Severance Tax is placed in the state general fund and the tax rate varies from 3 to 5 percent of the sales price. The Oil and Gas Conservation Fee funds the state Division of Oil, Gas and Mining. The fee is imposed at a rate of 0.2 percent of the value of production.

Both the Oil and Gas Severance Tax and the Oil and Gas Conservation Fee have significantly increased in recent years (Table 15). The Oil and Gas Severance Tax increased by 82 percent from 2001 to 2006, while the Oil and Gas Conservation Fee increased by 102 percent. The drop from 2001 to 2002 was due to the decline of the wellhead price of natural gas produced in Utah from \$3.52 per MCF to \$1.99 per MCF. These data reflect statewide oil and gas operations and are not specific to the Hingeline area.

Table 15
State Tax Collections Related to
Oil and Gas Production, 2001-2006

	Oil and Gas Severance Tax	Oil and Gas Conservation Fee
2001	\$39,357,798	\$2,748,318
2002	18,893,082	1,710,219
2003	26,745,279	1,943,755
2004	36,659,808	2,696,250
2005	53,484,320	3,631,963
2006	71,513,869	5,560,449
Note: Years are state fiscal years. Source: Utah State Tax Commission.		

5.1 Hingeline Area

The largest direct fiscal impacts on the Hingeline due to oil and gas operations in the area are property taxes paid by the operating companies, the federal mineral royalties distributed to the local governments by the Utah Department of Transportation, and mineral revenue sharing money distributed to the local governments by SITLA. The Utah State Tax Commission centrally assesses oil and gas properties using a net present value approach applied to future production. The local county treasurers bill and collect the taxes. Property taxes are levied by

numerous units of local government, including county and city governments, school districts, and special service districts.

In 2006, property taxes paid on oil and gas properties located in Sevier County, added to the natural resources tax totaled \$2.5 million, accounting for about 2.1 percent of the county's property tax revenue. Property taxes paid to Sanpete County and Piute County were not significant (Tables 16A, 65B and 16C). Tables 16A through 16C include all property taxes paid to various government entities in the three counties, not just county governments.

As prices of crude oil and natural gas have increased in recent years, the net present value of future production has increased. This, coupled with rising production, has resulted in the amount of property taxes paid by the oil and gas industry in Sevier County increasing over the past 2 years, and, although data are not available they have increased in 2007 and 2008, as well. Given the rising production and expected continuation of current energy prices, the property taxes paid by the oil and gas production industry in Sevier County should continue to rise into the future.

**Table 16A
Oil and Gas Property Taxes – Sevier County**

Year	Sevier County			
	Oil and Gas Property Tax	Natural Resources Tax	Total Tax Revenue	O&G % of Total Tax Revenue
2006	\$254,483	\$2,222,529	\$11,928,291	2.13%
2005	65,906	1,748,468	11,148,424	0.59%
2004	0	1,192,565	12,129,764	0.00%
2003	0	1,116,278	10,168,096	0.00%
2002	0	1,142,287	9,794,180	0.00%
2001	0	1,233,257	9,957,288	0.00%
2000	0	1,185,683	8,911,008	0.00%

Source: Source: Utah State Tax Commission.

Table 16B
Oil and Gas Property Taxes – Sanpete County

Year	Sanpete County			
	Oil and Gas Property Tax	Natural Resources Tax	Total Tax Revenue	O&G % of Total Tax Revenue
2006	\$143	\$63,752	\$11,441,965	0.00%
2005	176	66,332	10,804,668	0.00%
2004	208	50,964	11,617,733	0.00%
2003	212	46,838	9,544,398	0.00%
2002	212	50,992	8,681,304	0.00%
2001	243	52,415	8,373,011	0.00%
2000	4,007	63,406	7,768,568	0.05%

Source: Source: Utah State Tax Commission.

Table 16C
Oil and Gas Property Taxes – Piute County

Year	Piute County			
	Oil and Gas Property Tax	Natural Resources Tax	Total Tax Revenue	O&G % of Total Tax Revenue
2006	\$0	\$8,162	\$813,346	0.00%
2005	0	8,981	748,740	0.00%
2004	0	7,981	748,422	0.00%
2003	0	9,003	626,666	0.00%
2002	0	8,891	585,330	0.00%
2001	0	4,047	573,256	0.00%
2000	0	3,604	595,013	0.00%

Source: Source: Utah State Tax Commission.

The funds generated through federal mineral royalties that are returned to the three counties through the Utah Department of Transportation are also a source of revenue for the local governments, especially in Sevier County (Table 17). These funds actually exceed the amount of property tax paid by the oil and gas industry. During 2007, the three counties collectively received almost \$5.2 million dollars in federal mineral royalties returned to them by the Utah Department of Transportation (UDOT).

Table 17
Federal Mineral Royalties Returned by UDOT
to the Three-County Area, 2001-2007

	Sevier County	Sanpete County	Piute County	Total
2001	\$2,073,944	\$21,138	\$458	\$2,095,540
2002	1,779,957	13,797	–	1,793,754
2003	1,614,650	1,324	615	1,616,589
2004	1,672,796	309	480	1,673,585
2005	1,839,724	317	491	1,840,532
2006	3,868,401	362	508	3,869,271
2007	5,161,756	375	526	5,162,657
Note: Years are state fiscal years. Source: Utah Department of Transportation.				

Mineral rents and royalties paid to the three counties by the State Institutional and Trust Lands Administration (SITLA) are reported in Table 18. Note that Sanpete and Piute Counties received lease rental payments on oil and gas leases, despite the fact that no producing wells are located in those counties.

Table 18
Rents and Royalties Paid for Production on
SITLA Lands in the Three-County Area, 2005-2006

	Sevier	Sanpete	Piute
2005	72,051	74,116	–
2006	1,451,169	95,168	26,198
2007	1,207,422	96,477	31,329
Note: Years are state fiscal years. Source: School and Institutional Trust Lands Administration.			

SITLA and the federal government have exchanged a significant amount of land to facilitate mineral development and operations, particularly in the Drunkard's Wash area. As a result of HB 134, SITLA was directed to return certain mineral lease royalties to counties where the state has acquired federal lands as a result of land exchanges in order to equalize revenue to those counties in compensation for land-trades. Table 19 shows the royalties returned to the three counties under the mineral revenue-sharing provision.

Table 19
Mineral Revenue Sharing with
Land Exchanged to the United States

County	Apr-Jun 2007	Jul-Sept 2007	Oct-Dec 2007	Jan-Mar 2007	Total
Sevier	\$146,682	\$250,003	\$115,678	\$157,260	\$669,623
Sanpete	\$10,338	\$6,358	\$7,059	\$11,687	\$35,442
Piute	\$21,118	\$12,988	\$14,421	\$23,874	\$72,401
Total	178,138	269,349	137,158	192,821	\$777,466
Source: School and Institutional Trust Lands Administration.					

6 Technical Notes and Methodology

Industries are classified by economists according to the North American Industry Classification System (NAICS), which was developed by the Office of Management and Budget in cooperation with other federal agencies and foreign governments (Office of Management and Budget, 2007). The NAICS codes replaced the Standard Industrial Classification (SIC) Codes that had been used since the 1930s. This change was prompted by structural changes in the U.S. economy, as the services sector became more complex and a much larger portion of the economy than when the SIC codes were developed. In the transition, the 10 major industrial sectors under the SIC system were replaced with 20 major sectors under the NAICS system. Many of the industrial sectors under the SIC codes were split among two or more of the redefined NAICS sectors, making comparisons difficult. The NAICS codes better explain the structure of the current economy but make time series data difficult to compile.

Under the NAICS system, 20 major industrial categories are further subdivided as needed. To demonstrate the level of detail obtained, Table 19 presents the divisions of the mining (NAICS 21) sector. The mining sector is divided into a total of 28 different industries. The other 19 industrial sectors are similarly subdivided.

Other local businesses and industries benefit from E&P activities. Examples of these are seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and electric utilities. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. These types of effects are referred to as the indirect and induced impacts. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses using input-output economic models.

Table 20
NAICS Codes Related to the Mining Industry

NAICS Code	Industry
21	Mining, Quarrying, and Oil and Gas Extraction
211	Oil and Gas Extraction
2111	Oil and Gas Extraction
21111	Oil and Gas Extraction
211111	Crude Petroleum and Natural Gas Extraction
211112	Natural Gas Liquid Extraction
212	Mining (except Oil and Gas)
2121	Coal Mining
21211	Coal Mining
212111	Bituminous Coal and Lignite Surface Mining
212112	Bituminous Coal Underground Mining
212113	Anthracite Mining
2122	Metal Ore Mining
21221	Iron Ore Mining
212210	Iron Ore Mining
21222	Gold and Silver Ore Mining
212221	Gold Ore Mining
212222	Silver Ore Mining
21223	Copper, Nickel, Lead and Zinc Mining
212231	Lead Ore and Zinc Ore Mining
212234	Copper Ore and Nickel Ore Mining
21229	Other Metal Ore Mining
212291	Uranium-Radium-Vanadium Ore Mining
212299	All Other Metal Ore Mining
2123	Nonmetallic Mineral Mining and Quarrying
21231	Stone Mining and Quarrying
212311	Dimension Stone Mining and Quarrying
212312	Crushed and Broken Limestone Mining and Quarrying
212313	Crushed and Broken Granite Mining and Quarrying
212319	Other Crushed and Broken Stone Mining and Quarrying
21232	Sand, Gravel, Clay and Ceramic and Refractory Minerals Mining and Quarrying
212321	Construction Sand and Gravel Mining
212322	Industrial Sand and Gravel Mining
212324	Kaoline and Ball Clay Mining
212325	Clay and Ceramic and Refractory Minerals Mining
21239	Other Nonmetallic Mineral Mining and Quarrying
212391	Potash, Soda, and Borate Mineral Mining
212392	Phosphate Rock Mining
212393	Other Chemical and Fertilizer Mineral Mining
212399	All Other Nonmetallic Mineral Mining
213	Support Activities for Mining
2131	Support Activities for Mining

21311	Support Activities for Mining
213111	Drilling Oil and Gas Wells
213112	Support Activities for Oil and Gas Operations
213113	Support Activities for Coal Mining
213114	Support Activities for Metal Mining
213115	Support Activities for Nonmetallic Minerals (except Fuels) Mining

6.1 NAICS Codes Related to Oil and Gas Production

There are three classifications directly related to the oil and gas exploration and production industry. These are NAICS 211–Oil and Gas Extraction, NAICS 213111 – Drilling Oil and Gas Wells, and NAICS 213112–Support Activities for Oil and Gas Operations. These three classifications cover the operating companies, drilling companies, and service companies, respectively. For this study, we consider them collectively as the oil and gas E&P industry. The definitions listed are those developed by the Office of Management and Budget.

NAICS 211–Oil and Gas Extraction: Industries in the Oil and Gas Extraction subsector operate and/or develop oil and gas field properties. Such activities may include exploration for crude petroleum and natural gas; drilling, completing, and equipping wells; operation of separators, emulsion breakers, desilting equipment and field gathering lines for crude petroleum and natural gas; and all other activities in the preparation of oil and gas up to the point of shipment from the producing property. The subsector includes the production of crude petroleum, the mining and extraction of oil from oil shale and oil sands, and the production of natural gas, sulfur recovery from natural gas, and recovery of hydrocarbon liquids.

Establishments in this subsector include those that operate oil and gas wells on their own account and for others on a contract or fee basis. Establishments primarily engaged in providing support services, on a fee or contract basis, required for the drilling or operation of oil and gas wells (except geophysical surveying and mapping, mine site preparation, and construction of oil/gas pipelines) are classified in Subsector 213, Support Activities for Mining.

NAICS 213111–Drilling Oil and Gas Wells: This U.S. industry comprises establishments primarily engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, re-drilling, and directional drilling.

NAICS 213112–Support Activities for Oil and Gas Operations: This U.S. industry comprises establishments primarily engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related activities). Services included are exploration (except geophysical surveying and

mapping); excavating slush pits and cellars; well surveying; running, cutting, and pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells.

6.2 Economic Impact Modeling

Economic impacts on an economy arise from exogenous sources or activities that inject new funds into the economy. Examples include new construction and products manufactured or produced locally and exported to users located outside the region. It is important for outside funds to be injected into a regional economy for economic impacts to occur. If an activity is financed with funds from inside a regional economy it is simply a diversion of the region's resources, not a net increase in the region's resources. Crude oil and natural gas from the producing areas in Utah are exported to refineries and markets in other portions of the country. Exporting oil and gas results in an inflow of funds, generating a positive economic impact on the area.

In this study, economic impact is used to mean the impact of oil and gas exploration and production activities on employment and wages paid in the various producing regions in Utah.

The oil and gas E&P industry has a direct impact on the local economy through employment and wages paid by producers. In addition to the direct impacts are the indirect and induced impacts. Indirect impacts result from local spending by the companies that supply the E&P industry and induced impacts arise when employees of the E&P industry, and the employees of companies that supply the E&P industry spend their wages.

Examples of indirect impacts are employment and wages at seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and utilities providing electricity. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses.

The RIMS II input-output model developed by the Bureau of Economic Analysis was used to determine the indirect and induced economic impacts of the oil and gas exploration and production industry in the Hingeline Area. The RIMS II model is based on an accounting framework called an input-output table. From each industry, an input-output table shows the industrial distribution of inputs purchased and outputs sold. The Bureau of Economic Analysis has developed a national input-output table (Bureau of Economic Analysis, 1997). To develop region-specific input-output tables, the national input-output table is modified using regional economic data. The

producer portion of the input-output table is modified using location quotients at the six-digit NAICS level based on personal income data for service industries and wage and salary data for nonservice industries. Household data is modified to account for commuting across regional boundaries and savings and taxes. Once the national input-output table is regionalized, the multipliers are estimated through the use of matrix algebra.

The impact of the oil and gas industry in the Hingeline area was estimated using the direct effect multiplier coefficients provided in the RIMS II model. In this process, the direct effect multipliers were applied to direct employment in the oil and gas industry and the direct wages paid by producers in the three counties that comprise the Hingeline region. The direct employment and wages used in calculating these economic impacts was obtained from an on-line database maintained by the Utah Department of Workforce Services.

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The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry Phase I - Coalbed Methane

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List of Acronyms & Abbreviations

BCF	Billion Cubic Feet
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
DOGM	Utah Division of Oil, Gas and Mining
E&P	Exploration and Production
IPAMS	Independent Petroleum Association of the Mountain States
MCF	Thousand Cubic Feet
MMCF	Million Cubic Feet
MW	Megawatts
NAICS	North American Industry Classification System
NYMEX	New York Mercantile Exchange
PADD	Petroleum Administration for Defense District
SIC	Standard Industrial Code
SITLA	School and Institutional Trust Lands Administration
RIMS II	Regional Input-Output Modeling System
UDOT	Utah Department of Transportation
USFS	U.S. Forest Service
WTI	West Texas Intermediate Crude

The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry

1 Executive Summary

The Bureau of Economic and Business Research at the University of Utah has completed an economic impact study of the oil and gas exploration and production industry in the Coalbed Methane Area in east-central Utah. The Coalbed Methane Area, comprising Carbon and Emery Counties, is an increasingly important center of natural gas production in Utah. Rapidly rising energy prices in recent years have stimulated greater production of both crude oil and natural gas in the northern Rocky Mountains, and the Coalbed Methane Area is an integral part of the oil and gas industry in the Rocky Mountain area. Coalbed Methane Area natural gas production increased 316 percent from 23.7 BCF in 1997 to 98.5 BCF in 2006.

The rise in oil and gas activity is having a noticeable and positive economic impact on the Coalbed Methane Area. During 2006, the oil and gas exploration and production industry was directly responsible for an estimated 137 jobs and \$6.5 million in wages in the two counties. When including indirect and induced impacts due to company and employee spending, the oil and gas industry accounted for 524 jobs and \$22.2 million in wages in the area. This represents 4.0 percent of total employment and 4.9 percent of total wages in the Coalbed Methane Area.

The industry also has a sizeable fiscal impact on local governments in the Coalbed Methane Area. Property taxes paid on producing oil and gas wells were \$10.2 million in 2006 and accounted for 24.3 percent of all property taxes paid in the two counties. Federal mineral royalties distributed to the two counties by the Utah Department of Transportation during 2006 amounted to \$13.7 million.

2 Background

The recent rise in the price of gasoline has refocused attention on energy markets with an intensity not seen since the collapse of oil prices in the mid 1980s. In contrast to the energy shortage of the 1970s, which was largely driven by constrained supply due to geopolitical issues, the recent runup is a result of increasing demand and decreasing supply from aging fields. Crude oil, and to a lesser extent natural gas, is a worldwide commodity with international supply and demand factors determining prices. Consumption of petroleum products is up worldwide, with developing countries driving the increase. Consumption of petroleum in China grew over 30 percent from 2002 to 2006. This rise in demand has resulted in a dramatic increase in the nominal price of crude oil (Figure 1).

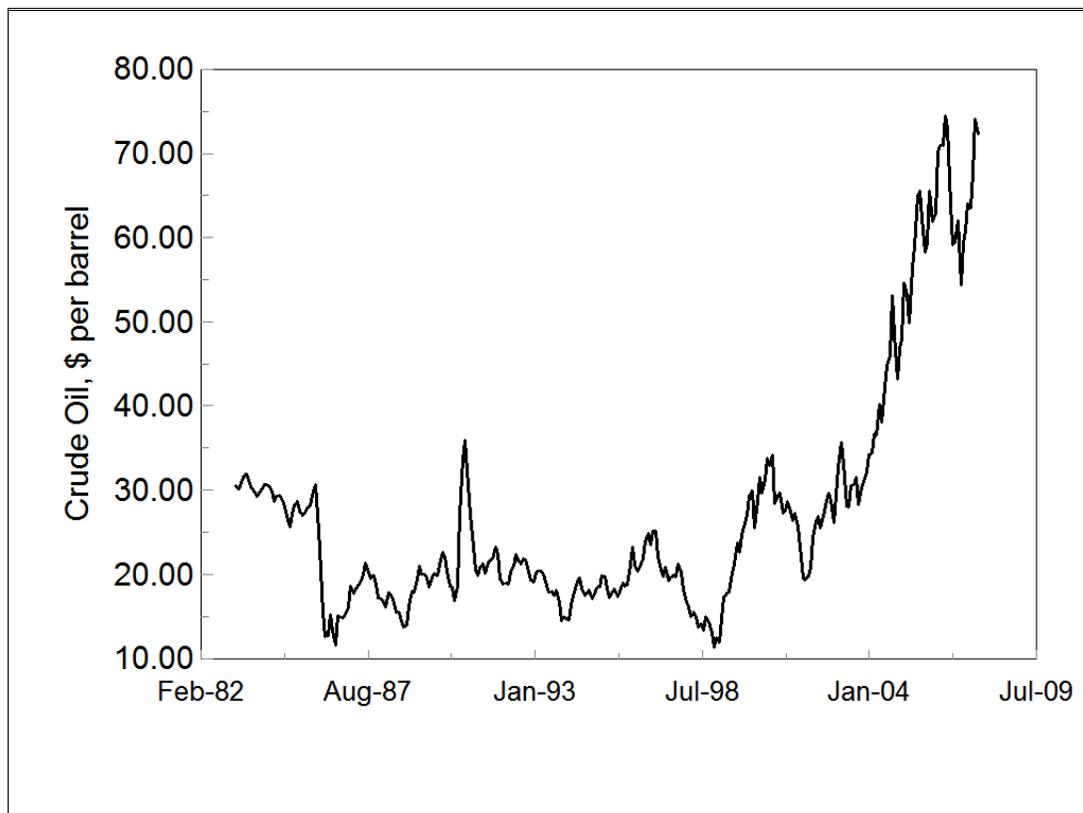


Figure 1 Crude Oil Price: NYMEX Near Month Contract for Light Sweet Crude
Source: Energy Information Administration

The price of crude oil was relatively flat during the 1990s, with prices in the \$20 to \$30 range. Then, from a low of \$11.31 per barrel in December 1998, crude oil increased to over \$70 per barrel in April 2006 and reached \$79.63 in September 2007. Forecasts expect crude oil prices to remain near current levels in the future.

In September 2007 the Energy Information Administration forecast the price of West Texas Intermediate Crude¹ would remain over \$71 per barrel through the end of 2008. During November 2007, prices were in the \$90 per barrel range.

At the same time, natural gas prices have increased from historically low values around \$2 per MCF in the late 1990s to a current price of about \$7 per MCF, with increased volatility in recent years (Figure 2). Natural gas is more of a regional commodity than crude oil, with more dependence on local supply and demand factors. The necessity of transporting natural gas by pipeline results in availability of transportation infrastructure having a large influence on regional prices. Currently, there is a shortage of pipeline capacity in the Rocky Mountains so wellhead natural gas prices in the area are depressed compared to the rest of the country.

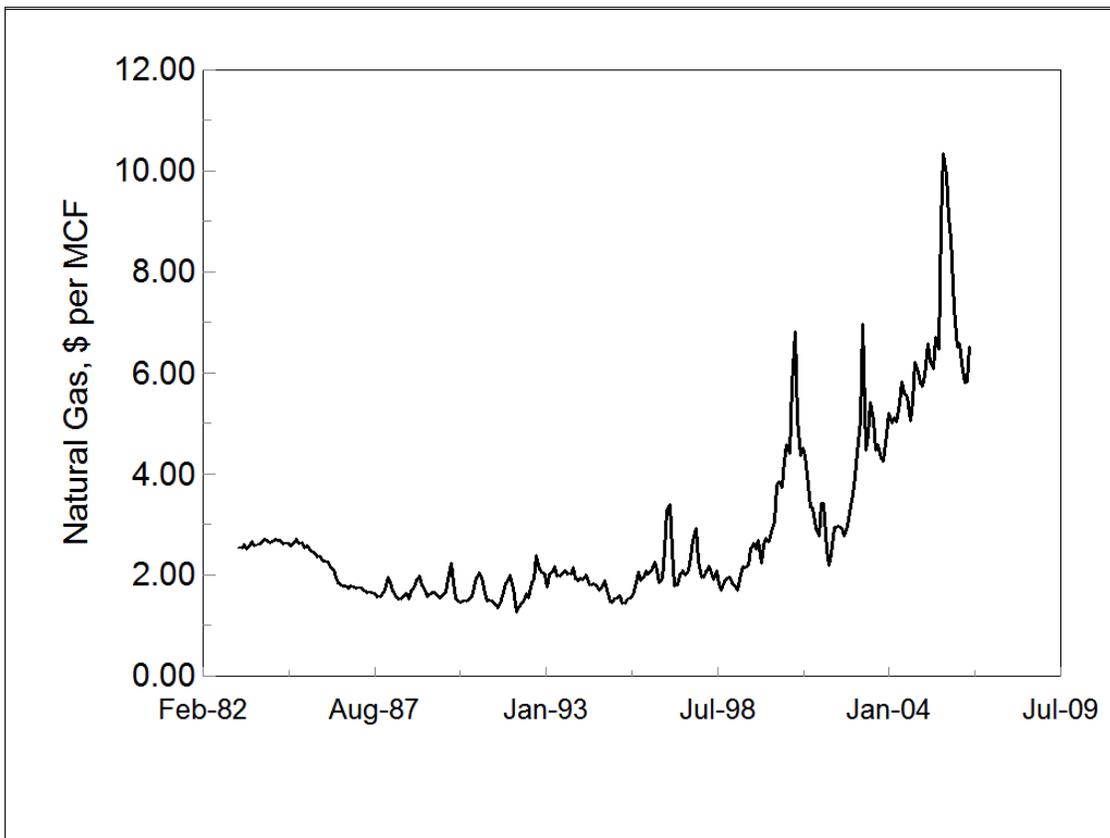


Figure 2 Average U.S. Wellhead Price of Natural Gas
Source: Energy Information Administration

¹West Texas Intermediate (WTI) refers to a crude stream produced in Texas and Oklahoma that is the most common reference or “marker” for pricing crude oil and, along with several other domestic and foreign crude streams, is acceptable for settling New York Mercantile Exchange contracts for light, sweet crude oil.

While increased demand in the Pacific Rim has driven petroleum prices, demand has also increased in the U.S. In addition, domestic crude oil production has declined from a high value of 3.5 billion barrels in 1970 to 1.9 billion barrels in 2006. Even with additional drilling in response to higher prices, domestic production is dropping due to geologic constraints. The Rocky Mountain states are the only area in the country currently experiencing significant increases in production of crude oil and natural gas. Of the five Petroleum Administration for Defense Districts (PADD) (Figure 3) used for analyzing petroleum data, crude oil and natural gas production are increasing only in PADD I (the East Coast) and in PADD IV (the Rocky Mountains).



Figure 3 Petroleum Administration for Defense Districts (PADD)
 Source: Energy Information Administration

Although crude oil production increased 11.3 percent and natural gas 15.3 percent on the East Coast from 2002 to 2005, the region is responsible for less than one-half of one percent of domestic crude oil production and three percent of natural gas production. Over the same period, the amount of crude oil produced in the Rocky Mountains increased by 20.4 percent while production on the Gulf Coast (PADD III), the largest producing area in the country, dropped by 12.8 percent. The center for production of natural gas in the United States is also shifting from the Gulf Coast to the Rocky Mountains. In 1982, PADD III was responsible for 75.5 percent of U.S. natural gas production and PADD IV supplied only 4.2 percent. By 2005, the

amount of natural gas produced in PADD III had dropped to 62.5 percent of total production while the amount from PADD IV had increased to 17.0 percent. Additionally, natural gas production in the Rocky Mountains is increasing approximately five percent annually. The increase in crude oil and natural gas production in the Rocky Mountain states is creating an economic boom in the producing areas.

Table 1 U.S. Crude Oil and Natural Gas Production by PADD, 2002-2005

	PADD I	PADD II	PADD III	PADD IV	PADD V	United States Total
Crude Oil, thousand barrels						
2002	7,458	164,635	1,174,305	102,982	947,745	2,097,124
2003	7,170	161,360	1,162,869	105,931	636,123	2,073,453
2004	6,941	159,309	1,103,743	113,069	600,239	1,983,302
2005	8,299	161,587	1,023,499	123,956	572,765	1,890,106
Percent Change, 2002-2005	11.3	(1.9)	(12.8)	20.4	(39.6)	(9.9)
Dry Natural Gas, MMCF						
2002	453,774	2,432,537	12,622,766	2,641,749	776,962	18,927,788
2003	521,824	2,336,271	12,662,381	2,797,202	780,866	19,098,544
2004	520,240	2,428,676	11,960,955	2,935,503	745,517	18,590,891
2005	522,997	2,413,736	11,298,362	3,075,234	763,907	18,074,237
Percent Change, 2002-2005	15.3	(0.8)	(10.5)	16.4	(1.7)	(4.5)
Source: Energy Information Administration						

Despite the common perception of being vertically integrated, the oil and gas industry is highly fragmented, especially at the exploration and production stage. Many companies concentrate exclusively on oil and gas production and have no interest in downstream operations such as pipelines, refineries and product distribution. Additionally, much of the work conducted in the producing fields is contracted to other companies that specialize in different aspects of drilling and maintaining the wells. Few of the operating companies operate their own drill rigs but instead contract with companies that specialize in drilling. Other companies specialize in different operations such as grading well locations, well surveying, running and pulling well casings, cementing wells, and perforating well casings. The operating, drilling and service companies collectively constitute the oil and gas exploration and production industry.

Many other industries benefit from spending by the oil and gas industry. These include consulting geologists and engineering companies, environmental consultants, vendors of oil field equipment, and pipeline and trucking companies. Spending by oil industry employees also benefits the local economy. These economic benefits beyond direct employment in the exploration and production

industry are known as indirect and induced benefits, and are the source of the “multiplier” effect. This study examines the structure of the Utah oil and gas exploration and production industry and the total economic impact on the producing areas.

3 Utah’s Oil and Gas Industry

The Utah oil and gas industry started in 1891, when a water well being drilled in Farmington Bay near the Great Salt Lake encountered natural gas at a depth of 1,000 feet. Gas from several wells in this area was transported to Salt Lake City through wooden pipelines for several years until shifting sand in the lakebed plugged the wells. The first oil was found in the early 1900s near Rozel Point at the north end of the Great Salt Lake, near Mexican Hat in southeastern Utah, and near the town of Virgin in southwestern Utah. The first large-scale commercial oil well was drilled near Vernal in 1948. Since the early 1960s, Utah has consistently ranked in the top 15 oil-producing states and in recent years has experienced a dramatic rise in natural gas production. During 2005, Utah ranked 15th in crude oil production out of 31 states and two Federal Offshore Areas and 11th in dry natural gas production out of 33 states and the Federal Offshore Area in the Gulf of Mexico.

Utah is contributing to the recent growth in crude oil and natural gas production taking place in the Rocky Mountain states (PADD IV). The state’s 2006 crude oil production of 17.9 million barrels was a 37 percent increase over the recent low of 13.1 million barrels produced in 2003 (Figure 4). Although a substantial increase from the recent past, 2006’s output was still only 44 percent of the all-time high of 41.1 million barrels produced in 1985.

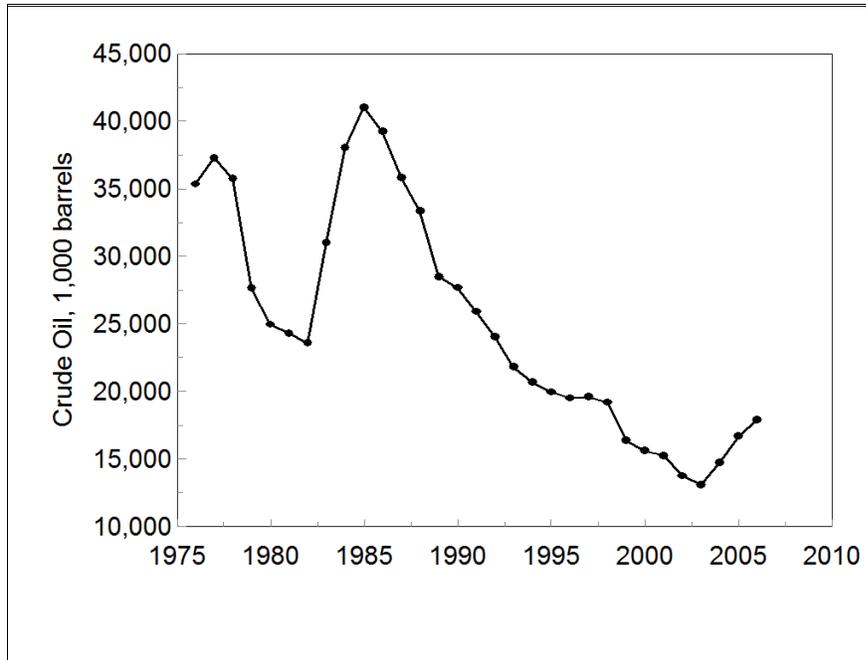


Figure 4 Utah Crude Oil Production
 Source: Utah Division of Oil, Gas and Mining

There has been an even greater rise in natural gas production in Utah. In 2006, Utah's marketed natural gas production hit an all-time high of 343 BCF, up 502 percent from 57 BCF in 1976 (Figure 5).

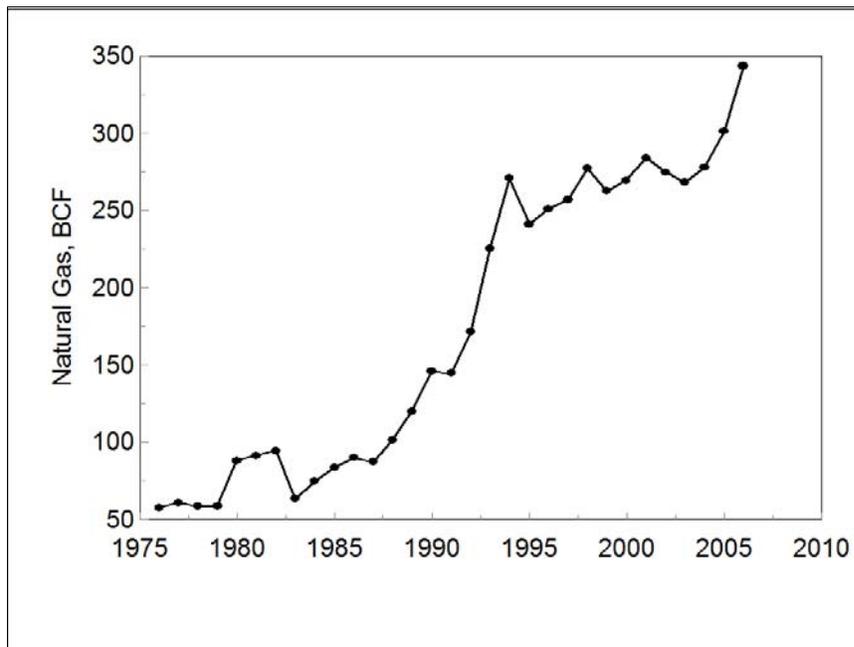


Figure 5 Utah Marketed Natural Gas Production
 Source: Utah Geological Survey

Not all gross withdrawals of natural gas are marketed to consumers. Low prices of natural gas during the late 1980s and early 1990s resulted in much of the gas produced in Utah at the time not being marketable. A large portion of the gas withdrawn from wells in Utah during this period was reinjected into the geologic formations to maintain pressure and oil production. The amount of gas used for repressuring in Utah reached a high in 1983, when 65 percent of gross withdrawals were reinjected to maintain pressure. Currently, approximately 95 percent of natural gas withdrawals in Utah are marketed. Most of the gas that is not marketed is used for fuel at the production site or is accounted for by nonhydrocarbon gases that are removed from the production stream prior to marketing.

Average production per well of both crude oil and natural gas has been declining in Utah, so additional drilling will have to continue to maintain production at current levels. Although natural gas production has been steadily rising and crude oil production in Utah has rebounded in recent years, production per individual well has been declining. Natural gas production per gas well peaked at 740 MMCF in 1962. Production per well steadily declined to 67 MMCF in 2000 before rising to 84 MMCF in 2006. Similarly, crude oil production per oil well peaked at 57,330 barrels in 1959, then dropped to 6,727 barrels in 2003. Crude oil production per well in Utah averaged 7,308 barrels during 2006.

During 2006, 129 different operating companies reported crude oil and natural gas production to the Utah Division of Oil, Gas and Mining. Production occurred in 11 of Utah's 29 counties. Duchesne County had the highest oil production with 6,401,299 barrels while Uintah County led natural gas production with gross withdrawals of 204 BCF.

Six different areas in Utah currently have significant production of oil and/or natural gas. These areas are defined by geology. Additionally, these areas are somewhat isolated from one another economically, especially in terms of the oil and gas exploration and production (E&P) industry. The major oil and gas producing area in Utah is the Uinta Basin in the northeastern part of the state. Vernal is a center of the oil and gas industry in the Uinta Basin with many of the producing, drilling and service companies maintaining offices in the area. Other producing areas in Utah include coalbed methane plays in Carbon and Emery Counties, the Paradox Basin in San Juan County, the Uncompahgre Uplift in Grand County, the Thrust Belt in Summit County and the recently discovered Hingeline in the central part of the state.

The Paradox Basin, Uncompahgre Uplift, and Thrust Belt all extend over state lines to adjacent states. Many of the workers involved in operating wells in these areas are actually employed in other states. Coalbed methane operations in Carbon and

Emery Counties and the Hingeline are fairly recent discoveries and an oil service industry has not developed in these areas.

Defining the oil and gas E&P industry is a key element for a study of this type. Economists use the North American Industry Classification System (NAICS) developed by the Office of Management and Budget to classify industries for reporting employment and earnings. The NAICS codes are divided into 20 major industrial sectors. These major sectors are then further subdivided as necessary.

The NAICS codes have three industrial classifications that directly apply to the oil and gas E&P industry. These are NAICS 211 – Oil and Gas Extraction, NAICS 213111 – Drilling Oil and Gas Wells, and NAICS 213112 – Support Activities for Oil and Gas Operations. For purposes of this study, these three industries are collectively considered the oil and gas E&P industry. Additional information on the NAICS codes for these three industries is available in Section 6.

The following section summarizes oil and gas production in Carbon and Emery Counties. Also included are economic data for Carbon and Emery Counties to place the oil and gas E&P industry in context.

3.1 Coalbed Methane Area

For purposes of this study, the Coalbed Methane Area is defined as Carbon and Emery Counties, Utah. Coalbed methane production is reported as natural gas production in Utah and when referring to production in the Coalbed Methane Area, the terms methane and natural gas are used synonymously in this report. Although there is potential for coalbed methane production from other coal deposits in Utah, and exploration has been conducted in other areas of the state, production has failed to materialize outside of Carbon and Emery.

The Coalbed Methane Area in central Utah has emerged as a significant coalbed methane producer over the past 15 years. Initial discoveries in the area were the Clear Creek Field in 1951 and the Ferron Field in 1957. Production noticeably increased in the early 1990s with discovery of the Drunkards Wash Field southwest of Price. Texaco Exploration and Production drilled two wells in 1988 and in 1991 River Gas Corporation took a 92,000-acre farmout from Texaco and commenced exploration. Between 1994 and 1997, exploratory drilling by Texaco established the Buzzard Bench Field between Huntington and Ferron. Meanwhile, Anadarko Petroleum Corp. established the Helper Field north of Price. Through a series of corporate buy-outs and mergers, ConocoPhillips has emerged as the major operator in the Drunkards Wash Field and is responsible for almost half of total production in the Coalbed Methane Area.

Carbon and Emery Counties contain just under 3.8 million acres (Table 2), with the federal government controlling nearly 72 percent of the land. The Bureau of Land Management is the major federal land-managing agency with responsibility for 2.5 million acres or 65 percent of the total. The U.S. Forest Service manages 6.3 percent of the land in the two counties. There is a small amount of National Park Service land where Capitol Reef National Park extends into the southwest corner of Emery County. With such a large portion of the land controlled by the federal government, the oil and gas E&P industry is highly sensitive to federal land management policy.

The majority of state land in the Coalbed Methane Area is controlled by the Utah School and Institutional Trust Lands Administration (SITLA). SITLA administers 11.6 percent of the land in the two counties with the Utah Division of Wildlife Resources and the Utah Division of State Parks and Recreation controlling lesser amounts of land. There is a minor amount of Indian land along the Green River at the eastern edge of the two counties. Only 16.2 percent of the land in the two counties is privately held.

Table 2 Land Ownership in the Coalbed Methane Area

	Carbon County, acres	Emery County, acres	Coalbed Methane Area Total, acres	Percent of Total
Bureau of Land Management	419,835	2,062,072	2,481,907	65.3
US Forest Service	30,237	210,652	240,889	6.3
National Park Service	0	2,085	2,085	0.1
Total Federal	450,162	2,274,808	2,724,970	71.7
State Parks	0	394	394	0.0
State Wildlife Lands	13,857	2,837	16,694	0.4
State Trust Lands	110,029	331,854	441,883	11.6
Total State Lands	123,887	335,085	458,972	12.1
Indian Lands	73	37	110	0.0
Private	373,511	240,425	613,936	16.2
Total	947,632	2,850,356	3,797,988	100.0

Source: Utah Governor's Office of Planning and Budget

Production of both natural gas and crude oil in the Coalbed Methane Area has increased dramatically over the past 10 years, although there has been a decrease in natural gas production in recent years. Although 2006 crude oil production in the two counties was nearly 10 times that of 1997, the area remains a minor producer of crude oil in Utah (Table 3). The 2006 production of 31,942 barrels of crude oil was 0.2 percent of statewide production.

Table 3 Coalbed Methane Area Crude Oil Production, 1997-2006

	Crude Oil, barrels			
	Carbon County	Emery County	Coalbed Methane Area Total	State Total
1997	0	3,354	3,354	19,592,548
1998	0	3,662	3,662	19,223,542
1999	527	1,649	2,176	16,376,521
2000	211	3,279	3,490	15,609,030
2001	128	4,552	4,680	15,273,926
2002	46	2,493	2,539	13,770,860
2003	1,885	6,191	8,076	13,098,424
2004	4,661	4,657	9,318	14,799,208
2005	9,468	3,196	12,664	16,675,302
2006	27,906	4,036	31,942	17,926,580
Percent of State Total, 2006	0.2	0.0	0.2	100.00

Source: Utah Division of Oil, Gas and Mining

In contrast to crude oil, the area is a significant producer of natural gas in Utah. Over the past 10 years, natural gas production in the area increased from 23.7 BCF in 1997 to 104.6 BCF in 2002 before declining to 98.5 BCF in 2006 (Table 4). Even with the decline from 2002, production in 2006 was over four times the level in 1997. During 2006, the two counties were responsible for 27.7 percent of natural gas production in Utah. Although Carbon County produces the bulk of the natural gas from the two counties, production in Emery County has been growing faster. From 1997 to 2006, natural gas production in Emery County increased by over 1,600 percent, while production in Carbon County increased by only 262 percent.

Table 4 Coalbed Methane Area Natural Gas Production (Gross Withdrawals), 1997-2006

	Natural Gas, MCF			
	Carbon County	Emery County	Coalbed Methane Area Total	State Total
1997	22,760,216	926,911	23,687,127	272,553,774
1998	31,903,361	1,345,422	33,248,783	297,503,246
1999	50,175,216	2,317,596	52,492,812	277,494,312
2000	72,586,085	4,042,810	76,628,895	281,170,016
2001	86,532,946	7,718,744	94,251,690	300,975,578
2002	90,700,883	13,901,494	104,602,377	293,030,004
2003	85,179,739	17,213,152	102,392,891	287,141,238
2004	79,238,531	17,443,464	96,681,995	293,735,994
2005	74,822,590	16,606,967	91,429,557	313,465,305
2006	82,337,741	16,199,707	98,537,448	356,361,028
Percent of State Total, 2006	23.1	4.5	27.7	100.0

Source: Utah Division of Oil, Gas and Mining

Drilling activity in the two counties reflects the rise in natural gas production that occurred in the late 1990s (Table 5). Drilling peaked with 148 wells spudded in 2001. At the time, the two counties accounted for 23.6 percent of all wells spudded in the state. Drilling declined to only 36 wells spudded in 2004, but rising gas prices stimulated additional drilling activity and the number of wells spudded hit 78 in 2006.

Table 5 Wells Spudded in the Coalbed Methane Area, 1997-2006

	Wells Spudded			
	Carbon County	Emery County	Coalbed Methane Area Total	State Total
1997	41	23	64	430
1998	74	3	77	430
1999	110	16	126	283
2000	122	55	144	540
2001	104	44	148	627
2002	51	53	104	391
2003	34	14	45	480
2004	32	4	36	659
2005	59	27	86	889
2006	57	21	78	1,057
Percent of State Total, 2006	5.4	2.0	7.4	100.00

Source: Utah Division of Oil, Gas and Mining

3.1.1 Coalbed Methane Area Economy

While production of both crude oil and natural gas is increasing in the Coalbed Methane Area, this increase must be placed in the context of the complete economy for the two counties.

The Coalbed Methane Area had an estimated 2006 population of 29,942, down 1.5 percent from 2002 (Table 6). Major cities include Price, with an estimated 2006 population of 8,010, Huntington (2,061), Helper (1,886), Castle Dale (1,617), Wellington (1,570) and Ferron (1,569). The 2000 Decennial Census determined that 40.5 percent of the population lives in the urban area of Price. The remainder of the two counties are not densely enough populated to be considered urban.² Although it contained over 40 percent of the population of the two counties, Price accounts for only 0.15 percent of the area in the two counties.

Table 6 Coalbed Methane Area Population, 2002-2006

	Population			
	Carbon County	Emery County	Coalbed Methane Area Total	State Total
2002	19,858	10,540	30,398	2,358,330
2003	19,558	10,477	30,035	2,413,618
2004	19,385	10,493	29,878	2,469,230
2005	19,338	10,491	29,829	2,547,389
2006	19,504	10,438	29,942	2,615,129
Source: Utah Population Estimates Committee				

The Coalbed Methane Area is benefitting economically from the boom in energy prices, with the unemployment rate dropping from 8.3 percent in January 2004 to 3.8 percent in September 2007 (Figure 6). Since energy prices have been increasing, employment in the Coalbed Methane Area has steadily risen, from 13,000 persons in January 2003 to 15,299 persons in September 2007. Although the unemployment rate in the area has been dropping, it has consistently been above the state average since the beginning of 1997.

²The Bureau of the Census defines urban areas as census blocks that have a population density of at least 1,000 persons per square mile and surrounding census blocks with a population density of 500 persons per square mile. Adjacent census blocks with a lower population density are also included if they meet criteria established by the Bureau of the Census.

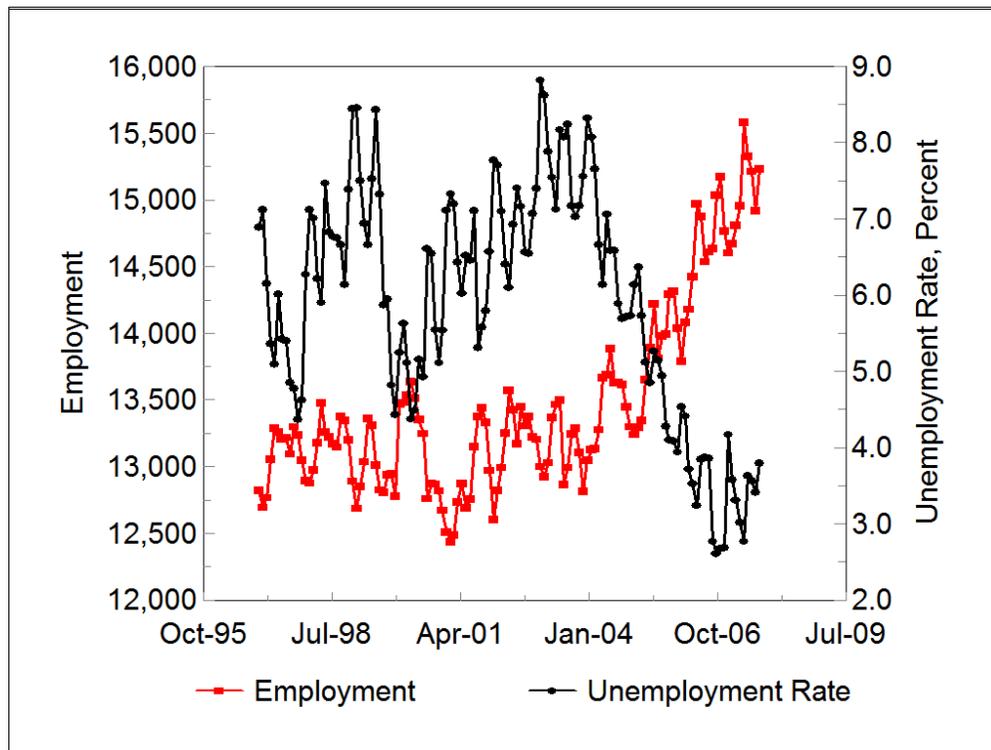


Figure 6 Employment and the Unemployment Rate in the Coalbed Methane Area
 Source: BLS, Local Area Unemployment Statistics

The industrial structure of the Coalbed Methane Area has significant differences from that of the state of Utah (Table 7). Mining constitutes a significant portion of the economy with both coal mining and oil and gas production figuring prominently. The majority of the mining employment in the two counties is due to coal mining, not oil and gas production. Although coal mining employment is not disclosable by federal data agencies because of the small number of firms, the Utah Geological Survey determined that coal mining employment was 1,657 jobs in the two counties during 2006.

Utilities are also a major portion of the area's economy due to the presence of three coal-fired power plants with a total summer generating capacity of 2,387 MW. The Hunter Plant (1,320 MW) is located south of Castle Dale and the Huntington Plant (895 MW) is sited at the mouth of Huntington Canyon near Huntington; both are located in Emery County. The Carbon Plant (172 MW) is in Price Canyon north of Price in Carbon County. Although Utility industry employment is not disclosable for Emery County due to the concentration of employment in one company, the presence of the three power plants results in the electric utility industry being an important component of the area's economy.

Several other major industries have employment data that are not disclosable for Carbon or Emery Counties. This is done to protect individual company data. In Carbon County, besides Mining, employment data are nondisclosable for Agriculture, Forestry, Fishing and Hunting; Educational Services; and Health Care. Emery County has a smaller economy than Carbon County and has eight industries with nondisclosable data. These are the same industries that were nondisclosable in Carbon plus Utilities, Wholesale Trade, Management of Companies and Enterprises, and Administrative and Support. Since employment numbers are not reported for these industries, location quotients³ can not be calculated.

Industries for which employment was reported and which have low location quotients in the Coalbed Methane Area include Manufacturing; Real Estate; Professional, Scientific and Technical Services; and Arts, Entertainment and Recreation. Manufacturing has a location quotient of 0.32, indicating that the area is only 32 percent as dependent on Manufacturing for employment as is the state of Utah.

³Location Quotients are the ratio of an industry's share of employment in a study area, in this case Carbon and Emery Counties, to its share in a reference area, e.g., the state of Utah.

Table 7 Employment by Industry in the Coalbed Methane Area, 2006

	Carbon County	Emery County	Coalbed Methane Area	Distribution, Percent	Location Quotient
Private Employment					
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	ND	ND	ND	NA	NA
Mining (NAICS 21)	ND	ND	ND	NA	NA
Utilities (NAICS 22)	138	ND	ND	NA	NA
Construction (NAICS 23)	393	338	731	5.6	0.69
Manufacturing (NAICS 31-32)	418	17	435	3.4	0.32
Wholesale Trade (NAICS 42)	450	ND	ND	NA	NA
Retail Trade (NAICS 44-45)	1,286	433	1,719	13.3	1.10
Transportation and Warehousing (NAICS 48-49)	300	135	435	3.4	0.92
Information (NAICS 51)	127	132	259	2.0	0.75
Finance and Insurance (NAICS 52)	192	52	244	1.9	0.41
Real Estate (NAICS 53)	59	6	65	0.5	0.33
Professional, Scientific and Technical Services (NAICS 54)	220	59	279	2.2	0.41
Management of Companies and Enterprises (NAICS 55)	58	ND	ND	NA	NA
Administrative and Support (NAICS 56)	371	ND	ND	NA	NA
Educational Services (NAICS 61)	ND	ND	ND	NA	NA
Health Care (NAICS 62)	ND	ND	ND	NA	NA
Arts, Entertainment and Recreation (NAICS 71)	71	0	71	0.5	0.37
Accommodation and Food Services (NAICS 72)	742	169	911	7.0	0.90
Other Services (NAICS 81)	342	143	485	3.7	1.50
Government Employment	1,978	823	2,801	21.6	1.32
Total Employment	9,067	3,887	12,954	100.0	1.00
ND: Not disclosed to protect individual company information. NA: Not Applicable. Source: BLS, Quarterly Census of Employment and Wages					

Both the concentration of the coalbed methane industry and its recent development in Carbon and Emery Counties are reflected in the employment data released by the Bureau of Labor Statistics (Table 8). If an industry is dominated by one company in an area, data are not released to prevent disclosure of individual company data. Much of the employment data specific to the oil and gas industry is not disclosable in Carbon and Emery Counties. Two characteristics of the industry in the two counties contribute to this. First, few operating companies maintain offices in the area. Only three operating companies (NAICS 211) reported employment in the area during 2006. The three companies were all located in Carbon County. The Drunkards Wash Field in Carbon County, currently operated by ConocoPhillips, is sufficiently large compared to other fields in the area that employment is concentrated in one company. Second, since the coalbed methane industry is a relatively recent development in the area, with major production occurring over the past 15 years, a sizable oil and gas service industry has not developed in the two counties, resulting in employment for drilling and service companies not being disclosable.

Table 8 Oil and Gas E&P Employment in the Coalbed Methane Area, 2001-2006

	NAICS 211 Oil and Gas Extraction	NAICS 213111 Drilling Oil and Gas Wells	NAICS 213112 Support Activities for Oil and Gas Operations
Carbon County			
2001	ND	0	19
2002	ND	0	ND
2003	ND	ND	44
2004	ND	ND	32
2005	ND	ND	ND
2006	ND	ND	ND
Emery County			
2001	0	0	ND
2002	0	0	ND
2003	0	0	ND
2004	ND	0	ND
2005	0	0	ND
2006	0	0	ND
ND: Not disclosed to protect individual company data. Source: BLS, Quarterly Census of Employment and Wages			

In the absence of data from the government statistical agencies, operating companies with offices in the area were contacted to obtain employment information. Currently, three operating companies maintain offices in the two

counties and directly employ 72 persons. Data obtained from these companies indicate that the average annual wage paid by companies in the Oil and Gas Extraction industry (NAICS 211) in the area is approximately \$52,000 annually. Data from the Bureau of Labor Statistics indicates that the average annual wage in Carbon County for the Support Activities for Mining industry (NAICS 213) was \$43,100 during 2006. Both the well drilling companies (NAICS 213111) and service companies (NAICS 213112) are subsets of the Support Activities for Mining industry and should pay similar wages.

Of the major industries in the two counties, only coal mining, Construction and Utilities pay a higher average wage (Table 9). The average wage for coal mining for the two counties is not disclosed by the government statistical agencies, but the statewide average annual wage for coal mining was \$62,666 in 2006. Since 82 percent of the coal mining employment in Utah is located in Carbon and Emery Counties, the wage in these counties should be close to the statewide average. The average annual wage for Utilities in Carbon County was \$81,156 in 2006. Since the majority of employment in the Utilities industry in both counties are power plant operators, the average annual wage for the industry in Emery County should be similar. The average wage for Construction was \$56,139 in Carbon County and \$38,988 in Emery County during 2006.

Table 9 Average Annual Wage by Industry in the Coalbed Methane Area, 2006

	Carbon County	Emery County
Private Employment		
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	ND	ND
Mining (NAICS 21)	ND	ND
Utilities (NAICS 22)	\$81,156	ND
Construction (NAICS 23)	56,139	\$38,988
Manufacturing (NAICS 31-32)	44,177	31,440
Wholesale Trade (NAICS 42)	44,491	ND
Retail Trade (NAICS 44-45)	19,084	13,226
Transportation and Warehousing (NAICS 48-49)	35,915	33,142
Information (NAICS 51)	20,694	30,837
Finance and Insurance (NAICS 52)	28,541	21,634
Real Estate (NAICS 53)	17,345	3,521
Professional, Scientific and Technical Services (NAICS 54)	16,938	29,393
Management of Companies and Enterprises (NAICS 55)	45,990	ND
Administrative and Support (NAICS 56)	20,550	ND
Educational Services (NAICS 61)	ND	ND
Health Care (NAICS 62)	ND	ND
Arts, Entertainment and Recreation (NAICS 71)	11,612	0
Accommodation and Food Services (NAICS 72)	9,066	10,551
Other Services (NAICS 81)	22,390	36,379
Government Employment	30,401	26,789
All Employment	32,603	39,864
ND: Not disclosed to protect individual company information.		
Source: BLS, Quarterly Census of Employment and Wages		

4 Economic Impacts

While rising energy prices are translating into rising employment and wages in the producing areas, not all of the economic gains are occurring in the oil and gas industry. The total increase in local economic conditions due to oil and gas activity is greater than the direct gain in the industry. This is the “multiplier effect” often referred to in economics and is a result of local spending by the industry for goods and services and spending of wages by the industry’s employees. These additional economic benefits are known as the indirect and induced benefits.

In this study, economic impact is defined as the effect on employment and wages in the subject areas. Additional information on economic impact is available in Section 6 and in several listed references.

4.1 Coalbed Methane Area

The Coalbed Methane Area of Carbon and Emery Counties is an increasingly important component of the oil and gas E&P industry in Utah. In turn the industry is becoming more important to the local economy as additional wells are drilled,

resulting in rising employment and wages. Since the industry is a relatively recent development in the area, many of the service companies have not established a permanent presence there but work out of offices in the Uinta Basin. Employment in the two counties in the oil and gas E&P industry is estimated at 137 persons, or 1.1 percent of total employment during 2006 (Table 10). Due to the industry paying higher than average wages, total wages in the area are estimated at \$6.5 million, or 1.5 percent of total wages for 2006.

Table 10 Direct Employment and Wages in the E&P Industry in the Coalbed Methane Area, 2006

	Coalbed Methane Area Total	
	Employment	Wages, \$1,000
Total	12,954	450,623
E&P Industry, Direct	137	6,546
E&P Industry, percent of total	1.1	1.5
Source: BLS, Quarterly Census of Employment and Wages; Utah Department of Workforce Services FirmFind; interviews with companies; author's estimates.		

In addition to the direct employment, additional jobs and wages due to spending by the industry and employees results in significant economic benefits to the Coalbed Methane Area. Other employment due to spending by the E&P industry is not limited to the mining industry but is distributed throughout different industries. Total employment in the Coalbed Methane Area due to the E&P industry, including direct, indirect, and induced, was estimated at 4.0 percent of total jobs in the area in 2006 (Table 11). When examining employment by industry, the oil and gas industry is shown to have significant effects on several other industries.

The E&P industry is responsible for 14.1 percent of total employment in the Construction industry in Carbon and Emery Counties. Additionally, 7.1 percent of the Real Estate employment in the area is due to oil and gas operations. There are an estimated 10 additional mining jobs in the area due to the oil and gas operations; these jobs are in addition to the estimated 137 jobs directly in the E&P industry. When considering both the direct jobs and the additional indirect and induced jobs in the mining industry, the oil and gas E&P industry is responsible for 8.1 percent of total mining jobs in the two counties, based on Utah Geological Survey estimates of coal mining employment in the area. The coal mining industry, which is much more labor intensive, is responsible for the bulk of the remaining mining jobs.

Although there are government employees located in the Coalbed Methane Area to regulate the oil and gas industry, these are not considered part of the Mining industry. The state Division of Oil, Gas and Mining has an office in Price and there are also local BLM employees dedicated to regulating the industry. For purposes of employment classification, these employees are considered to be employed in

NAICS 92 – Public Administration, which is included in the government employment in Table 11.

Table 11 Employment Due to Oil and Gas E&P in the Coalbed Methane Area, 2006

	Coalbed Methane Area Total Employment	Total Employment Due to Oil and Gas E&P	Oil and Gas E&P Employment, percent of total
Private Employment			
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	ND	1	NA
Mining (NAICS 21)	1,804	147	8.1
Utilities (NAICS 22)	ND	44	NA
Construction (NAICS 23)	731	103	14.1
Manufacturing (NAICS 31-32)	435	5	1.2
Wholesale Trade (NAICS 42)	ND	10	2.1
Retail Trade (NAICS 44-45)	1,719	68	4.0
Transportation and Warehousing (NAICS 48-49)	435	16	3.7
Information (NAICS 51)	259	4	1.4
Finance and Insurance (NAICS 52)	244	6	2.3
Real Estate (NAICS 53)	65	5	7.1
Professional, Scientific and Technical Services (NAICS 54)	279	4	1.5
Management of Companies and Enterprises (NAICS 55)	ND	1	NA
Administrative and Support (NAICS 56)	ND	10	NA
Educational Services (NAICS 61)	ND	11	NA
Health Care (NAICS 62)	ND	25	NA
Arts, Entertainment and Recreation (NAICS 71)	71	3	3.6
Accommodation and Food Services (NAICS 72)	911	34	3.7
Other Services (NAICS 81)	485	27	5.5
Households	NA	2	NA
Government Employment	2,801	NA	NA
All Employment	12,954	524	4.0
ND: Nondisclosable. Data are included in the totals. NA: Not applicable.			
Source: BLS, Quarterly Census of Employment and Wages; author's calculations.			

Oil and gas E&P accounts for just under five percent of all wages paid in the Coalbed Methane Area (Table 12). The industry is responsible for a higher percentage of wages than employment due to oil and gas E&P paying above average wages. The oil and gas industry is responsible for 6.6 percent of an estimated \$111 million in wages in the Mining industry in the two counties. Both the Construction and Real Estate industries have more than 10 percent of their total wage due to spending by the oil and gas industry.

Table 12 Wages Due to Oil and Gas E&P in the Coalbed Methane Area, 2006

	Coalbed Methane Area Total Wages, \$1,000	Total Wages Due to Oil and Gas E&P, \$1,000	Oil and Gas E&P Wages, percent of total
Private Employment			
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	ND	9	NA
Mining (NAICS 21)	111,000	7,359	6.6
Utilities (NAICS 22)	ND	3,891	NA
Construction (NAICS 23)	35,249	4,241	12.0
Manufacturing (NAICS 31-32)	18,992	260	1.4
Wholesale Trade (NAICS 42)	ND	458	2.3
Retail Trade (NAICS 44-45)	30,198	1,542	5.1
Transportation and Warehousing (NAICS 48-49)	15,243	945	6.2
Information (NAICS 51)	6,713	191	2.8
Finance and Insurance (NAICS 52)	6,599	218	3.3
Real Estate (NAICS 53)	1,044	117	11.2
Professional, Scientific and Technical Services (NAICS 54)	5,450	207	3.8
Management of Companies and Enterprises (NAICS 55)	ND	56	NA
Administrative and Support (NAICS 56)	ND	214	NA
Educational Services (NAICS 61)	ND	233	NA
Health Care (NAICS 62)	ND	924	NA
Arts, Entertainment and Recreation (NAICS 71)	825	44	5.4
Accommodation and Food Services (NAICS 72)	9,660	530	5.5
Other Services (NAICS 81)	12,846	678	5.3
Households	NA	36	NA
Government Employment	82,266	NA	NA
All Employment	450,623	22,151	4.9
ND: Not disclosed. NA: Not applicable.			
Source: BLS, Quarterly Census of Employment and Wages; author's calculations.			

5 Fiscal Impacts

The oil and gas industry also has fiscal impacts on the local areas. Fiscal impacts refer to impacts on government finances and tax collections. The oil and gas industry is subject to the tax laws common to all businesses. There are also impacts unique to the industry. Production on federal land is subject to a royalty payment under the Mineral Lands Leasing Act of 1920. This royalty is paid to the Minerals Management Service, an agency within the U.S. Department of Interior. A portion of the federal mineral royalties is returned to the state of origin, generally one-half. Royalties from production on Indian lands are returned to the appropriate tribe, not to the state government. Since a large portion of the crude oil production in Utah occurs on Indian lands, especially in Duchesne and San Juan Counties, the amount of crude oil royalty returned to the state government is significantly less than one-half of the amount paid to the Minerals Management Service. The states have full discretion as to the distribution of federal mineral royalties as long as priority is given to areas with economic and/or social impacts from leasing activities. The

Minerals Management Service does not release federal mineral royalty data at the county level, but statewide data are available.

Federal mineral royalties due to oil and gas production in Utah have increased dramatically from \$91 million in 2001 to nearly \$300 million in 2006, a 228 percent rise (Table 13). Oil and gas production accounted for 91.3 percent of the royalties paid for mineral production on federal land in Utah during 2006. There was also an additional \$103 million paid in bonuses and rents on federal mineral leases. These are fees associated with awarding federal mineral leases and maintaining the leases until production is initiated. Table 13 includes royalties due to oil and gas production, but does not include bonus or rent payments for federal oil and gas leases. Of the nearly \$300 million paid in federal mineral royalties by the oil and gas industry in Utah, \$109 million was returned to the state government.

Table 13 Federal Mineral Royalty Payments and Disbursements for Utah, 2001-2006

	Oil		Natural Gas		Total	
	Royalties	Disbursements	Royalties	Disbursements	Royalties	Disbursements
2001	\$32,799,794	\$4,392,667	\$58,553,527	\$26,210,621	\$91,353,321	\$30,603,288
2002	26,028,911	3,493,794	37,653,050	11,921,373	63,681,961	15,415,167
2003	37,462,357	5,575,810	55,369,036	26,040,706	92,831,293	31,616,515
2004	45,743,590	7,235,629	87,075,857	38,228,494	132,819,447	45,464,122
2005	66,900,212	10,405,687	118,132,687	53,647,636	185,032,900	64,053,323
2006	106,457,298	21,866,066	193,416,183	87,551,457	299,873,481	109,417,522

Note: Years are federal fiscal years. Natural gas includes natural gas liquids from gas processing plants.
Source: Minerals Management Service

In Utah, federal mineral royalties are distributed to several different accounts according to state law (Table 14). The largest recipients of federal mineral royalties in Utah are the Permanent Community Impact Fund and the Department of Transportation. The funds distributed to the Department of Transportation are then distributed to local governments to fund local highways in proportion to the amount of mineral lease money generated by each county. The Permanent Community Impact Fund makes loans and grants to state agencies and subdivisions of state government impacted by mineral resource development. Unlike the funds administered by the Department of Transportation, which are distributed in proportion to royalties generated in the county, the Permanent Community Impact Fund is distributed by a state-appointed board in response to proposals submitted by state agencies and local governments. Therefore, the distribution of funds by the Permanent Community Impact Fund to the various counties may vary from the amount of royalty generated. The payments in lieu of taxes cited in Table 14 are not the payments in lieu of taxes made by the federal government for federal land in Utah but are payments made by the state government to counties for lands

controlled by the School and Institutional Trust Lands Administration, state Division of Parks and Recreation and the state Division of Wildlife Resources.

Table 14 Distribution of Federal Mineral Royalties in Utah

	Percent
Permanent Community Impact Fund	32.50
State Board of Education	2.25
Utah Geological Survey	2.25
Water Research Laboratory	2.25
Department of Transportation	40.00
Department of Community and Culture	5.00
Payments in Lieu of Taxes	52 cents per acre
Permanent Community Impact Fund	Remainder
Note: The amount paid for Payments in Lieu of Taxes has been adjusted annually since 1994 according to the Consumer Price Index. Source: Utah State Code, Title 59, Chapter 21.	

The School and Institutional Trust Lands Administration (SITLA) controls mineral rights on approximately 4.4 million acres in Utah. These lands are held in trust for the public schools in Utah and 11 other beneficiaries. They were established at statehood and through land exchanges with the federal government. During 2006, royalties paid for oil and gas extraction on SITLA lands totaled \$82.7 million. This was 51.0 percent of total SITLA revenue for 2006. These funds are not returned to the county of origin, but are placed in a permanent fund managed by the state treasurer on behalf of the public schools or distributed to the appropriate beneficiary as mandated. Dividends and interest from the Public School Fund are distributed annually to all Utah public schools based on an established formula.

In addition to royalties, there is an Oil and Gas Severance Tax in Utah and an Oil and Gas Conservation Fee that are levied on all production in the state. Revenue from the Oil and Gas Severance Tax is placed in the state general fund and the tax rate varies from 3 to 5 percent of the sales price. The Oil and Gas Conservation Fee funds the state Division of Oil, Gas and Mining. The fee is imposed at a rate of 0.2 percent of the value of production.

Both the Oil and Gas Severance Tax and the Oil and Gas Conservation Fee have significantly increased in recent years (Table 15). The Oil and Gas Severance Tax increased by 82 percent from 2001 to 2006, while the Oil and Gas Conservation Fee increased by 102 percent. The drop from 2001 to 2002 was due to the decline of the the wellhead price of natural gas produced in Utah from \$3.52 per MCF to \$1.99 per MCF. These data reflect statewide oil and gas operations and are not specific to the Coalbed Methane Area.

Table 15 State Tax Collections Related to Oil and Gas Production, 2001-2006

	Oil and Gas Severance Tax	Oil and Gas Conservation Fee
2001	\$39,357,798	\$2,748,318
2002	18,893,082	1,710,219
2003	26,745,279	1,943,755
2004	36,659,808	2,696,250
2005	53,484,320	3,631,963
2006	71,513,869	5,560,449
Note: Years are state fiscal years.		
Source: Utah State Tax Commission		

5.1 Coalbed Methane Area

The largest direct fiscal impacts on the Coalbed Methane Area due to oil and gas operations in the area are property taxes paid by the operating companies and federal mineral royalties distributed to the local governments by the Utah Department of Transportation. The Utah State Tax Commission centrally assesses oil and gas properties using a net present value approach applied to future production. The local county treasurers bill and collect the taxes. Property taxes are levied by numerous units of local government, including county and city governments, school districts, and special service districts.

Property taxes paid on oil and gas properties have become a significant portion of total property taxes in the Coalbed Methane Area (Table 16). During 2006, the oil and gas industry paid nearly 25 percent of total property taxes in the two counties. Over one-third of the property tax paid in Carbon County during 2006 was due to oil and gas production and just over one-tenth of the property tax in Emery County was due to oil and gas. The two large power plants located in Emery County mean that 65 percent of property taxes in Emery county are paid by the utilities industry. Table 16 refers to all property taxes paid to various government entities in the two counties, not just the county governments. As the price of natural gas has increased in recent years, the net present value of future production has increased. This, coupled with rising production, has resulted in the amount of property taxes paid by the oil and gas industry in the Coalbed Methane Area increasing by over 25 times over the past 10 years, not adjusting for inflation. Oil and gas property taxes have been rising faster in Emery County than in Carbon County, reflecting rising natural gas production in the county. Property taxes paid on oil and gas production increased by 4,622 percent in Emery County from 1997 to 2006, and by 2,155 percent in Carbon County. Given the rising production and expected continuation of current energy prices, the property taxes paid by the oil and gas production industry in the two counties should continue to rise into the future.

Table 16 Oil and Gas Property Tax Payments in the Coalbed Methane Area, 1997-2006

	Carbon County		Emery County		Coalbed Methane Area Total	
	Oil & Gas Property Tax	Percent of Total Property Tax	Oil & Gas Property Tax	Percent of Total Property Tax	Oil & Gas Property Tax	Percent of Total Property Tax
1997	\$359,255	3.0	\$44,722	0.2	\$403,977	1.2
1998	653,781	4.9	56,297	0.3	710,078	2.2
1999	1,233,733	10.2	144,661	0.7	1,378,394	4.4
2000	3,316,312	22.2	237,473	1.2	3,553,785	10.4
2001	4,779,864	28.0	547,486	2.8	5,327,350	14.4
2002	4,290,845	26.5	755,816	4.1	5,046,661	14.6
2003	4,567,518	24.5	985,587	5.5	5,553,105	15.1
2004	6,576,519	32.8	1,496,054	8.2	8,072,573	21.1
2005	7,418,552	38.7	1,836,886	10.2	9,255,438	24.9
2006	8,101,170	35.8	2,111,766	10.9	10,212,936	24.3

Source: Utah State Tax Commission, Property Tax Division Annual Reports

In terms of property taxes paid, the oil and gas industry has a greater fiscal impact on Carbon and Emery Counties than does the coal mining industry. In 2006, property taxes charged against coal mines in the two counties totaled \$3,483,001, or 34.1 percent of the amount charged against oil and gas wells.

The funds generated through federal mineral royalties that are returned to the Coalbed Methane Area through the Utah Department of Transportation are also a significant source of revenue for the local governments. These funds actually exceed the amount of property tax paid by the oil and gas industry. During 2006, Carbon and Emery Counties collectively received \$13.7 million dollars in federal mineral royalties returned to them by the Department of Transportation (Table 17). This was a 70 percent increase over the amount returned in 2001.

Table 17 Federal Mineral Royalties Returned by UDOT to the Coalbed Methane Area, 2001-2006

	Carbon County	Emery County	Coalbed Methane Area Total
2001	\$5,140,732	\$2,900,800	\$8,041,532
2002	2,260,889	1,703,743	3,964,632
2003	3,233,674	2,208,352	5,442,026
2004	5,421,384	3,761,439	9,182,823
2005	7,050,220	4,082,628	11,132,848
2006	10,145,446	3,566,833	13,712,279

Note: Years are state fiscal years.
Source: Utah Department of Transportation

Table 17 includes data on all royalties from federal mineral leases in Utah, not just oil and gas operations. There is significant coal production from federal leases in the two counties and a major portion of the federal mineral royalties returned by UDOT may be due to coal production. Almost all federal mineral royalties in the two counties are the result of energy production, whether coal, oil or natural gas. The rise in energy prices in recent years, coupled with the resultant production increases, has had a noticeable fiscal impact on the two counties.

Royalties paid to SITLA due to production of oil and gas in the Coalbed Methane Area dropped slightly from 2005 to 2006 (Table 18).

Table 18 Royalties Paid for Production on SITLA Lands in the Coalbed Methane Area, 2005-2006

	Carbon County	Emery County	Coalbed Methane Total
2005	\$21,077,378	\$5,775,864	\$26,853,242
2006	19,786,589	5,355,106	25,141,695
Note: Years are state fiscal years.			
Source: School and Institutional Trust Lands Administration			

Fiscal effects also arise from the direct, indirect and induced impacts of the oil and gas E&P industry. State personal income taxes as a result of oil and gas E&P activities in the Coalbed Methane Area are estimated at \$681,000 for 2006 (Table 19).

Table 19 Personal State Income Taxes Due to Oil and Gas E&P in the Coalbed Methane Area

	Coalbed Methane Area Total
Total Wages due to Oil and Gas E&P, \$1,000	22,151
Personal State Income Taxes, \$1,000	681
Source: Author's Calculations. Details of the estimation are in Section 6.	

6 Technical Notes and Methodology

Industries are classified by economists according to the North American Industry Classification System (NAICS), which was developed by the Office of Management and Budget in cooperation with other federal agencies and foreign governments (Office of Management and Budget, 2007). The NAICS codes replaced the Standard Industrial Classification (SIC) Codes that had been used since the 1930s. This change was prompted by structural changes in the U.S. economy, with the services sector becoming a much larger portion of the economy and more complex than when the SIC codes were developed. In the switch, the 10 major industrial sectors

under the SIC codes were replaced with 20 major sectors under the NAICS codes. Many of the industrial sectors under the SIC codes were split among two or more of the redefined NAICS sectors, making comparisons difficult. The NAICS codes better explain the structure of the current economy but make time series data difficult to compile.

Under the NAICS system, 20 major industrial categories are further subdivided as needed. There are three classifications directly related to the oil and gas exploration and production industry. These are NAICS 211 – Oil and Gas Extraction, NAICS 213111 – Drilling Oil and Gas Wells, and NAICS 213112 – Support Activities for Oil and Gas Operations. These three classifications cover the operating companies, drilling companies, and service companies, respectively. For this study, we consider them collectively as the oil and gas E&P industry.

Other local businesses and industries benefit from E&P activities. Examples of these are seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and electric utilities. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. These types of effects are referred to as the indirect and induced impacts. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses using input-output economic models.

6.1 NAICS Codes Related to Oil and Gas Production

For this study, we consider the following three NAICS classifications collectively as the oil and gas E&P industry. The definitions listed are those developed by the Office of Management and Budget.

NAICS 211 – Oil and Gas Extraction Industries in the Oil and Gas Extraction subsector operate and/or develop oil and gas field properties. Such activities may include exploration for crude petroleum and natural gas; drilling, completing, and equipping wells; operation of separators, emulsion breakers, desilting equipment and field gathering lines for crude petroleum and natural gas; and all other activities in the preparation of oil and gas up to the point of shipment from the producing property. The subsector includes the production of crude petroleum, the mining and extraction of oil from oil shale and oil sands, and the production of natural gas, sulfur recovery from natural gas, and recovery of hydrocarbon liquids.

Establishments in this subsector include those that operate oil and gas wells on their own account and for others on a contract or fee basis. Establishments primarily engaged in providing support services, on a fee or contract basis, required for the drilling or operation of oil and gas wells (except geophysical surveying and mapping,

mine site preparation, and construction of oil/gas pipelines) are classified in Subsector 213, Support Activities for Mining.

NAICS 213111 – Drilling Oil and Gas Wells This U.S. industry comprises establishments primarily engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, redrilling, and directional drilling.

NAICS 213112 – Support Activities for Oil and Gas Operations This U.S. industry comprises establishments primarily engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related activities). Services included are exploration (except geophysical surveying and mapping); excavating slush pits and cellars; well surveying; running, cutting, and pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells.

6.2 Economic Impact Modeling

Economic impacts on an economy arise from exogenous sources or activities that inject new funds into the economy. Examples include products that are exported and new construction funding. It is important for outside funds to be injected into a regional economy for economic impacts to occur. If an activity is financed by funds from inside a regional economy, known as residentiary spending, then the funds are diverted from one industrial sector to another and there is no net multiplier effect or economic impact. Crude oil and natural gas from the producing areas in Utah are exported to refineries and markets in other portions of the country. Exporting oil and gas results in an inflow of funds, which creates a positive economic impact on the area.

In this study, economic impact is used to mean the impact of oil and gas E&P activities on the amount of employment and wages paid in the various producing regions in Utah. Many similar studies present the total economic output of an activity as the economic impact; this is the sum of all transactions in a supply chain and can be much larger than the value of the final good or service provided to the end consumer. Similarly, many authors apply economic output multipliers to all spending related to an activity, with no distinction between export-based and residentiary spending. The result is often termed “economic contribution” and presented as economic impact. As with all economic output calculations, the result is much larger than the value of the final product delivered to an end consumer.

The oil and gas exploration and production industry has a direct impact on the local economy through employment and wages paid. In addition, there are additional

indirect and induced impacts. Indirect impacts result from local spending by the E&P industry and induced impacts arise from employees of the E&P industry spending their earnings.

Examples of indirect impacts are employment and wages at seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and utilities providing electricity. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses.

The RIMS II input-output model developed by the Bureau of Economic Analysis was used to determine the indirect and induced economic impacts of the oil and gas exploration and production industry in the Coalbed Methane Area. The RIMS II model is based on an accounting framework called an input-output table. From each industry, an input-output table shows the industrial distribution of inputs purchased and outputs sold. The Bureau of Economic Analysis has developed a national input-output table (Bureau of Economic Analysis, 1997). To develop region-specific input-output tables, the national input-output table is modified using regional economic data. The producer portion of the input-output table is modified using location quotients at the six-digit NAICS level based on personal income data for service industries and wage and salary data for nonservice industries. Household data is modified to account for commuting across regional boundaries and savings and taxes. Once the national input-output table is regionalized, the multipliers are estimated through the use of matrix algebra. The RIMS II model estimates the employment and wage impacts by major NAICS industry.

Data on spending by the E&P industry in the Coalbed Methane Area was obtained via a survey of operating, drilling and service companies operating in the area. Personnel with the Bureau of Economic and Business Research at the University of Utah worked with the Independent Petroleum Association of the Mountain States (IPAMS) to develop survey forms with input from several representatives of the petroleum industry. IPAMS distributed the survey forms to operating, drilling and service companies operating in the Coalbed Methane Area and the forms were returned to the Bureau of Economic and Business Research. Data from returned survey forms was totaled by spending category. Using data on total production of oil and gas, number of wells spudded and employment reported by government agencies, the total spending reported by responding companies was expanded to total industry spending in the region. The multipliers from the RIMS II model were then applied to the total spending by category to determine the indirect and induced employment and wages. Trade margins were applied to the Retail Trade, Wholesale Trade, and Transportation industries.

State income tax impacts were estimated by calculating the ratio of the Utah income tax liability for Carbon and Emery Counties to the sum of the total earnings by place of work for the two counties as determined by the Bureau of Economic Analysis. The average of this ratio for the years 2003 through 2005 was 4.02 percent. This ratio was then applied to the total estimated earnings due to oil and gas E&P in the Coalbed Methane Area of \$22.2 million to estimate the state personal income tax.

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The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry Phase I - Paradox Basin

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List of Acronyms & Abbreviations

BCF	Billion Cubic Feet
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
CDP	Census Designated Place
DOG M	Utah Division of Oil, Gas and Mining
E&P	Exploration and Production
IPAMS	Independent Petroleum Association of the Mountain States
MCF	Thousand Cubic Feet
MMCF	Million Cubic Feet
MW	Megawatts
NAICS	North American Industry Classification System
NYMEX	New York Mercantile Exchange
PADD	Petroleum Administration for Defense District
SIC	Standard Industrial Code
SITLA	School and Institutional Trust Lands Administration
RIMS II	Regional Input-Output Modeling System
UDOT	Utah Department of Transportation
USFS	U.S. Forest Service
WTI	West Texas Intermediate Crude

The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry Paradox Basin

1 Executive Summary

The Bureau of Economic and Business Research at the University of Utah has completed an economic impact study of the oil and gas exploration and production industry in the Paradox Basin, principally located in San Juan County, Utah. Portions of the Paradox Basin overlap into Grand County, Utah, Colorado, New Mexico, and Arizona. San Juan County is the oldest and second-largest oil and gas producer in Utah.

Federal land made up of BLM holdings, the National Park Service and the U.S. Forest Service make up 61 percent of the land in San Juan County. Indian land, including the Navajo and White Mesa Ute reservations comprises 25 percent. The largest state land holder is the State Institutional and Trust Land Administration (SITLA) with 5 percent.

The largest field in San Juan County is Aneth Field. A large number of operators have activities in San Juan County; however, Resolute Natural Resources is the dominant operator, with 364 listed operating wells, approximately 10 times the number of wells of the second most active operator, US Oil & Gas, Inc.

Crude oil production in San Juan County has been dropping over the past 10 years. Crude oil production in San Juan County was 4.5 million barrels in 2003, by 2006, production in the county had dropped to 3.8 million barrels. In 2006, production in San Juan County accounted for 21.0 percent of the crude oil produced in Utah. Most of the oil production in San Juan occurs in the Paradox Basin in the southwest part of the county.

Like crude oil, natural gas production from San Juan County has been declining over the past 10 years. Since 2003 production has dropped from 20.6 BCF to 12.4 BCF in 2006 and 2007. During 2006, 3.5 percent of the natural gas produced in Utah originated in San Juan County.

Past production declines have been reversed due to rising prices that have stimulated recent additional drilling. From a low of only one well spudded in the county in 2003, drilling activity increased to 11 wells spudded in 2006 and 15 in 2007.

The economic impact of the E&P industry on San Juan County is moderate. In 2006, the direct, indirect and induced employment generated by E&P activities totaled 250 workers and accounted for 6.2% of all non-farm employment in the county. Direct, indirect and induced wages generated by E&P activities totaled almost \$8.6, accounting for 8.2% of all non-farm wages in the county.

The oil and gas industry has a sizeable fiscal impact on San Juan County. Property taxes paid on producing oil and gas wells were \$9.1 million in 2006 and accounted for 31.4 percent of all property taxes paid in the county. Federal mineral royalties distributed to San Juan County by the Utah Department of Transportation during 2006 amounted to \$1.4 million. Rents and royalties paid on SITLA lands in San Juan County totaled nearly \$1.0 million in 2006.

2 Background

The recent rise in the price of gasoline has refocused attention on energy markets with an intensity not seen since the collapse of oil prices in the mid 1980s. In contrast to the energy shortage of the 1970s, which was largely driven by constrained supply due to geopolitical issues, the recent runup is a result of increasing demand and decreasing supply from aging fields. Crude oil, and to a lesser extent natural gas, is a worldwide commodity with international supply and demand factors determining prices. Consumption of petroleum products is up worldwide, with developing countries driving the increase. Consumption of petroleum in China grew over 30 percent from 2002 to 2006. This rise in demand has resulted in a dramatic increase in the nominal price of crude oil (Figure 1).

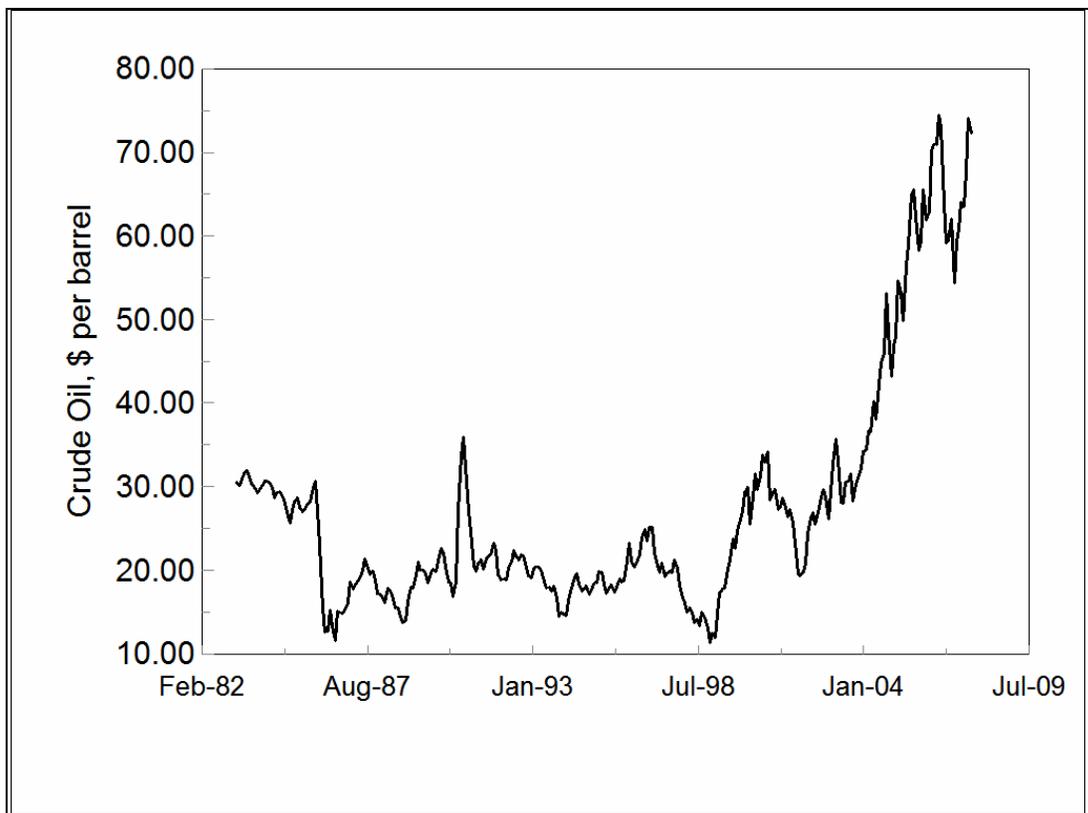


Figure 1 Crude Oil Futures: NYMEX

Source: Energy Information Administration.

The price of crude oil was relatively flat during the 1990s, with per barrel prices in the \$20 to \$30 range. Then, from a low of \$11.31 per barrel in December 1998, crude oil increased to more than \$70 per barrel in April 2006, reaching \$79.63 in September 2007. Forecasts expect crude oil prices to remain near current levels in the future. In September 2007 the Energy Information Administration forecast that the price of West Texas Intermediate Crude would remain over \$71 per barrel

through the end of 2008. During November 2007, prices were in the \$90 per barrel range.¹

At the same time, natural gas prices have increased from historically low values of approximately \$2 per MCF in the late 1990s to a current price of about \$7 per MCF, with increased volatility in recent years (Figure 2). Natural gas is more of a regional commodity than is crude oil, with more dependence on local supply and demand factors. The necessity of transporting natural gas by pipeline means that transportation infrastructure has a large influence on regional prices. Currently, there is a shortage of pipeline capacity in the Rocky Mountain region and wellhead natural gas prices in the area are depressed compared to the rest of the country.

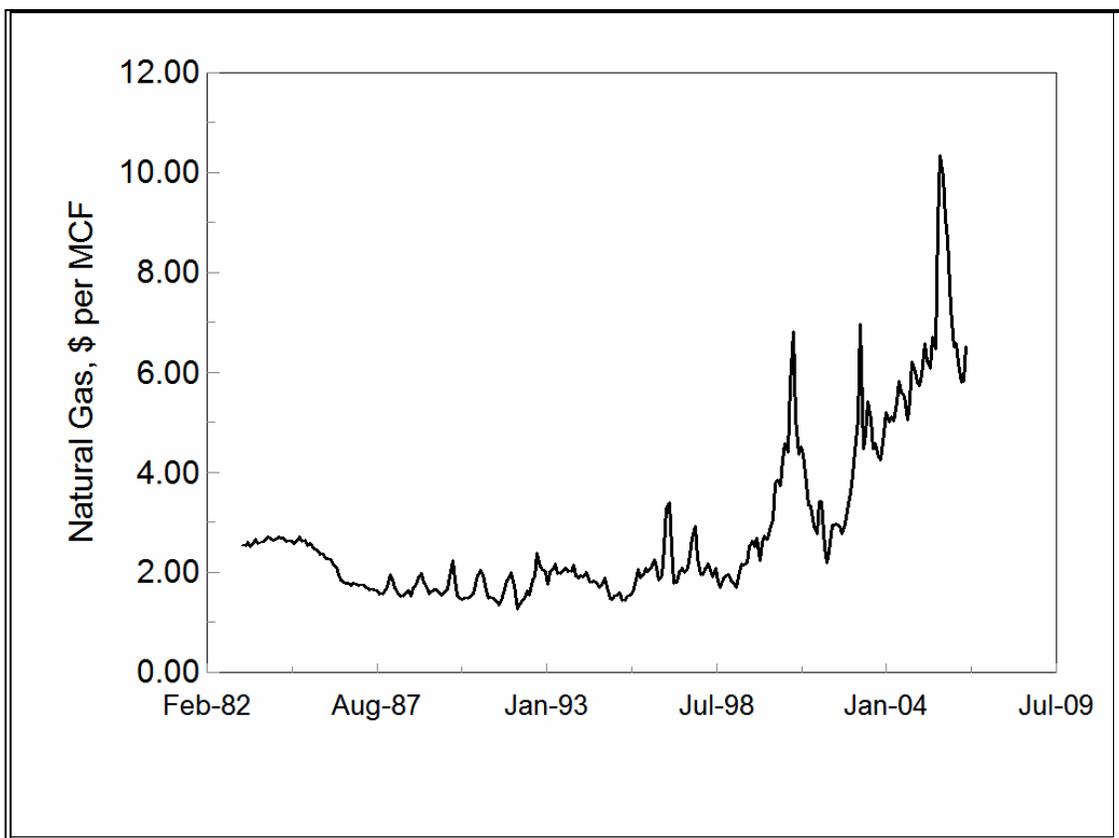


Figure 2 NYMEX Natural Gas Futures

Source: Energy Information Administration.

¹ West Texas Intermediate (WTYI) refers to a crude stream produced in Texas and Oklahoma that is the most common “marker” for pricing crude oil and, along with several other domestic and foreign crude streams, is acceptable for settling New York Mercantile Exchange contracts to light, sweet crude oil.



Figure 3 Petroleum Administration for Defense Districts (PADD)

Source: Energy Information Administration.

While increased demand in the Pacific Rim has been a primary driver of petroleum prices, demand in the U.S. has also contributed to price increase. In addition, domestic crude oil production has declined from a high value of 3.5 billion barrels in 1970 to 1.9 billion barrels in 2006.

Even with additional drilling in response to higher prices, domestic production is dropping due to geologic constraints. The Rocky Mountain region is the only area in the country currently experiencing significant increases in production of crude oil and natural gas. As shown in Figure 3, of the five Petroleum Administration for Defense Districts (PADD) used to analyze petroleum data, the production of crude oil and natural gas production is increasing only in PADD I (the East Coast) and in PADD IV (the Rocky Mountains).

Although crude oil production increased 11.3 percent and natural gas 15.3 percent on the East Coast from 2002 to 2005, the region is responsible for less than one-half of one percent of domestic crude oil production and three percent of natural gas production. Over the same period, the amount of crude oil produced in the Rocky Mountains increased by 20.4 percent and production on the Gulf Coast (PADD III), the largest producing area in the country, dropped by 12.8 percent.

The center for production of natural gas in the United States is also shifting from the Gulf Coast to the Rocky Mountains. In 1982, PADD III was responsible for 75.5 percent of U.S. natural gas production and PADD IV supplied only 4.2 percent. By 2005, the amount of natural gas produced in PADD III had dropped to 62.5 percent of total production while the amount from PADD IV had increased to 17.0 percent. Additionally, natural gas production in the Rocky Mountains is increasing approximately five percent annually. The increase in crude oil and natural gas production in the Rocky Mountain region is creating an economic boom in the producing areas.

**Table 1
U.S. Crude Oil and Natural Gas Production by PADD, 2002-2006**

	PADD I	PADD II	PADD III	PADD IV	PADD V	United States Total
Crude Oil, thousand barrels						
2002	7,458	164,635	1,174,305	102,982	947,745	2,097,124
2003	7,170	161,360	1,162,869	105,931	636,123	2,073,453
2004	6,941	159,309	1,103,743	113,069	600,239	1,983,302
2005	8,299	161,587	1,023,499	123,956	572,765	1,890,106
2006	8,062	167,298	1,035,904	130,466	520,829	1,862,259
% Change 2002-2006	8.1	1.6	(11.8)	26.7	(45.1)	(11.2)
Dry Natural Gas, MMCF						
2002	453,774	2,432,537	12,622,766	2,641,749	776,962	18,927,788
2003	521,824	2,336,271	12,662,381	2,797,202	780,866	19,098,544
2004	520,240	2,428,676	11,960,955	2,935,503	745,517	18,590,891
2005	522,997	2,413,736	11,298,362	3,075,234	763,907	18,074,237
2006	536,184	2,533,780	11,311,563	3,371,822	722,476	18,475,826
% Change 2002-2006	18.2	4.2	(10.2)	27.6	(7.0)	(2.4)

Source: Energy Information Administration.

Despite a common perception that the oil and gas industry is vertically integrated, the industry is actually highly fragmented, especially at the exploration and production stage. Many companies concentrate exclusively on oil and gas production and have no interest in downstream operations such as pipelines, refineries and product distribution. Additionally, much of the work conducted in the producing fields is contracted to other companies that specialize in different aspects of drilling and maintaining the wells. Few operating companies operate their own drill rigs but instead contract with companies that specialize in drilling. Other companies specialize in different operations such as grading well locations, well surveying, running and pulling well casings, cementing wells, perforating well casings and reservoir treatment and stimulation. The operating, drilling and service companies collectively constitute the oil and gas exploration and production industry.

Many other industries benefit from spending by the oil and gas industry. These include consulting geologists and engineering companies, environmental consultants, vendors of oil field equipment, and pipeline and trucking companies. Spending by oil industry employees also benefits the local economy. These secondary economic benefits are the indirect and induced impacts, and are known in common parlance as the “multiplier” effects. This study examines the structure of the Utah oil and gas exploration and production industry and the total economic impact on the producing areas.

3 Utah’s Oil and Gas Industry

The Utah oil and gas industry started in 1891, when a water well being drilled in Farmington Bay near the Great Salt Lake encountered natural gas at a depth of 1,000 feet. Gas from several wells in this area was transported to Salt Lake City through wooden pipelines for several years until shifting sand in the lakebed plugged the wells. The first oil was found in the early 1900s near Rozel Point at the north end of the Great Salt Lake, near Mexican Hat in southeastern Utah, and near the town of Virgin in southwestern Utah. The first large-scale commercial oil well was drilled near Vernal in 1948. Since the early 1960s, Utah has consistently ranked in the top 15 oil-producing states and in recent years has experienced a dramatic rise in natural gas production. During 2005, Utah ranked 15th in crude oil production out of 31 states and two Federal Offshore Areas and 11th in dry natural gas production out of 33 states and the Federal Offshore Area in the Gulf of Mexico.

Utah is contributing to the recent growth in crude oil and natural gas production taking place in the Rocky Mountain states (PADD IV). The state’s 2006 crude oil production of 17.9 million barrels was a 37 percent increase over the recent low of 13.1 million barrels produced in 2003 (Figure 4). Although a substantial increase from the recent past, 2006’s output was still only 44 percent of the all-time high of 41.1 million barrels produced in 1985.

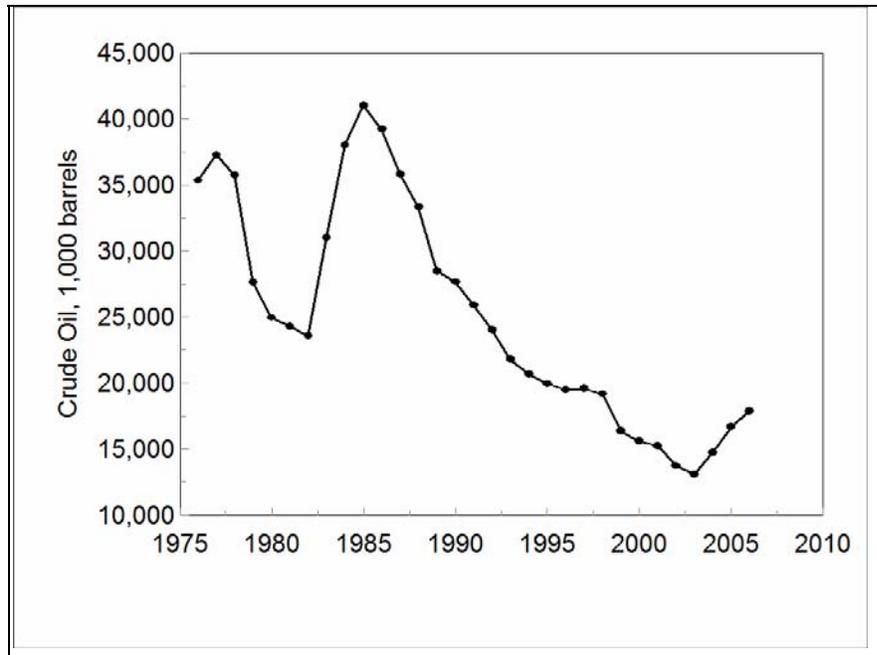


Figure 4 Utah Crude Oil Production
 Source: Utah Division of Oil, Gas and Mining.

There has been an even greater rise in natural gas production in Utah. In 2006, Utah’s marketed natural gas production hit an all-time high of 343 BCF, up 502 percent from a total of 57 BCF produced in 1976 (Figure 5).

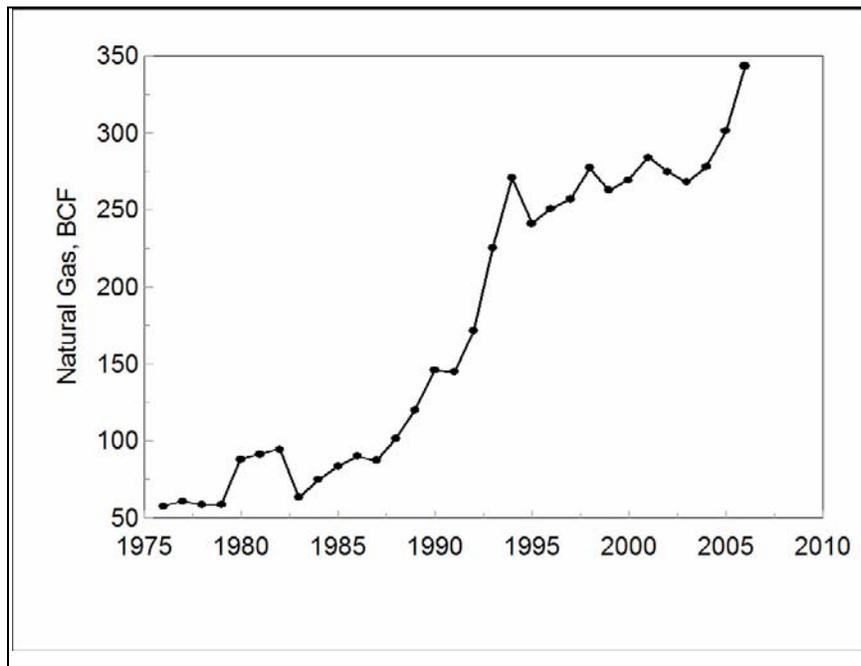


Figure 5 Utah Marketed Natural Gas Production

Source: Utah Division of Oil, Gas and Mining.

Not all gross withdrawals of natural gas are marketed to consumers. Due to low prices of natural gas during the late 1980s and early 1990s much of the gas produced in Utah during that time was not marketed. Instead, a large portion of the gas withdrawn from wells in Utah during this period was reinjected into the geologic formations to maintain pressure and oil production. The amount of gas used for repressuring in Utah reached a high in 1983, when 65 percent of gross withdrawals were reinjected to maintain pressure. Currently, approximately 95 percent of natural gas withdrawals in Utah are marketed. Most of the gas that is not marketed is used for fuel at the production site or is accounted for by nonhydrocarbon gases that are removed from the production stream prior to marketing.

Although natural gas production has been steadily rising and crude oil production in Utah has rebounded in recent years, production per individual well has been declining. Natural gas production per gas well peaked at 740 MMCF in 1962. Production per well steadily declined to 67 MMCF in 2000 before rising to 84 MMCF in 2006. Similarly, crude oil production per oil well peaked at 57,330 barrels in 1959, then dropped to 6,727 barrels in 2003. Crude oil production per well in Utah averaged 7,308 barrels during 2006.

During 2006, 129 operating companies reported crude oil and natural gas production to the Utah Division of Oil, Gas and Mining. Production occurred in 11 of Utah's 29

counties. Duchesne County had the highest oil production with 6,401,299 barrels while Uintah County led natural gas production with gross withdrawals of 204 BCF.

Six different areas in Utah currently have significant production of oil and/or natural gas. These areas are defined by geology. Additionally, these areas are somewhat isolated from one another economically, especially in terms of the oil and gas exploration and production (E&P) industry. The major oil and gas producing area in Utah is the Uinta Basin in the northeastern part of the state. Vernal is a center of the oil and gas industry in the Uinta Basin with many of the producing, drilling and service companies maintaining offices in the area. Other producing areas in Utah include both the conventional coalbed methane plays in Carbon and Emery Counties, the Paradox Basin in San Juan County, the Uncompahgre Uplift in Grand County, the Thrust Belt in Summit County as well as the recently discovered Hingeline in the central part of the state.

The Paradox Basin, Uncompahgre Uplift, and Thrust Belt all extend over state lines into adjacent states. Many workers involved in operating wells in these areas are actually employed outside Utah. Expanded gas operations in Carbon and Emery Counties and new oil production in the Hingeline are fairly recent discoveries and an oil service industry has not developed in these areas.

Defining the oil and gas E&P industry is a key element for a study of this type. Economists use the numerical North American Industry Classification System (NAICS) developed by the Office of Management and Budget to classify industries for reporting employment and earnings. The two-digit NAICS codes are divided into 20 major industrial sectors. These major sectors are then further subdivided as necessary to provide additional industry detail.

The NAICS codes have three industrial subdivision classifications that directly apply to the oil and gas E&P industry. These are NAICS 211–Oil and Gas Extraction, NAICS 213111–Drilling Oil and Gas Wells, and NAICS 213112–Support Activities for Oil and Gas Operations. For purposes of this study, these three industries are collectively considered the oil and gas E&P industry. Additional information on the NAICS codes for these three industries is available in Section 6.

The following section summarizes oil and gas production in San Juan County. Also included are economic data for San Juan County to place the oil and gas E&P industry in context.

3.1 The Paradox Basin – San Juan County

This study focuses on the Paradox Basin located primarily in San Juan County of southeastern Utah, in southwestern Colorado, and to some extent, into northern Arizona and New Mexico. Most of the oil production is located in Utah, as shown in Figure 6. The Paradox Basin is the second largest oil and gas producing region in Utah, after the Uinta Basin.

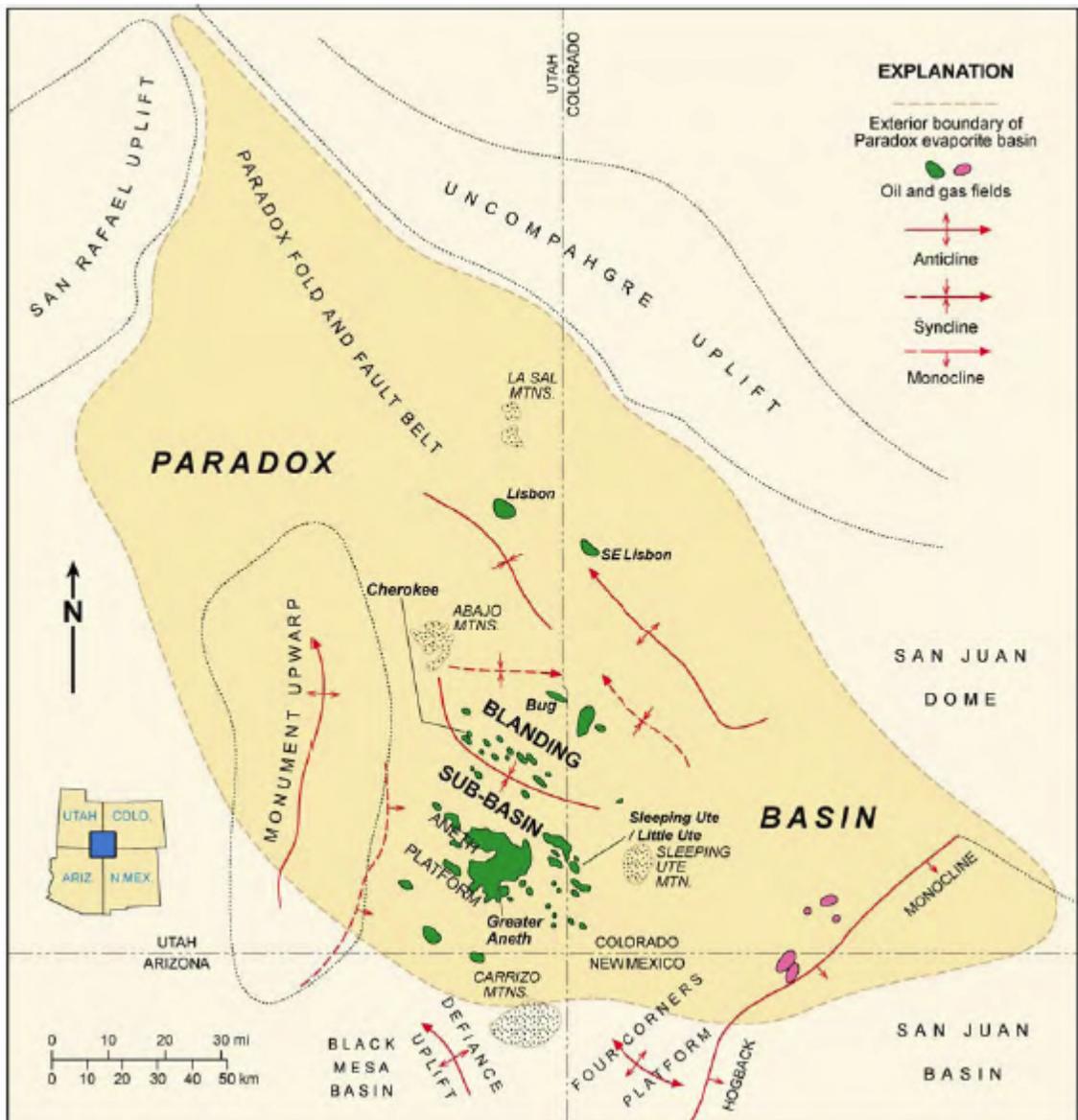


Figure 6 Map of the Paradox Basin Showing Producing Oil and Gas Fields and Geological Features

Source: Utah Geological Survey.

The majority of land in San Juan county is owned by the federal government--the BLM, National Park Service and the U.S. Forest Service control 61.1% of the land

(Table 2). The Utah School and Institutional Trust Lands Administration (SITLA) controls 5.2 percent of the land in the county. A lesser amount is controlled by the Utah Division of State Parks and Recreation. Indian lands make up 25.5 percent of San Juan County and include the Navajo Reservation and the White Mesa Community of the Ute Mountain Ute Tribe.

**Table 2
Land Ownership in San Juan County**

	San Juan County	Percent of Total
Bureau of Land Management	2,077,638	41.5
US Forest Service	449,982	9.0
Military	0	0.0
USFS and BLM Wilderness	0	0.0
National Park Service	528,926	10.6
Total Federal	3,056,546	61.1
State Parks	1,071	0.0
State Wildlife Land	0	0.0
State Trust Lands	260,530	5.2
Total State Lands	261,601	5.2
Indian Lands	1,278,376	25.5
Private	411,836	8.2
Total	5,008,359	100.0

Source: Utah Governor's Office of Planning and Budget.

The Utah Division of Oil, Gas and Mining reports a total of 577 producing wells in San Juan County. The major operators and the number of active wells reported are presented in Table 3.

**Table 3
Major Oil & Gas Operators in San Juan County**

Operator	Number of Active Wells
Resolute Natural Resources	364
US Oil and Gas, Inc.	39
Wesgra Corporation	29
Encana Oil & Gas (USA) Corporation	19
Rim Southwest Corporation	18
Citation Oil & Gas Corporation	16
Seeley Oil Company, LLC	13
D J Simmons, Inc.	10
Robert L. Bayless Production, LLC	9
Elm Ridge Exploration Company	9

Crude oil production in San Juan County has been dropping over the past 10 years (Table 4). Crude oil production in San Juan County was 4.5 million barrels in 2003,

and by 2006, production in the county had dropped to 3.8 million barrels. In 2006, San Juan County was responsible for 21.0 percent of the crude oil produced in Utah. Most of the oil production in San Juan occurs in the Paradox Basin in the southwest part of the county.

Table 4
San Juan County Crude Oil and Gas Production, 2003-2006

San Juan County	2006	2005	2004	2003	Cumulative Production	Percent of State Total 2006
Oil	3,761,946	3,865,892	3,988,184	4,555,411	551,468,815	21%
Gas	12,452,938	13,425,654	17,387,573	20,637,369	1,366,537,064	3%

Source: Utah Division of Oil, Gas and Mining.

Like crude oil, natural gas production from San Juan County has also been declining. Production dropped to 12.4 BCF in 2006 and 2007, down significantly from 2003 production levels of 20.6 BCF. During 2006, 3.5 percent of the natural gas produced in Utah originated in San Juan County.

Although production has been declining over the past 10 years, rising prices have stimulated additional drilling in recent years (Table 5). From a low of only one well spudded in the county in 2003, drilling activity increased to 11 wells spudded in 2006 and 15 in 2007.

Table 5
Wells Spudded in San Juan County, 2004-2007

	2007	2006	2005	2004
Number of Wells Spudded	15	11	7	3
State Total	1,120	1,068	889	659
Percent of State Total	1%	1%	1%	0.5%

Source: Utah Division of Oil, Gas and Mining.

3.1.1 San Juan County Economy

While San Juan County is a major component of the Utah oil and gas industry, the production must be placed in the context of the total economy for the county.

San Juan County had an estimated 2006 population of 14,647, up 3.0 percent from 2002 (Table 6). The two incorporated cities in San Juan County are Blanding, with a 2006 estimated population of 3,169 and Monticello with a 2006 population of 1,922. According to the 2000 Decennial Census, Blanding is the only area in the county densely enough populated to be considered urban. In 2000, 20.7 percent of the county's population lived in the urban area. Although the remainder of the county is

not densely enough populated to be considered urban, it contained nearly 80 percent of the population in 2000.²

Unlike many portions of Utah, where the majority of the population lives in cities and towns, the residents of San Juan County are more dispersed. This is especially true on the Navajo Indian Reservation, which accounts for one-quarter of the area in the county.

Current population estimates for these scattered communities are not available, but data from the 2000 Decennial Census are available. Since these communities are not legally incorporated and there are no legally-defined boundaries, the Bureau of the Census determines boundaries for purposes of population counts and refers to these areas as Census Designated Places (CDP). Population counts from the 2000 Decennial Census for these places are Aneth (598), Bluff (320), Halchita (270), Halls Crossing (89), La Sal (339), Mexican Hat (88), Montezuma Creek (507), Navajo Mountain (379), Ojato-Monument Valley (864), and Tselakai Dezza (103). Combined, the two incorporated cities and 11 CDPs accounted for 60.2 percent of the county's population in 2000.

As shown in Figure 7, the overall population in San Juan County has increased only slightly since 1980, from 12,400 in 1980 to 14,807 in 2007.

² The Bureau of the Census defines urban areas as census blocks that have a population density of at least 1,000 persons per square mile and surrounding census blocks with a density of 500 persons per square mile. Adjacent census blocks with a lower population density are also included if they meet additional criteria established by the Bureau of the Census.

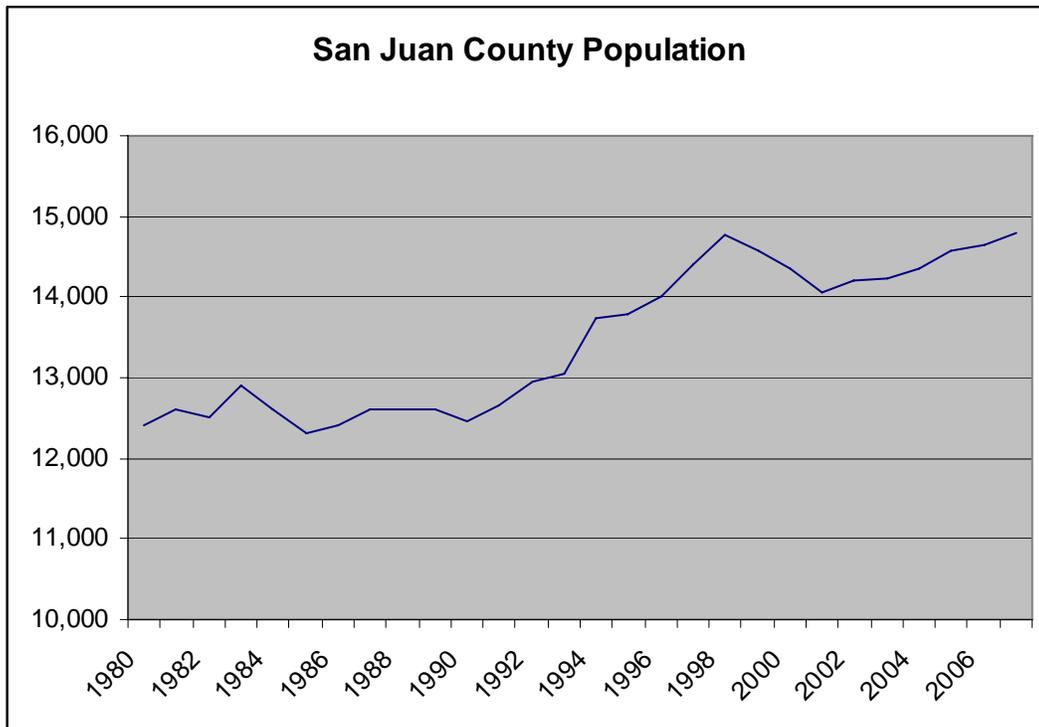


Figure 7 San Juan County Population, 1980-2007

Source: Utah Governor’s Office of Planning and Budget.

Although San Juan County has experience several economic booms in the past (including copper, gold, oil and uranium mining booms), tourism is currently a major component of the county’s economy. Most tourism is concentrated during the summer months and is tied to National Parks and Monuments in the area. Canyonlands NP, Natural Bridges NM, Hovenweep NM, Rainbow Bridge NM and Glen Canyon NRA are located in the county and Arches NP is located just to the north in Grand County. There are also several national parks and monuments nearby in Arizona, Colorado and New Mexico.

With tourism a major component of the San Juan County economy, employment and the unemployment rate in the county are noticeably seasonal (Figure 8). The unemployment rate in San Juan County routinely rises to 10 percent during the winter months due to a lack to tourism. Even during the summer months when tourism is at a high, the unemployment rate in the county has been significantly higher than the statewide average. In recent years, the unemployment rate in the county has experienced a downward trend, although there is still a seasonal effect. Simultaneously, the total employment in the county has been rising. The annual employment and the unemployment rates from 1998 to 2007 (Figure 9).

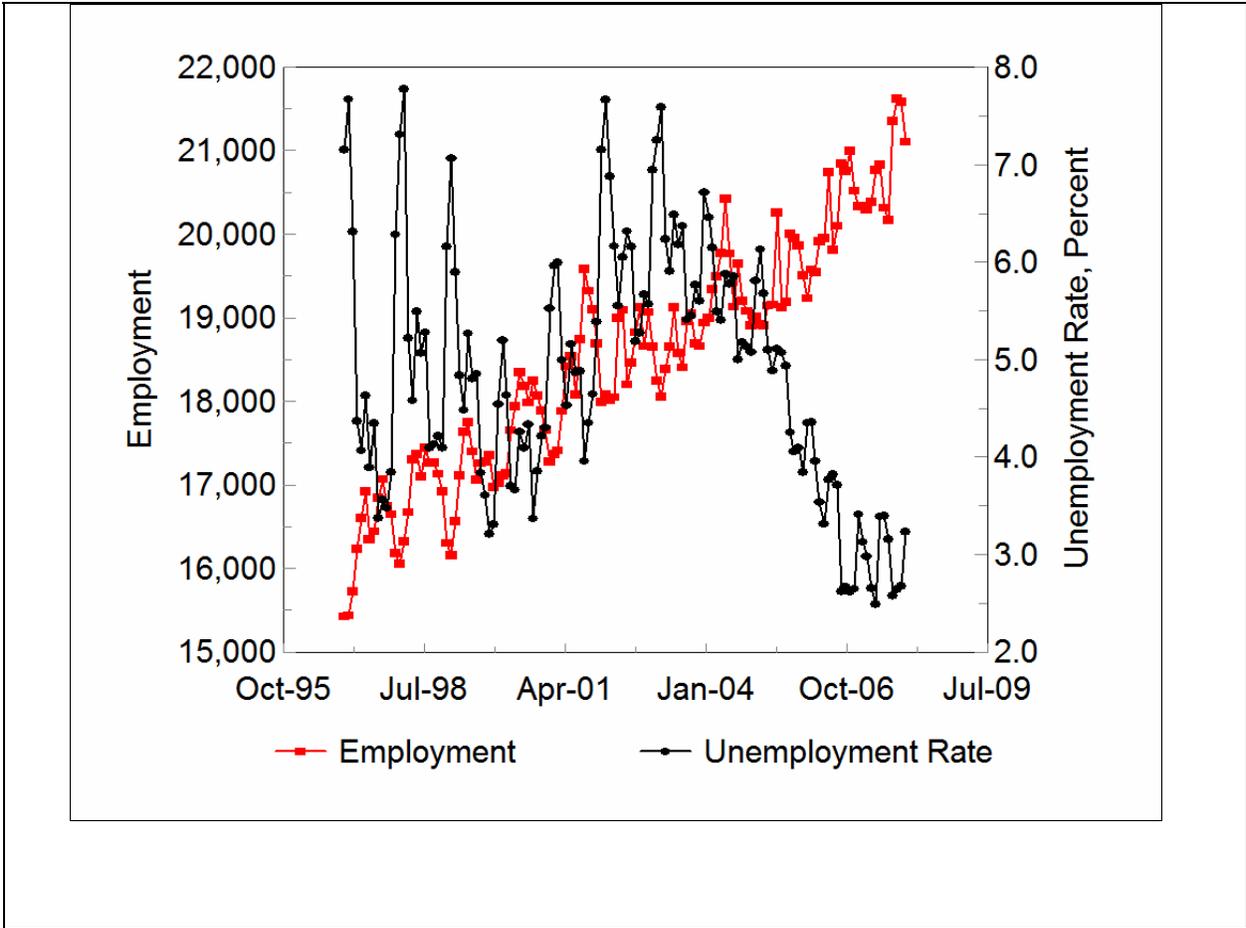


Figure 8 San Juan County Employment and Unemployment Seasonality
 Source: BLS, Local Area Unemployment Statistics.

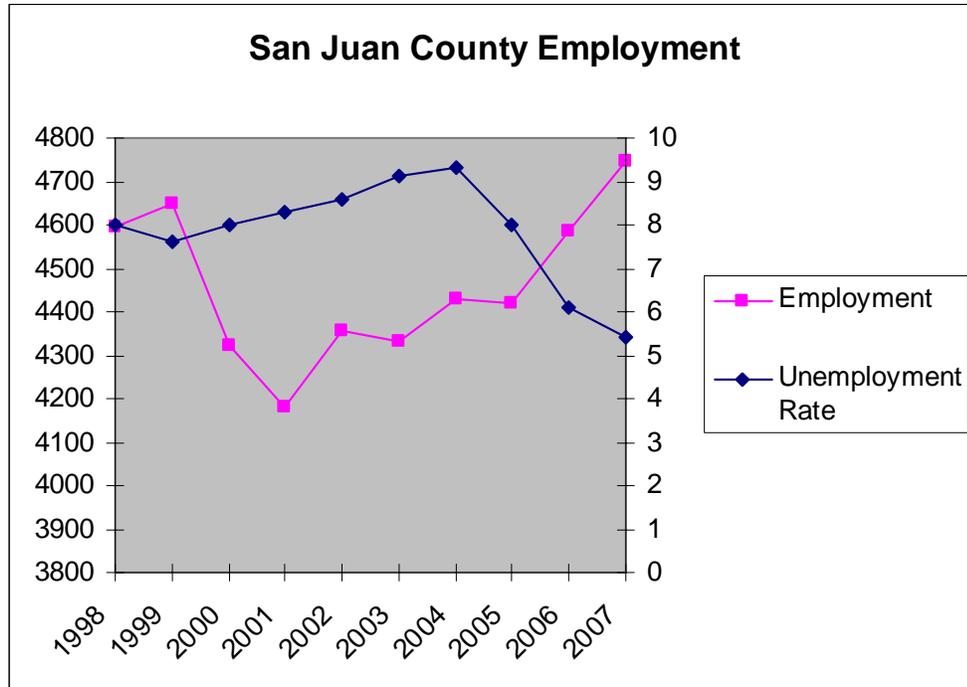


Figure 9 San Juan County Employment and Unemployment Rate
 Source: BLS, Local Area Unemployment Statistics.

The mining industry (NAICS 21) that includes oil and gas extraction has a long history in San Juan County with oil discovered at the Aneth/Montezuma Creek Fields in 1956. In the 1950s a uranium boom occurred in southern Utah, and San Juan County was a center of uranium mining and milling operations. Uranium production came to an end in the area in the mid 1980s due to low prices, but on April 30, 2008, the Dennison Mill on White Mesa (six miles south of Blanding) officially began milling uranium ore. It is presently the only licensed uranium mill in the United States. The increased interest in uranium exploration should make San Juan County once again a center of uranium activity.

As shown in Table 6, an analysis of employment concentrations by industry shows no particular weighting to any industry, with the exception of government employment, which comprises 40.7 distribution percent of employment and has a 2.40 location quotient. This is largely the result of government employment on the Navajo Reservation.

Table 6
Employment by Industry in San Juan County, 2006

	San Juan County	Distribution, Percent	Location Quotient
Private Employment			
Agriculture, Forestry, Fishing and Hunting	ND	NA	NA
Mining	ND	NA	NA
Utilities	ND	NA	NA
Construction	259	6.4	0.79
Manufacturing	248	6.1	0.59
Wholesale Trade	ND	ND	NA
Retail Trade	317	7.9	0.65
Transportation and Warehousing	61	1.5	0.41
Information	7	0.2	0.06
Finance and Insurance	52	1.3	0.28
Real Estate	3	0.1	0.05
Professional, Scientific and Technical Services	ND	ND	NA
Management of Companies and Enterprises	ND	ND	NA
Administrative and Support	56	1.4	0.22
Educational Services	68	1.7	1.02
Health Care	395	9.8	1.13
Arts, Entertainment and Recreation	ND	ND	NA
Accommodation and Food Services	ND	ND	NA
Other Services	74	1.8	0.74
Government Employment	1,644	40.7	2.48
Total Employment	4,035	100.0	1.00
ND: Not disclosed to protect individual company information. Data are included in the totals. Source: BLS, Quarterly Census of Employment and Wages.			

Direct non-farm employment in the oil and gas industry in San Juan County is shown in Table 7. No operating companies maintain offices in the county, but instead work out of other areas (particularly in Farmington, New Mexico and Denver, Colorado) or contract with others for well operations. The Utah Department of Workforce Services lists two oil service companies (NAICS 213111) in the area: HT Well Service with an employment range of 20-49 and the Aneth Plant with an employment range of 1-4. Three oil companies were also listed: Encana Oil and Gas USA Inc., US Oil and Gas Inc., and Rim SW Holding Corporation; although Encana states that they are located in Moab, which is in Grand County.

Table 7
Oil and Gas Employment in San Juan County,
2001-2006

	NAICS 211 Oil and Gas Extraction	NAICS 213111 Drilling Oil and Gas Wells	NAICS 213112 Support Activities for Oil and Gas Operations
San Juan County			
2001	30	ND	111
2002	27	ND	74
2003	74	ND	50
2004	89	ND	41
2005	77	ND	42
2006	71	ND	47
ND: Not disclosed to protect individual company data. Source: Utah Department of Workforce Services.			

The average annual wage in San Juan County during 2006 was \$25,566 (Table 8), compared to \$35,130 for the state of Utah. A major reason for the relatively low annual wages in San Juan County is the seasonal nature of its tourism-based economy. Many of the tourism-related jobs are only available during the summer months, when tourism is most active. The average nonfarm wage in oil and gas as reported by the Utah Department of Workforce Services was significantly higher, at \$62,856. Thus wages from oil and gas exploration and production are the single most important contributor to high wages in the county.

Table 8
Average Annual Wages by Industry in San Juan County, 2006

	San Juan County
Private Employment	
Agriculture, Forestry, Fishing and Hunting	ND
Mining	ND
Utilities	ND
Construction	23,780
Manufacturing	32,228
Wholesale Trade	ND
Retail Trade	13,235
Transportation and Warehousing	18,856
Information	12,742
Finance and Insurance	24,171
Real Estate	31,212
Professional, Scientific and Technical Services	ND
Management of Companies and Enterprises	ND
Administrative and Support	25,438
Educational Services	21,966
Health Care	30,291
Arts, Entertainment and Recreation	ND
Accommodation and Food Services	ND
Other Services	15,930
Government Employment	28,422
All Employment	25,566
ND: Not disclosed to protect individual company information.	
Source: BLS, Quarterly Census of Employment and Wages	

Nonfarm wage information for the oil and gas industry is shown in Table 9. The average non-farm wage for oil and gas extraction (NAICS 211) in San Juan County was \$62,856 in 2006, down from a high of \$82,596 in 2004. The average non farm wage for oil and gas support activities (NAICS 213112) in 2006 was \$36,072.

Table 9
Oil and Gas Industry Average Annual Wages in
San Juan County, 2001-2006

	NAICS 211 Oil and Gas Extraction	NAICS 213111 Drilling Oil and Gas Wells	NAICS 213112 Support Activities for Oil and Gas Operations
San Juan County			
2001	\$46,008	ND	\$35,100
2002	54,024	ND	26,304
2003	64,248	ND	28,596
2004	82,596	ND	28,752
2005	66,780	ND	33,288
2006	62,856	ND	36,072
ND: Not disclosed to protect individual company data. Source: Utah Department of Workforce Services.			

4 Economic Impacts

While rising energy prices are translating into rising employment and wages in the producing areas, not all of the economic gains are occurring in the oil and gas industry. The total increase in local economic conditions due to oil and gas activity is greater than the direct gain in the industry. This is the “multiplier effect” often referred to in economics and is a result of local spending by the industry for goods and services and spending of wages by the industry’s employees. These additional economic benefits are known as the indirect and induced benefits.

In this study, economic impact is defined as the effect on employment and wages in the subject areas. Additional information on economic impact is available in Section 6 and in several listed references.

4.1 San Juan County

While many of the persons involved in oil and gas production in San Juan County do live in the county, a majority live in other locations, including Farmington, New Mexico, Moab, Utah, and Denver, Colorado. The wells in the Paradox Basin are operated by persons who work on a contract basis for the operating companies. Additionally, the service companies in the area purchase operating supplies from local merchants and employee spending also benefits the local economy.

Based on data collected and maintained by the Utah Department of Workforce Services, direct employment in the E&P industry (Table 10) is reported as 118

persons out of 4,035, or about 3 percent of the county's total nonfarm employment in 2006. Nonfarm wages paid to workers in this industry totaled \$6,118,014, accounting for about 6 percent of all wages paid in San Juan County during 2006, underscoring the high-paying nature of E&P jobs in the region.

In addition to the direct employment, additional jobs and wages due to spending by the industry and employees results in some economic benefit to San Juan County. Other employment due to spending by the E&P industry is not limited to the mining industry but is distributed throughout different industries.

Total employment (direct, indirect and induced) in San Juan County generated by the oil and gas industry was estimated to be 250 workers in 2006, or about 6.2 percent of all nonfarm employment. Total wages (direct, indirect and induced) generated by the oil and gas industry were \$8,568,279, or about 8.2 percent of all nonfarm wages in the county in 2006. Table 10

Table 10
Economic Impact of the Oil and Gas Industry
in San Juan County, 2006

	San Juan County	
	Employment	Wages (1000s)
Total, Nonfarm	4,035	\$104,224.3
E&P Direct	118	6,118.0
E&P Indirect and Induced	132	2,450.3
E&P Total	250	8,568.3
E&P % of total	6.2%	8.2%

Source: Utah Department of Workforce Services.

5 Fiscal Benefits

The oil and gas industry provides significant fiscal benefits for San Juan County. Fiscal benefits refer to tax collections, rents and royalties received by San Juan County that are derived from oil and gas production.

The oil and gas industry is subject to the tax laws common to all businesses. There are also taxes unique to the industry. Production on federal land is subject to a royalty payment under the Mineral Lands Leasing Act of 1920. This royalty is paid to the Minerals Management Service, an agency within the U.S. Department of Interior. A portion of the federal mineral royalties is returned to the state of origin, generally one-half of the royalty payment. Royalties from production on Indian lands are returned to the appropriate tribe, not to the state government. Since a large portion

of the crude oil production in Utah occurs on Indian lands, especially in Duchesne and San Juan Counties, the amount of crude oil royalty returned to state government is significantly less than one-half of the amount paid to the Minerals Management Service. The states have full discretion as to the distribution of federal mineral royalties as long as priority is given to areas with economic and/or social impacts from leasing activities. The Minerals Management Service does not release federal mineral royalty data at the county level, but statewide data are available.

Federal mineral royalties due to oil and gas production in Utah have increased dramatically from \$91 million in 2001 to nearly \$300 million in 2006, a 228 percent rise. (Table 11) Oil and gas production accounted for 91.3 percent of the royalties paid for mineral production on federal land in Utah during 2006. There was also an additional \$103 million paid in bonuses and rents on federal mineral leases. These are fees associated with awarding federal mineral leases and maintaining the leases until production is initiated. Table 11 includes royalties paid on oil and gas production, but does not include bonus or rent payments for federal oil and gas leases. Of the nearly \$300 million paid in federal mineral royalties by the oil and gas industry in Utah, \$109 million was returned to state government.

Table 11
Federal Mineral Royalty Payments and Disbursements for Utah, 2001-2006

	Oil		Natural Gas		Total	
	Royalties	Disbursements	Royalties	Disbursements	Royalties	Disbursements
2001	\$32,799,794	\$4,392,667	\$58,553,527	\$26,210,621	\$91,353,321	\$30,603,288
2002	26,028,911	3,493,794	37,653,050	11,921,373	63,681,961	15,415,167
2003	37,462,357	5,575,810	55,369,036	26,040,706	92,831,293	31,616,515
2004	45,743,590	7,235,629	87,075,857	38,228,494	132,819,447	45,464,122
2005	66,900,212	10,405,687	118,132,687	53,647,636	185,032,900	64,053,323
2006	106,457,298	21,866,066	193,416,183	87,551,457	299,873,481	109,417,522

Note: Years are federal fiscal years. Natural gas includes natural gas liquids from gas processing plants.
Source: Minerals Management Service.

In Utah, federal mineral royalties are distributed to several different accounts according to state law (Table 12). The largest recipients of federal mineral royalties in Utah are the Permanent Community Impact Fund and the Department of Transportation. The funds distributed to the Department of Transportation are then distributed to local governments to fund local highways in proportion to the amount of mineral lease money generated by each county. The Permanent Community Impact Fund makes loans and grants to state agencies and subdivisions of state government impacted by mineral resource development. Unlike the funds administered by the Department of Transportation, which are distributed in proportion to royalties

generated in the county, the Permanent Community Impact Fund is distributed by a state-appointed board in response to proposals submitted by state agencies and local governments. Therefore, the distribution of funds by the Permanent Community Impact Fund to the various counties may vary from the amount of royalty generated. The payments in lieu of taxes cited in Table 12 are not the payments in lieu of taxes made by the federal government for federal land in Utah but are payments made by the state government to counties for lands controlled by the School and Institutional Trust Lands Administration, state Division of Parks and Recreation and the state Division of Wildlife Resources.

Table 12
Distribution of Federal Mineral Royalties in Utah

	Percent
Permanent Community Impact Fund	32.50
State Board of Education	2.25
Utah Geological Survey	2.25
Water Research Laboratory	2.25
Department of Transportation	40.00
Department of Community and Culture	5.00
Payments in Lieu of Taxes	52 cents per acre
Permanent Community Impact Fund	Remainder
Note: The amount paid for Payments in Lieu of Taxes has been adjusted annually since 1994 according to the Consumer Price Index. Source: Utah State Code, Title 59, Chapter 21.	

The School and Institutional Trust Lands Administration (SITLA) controls mineral rights on approximately 4.4 million acres in Utah. These lands are held in trust for the public schools in Utah and 11 other beneficiaries. They were established at statehood and through land exchanges with the federal government. During 2006, royalties paid for oil and gas extraction on SITLA lands totaled \$82.7 million. This was 51.0 percent of total SITLA revenue for 2006. These funds are not returned to the county of origin, but are placed in a permanent fund managed by the state treasurer on behalf of the public schools or distributed to the appropriate beneficiary as mandated. Dividends and interest from the Public School Fund are distributed annually to all Utah public schools based on an established formula.

In addition to royalties, there is an Oil and Gas severance tax in Utah and an Oil and Gas Conservation Fee that are levied on all production in the state. Revenue from the Oil and Gas Severance Tax is placed in the state general fund and the tax rate varies from 3 to 5 percent of the sales price. The Oil and Gas Conservation Fee funds the state Division of Oil, Gas and Mining. The fee is imposed at a rate of 0.2 percent of the value of production.

Both the Oil and Gas Severance Tax and the Oil and Gas Conservation Fee have significantly increased in recent years (Table 13). The Oil and Gas Severance Tax increased by 82 percent from 2001 to 2006, while the Oil and Gas Conservation Fee increased by 102 percent. The drop from 2001 to 2002 was due to the decline of the wellhead price of natural gas produced in Utah from \$3.52 per MCF to \$1.99 per MCF. These data reflect statewide oil and gas operations and are not specific to San Juan County.

Table 13
State Tax Collections Related to
Oil and Gas Production, 2001-2006

	Oil and Gas Severance Tax	Oil and Gas Conservation Fee
2001	\$39,357,798	\$2,748,318
2002	18,893,082	1,710,219
2003	26,745,279	1,943,755
2004	36,659,808	2,696,250
2005	53,484,320	3,631,963
2006	71,513,869	5,560,449

Note: Years are state fiscal years.
Source: Utah State Tax Commission.

5.1 San Juan County

The largest direct fiscal impacts in San Juan County due to oil and gas operations in the area are property taxes paid by the operating companies and federal mineral royalties distributed to the local governments by the Utah Department of Transportation. The Utah State Tax Commission centrally assesses oil and gas properties using a net present value approach applied to future production. The local county treasurers bill and collect the taxes. Property taxes are levied by numerous units of local government, including county and city governments, school districts, and special service districts.

Royalties paid to SITLA that result from production of oil and gas in San Juan County increased from 2005 to 2007 (Table 14). In 2005, oil and gas production in the San Juan County resulted in \$669,225 in SITLA royalties. Increased production and price resulted in a 39 percent increase in 2007, with over \$1,096,935 in SITLA royalties paid.

Table 14
Rents and Royalties Paid for Production
on SITLA Lands In San Juan County,
2005 and 2006

	Payments
2005	\$669,255
2006	\$936,280
Note: Years are state fiscal years. Source: School and Institutional Trust Lands Administration.	

SITLA and the federal government have exchanged significant acreage in order to facilitate mineral development and operations, particularly in the Drunkard's Wash area. As a result of HB 134, SITLA was directed to return certain mineral lease royalties to counties where the state has acquired federal lands as a result of land exchanges in order to equalize revenue to those counties in compensation for land-trades. Table 15 shows the royalties returned to San Juan County under the mineral revenue-sharing provision.

Table 15
Mineral Revenue Sharing for Land Exchanged to the United States

	Apr-Jun 2007	Jul-Sept 2007	Oct-Dec 2007	Jan-Mar 2007	Total
San Juan County	\$135,855	\$83,557	\$92,769	\$153,583	\$465,764
Source: School and Institutional Trust Lands Administration					

Property taxes paid on oil and gas properties are a significant portion of total property taxes in the San Juan County (Table 16). During 2006, the oil and gas industry paid over 31 percent of total property taxes in San Juan County. Table 16 refers to all property taxes paid to various government entities in the county, not just the county governments. As prices of crude oil and natural gas have increased in recent years, the net present value of future production has increased. Oil and gas property taxes have been fairly flat over the past decade, but should rise in the future driven by the rapid increase in oil price.

Table 16
Oil and Gas Property Tax Payments in San Juan County, 2000-2006

Year	Oil and Gas Property Tax	Natural Resources Tax	Total Tax Revenue	O&G % of Total Tax Revenue
2006	\$2,855,217	\$3,506,662	\$9,140,876	31.24%
2005	2,229,619	2,278,556	7,457,101	29.90%
2004	2,212,306	2,254,520	7,593,104	29.14%
2003	2,314,921	2,362,925	7,135,735	32.44%
2002	2,763,977	2,818,393	7,474,247	36.98%
2001	3,328,897	3,703,899	7,798,008	42.69%
2000	2,904,701	3,013,533	7,398,641	39.26%

Source: Utah State Tax Commission, Property Tax Division Annual Reports.

The funds generated from federal mineral royalties that are returned to San Juan County through the Utah Department of Transportation are also a significant source of revenue for the local governments (Table 17). These funds may exceed the amount of property tax paid by the oil and gas industry. During 2006, San Juan County received over \$1.4 million dollars in federal mineral royalties from the Utah Department of Transportation.

Table 17
Federal Mineral Royalties Returned by UDOT to San Juan County, 2001-2006

Year	Royalties
2001	\$1,451,439
2002	811,210
2003	935,712
2004	1,103,064
2005	856,334
2006	1,411,059

Note: Years are state fiscal years.
Source: Utah Department of Transportation.

6 Technical Notes and Methodology

Industries are classified by economists according to the North American Industry Classification System (NAICS), which was developed by the Office of Management and Budget in cooperation with other federal agencies and foreign governments (Office of Management and Budget, 2007). The NAICS codes replaced the Standard Industrial Classification (SIC) Codes that had been used since the 1930s. This change was prompted by structural changes in the U.S. economy, as the services sector became more complex and a much larger portion of the economy. In the change from SIC to NAICS, the 10 major industrial sectors under the SIC system were replaced with 20 major sectors under NAICS. Many of the industrial sectors under the SIC system were split among two or more of the redefined NAICS sectors, making comparisons difficult. The NAICS codes better explain the structure of the current economy but make time series data difficult to compile.

Under the NAICS system, 20 major industrial categories are further subdivided as needed. To demonstrate the level of detail obtained, Table 21 presents the divisions of the mining (NAICS 21) sector. The mining sector is divided into a total of 28 different industries. The other 19 industrial sectors are similarly subdivided.

Other local businesses and industries benefit from oil and gas exploration and production activities. Examples of these are seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirt work, and electric utilities. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. These types of effects are referred to as the indirect and induced impacts. The indirect and induced impacts can be calculated from the value of transactions between the oil and gas industry and these other businesses using input-output economic models

Table 20
NAICS Codes Related to the Mining Industry

NAICS Code	Industry
21	Mining, Quarrying, and Oil and Gas Extraction
211	Oil and Gas Extraction
2111	Oil and Gas Extraction
21111	Oil and Gas Extraction
211111	Crude Petroleum and Natural Gas Extraction
211112	Natural Gas Liquid Extraction
212	Mining (except Oil and Gas)
2121	Coal Mining
21211	Coal Mining
212111	Bituminous Coal and Lignite Surface Mining
212112	Bituminous Coal Underground Mining
212113	Anthracite Mining
2122	Metal Ore Mining
21221	Iron Ore Mining
212210	Iron Ore Mining
21222	Gold and Silver Ore Mining
212221	Gold Ore Mining
212222	Silver Ore Mining
21223	Copper, Nickel, Lead and Zinc Mining
212231	Lead Ore and Zinc Ore Mining
212234	Copper Ore and Nickel Ore Mining
21229	Other Metal Ore Mining
212291	Uranium-Radium-Vanadium Ore Mining
212299	All Other Metal Ore Mining
2123	Nonmetallic Mineral Mining and Quarrying
21231	Stone Mining and Quarrying
212311	Dimension Stone Mining and Quarrying
212312	Crushed and Broken Limestone Mining and Quarrying
212313	Crushed and Broken Granite Mining and Quarrying
212319	Other Crushed and Broken Stone Mining and Quarrying
21232	Sand, Gravel, Clay and Ceramic and Refractory Minerals Mining and Quarrying
212321	Construction Sand and Gravel Mining
212322	Industrial Sand and Gravel Mining
212324	Kaoline and Ball Clay Mining
212325	Clay and Ceramic and Refractory Minerals Mining
21239	Other Nonmetallic Mineral Mining and Quarrying
212391	Potash, Soda, and Borate Mineral Mining
212392	Phosphate Rock Mining
212393	Other Chemical and Fertilizer Mineral Mining
212399	All Other Nonmetallic Mineral Mining
213	Support Activities for Mining
2131	Support Activities for Mining

21311	Support Activities for Mining
213111	Drilling Oil and Gas Wells
213112	Support Activities for Oil and Gas Operations
213113	Support Activities for Coal Mining
213114	Support Activities for Metal Mining
213115	Support Activities for Nonmetallic Minerals (except Fuels) Mining

6.1 NAICS Codes Related to Oil and Gas Production

There are three classifications directly related to the oil and gas exploration and production industry. These are NAICS 211–Oil and Gas Extraction, NAICS 213111 – Drilling Oil and Gas Wells, and NAICS 213112–Support Activities for Oil and Gas Operations. These three classifications cover the operating companies, drilling companies, and service companies, respectively. For this study, we consider them collectively as the oil and gas E&P industry. The definitions listed are those developed by the Office of Management and Budget.

NAICS 211–Oil and Gas Extraction: Industries in the Oil and Gas Extraction subsector operate and/or develop oil and gas field properties. Such activities may include exploration for crude petroleum and natural gas; drilling, completing, and equipping wells; operation of separators, emulsion breakers, desilting equipment and field gathering lines for crude petroleum and natural gas; and all other activities in the preparation of oil and gas up to the point of shipment from the producing property. The subsector includes the production of crude petroleum, the mining and extraction of oil from oil shale and oil sands, and the production of natural gas, sulfur recovery from natural gas, and recovery of hydrocarbon liquids.

Establishments in this subsector include those that operate oil and gas wells on their own account and for others on a contract or fee basis. Establishments primarily engaged in providing support services, on a fee or contract basis, required for the drilling or operation of oil and gas wells (except geophysical surveying and mapping, mine site preparation, and construction of oil/gas pipelines) are classified in Subsector 213, Support Activities for Mining.

NAICS 213111–Drilling Oil and Gas Wells: This U.S. industry comprises establishments primarily engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, re-drilling, and directional drilling.

NAICS 213112 –Support Activities for Oil and Gas Operations: This U.S. industry comprises establishments primarily engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related activities). Services included are exploration (except geophysical surveying and mapping); excavating slush pits and cellars; well surveying; running, cutting, and

pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells.

6.2 Economic Impact Modeling

Economic impacts on an economy arise from exogenous sources or activities that inject new funds into the economy. Examples include new construction and products that are manufactured locally and exported to users located outside of the region. It is important for outside funds to be injected into a regional economy for economic impacts to occur. If an activity is financed by funds from inside the regional economy, then the funds are diverted from one industrial sector to another and there is no net multiplier effect or economic impact. Crude oil and natural gas from the producing areas in Utah are exported to refineries and markets in other portions of the country. Exporting oil and gas results in an inflow of funds, creating a positive economic impact on the area.

In this study, economic impact refers to the impact of oil and gas exploration and production activities on employment and wages paid in the various producing regions in Utah.

The oil and gas exploration and production industry has a direct impact on the local economy through employment and wages paid by producers. In addition to the direct impacts are the additional indirect and induced impacts. Indirect impacts result from local spending by companies that supply goods and services to the oil and gas industry. Induced impacts occur when employees of the oil and gas industry and employees of companies that supply goods and services to the oil and gas industry spend their wages.

Examples of indirect impacts are employment and wages at seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and utilities providing electricity. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses.

The RIMS II input-output model developed by the Bureau of Economic Analysis was used to estimate the indirect and induced economic impacts of the oil and gas exploration and production industry in the Coalbed Methane Area. The RIMS II model is based on an accounting framework called an input-output table. From each industry, an input-output table shows the industrial distribution of inputs purchased and outputs sold. The Bureau of Economic Analysis has developed a national input-output table (Bureau of Economic Analysis, 1997). To develop region-specific input-output tables, the national input-output table is modified using regional economic

data. The producer portion of the input-output table is modified using location quotients at the six-digit NAICS level based on personal income data for service industries and wage and salary data for nonservice industries. Household data is modified to account for commuting across regional boundaries and savings and taxes. Once the national input-output table is regionalized, the multipliers are estimated through the use of matrix algebra. The RIMS II model estimates the employment and wage impacts by major NAICS industry.

The impact of the oil and gas industry in San Juan County was estimated using the Direct Effect multiplier coefficients available in the RIMS II model. In this process the Direct Effect multipliers were applied to the direct employment in the oil and gas industry in San Juan County and the direct wages paid by producers, as reported by the Utah Department of Workforce Services in 2006.

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The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry Phase I - Overthrust Belt

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List of Acronyms & Abbreviations

BCF	Billion Cubic Feet
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
CDP	Census Designated Place
DOGM	Utah Division of Oil, Gas and Mining
E&P	Exploration and Production
IPAMS	Independent Petroleum Association of the Mountain States
MCF	Thousand Cubic Feet
MMCF	Million Cubic Feet
MW	Megawatts
NAICS	North American Industry Classification System
NYMEX	New York Mercantile Exchange
PADD	Petroleum Administration for Defense District
SIC	Standard Industrial Code
SITLA	School and Institutional Trust Lands Administration
RIMS II	Regional Input-Output Modeling System
UDOT	Utah Department of Transportation
USFS	U.S. Forest Service
WTI	West Texas Intermediate Crude

The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry The Overthrust Belt

1 Executive Summary

The Bureau of Economic and Business Research at the University of Utah has completed an economic impact study of the oil and gas exploration and production industry in the Overthrust Belt area of northern Utah, located in Summit County, Utah and extending into southwest Wyoming.

Oil was discovered at the Pineview field in 1975 and the area has been thoroughly explored. The geology of the Overthrust is complex and is best understood using 3-D seismic techniques. Present production is from 10 fields with 49 wells producing both oil and gas. No recent wildcat activity has occurred and no wells were spudded in 2007 or thus far in 2008. While some exploration may take place in the future, the overthrust in this area is generally considered a mature province and other areas, such as the Hingeline area in central Utah, may be more promising. Most of the Overthrust oil and gas drilling and support is centered in Wyoming, in Rock Springs, Green River, and Evanston, and thus does not contribute substantially to Utah employment.

The majority of the land in Summit County is privately held (54.3%). The U.S. Forest Service controls 43.5% and the remaining 2.2 percent is controlled by the state.

Oil and gas Production has been declining since 2003, with 2007 oil production 411,535 barrels (2% of state production) and 2007 gas production approximately 11 BCFG (4% of state production).

Summit County has had steady population growth since 1990. In 2007, the county's population totaled nearly 40,000 people. The local economy is largely driven by the ski and tourism industry centered around Park City, and includes the Park City, Deer Valley, and The Canyons resorts. The presence of these resorts has spurred the concomitant growth of residential housing construction, real estate, retail trade, and associated industries. In this sense, the overall impact of the oil and gas industry, while beneficial, is a minor factor in Summit County.

In 2006, direct, indirect and induced employment generated by E&P activities in Summit County totaled 40 jobs. Direct, indirect and induced wages totaled \$1.6 million. Because the Overthrust Belt is considered a mature province, combined with the fact that Summit County's economy is concentrated in other industries, it is unlikely that oil and gas exploration will play much of an economic role in the county going forward.

There is some positive fiscal impact of oil and gas in Summit County. Property taxes paid on producing oil and gas wells totaled \$2 million in 2006 and accounted for 2.21 percent of all property taxes paid in the county. SITLA rent and royalties totaled \$52,201 in 2006 and \$44,968 in 2007, and federal mineral exchange land payments were \$5,891. Federal mineral royalties distributed to Summit County by the Utah Department of Transportation during 2006 amounted to \$48,628 and \$90,355 in 2007.

2 Background

The recent rise in the price of gasoline has refocused attention on energy markets with an intensity not seen since the collapse of oil prices in the mid 1980s. In contrast to the energy shortage of the 1970s, which was largely driven by constrained supply due to geopolitical issues, the recent runup is a result of increasing demand and decreasing supply from aging fields, as well as the decreasing value of the dollar against foreign currencies. Crude oil, and to a lesser extent natural gas, is a worldwide commodity with international supply and demand factors determining prices. Consumption of petroleum products is up worldwide, with developing countries driving the increase. Consumption of petroleum in China grew over 30 percent from 2002 to 2006. This rise in demand has resulted in a dramatic increase in the nominal price of crude oil (Figure 1).

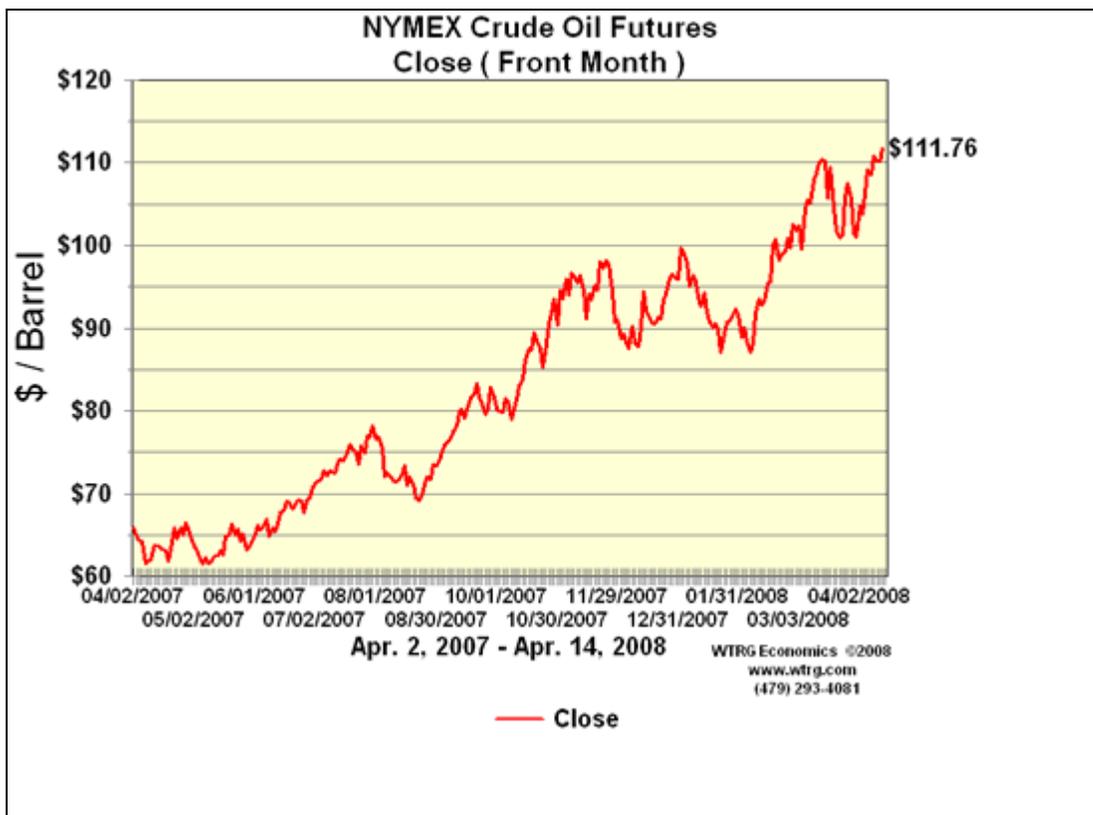


Figure 1 Crude Oil Futures: NYMEX

Source: WTRG Economics.

The price of crude oil was relatively flat during the 1990s, with per barrel prices in the \$20 to \$30 range. Then, from a low of \$11.31 per barrel in December 1998, crude oil increased to more than \$70 per barrel in April 2006, reaching \$79.63 in

September 2007. The price of crude has risen steadily since then, reaching a price of over \$111 per barrel as of April 15, 2008.

At the same time, natural gas prices have increased from historically low values of around \$2 per MCF in the late 1990s to a current price of about \$10 per MCF, with increased volatility in recent years (Figure 2). Natural gas is more of a regional commodity than is crude oil, with more dependence on local supply and demand factors. The necessity of transporting natural gas by pipeline means that transportation infrastructure has a large influence on regional prices. Currently, there is a shortage of pipeline capacity in the Rocky Mountain region and wellhead natural gas prices in the area are depressed compared to the rest of the country.

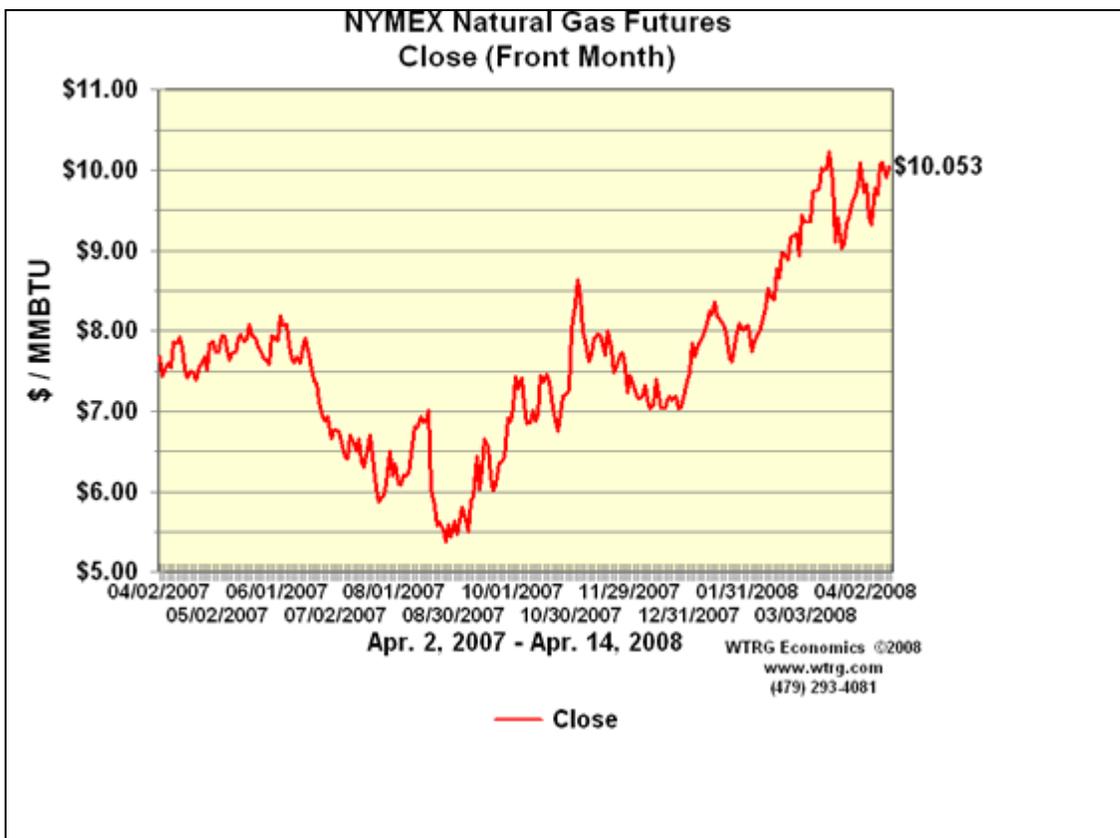


Figure 2 NYMEX Natural Gas Futures

Source: WTRG Economics.

While increased demand in the Pacific Rim has been a primary driver of petroleum prices, demand has also increased in the U.S. In addition, domestic crude oil production has declined from a high of 3.5 billion barrels in 1970 to 1.9 billion barrels in 2006. Even with additional drilling in response to higher prices, domestic production is dropping due to geologic constraints. The Rocky Mountain region is the only area in the country currently experiencing significant increases in production

of crude oil and natural gas. As shown in Figure 3, of the five Petroleum Administration for Defense Districts (PADD) used for analyzing petroleum data, crude oil and natural gas production are increasing only in PADD I (the East Coast) and in PADD IV (the Rocky Mountains).



Figure 3 Petroleum Administration for Defense Districts (PADD)

Source: Energy Information Administration.

Although crude oil production increased 11.3 percent and natural gas 15.3 percent on the East Coast from 2002 to 2005, the region is responsible for less than one-half of one percent of domestic crude oil production and three percent of natural gas production. Over the same period, the amount of crude oil produced in the Rocky Mountains increased by 20.4 percent and production on the Gulf Coast (PADD III), the largest producing area in the country, dropped by 12.8 percent.

The center for production of natural gas in the United States is also shifting from the Gulf Coast to the Rocky Mountains. In 1982, PADD III was responsible for 75.5 percent of U.S. natural gas production and PADD IV supplied only 4.2 percent. By 2005, the amount of natural gas produced in PADD III had dropped to 62.5 percent of total production while the amount from PADD IV had increased to 17.0 percent. Additionally, natural gas production in the Rocky Mountains is increasing approximately five percent annually. The increase in crude oil and natural gas

production in the Rocky Mountain region is creating an economic boom in the producing areas.

Table 1
U.S. Crude Oil and Natural Gas Production by PADD, 2002-2005

	PADD I	PADD II	PADD III	PADD IV	PADD V	United States Total
Crude Oil, thousand barrels						
2002	7,458	164,635	1,174,305	102,982	947,745	2,097,124
2003	7,170	161,360	1,162,869	105,931	636,123	2,073,453
2004	6,941	159,309	1,103,743	113,069	600,239	1,983,302
2005	8,299	161,587	1,023,499	123,956	572,765	1,890,106
2006	8,062	167,298	1,035,924	130,499	520,829	1,862,259
% Change 2002-2006	8.1	1.6	(11.8)	26.7	(45.1)	(11.2)
Dry Natural Gas, MMCF						
2002	453,774	2,432,537	12,622,766	2,641,749	776,962	18,927,788
2003	521,824	2,336,271	12,662,381	2,797,202	780,866	19,098,544
2004	520,240	2,428,676	11,960,955	2,935,503	745,517	18,590,891
2005	522,997	2,413,736	11,298,362	3,075,234	763,907	18,074,237
2006	536,184	2,533,780	11,311,563	3,371,822	722,476	18,475,826
% Change 2002-2005	18.2	4.2	(10.2)	27.6	(7.0)	(2.4)

Source: Energy Information Administration.

Despite a common perception that the oil and gas industry is vertically integrated, the industry is actually highly fragmented, especially at the exploration and production stage. Many companies concentrate exclusively on oil and gas production and have no interest in downstream operations such as pipelines, refineries and product distribution. Additionally, much of the work conducted in the producing fields is contracted to other companies that specialize in different aspects of drilling and maintaining the wells. Few operating companies operate their own drill rigs but instead contract with companies that specialize in drilling. Other companies specialize in different operations such as grading well locations, well surveying, running and pulling well casings, cementing wells, perforating well casings and reservoir treatment and stimulation. The operating, drilling and service companies collectively constitute the oil and gas exploration and production industry.

Many other industries benefit from spending by the oil and gas industry. These include consulting geologists and engineering companies, environmental consultants, vendors of oil field equipment, and pipeline and trucking companies. Spending by oil industry employees also benefits the local economy. These

secondary economic benefits are the indirect and induced impacts, and are commonly known as the “multiplier” effects. This study examines the structure of the Utah oil and gas exploration and production industry and the total economic impact on the producing areas.

3 Utah’s Oil and Gas Industry

The Utah oil and gas industry started in 1891, when a water well being drilled in Farmington Bay near the Great Salt Lake encountered natural gas at a depth of 1,000 feet. Gas from several wells in this area was transported to Salt Lake City through wooden pipelines for several years until shifting sand in the lakebed plugged the wells. The first oil was found in the early 1900s near Rozel Point at the north end of the Great Salt Lake, near Mexican Hat in southeastern Utah, and near the town of Virgin in southwestern Utah. The first large-scale commercial oil well was drilled near Vernal in 1948. Since the early 1960s, Utah has consistently ranked in the top 15 oil-producing states and in recent years has experienced a dramatic rise in natural gas production. During 2005, Utah ranked 15th in crude oil production out of 31 states and two Federal Offshore Areas and 11th in dry natural gas production out of 33 states and the Federal Offshore Area in the Gulf of Mexico.

Utah is contributing to the recent growth in crude oil and natural gas production taking place in the Rocky Mountain states (PADD IV). The state’s 2006 crude oil production of 17.9 million barrels was a 37 percent increase over the recent low of 13.1 million barrels produced in 2003 (Figure 4). Although a substantial increase from the recent past, the output in 2006 was only 44 percent of the all-time high of 41.1 million barrels produced in 1985.

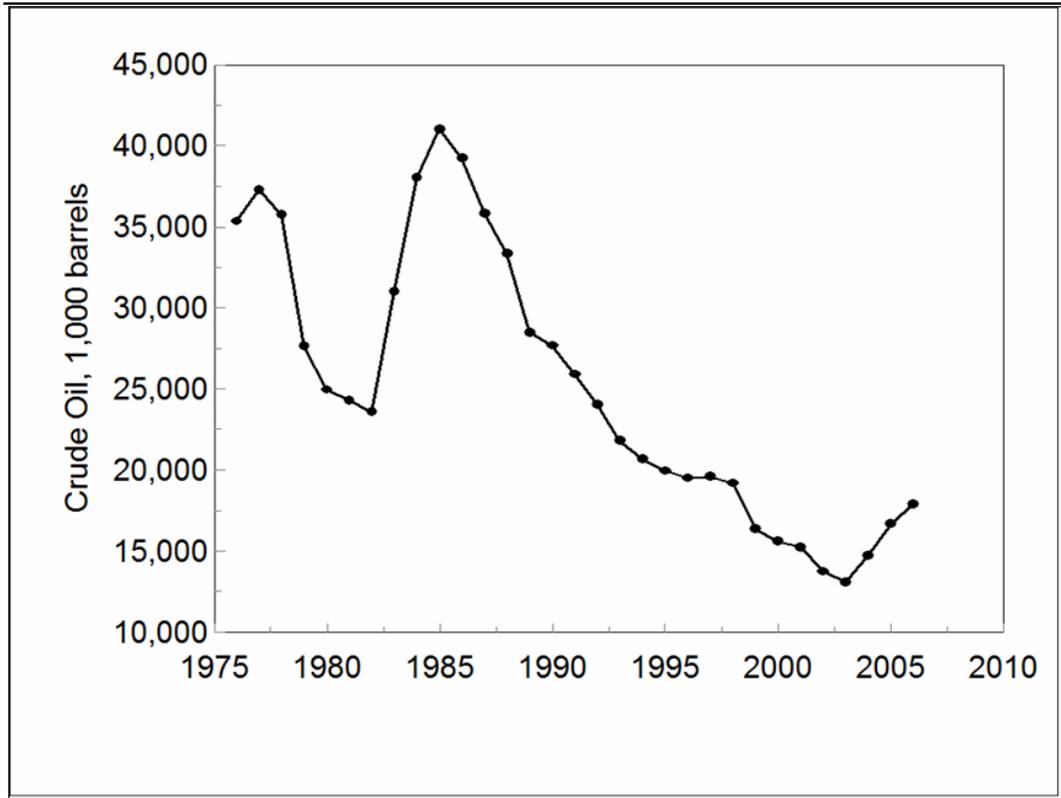


Figure 4 Utah Crude Oil Production

Source: Utah Division of Oil, Gas and Mining.

There has been an even greater rise in natural gas production in Utah. In 2006, Utah's marketed natural gas production hit an all-time high of 343 BCF, up 502 percent from a total of 57 BCF produced in 1976 (Figure 5).

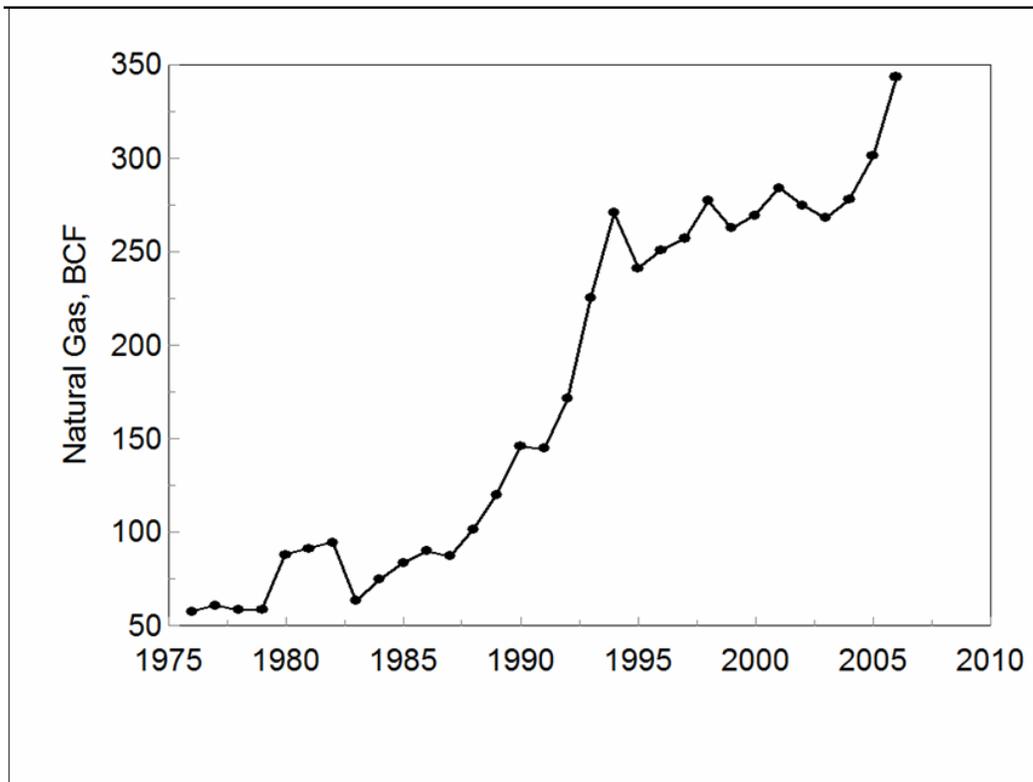


Figure 5 Utah Marketed Natural Gas Production

Source: Utah Division of Oil, Gas and Mining.

Not all gross withdrawals of natural gas are marketed to consumers. Due to low prices of natural gas during the late 1980s and early 1990s much of the gas produced in Utah during that period was not marketed. Instead, a large portion of the gas withdrawn from wells in Utah during this period was reinjected into the geologic formations to maintain pressure and oil production. The amount of gas used for repressuring in Utah reached a high in 1983, when 65 percent of gross withdrawals were reinjected to maintain pressure. Currently, approximately 95 percent of natural gas withdrawals in Utah are marketed. Most of the gas that is not marketed is used for fuel at the production site or is accounted for by non-hydrocarbon gases that are removed from the production stream prior to marketing.

Although natural gas production has been steadily rising and crude oil production in Utah has rebounded in recent years, production per individual well has been declining. Natural gas production per gas well peaked at 740 MMCF in 1962. Production per well steadily declined to 67 MMCF in 2000 before rising to 84 MMCF in 2006. Similarly, crude oil production per oil well peaked at 57,330 barrels in 1959, then dropped to 6,727 barrels in 2003. Crude oil production per well in Utah averaged 7,308 barrels during 2006.

During 2006, 129 operating companies reported crude oil and natural gas production to the Utah Division of Oil, Gas and Mining. Production occurred in 11 of Utah's 29 counties. Duchesne County had the highest oil production with 6,401,299 barrels while Uintah County led natural gas production with gross withdrawals of 204 BCF.

Six different areas in Utah currently have significant production of oil and/or natural gas. These areas are defined by geology. Additionally, these areas are somewhat isolated from one another economically, especially in terms of the oil and gas exploration and production (E&P) industry. The major oil and gas producing area in Utah is the Uinta Basin in the northeastern part of the state. Vernal is a center of the oil and gas industry in the Uinta Basin with many of the producing, drilling and service companies maintaining offices in the area. Other producing areas in Utah include both conventional coal-bed methane plays in Carbon and Emery Counties, the Paradox Basin in San Juan County, the Uncompahgre Uplift in Grand County, the Thrust Belt in Summit County as well as the recently discovered Hingeline in the central part of the state.

The Paradox Basin, Uncompahgre Uplift, and Thrust Belt all extend over state lines into adjacent states. Many workers involved in operating wells in these areas are actually employed outside Utah. Expanded gas operations in Carbon and Emery Counties and new oil production in the Hingeline are fairly recent discoveries and an oil service industry has not developed in these areas.

Defining the oil and gas E&P industry is a key element for a study of this type. Economists use the numerical North American Industry Classification System (NAICS) developed by the Office of Management and Budget to classify industries for reporting employment and earnings. The two-digit NAICS codes are divided into 20 major industrial sectors. These major sectors are then further subdivided as necessary industry information in more detail.

The NAICS codes have three industrial subdivision classifications that directly apply to the oil and gas E&P industry. These are NAICS 211–Oil and Gas Extraction, NAICS 213111–Drilling Oil and Gas Wells, and NAICS 213112–Support Activities for Oil and Gas Operations. For purposes of this study, these three industries are collectively considered the oil and gas E&P industry. Additional information on the NAICS codes for these three industries is available in Section 6.

The following section summarizes oil and gas production in the Overthrust. Also included are economic data for Summit County to place the oil and gas E&P industry in context.

3.1 The Overthrust

The Overthrust, sometimes referred to as the Thrust Belt or Overthrust Belt, was formed in the late Cretaceous Period when a western continental tectonic plate moved east, closing a Cretaceous seaway that ran through what is now central Utah, Wyoming, and parts of Idaho. The resulting thrust-faulting piled up geological formations on top of each other, creating complex structures that are ideal for trapping oil and gas.

The major reservoirs in the Overthrust are the Mississippian Madison Group, Pennsylvanian Weber Sandstone, Permian Phosphoria Formation, Triassic Dinwoody Formation, Jurassic Nugget Sandstone, and the Jurassic Twin Creek Limestone. The trapping mechanisms include anticlines in the hanging walls of detached thrust systems and untested subthrust structures beneath detached and basement-cored faults.

The first commercial discovery was Pineview field in 1975 and now there are ten producing fields. Average monthly production is 34,300 bbl of oil and 1.3 Bcf of gas. Enhanced oil recovery is by gas re-injection and horizontal drilling.

Figure 6 shows the location of Overthrust oil and gas fields in Summit County, with gas production predominating toward the northern end and oil production dominating toward the southern end. The trend can be seen continuing to the north, into Wyoming.

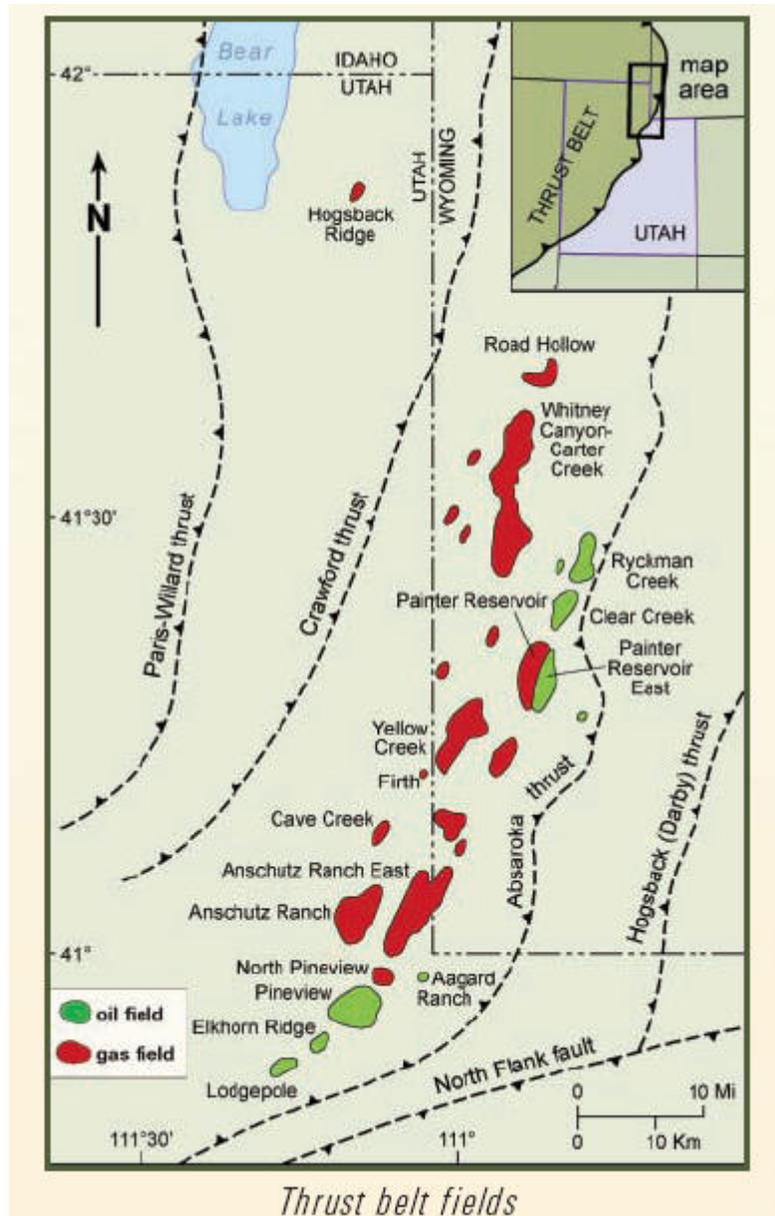


Figure 6 Overthrust Play and Field Location

Source: Utah Geological Survey.

The structure of the typical Overthrust field is seen in Figure 7, a cross-section of a typical Thrust Belt field. One can see how the formations have been “pushed up and over” themselves, creating a thrust-fault at the base and causing the tops of the formations to roll over, creating oil and gas traps. This type of trap can be complex and drilling targets are difficult to locate without sophisticated 3D seismic data.

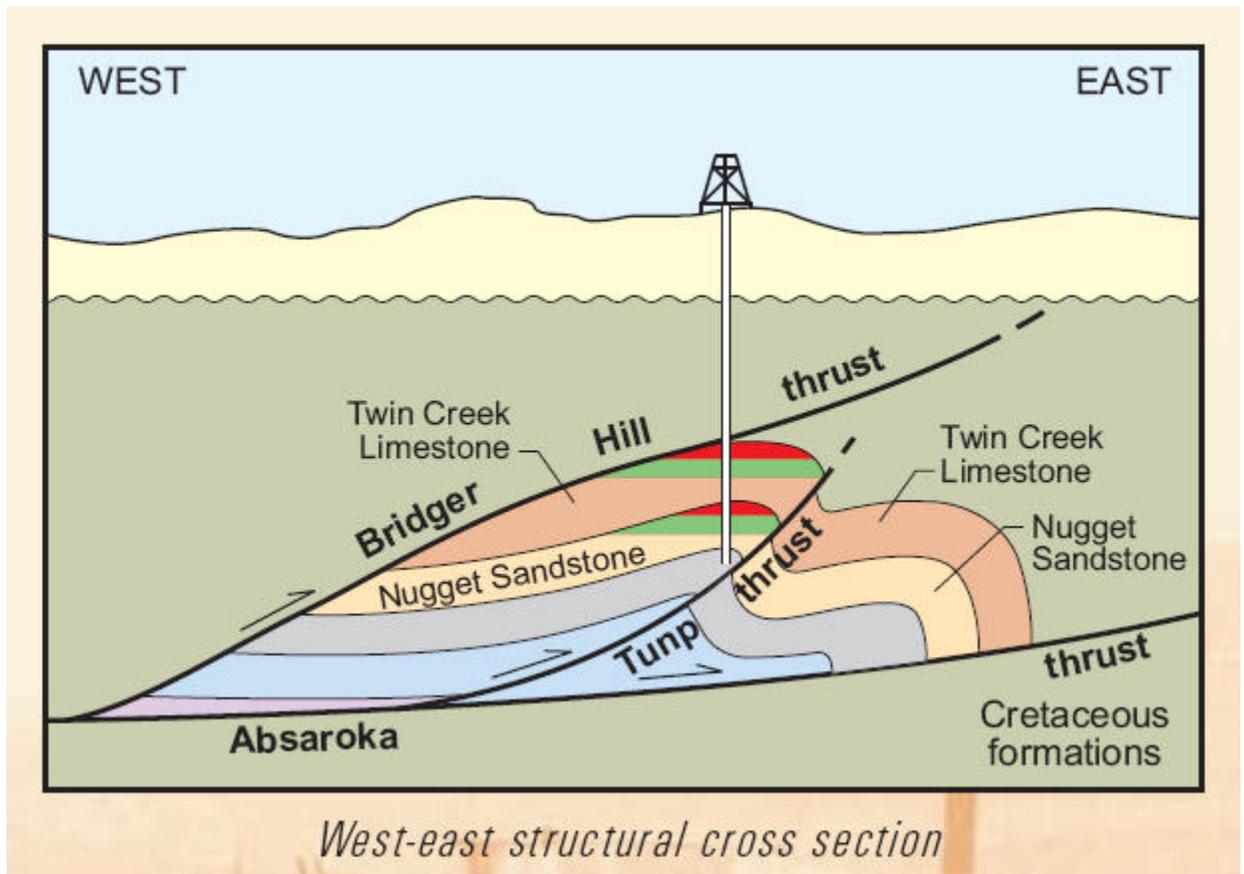


Figure 7 Typical Overthrust Field Cross-Section

Source: Utah Geological Survey.

Utah Division of Oil, Gas and Mining reports a total of 45 producing wells in Summit County. The operators and the number of active wells reported are presented in Table 2.

**Table 2
Oil and Gas Operators in Summit County**

Operator	Active Wells in Summit County
Merit Energy Company	31
Citation Oil and Gas Corp	9
Anschutz Corporation, The	2
Whiting Oil and Gas Corporation	2
Rim Operating Company	1

Source: Utah Division of Oil, Gas and Mining.

Active fields, as shown in Figure 7 include Firth, Cave Creek, Anschutz Ranch, Anschutz Ranch East, Pineview, North Pineview, Aagard Ranch, Elkhorn Ridge, and Lodgepole.

A majority of the land in Summit County, 54.3%, is privately held (Table 3). The federal government, primarily the U.S. Forest Service, also holds substantial acreage, 43.5% of the total. The remainder is held by the state.

Table 3
Land Ownership in Summit County

	Acreage	Percent of Total
Bureau of Land Management	695	0.0
US Forest Service	521,092	43.4
Military	0	0.0
USFS and BLM Wilderness	0	0.0
National Park Service	0	0.0
Total Federal	521,787	43.5
State Parks	802	0.0
State Wildlife Land	17,508	1.5
State Trust Lands	8,665	0.7
Total State Lands	26,975	2.2
Indian Lands	0	0.0
Private	651,069	54.3
Total	1,199,831	100.0

Source: Governor's Office of Planning and Budget

Crude oil and gas production in Summit County have been generally declining since 2003 (Table 4). Crude oil production in Summit County was 819,793 barrels in 2003 but decreased to 411,535 barrels by 2007. This is approximately two percent of the state's total production.

Natural gas production declined from 33,943,295 mcf in 2003 to 11,189,237 mcf in 2007. This is approximately four percent of the state total of over 356 BCF (2006).

Table 4
Summit County Oil and Gas Production, 2003-2007

	2007	2006	2005	2004	2003	Cumulative Production
Oil, bbls	411,535	398,579	472,156	587,176	819,793	180,246,686
Gas, mcf	11,189,237	11,211,675	16,526,002	23,769,095	33,943,295	3,186,005,094

Source: Utah Division of Oil, Gas and Mining.

Although production as been declining over the past 10 years, the rising prices have not stimulated additional drilling in recent years (Table 5). A maximum of four wells were spudded in 2006; however, none were spudded in 2007 or (thus far) in 2008.

Table 5 Wells Spudded in Summit County, 2004-2008

	2008	2007	2006	2005	2004
SPUDS	0	0	4	1	0

3.1.1 Summit County Economy

The population of Summit County has grown steadily between 1980 and 2007 (Figure 8) at a fairly consistent rate of about 1,500 per year. The 2005 population was estimated to be 35,001. The principal cities in Summit County are Coalville, Kamas, Oakley, and Park City. Towns are Francis and Henefer. Census-designated places include North Snyderville Basin, Samak, South Snyderville Basin, Summit Park, and Woodland. Other localities are Echo, Hoytsville and Peoa.

Most of the growth within the county can be attributed to the growth of the ski and tourism industry centered around Park City and including the Park City, Deer Valley, and The Canyons ski areas. This is evidenced by the large percentage employment in arts, entertainment and recreation, and accommodation and food services. The success of the tourism industry has spurred growth in the construction and real estate industries, as well.

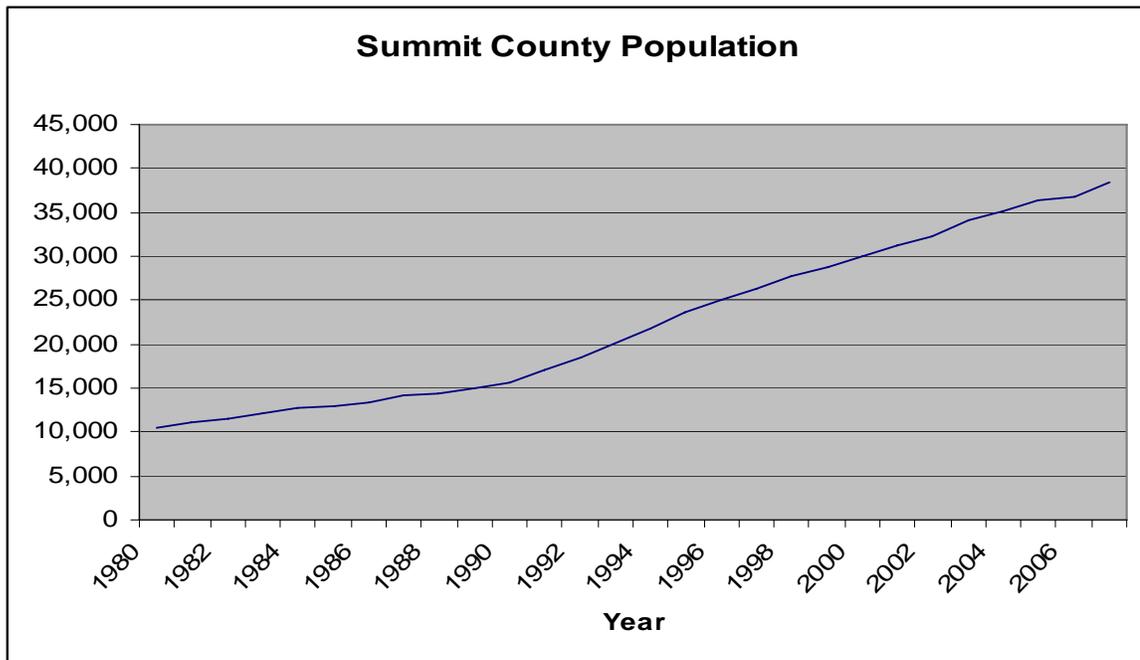


Figure 8 Summit County Population, 1980-2007

Source: Utah Governor’s Office of Planning and Budget.

Employment in Summit County has steadily risen from 1998 to 2007 while unemployment has declined to record levels, below 3%, as shown in Figure 9. A major factor in this has been the remarkable boom in recreation and tourism spawned by the major ski areas in the county.

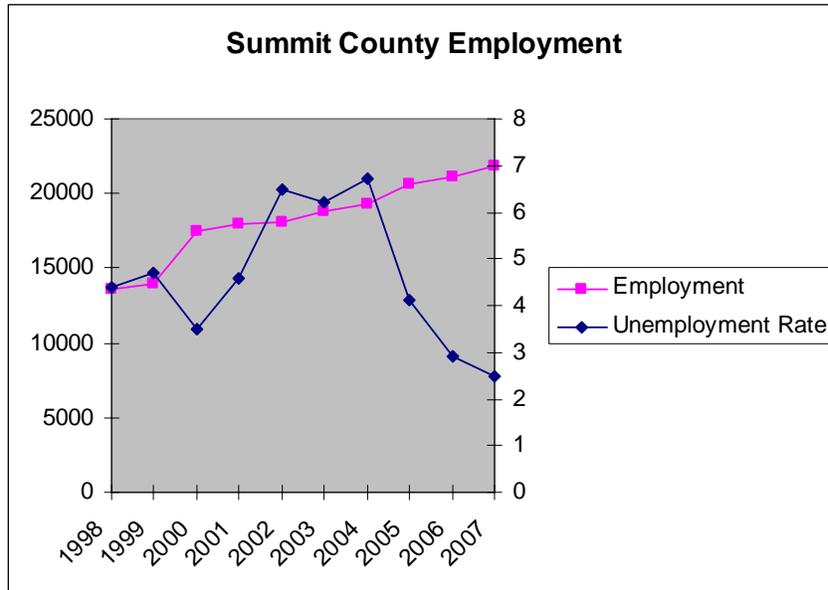


Figure 9 Summit County Employment and Unemployment Rate

Source: BLS, Local Area Unemployment Statistics.

Employment by industry in Summit County is significantly different from that of the state of Utah (Table 6). The tourism-based economy results in accommodation and food services, and arts, entertainment and recreation being very important to the local economy, with location quotients¹ of 2.38 and 9.57, respectively. Other industrial sectors important to Summit County are real estate, retail trade, and construction, with location quotients of 2.97, 1.16, and 1.70 respectively. Industries of noticeably lesser importance in Summit County than the state of Utah are manufacturing, information, finance and insurance, wholesale trade and professional, scientific and technical services.

The mining industry, which includes oil and gas extraction has a location quotient of only 0.79, indicating that it is not nearly as important to the Summit County economy as the recreation-related codes.

¹Location Quotients are the ratio of an industry’s share of employment in a study area, in this case Summit County, to its share in a reference area, e.g., the state of Utah.

Table 6
Employment by Industry in Summit County, 2006

NAICS	Industry	Summit County	Distribution Percentage	Location Quotient
11	Agriculture, Forestry, Fishing and Hunting	56	0.2%	0.30
21	Mining	79	0.5%	0.79
22	Utilities	50	0.3%	0.56
23	Construction	2,113	10%	1.70
31-33	Manufacturing	606	3%	0.26
42	Wholesale Trade	227	1%	0.24
44-45	Retail Trade	2,907	14%	1.16
48-49	Transportation and Warehousing	244	1%	0.36
51	Information	252	1%	0.51
52	Finance and Insurance	434	2%	0.44
53	Real Estate	1,045	5%	2.97
54	Professional, Scientific and Tech. Services	814	4%	0.68
55	Management of Companies and Enterprises	102	1%	0.35
56	Administrative and Support	692	3%	0.51
61	Educational Services	313	2%	0.87
62	Health Care	526	3%	0.22
71	Arts, Entertainment and Recreation	2,966	14%	9.57
72	Accommodation and Food Services	4,321	21%	2.38
81	Other Services	636	3%	0.89
	Government Employment	2,247	11%	1.72
	All Employment	2,0631	100%	1.00

Source: BLS, Quarterly Census of Employment and Wages.

The oil and gas industry is not a significant source of employment in Summit County. Data available from the Bureau of Labor Statistics, and the Utah Department of Workforce Services show that a total of 17 persons were employed in oil and gas extraction in Summit County in 2006 (NAICS 211). There was no employment in oil and gas drilling or in support activities for oil and gas operations.

The average annual wage in Summit County during 2006 was \$30,584, compared with \$35,130 for the state of Utah. (Table 7) One reason for the slightly lower annual wages in Summit County is the seasonal nature of its tourism-based economy. Many of the tourism-related jobs are seasonal in nature. The arts, entertainment and recreation (NAICS 71) and the accommodations and food service industries paid average annual salaries of only \$23,682 and \$19,040, respectively, during 2006. Again, many of these jobs are part-time and seasonal, resulting in low salaries.

Table 7
Average Annual Wages by Industry
in Summit County, 2006

Summit County	Average Annual Wages
Private Employment	
Agriculture, Forestry, Fishing and Hunting	\$18,438
Mining	52,953
Utilities	66,607
Construction	39,296
Manufacturing	42,145
Wholesale Trade	77,877
Retail Trade	23,610
Transportation and Warehousing	26,536
Information	44,355
Finance and Insurance	58,508
Real Estate	41,339
Professional, Scientific and Tech. Services	54,098
Management of Companies and Enterprises	76,405
Administrative and Support	33,266
Educational Services	29,642
Health Care	29,521
Arts, Entertainment and Recreation	23,682
Accommodation and Food Services	19,040
Other Services	32,076
Government Employment	36,465
All Employment	30,584

Source: BLS, Quarterly Census of Employment and Wages.

4 Economic Impacts

While rising energy prices are translating into rising employment and wages in the producing areas, not all of the economic gains are occurring in the oil and gas industry. The total increase in local economic conditions due to oil and gas activity is greater than the direct gain in the industry. This is the “multiplier effect” often referred to in economics and is a result of (1) local spending by the companies that supply goods and services to the oil and gas industry and (2) employees spending. These additional economic benefits are known as the indirect and induced benefits.

In this study, economic impact is defined as the effect on employment and wages in the subject areas. Additional information on economic impact is available in Section 6 and in several listed references.

4.1 Summit County

Many workers involved in oil and gas exploration and production and oilfield support services in Summit County actually live in other counties or in Wyoming. Summit County does benefit economically from the industry, primarily through royalty payments received on oil extractions. In 2006 a total of 17 workers were employed in the oil and gas exploration industry. Wages paid to these 17 employees totaled \$1,124,121.

In addition to the direct employment of 17 workers and wages of \$1.1 million are the secondary impacts that result from oil and gas exploration and production. These secondary impacts include jobs and wages received by employees working in many other industries in the county.

In 2006, the total economic impact of the oil and gas E&P industry in Summit County was 40 jobs and \$1,581,751 in wages. This includes direct employment of 17 workers and \$1.1 million in wages. The indirect and induced impacts included 23 workers and \$457,630 in additional wages (Table 8).

Table 8
Economic Impact of the Oil and Gas Industry
in Summit County, 2006

	Summit County	
	Employment	Wages (1000s)
Totals	20,620	\$636,907.8
E&P Direct	17	\$1,124.1
E&P Indirect and Induced	23	\$457.6
E&P % of total	40	\$1581.7

Source: Utah Department of Workforce Services.

As shown in Table 8, the oil and gas industry accounts for a very small percentage of the economy in Summit County.

5 Fiscal Benefits

The oil and gas industry also provides fiscal benefits for Summit County. Fiscal benefits include the effects on government finances and tax collections.

The oil and gas industry is subject to the tax laws common to all businesses. There are also taxes unique to the industry. Production on federal land is subject to a royalty payment under the Mineral Lands Leasing Act of 1920. This royalty is paid to

the Minerals Management Service, an agency within the U.S. Department of Interior. A portion of the federal mineral royalties is returned to the state of origin, generally one-half of the royalty payment. Royalties from production on Indian lands are returned to the appropriate tribe, not to the state government. Since a large portion of the crude oil production in Utah occurs on Indian lands, especially in Duchesne and San Juan Counties, the amount of crude oil royalty returned to the state government is significantly less than one-half of the amount paid to the Minerals Management Service. States have full discretion as to the distribution of federal mineral royalties as long as priority is given to areas with economic and/or social impacts from leasing activities. The Minerals Management Service does not release federal mineral royalty data at the county level, but statewide data are available.

Federal mineral royalties due to oil and gas production in Utah have increased dramatically from \$91 million in 2001 to nearly \$300 million in 2006, a 228 percent rise (Table 9). Oil and gas production accounted for 91.3 percent of the royalties paid for mineral production on federal land in Utah during 2006. There was also an additional \$103 million paid in bonuses and rents on federal mineral leases. These are fees associated with awarding federal mineral leases and maintaining the leases until production is initiated. Table 9 includes royalties due to oil and gas production, but does not include bonus or rent payments for federal oil and gas leases. Of the nearly \$300 million paid in federal mineral royalties by the oil and gas industry in Utah, \$109 million was returned to the state government.

**Table 9
Federal Mineral Royalty Payments and Disbursements for Utah, 2001-2006**

	Oil		Natural Gas		Total	
	Royalties	Disbursements	Royalties	Disbursements	Royalties	Disbursements
2001	\$32,799,794	\$4,392,667	\$58,553,527	\$26,210,621	\$91,353,321	\$30,603,288
2002	26,028,911	3,493,794	37,653,050	11,921,373	63,681,961	15,415,167
2003	37,462,357	5,575,810	55,369,036	26,040,706	92,831,293	31,616,515
2004	45,743,590	7,235,629	87,075,857	38,228,494	132,819,447	45,464,122
2005	66,900,212	10,405,687	118,132,687	53,647,636	185,032,900	64,053,323
2006	106,457,298	21,866,066	193,416,183	87,551,457	299,873,481	109,417,522

Note: Years are federal fiscal years. Natural gas includes natural gas liquids from gas processing plants.
Source: Minerals Management Service

In Utah, federal mineral royalties are distributed to several different accounts according to state law (Table 10). The largest recipients of federal mineral royalties in Utah are the Permanent Community Impact Fund and the Department of Transportation. The funds distributed to the Department of Transportation are then distributed to local governments to fund local highways in proportion to the amount of mineral lease money generated by each county. The Permanent Community

Impact Fund makes loans and grants to state agencies and subdivisions of state government impacted by mineral resource development. Unlike the funds administered by the Department of Transportation, which are distributed in proportion to royalties generated in the county, the Permanent Community Impact Fund is distributed by a state-appointed board in response to proposals submitted by state agencies and local governments. Therefore, the distribution of funds by the Permanent Community Impact Fund to the various counties may vary from the amount of royalty generated. The payments in lieu of taxes cited in Table 10 are not the payments in lieu of taxes made by the federal government for federal land in Utah but are payments made by the state government to counties for lands controlled by the School and Institutional Trust Lands Administration, state Division of Parks and Recreation and the state Division of Wildlife Resources.

Table 10
Distribution of Federal Mineral Royalties in Utah

Organization	Percent
Permanent Community Impact Fund	32.50
State Board of Education	2.25
Utah Geological Survey	2.25
Water Research Laboratory	2.25
Department of Transportation	40.00
Department of Community and Culture	5.00
Payments in Lieu of Taxes	52 cents per acre
Permanent Community Impact Fund	Remainder

Note: The amount paid for Payments in Lieu of Taxes has been adjusted annually since 1994 according to the Consumer Price Index.
Source: Utah State Code, Title 59, Chapter 21.

The School and Institutional Trust Lands Administration (SITLA) controls mineral rights on approximately 4.4 million acres in Utah. These lands are held in trust for the public schools in Utah and 11 other beneficiaries. They were established at statehood and through land exchanges with the federal government. During 2006, royalties paid for oil and gas extraction on SITLA lands totaled \$82.7 million. This was 51.0 percent of total SITLA revenue for 2006. These funds are not returned to the county of origin, but are placed in a permanent fund managed by the state treasurer on behalf of the public schools or distributed to the appropriate beneficiary as mandated. Dividends and interest from the Public School Fund are distributed annually to all Utah public schools based on an established formula.

In addition to royalties, there is an Oil and Gas severance tax in Utah and an Oil and Gas Conservation Fee that are levied on all production in the state. Revenue from the Oil and Gas Severance Tax is placed in the state general fund and the tax rate varies from 3 to 5 percent of the sales price. The Oil and Gas Conservation Fee

funds the state Division of Oil, Gas and Mining. The fee is imposed at a rate of 0.2 percent of the value of production.

Both the Oil and Gas Severance Tax and the Oil and Gas Conservation Fee have significantly increased in recent years (Table 11). The Oil and Gas Severance Tax increased by 82 percent from 2001 to 2006, while the Oil and Gas Conservation Fee increased by 102 percent. The drop from 2001 to 2002 was due to the decline of the wellhead price of natural gas produced in Utah from \$3.52 per MCF to \$1.99 per MCF. These data reflect statewide oil and gas operations and are not specific to Summit County.

Table 11
State Tax Collections Related to
Oil and Gas Production, 2001-2006

	Oil and Gas Severance Tax	Oil and Gas Conservation Fee
2001	\$39,357,798	\$2,748,318
2002	18,893,082	1,710,219
2003	26,745,279	1,943,755
2004	36,659,808	2,696,250
2005	53,484,320	3,631,963
2006	71,513,869	5,560,449
Note: Years are state fiscal years.		
Source: Utah State Tax Commission.		

5.1 Summit County

The largest direct fiscal impacts in Summit County due to oil and gas operations in the area are property taxes paid by the operating companies, the federal mineral royalties distributed to the local governments by the Utah Department of Transportation, and mineral revenue sharing money distributed to the local governments by SITLA. The Utah State Tax Commission centrally assesses oil and gas properties using a net present value approach applied to future production. The local county treasurers bill and collect the taxes. Property taxes are levied by numerous units of local government, including county and city governments, school districts, and special service districts.

Rents and royalties paid for production on SITLA lands located in Summit County have been decreasing since 2005 (Table 12). In 2005, oil and gas production in Summit County resulted in \$58,447 in SITLA royalties. Declining production resulted in a 23 percent decrease in 2007, with \$44,968 in SITLA royalties paid.

Table 12
Rents and Royalties Paid for
Production on SITLA Lands
in Summit County, 2005-2007

	Summit County
2005	\$58,447
2006	\$52,201
2007	\$44,968
Note: Years are state fiscal years. Source: School and Institutional Trust Lands Administration.	

SITLA and the federal government have exchanged a significant amount of acreage in order to facilitate mineral development and operations, particularly in the Drunkard's Wash area. As a result of HB 134, SITLA was directed to return certain mineral lease royalties to counties where the state has acquired federal lands as a result of land exchanges in order to equalize revenue to those counties in compensation for land-trades. The royalties returned to Summit County under the mineral revenue-sharing provision were \$5,891 in 2007 (Table 13).

Table 13
Mineral Revenue Sharing with
Land Exchanged to the United States

	Apr-Jun 2007	Jul-Sept 2007	Oct-Dec 2007	Jan-Mar 2007	Total
Summit County	\$1,718	\$1,057	\$1,173	\$1,943	\$5,891
Source: School and Institutional Trust Lands Administration.					

Property taxes paid on oil and gas properties comprise a little over 2% Summit County's of the total property tax revenue (Table 14). Table 14 refers to all property taxes paid to various government entities in the three counties, not just the county governments.

Table 14
Oil and Gas Property Tax Paid in Summit County, 2000-2006

Year	Oil and Gas Property Tax	Natural Resources Tax	Total Tax Revenue	O&G % of Total Tax Revenue
2006	\$2,009,266	\$2,305,883	\$90,718,977	2.21%
2005	2,276,655	2,548,189	90,404,821	2.52%
2004	3,524,321	379,151	92,014,135	3.83%
2003	2,229,433	2,495,979	79,811,524	2.79%
2002	2,779,320	3,045,451	75,026,754	3.70%
2001	3,448,173	3,703,899	68,617,888	5.03%
2000	699,262	986,315	65,84,4873	1.06%

Source: Utah State Tax Commission, Property Tax Division Annual Reports.

The funds generated through federal mineral royalties that are returned to the Uinta Basin through the Utah Department of Transportation are also a significant source of revenue for the local governments (Table 15). During 2006, Summit County received \$48,628 dollars in federal mineral royalties from the Utah Department of Transportation. In 2007 Summit County received \$90,355 in federal mineral royalties.

Table 15
Federal Mineral Royalties
Returned by UDOT, 2001-2006

	Summit County
2001	\$84,785
2002	81,353
2003	47,276
2004	46,525
2005	95,360
2006	48,628
2007	90,355
Note: Years are state fiscal years. Source: Utah Department of Transportation.	

6 Technical Notes and Methodology

Industries are classified by economists according to the North American Industry Classification System (NAICS), which was developed by the Office of Management and Budget in cooperation with other federal agencies and foreign governments (Office of Management and Budget, 2007). The NAICS codes replaced the Standard Industrial Classification (SIC) Codes that had been used since the 1930s. This change was prompted by structural changes in the U.S. economy, as the services sector became more complex and a much larger portion of the economy than when the SIC codes were developed. In the transition, the 10 major industrial sectors under the SIC system were replaced with 20 major sectors under the NAICS system. Many of the industrial sectors under the SIC system were split among two or more of the redefined NAICS sectors, making comparisons difficult. The NAICS codes better explain the structure of the current economy but make time series data difficult to compile.

Under the NAICS system, 20 major industrial categories are further subdivided as needed. To demonstrate the level of detail obtained, Table 16 presents the divisions of the mining (NAICS 21) sector. The mining sector is divided into a total of 28 different industries. The other 19 industrial sectors are similarly subdivided.

Other local businesses and industries benefit from E&P activities. Examples of these are seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and electric utilities. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. These types of effects are referred to as the indirect and induced impacts. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses using input-output economic models.

Table 16
NAICS Codes Related to the Mining Industry

NAICS Code	Industry
21	Mining, Quarrying, and Oil and Gas Extraction
211	Oil and Gas Extraction
2111	Oil and Gas Extraction
21111	Oil and Gas Extraction
211111	Crude Petroleum and Natural Gas Extraction
211112	Natural Gas Liquid Extraction
212	Mining (except Oil and Gas)
2121	Coal Mining
21211	Coal Mining
212111	Bituminous Coal and Lignite Surface Mining
212112	Bituminous Coal Underground Mining
212113	Anthracite Mining
2122	Metal Ore Mining
21221	Iron Ore Mining
212210	Iron Ore Mining
21222	Gold and Silver Ore Mining
212221	Gold Ore Mining
212222	Silver Ore Mining
21223	Copper, Nickel, Lead and Zinc Mining
212231	Lead Ore and Zinc Ore Mining
212234	Copper Ore and Nickel Ore Mining
21229	Other Metal Ore Mining
212291	Uranium-Radium-Vanadium Ore Mining
212299	All Other Metal Ore Mining
2123	Nonmetallic Mineral Mining and Quarrying
21231	Stone Mining and Quarrying
212311	Dimension Stone Mining and Quarrying
212312	Crushed and Broken Limestone Mining and Quarrying
212313	Crushed and Broken Granite Mining and Quarrying
212319	Other Crushed and Broken Stone Mining and Quarrying
21232	Sand, Gravel, Clay and Ceramic and Refractory Minerals Mining and Quarrying
212321	Construction Sand and Gravel Mining
212322	Industrial Sand and Gravel Mining
212324	Kaoline and Ball Clay Mining
212325	Clay and Ceramic and Refractory Minerals Mining
21239	Other Nonmetallic Mineral Mining and Quarrying
212391	Potash, Soda, and Borate Mineral Mining
212392	Phosphate Rock Mining
212393	Other Chemical and Fertilizer Mineral Mining
212399	All Other Nonmetallic Mineral Mining
213	Support Activities for Mining
2131	Support Activities for Mining

21311	Support Activities for Mining
213111	Drilling Oil and Gas Wells
213112	Support Activities for Oil and Gas Operations
213113	Support Activities for Coal Mining
213114	Support Activities for Metal Mining
213115	Support Activities for Nonmetallic Minerals (except Fuels) Mining

6.1 NAICS Codes Related to Oil and Gas Production

There are three classifications directly related to the oil and gas exploration and production industry. These are NAICS 211 – Oil and Gas Extraction, NAICS 213111 – Drilling Oil and Gas Wells, and NAICS 213112 – Support Activities for Oil and Gas Operations. These three classifications cover the operating companies, drilling companies, and service companies, respectively. For this study, we consider them collectively as the oil and gas E&P industry. The definitions listed are those developed by the Office of Management and Budget.

NAICS 211–Oil and Gas Extraction: Industries in the Oil and Gas Extraction subsector operate and/or develop oil and gas field properties. Such activities may include exploration for crude petroleum and natural gas; drilling, completing, and equipping wells; operation of separators, emulsion breakers, desilting equipment and field gathering lines for crude petroleum and natural gas; and all other activities in the preparation of oil and gas up to the point of shipment from the producing property. The subsector includes the production of crude petroleum, the mining and extraction of oil from oil shale and oil sands, and the production of natural gas, sulfur recovery from natural gas, and recovery of hydrocarbon liquids.

Establishments in this subsector include those that operate oil and gas wells on their own account and for others on a contract or fee basis. Establishments primarily engaged in providing support services, on a fee or contract basis, required for the drilling or operation of oil and gas wells (except geophysical surveying and mapping, mine site preparation, and construction of oil/gas pipelines) are classified in Subsector 213, Support Activities for Mining.

NAICS 213111–Drilling Oil and Gas Wells: This U.S. industry comprises establishments primarily engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, re-drilling, and directional drilling.

NAICS 213112 –Support Activities for Oil and Gas Operations: This U.S. industry comprises establishments primarily engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related activities). Services included are exploration (except geophysical surveying and

mapping); excavating slush pits and cellars; well surveying; running, cutting, and pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells.

6.2 Economic Impact Modeling

Economic impacts on an economy arise from exogenous sources or activities that inject new funds into the economy. Examples include new construction and products manufactured or produced locally and exported to users located outside the region. It is important for outside funds to be injected into a regional economy for economic impacts to occur. Activities financed with funds from inside a regional economy are simply a diversion of the region's resources, not an increase of the region's resources. Crude oil and natural gas from the producing areas in Utah are exported to refineries and markets in other portions of the country. Exporting oil and gas results in an inflow of funds, which creates a positive economic impact on the area.

In this study, economic impact is used to mean the impact of oil and gas E&P activities on the amount of employment and wages paid in the various producing regions in Utah.

The oil and gas exploration and production industry has a direct impact on the local economy through employment and wages paid by producers. In addition to the direct impacts are the indirect and induced impacts. Indirect impacts result from local spending by the companies that supply the E&P industry and induced impacts arise when employees of the E&P industry and the employees of companies that supply the E&P industry spend their wages.

Examples of indirect impacts are employment and wages at seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and utilities providing electricity. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses.

The RIMS II input-output model developed by the Bureau of Economic Analysis was used to determine the indirect and induced economic impacts of the oil and gas exploration and production industry in Summit County. The RIMS II model is based on an accounting framework called an input-output table. From each industry, an input-output table shows the industrial distribution of inputs purchased and outputs sold. The Bureau of Economic Analysis has developed a national input-output table (Bureau of Economic Analysis, 1997). To develop region-specific input-output tables, the national input-output table is modified using regional economic data. The

producer portion of the input-output table is modified using location quotients at the six-digit NAICS level based on personal income data for service industries and wage and salary data for nonservice industries. Household data is modified to account for commuting across regional boundaries and savings and taxes. Once the national input-output table is regionalized, the multipliers are estimated through the use of matrix algebra.

The impact of the oil and gas industry in Summit County was estimated using the direct effect multiplier coefficients provided in the RIMS II model. In this process, the direct effect multipliers were applied to direct employment in the oil and gas industry and to the direct wages paid by producers in Summit County. The direct employment and wages used in calculating the economic impacts were accessed from an on-line database maintained by the Utah Department of Workforce Services.

7 References

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The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry Phase I - Grand County

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List of Acronyms & Abbreviations

BCF	Billion Cubic Feet
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
DOGM	Utah Division of Oil, Gas and Mining
E&P	Exploration and Production
IPAMS	Independent Petroleum Association of the Mountain States
MCF	Thousand Cubic Feet
MMCF	Million Cubic Feet
MW	Megawatts
NAICS	North American Industry Classification System
NYMEX	New York Mercantile Exchange
PADD	Petroleum Administration for Defense District
SIC	Standard Industrial Code
SITLA	School and Institutional Trust Lands Administration
RIMS II	Regional Input-Output Modeling System
UDOT	Utah Department of Transportation
USFS	U.S. Forest Service
WTI	West Texas Intermediate Crude

The Structure and Economic Impact of Utah's Oil and Gas Exploration and Production Industry Phase I - Grand County

1 Executive Summary

The Bureau of Economic and Business Research at the University of Utah has completed an economic impact study of the oil and gas exploration and production industry in Grand County, Utah. Grand County has been a consistent producer of both crude oil and natural gas for several decades. From 1997 to 2006, crude oil production declined from 177,423 barrels to 125,340 barrels, a drop of 29 percent. The 2006 crude oil production was an increase of 27 percent over the near-term low of 98,975 barrels in 2003. The 2007 natural gas production of 6.9 BCF was a drop of 6.4 percent from the 2006 production of 7.3 BCF.

There are two main producing areas in Grand County, with wells in the Uncompahgre Uplift in the northern portion of the county producing most of the natural gas in the county. Wells west of Moab located in the Paradox Basin produce most of the crude oil in the county. The Uncompahgre Uplift is responsible for 91 percent of total production in the county (measured in barrels of oil equivalent), while 9 percent is from the Paradox Basin.

The wells in the Uncompahgre Uplift are closer to Grand Junction, Colorado than to Moab and are operated by personnel from Grand Junction. Since the firms operating these wells are located in Colorado and the employees live in Colorado, they have little economic impact on Grand County in terms of employment and wages. There is a positive economic impact on the Grand Junction area but this that is outside the scope of this report.

The wells in the Paradox Basin are operated by several oil service firms in Moab that contract with the wells' owners. During 2006, these firms were directly responsible for 0.5 percent of total employment and 0.8 percent of total wages paid in Grand County. When considering indirect and induced employment due to spending by the companies and their employees, oil and gas was responsible for 1.1 percent of employment and 1.3 percent of wages in Grand County in 2006.

There is a positive fiscal impact on Grand County due to oil and gas extraction. During 2006, property taxes on oil and gas wells in the county amounted to \$593,754 and were 7.3 percent of total property taxes collected in the county. Federal mineral royalties returned to Grand County during 2006 were \$783,048.

2 Background

The recent rise in the price of gasoline has refocused attention on energy markets with an intensity not seen since the collapse of oil prices in the mid 1980s. In contrast to the energy shortage of the 1970s, which was largely driven by constrained supply due to geopolitical issues, the recent runup is a result of increasing demand and decreasing supply from aging fields. Crude oil, and to a lesser extent natural gas, is a worldwide commodity with international supply and demand factors determining prices. Consumption of petroleum products is up worldwide, with developing countries driving the increase. Consumption of petroleum in China grew over 30 percent from 2002 to 2006. This rise in demand has resulted in a dramatic increase in the nominal price of crude oil (Figure 1).

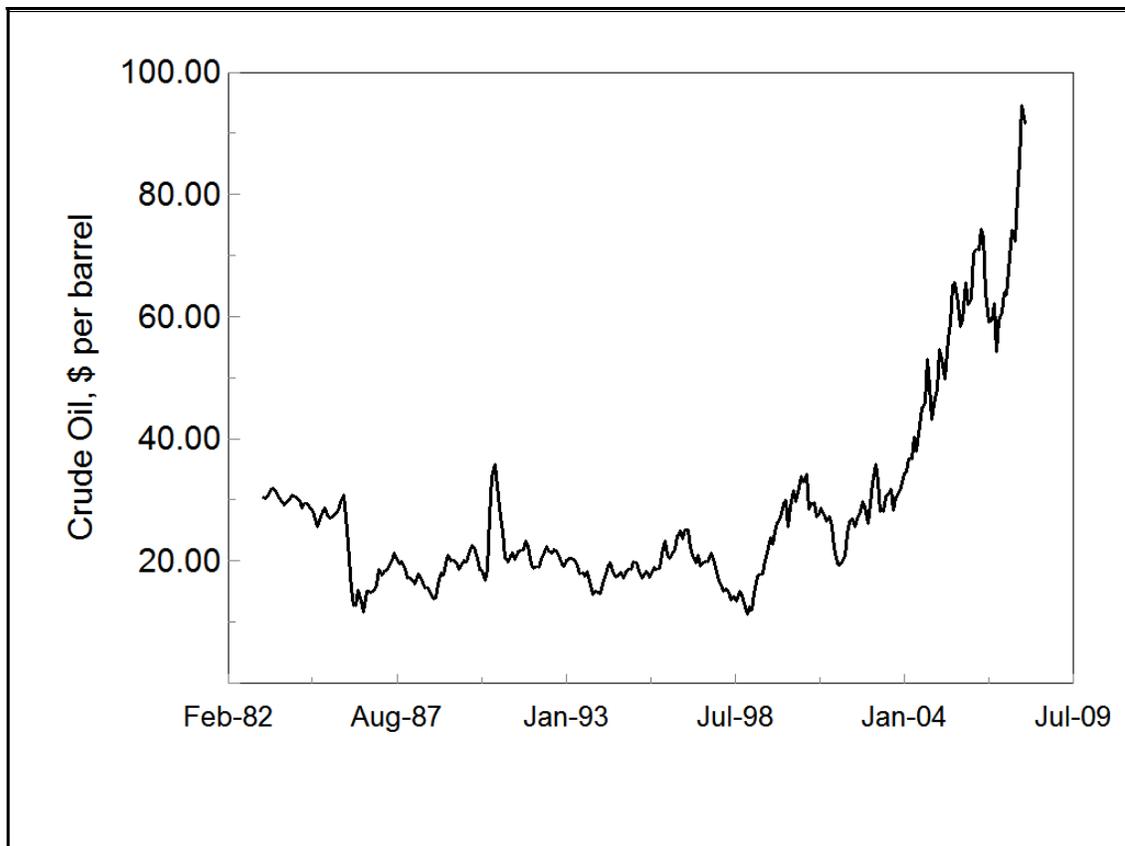


Figure 1 Crude Oil Price: NYMEX Near Month Contract for Light Sweet Crude

Source: Energy Information Administration

The price of crude was relatively flat during the 1990s, with prices in the \$20 to \$30 range. Then, from a low of \$11.31 per barrel in December 1998, crude oil increased to over \$70 per barrel in April 2006 and reached \$100 in January 2008. During mid-January 2008, the price was in the \$90 per barrel range. Forecasts expect crude

oil prices to remain near current levels in the future. In January 2008 the Energy Information Administration forecast the price of West Texas Intermediate Crude¹ would average about \$87 per barrel through the end of 2008.

At the same time, natural gas prices have increased from historically low values around \$2 per MCF in the late 1990s to a current price of about \$7 per MCF, with increased volatility in recent years (Figure 2). Natural gas is more of a regional commodity than crude oil, with more dependence on local supply and demand factors. The necessity of transporting natural gas by pipeline results in availability of transportation infrastructure having a large influence on regional prices. Currently, there is a shortage of pipeline capacity in the Rocky Mountains so wellhead natural gas prices in the area are depressed compared to the rest of the country. As of January 2008, the Energy Information Administration expects natural gas prices (the Henry Hub spot price) to average \$7.78 per MCF during 2008.

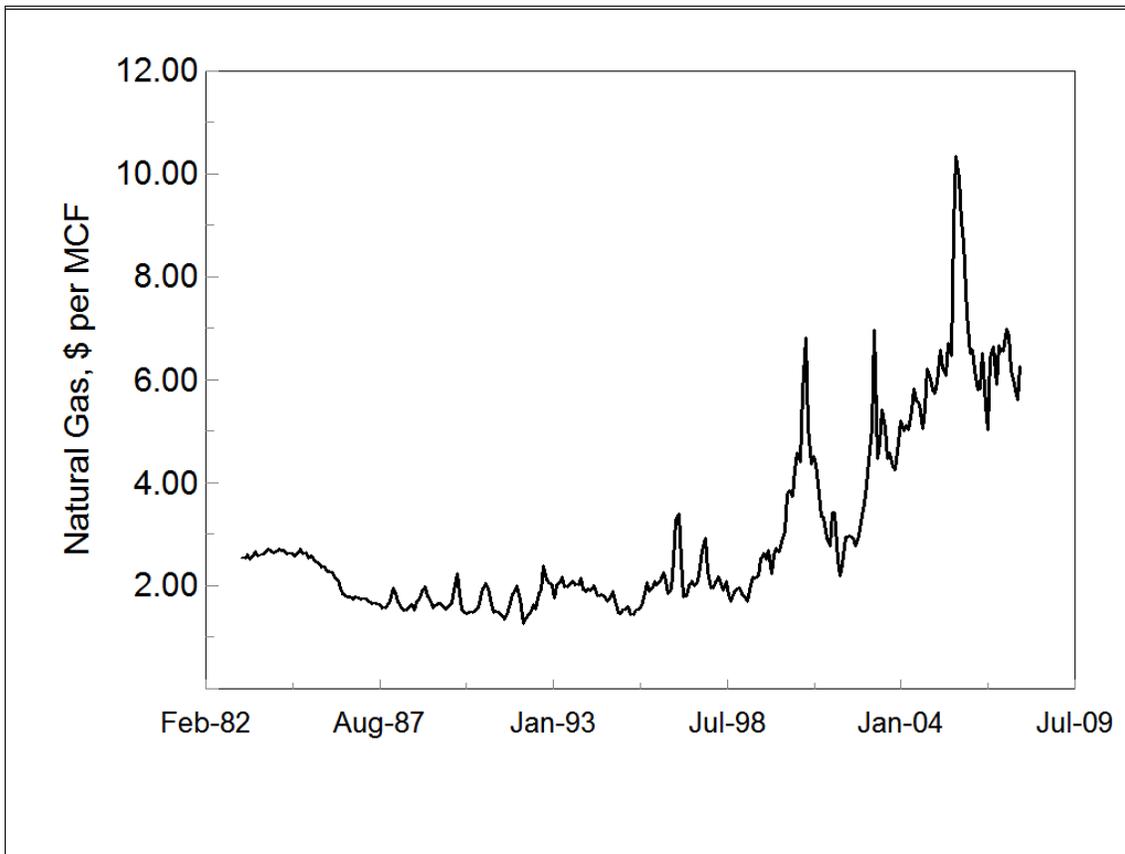


Figure 2 Monthly Average U.S. Wellhead Price of Natural Gas
Source: Energy Information Administration

¹West Texas Intermediate (WTI) refers to a crude stream produced in Texas and Oklahoma that is the most common reference or “marker” for pricing crude oil and, along with several other domestic and foreign crude streams, is acceptable for settling New York Mercantile Exchange contracts for light, sweet crude oil.

While increased demand in the Pacific Rim has driven petroleum prices, demand has also increased in the U.S. In addition, domestic crude oil production has declined from a high value of 3.5 billion barrels in 1970 to 1.9 billion barrels in 2006. Even with additional drilling in response to higher prices, domestic production is dropping due to geologic constraints. The Rocky Mountain states are the only area in the country currently experiencing significant increases in production of crude oil and natural gas. Of the five Petroleum Administration for Defense Districts (PADD) (Figure 3) used for analyzing petroleum data, crude oil and natural gas production are increasing at the highest rate in PADD IV (the Rocky Mountains) while PADD III (the Gulf Coast) and PADD V (the Pacific Coast) are declining. PADD III and PADD V have traditionally been the largest producing areas in the country.



Figure 3 Petroleum Administration for Defense Districts (PADD)

Source: Energy Information Administration

Although crude oil production increased 18.2 percent and natural gas 8.1 percent on the East Coast from 2002 to 2006, the region is responsible for less than one-half of one percent of domestic crude oil production and three percent of natural gas production. Over the same period, the amount of crude oil produced in the Rocky Mountains increased by 26.7 percent while production on the Gulf Coast (PADD III), the largest producing area in the country, dropped by 11.8 percent. The center for production of natural gas in the United States is also shifting from the Gulf Coast to the Rocky Mountains. In 1982, PADD III was responsible for 75.5 percent of U.S.

natural gas production and PADD IV supplied only 4.2 percent. By 2006, the amount of natural gas produced in PADD III had dropped to 61.2 percent of total production while the amount from PADD IV had increased to 18.2 percent. Additionally, natural gas production in the Rocky Mountains is increasing approximately five percent annually. The increase in crude oil and natural gas production in the Rocky Mountain states is creating an economic boom in the producing areas.

Table 1 U.S. Crude Oil and Natural Gas Production by PADD, 2002-2006

	PADD I	PADD II	PADD III	PADD IV	PADD V	United States Total
Crude Oil, thousand barrels						
2002	7,458	164,635	1,174,305	102,982	947,745	2,097,124
2003	7,170	161,360	1,162,869	105,931	636,123	2,073,453
2004	6,941	159,309	1,103,743	113,069	600,239	1,983,302
2005	8,299	161,587	1,023,499	123,956	572,765	1,890,106
2006	8,062	167,298	1,035,904	130,466	520,829	1,862,259
Percent Change, 2002-2006	8.1	1.6	(11.8)	26.7	(45.1)	(11.2)
Dry Natural Gas, MMCF						
2002	453,774	2,432,537	12,622,766	2,641,749	776,962	18,927,788
2003	521,824	2,336,271	12,662,381	2,797,202	780,866	19,098,544
2004	520,240	2,428,676	11,960,955	2,935,503	745,517	18,590,891
2005	522,997	2,413,736	11,298,362	3,075,234	763,907	18,074,237
2006	536,184	2,533,780	11,311,563	3,371,822	722,476	18,475,826
Percent Change, 2002-2006	18.2	4.2	(10.2)	27.6	(7.0)	(2.4)
Source: Energy Information Administration						

Despite the common perception of being vertically integrated, the oil and gas industry is highly fragmented, especially at the exploration and production stage. Many companies concentrate exclusively on oil and gas production and have no interest in downstream operations such as pipelines, refineries and product distribution. Additionally, much of the work conducted in the producing fields is contracted to other companies that specialize in different aspects of drilling and maintaining the wells. Few of the operating companies operate their own drill rigs but instead contract with companies that specialize in drilling. Other companies specialize in different operations such as grading well locations, well surveying, running and pulling well casings, cementing wells, perforating well casings and reservoir treatment and stimulation. The operating, drilling and service companies collectively constitute the oil and gas exploration and production industry.

Many other industries benefit from spending by the oil and gas industry. These include consulting geologists and engineering companies, environmental

consultants, vendors of oil field equipment, and pipeline and trucking companies. Spending by oil industry employees also benefits the local economy. These economic benefits beyond direct employment in the exploration and production industry are known as indirect and induced benefits, and are the source of the “multiplier” effect. This study examines the structure of the Utah oil and gas exploration and production industry and its economic impact on the producing areas.

3 Utah’s Oil and Gas Industry

The Utah oil and gas industry started in 1891, when a water well being drilled in Farmington Bay near the Great Salt Lake encountered natural gas at a depth of 1,000 feet. Gas from several wells in this area was transported to Salt Lake City through wooden pipelines for several years until shifting sand in the lakebed plugged the wells. The first oil was found in the early 1900s near Rozel Point at the north end of the Great Salt Lake, near Mexican Hat in southeastern Utah, and near the town of Virgin in southwestern Utah. The first large-scale commercial oil well was drilled near Vernal in 1948. Since the early 1960s, Utah has consistently ranked in the top 15 oil-producing states and in recent years has experienced a dramatic rise in natural gas production. During 2005, Utah ranked 15th in crude oil production out of 31 states and two Federal Offshore Areas and 11th in dry natural gas production out of 33 states and the Federal Offshore Area in the Gulf of Mexico.

Utah is contributing to the recent growth in crude oil and natural gas production taking place in the Rocky Mountain states (PADD IV). The state’s 2006 crude oil production of 17.9 million barrels was a 37 percent increase over the recent low of 13.1 million barrels produced in 2003 (Figure 4). Although a substantial increase from the recent past, 2006’s output was still only 44 percent of the all-time high of 41.1 million barrels produced in 1985.

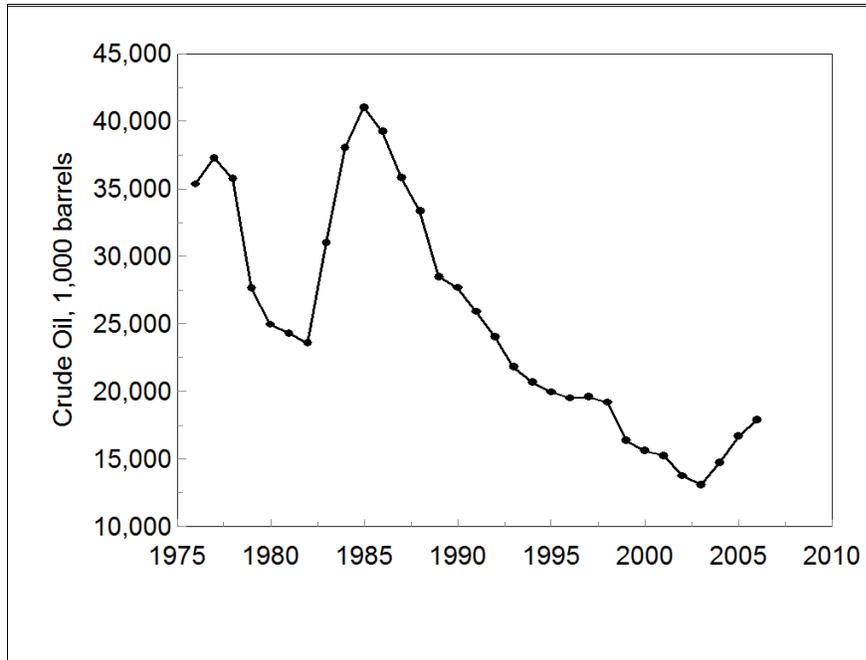


Figure 4 Utah Crude Oil Production
 Source: Utah Division of Oil, Gas and Mining

There has been an even greater rise in natural gas production in Utah. In 2006, Utah's marketed natural gas production hit an all-time high of 343 BCF, up 502 percent from 57 BCF in 1976 (Figure 5).

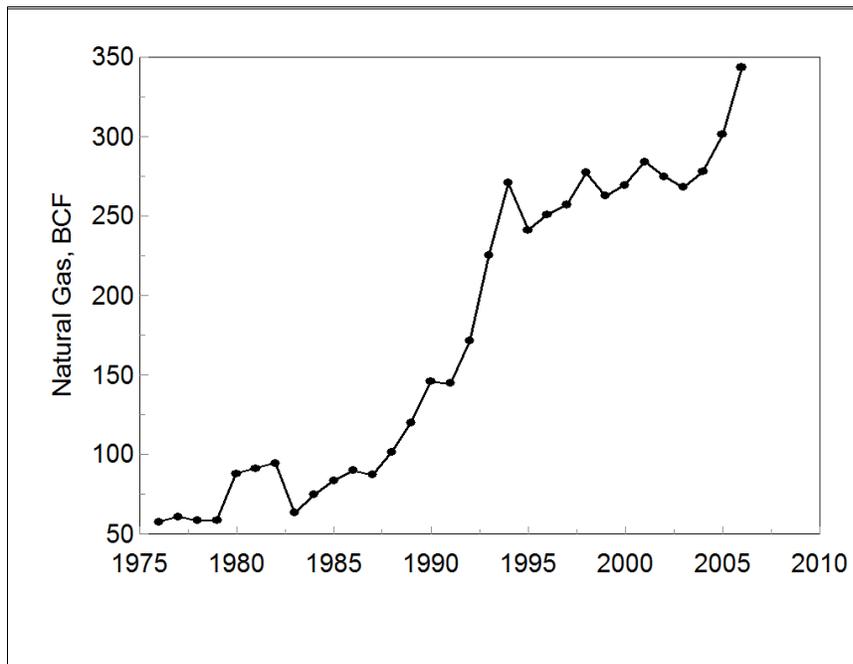


Figure 5 Utah Marketed Natural Gas Production
 Source: Utah Geological Survey

Not all gross withdrawals of natural gas are marketed to consumers. Low prices of natural gas during the late 1980s and early 1990s resulted in much of the gas produced in Utah at the time not being marketable. A large portion of the gas withdrawn from wells in Utah during this period was reinjected into the geologic formations to maintain pressure and oil production. The amount of gas used for repressuring in Utah reached a high in 1983, when 65 percent of gross withdrawals were reinjected to maintain pressure. Currently, approximately 95 percent of natural gas withdrawals in Utah are marketed. Most of the gas that is not marketed is used for fuel at the production site or is accounted for by nonhydrocarbon gases that are removed from the production stream prior to marketing.

Although natural gas production has been steadily rising and crude oil production in Utah has rebounded in recent years, average production per well has been declining. Natural gas production per gas well peaked at 740 MMCF in 1962. Production per well steadily declined to 67 MMCF in 2000 before rising to 84 MMCF in 2006. Similarly, crude oil production per oil well peaked at 57,330 barrels in 1959, then dropped to 6,727 barrels in 2003. Crude oil production per well averaged 7,308 barrels in 2006. In order to maintain total oil and gas production at current levels, additional drilling will have to continue.

During 2006, 129 different operating companies reported crude oil and natural gas production to the Utah Division of Oil, Gas and Mining. Production occurred in 11 of Utah's 29 counties. Duchesne County had the highest oil production with 6,401,299 barrels while Uintah County led natural gas production with gross withdrawals of 204 BCF.

Six different areas in Utah currently have significant production of oil and/or natural gas. These areas are defined by geology. Additionally, these areas are somewhat isolated from one another economically, especially in terms of the oil and gas exploration and production (E&P) industry. The major oil and gas producing area in Utah is the Uinta Basin in the northeastern part of the state. Vernal is a center of the oil and gas industry in the Uinta Basin with many of the producing, drilling and service companies maintaining offices in the area. Other producing areas in Utah include both conventional and coalbed methane plays in Carbon and Emery counties, the Paradox Basin in San Juan County, the Uncompahgre Uplift in Grand County, the Thrust Belt in Summit County and the recently discovered Hingeline in the central part of the state.

The Paradox Basin, Uncompahgre Uplift, and Thrust Belt all extend over state lines into adjacent states. Many of the workers involved in operating wells in these areas are actually employed in other states. Expanded gas operations in Carbon and

Emery counties and new oil production in the Hingeline are fairly recent discoveries, and an oil service industry has not yet developed in these areas.

Defining the oil and gas E&P industry is a key element for a study of this type. Economists use the numerical North American Industry Classification System (NAICS) developed by the Office of Management and Budget to classify industries for reporting employment and earnings. The two-digit NAICS codes are divided into 20 major industrial sectors. These major sectors are then further subdivided as necessary with the addition of more numerical digits after the first two.

The NAICS codes include three industrial subdivision classifications that directly apply to the oil and gas E&P industry. These are NAICS 211 – Oil and Gas Extraction, NAICS 213111 – Drilling Oil and Gas Wells, and NAICS 213112 – Support Activities for Oil and Gas Operations. For purposes of this study, these three industries are collectively considered the oil and gas E&P industry. Additional information on the NAICS codes for these three industries is available in Section 6.

The following section summarizes oil and gas production in Grand County. Also included are economic data for Grand County to place the oil and gas E&P industry in context.

3.1 Grand County

Most of the production in Grand County occurs in the northeast corner of the county in the Book Cliffs. There is also some production in the southwestern part of the county near Kane Creek where the Paradox Basin extends into the county from the south. Initial oil and gas activity in the county occurred in the 1890s and sporadic drilling occurred over the next 25 years. There were scattered reports of successful oil wells in the county during the early 1920s, but the first commercial discovery was the Cisco Dome Field in 1925. The Crystal Carbon Oil Company of Charleston, West Virginia constructed a plant northwest of Cisco that manufactured carbon black from natural gas in the area. The post – World War II uranium boom stimulated additional oil exploration in the county and additional wells were drilled at Cisco and at Kane Creek west of Moab. One well at Kane Creek reportedly produced 2,666 barrels per day. This era is also when many of the producing fields in the Book Cliffs were established. Uranium production came to an end in the area in the mid-1980s due to low prices, but several mines have recently reopened in surrounding counties. Currently, the largest mining operation located in Grand County is the Intrepid Moab – Potash LLC in situ leach operation. This mine employs an estimated 50 persons.

The county contains just under 2.4 million acres (Table 2), with 71.7 percent of the land controlled by the federal government. After including land controlled by the

state government and Indian lands, only 4.3 percent of Grand County is privately owned. With such a large portion of the land under federal control, the oil and gas E&P industry is highly sensitive to changes in federal land management policy. The largest federal landholder in Grand County the Bureau of Land Management, which is responsible for 66.0 percent of the land. An additional 3.2 percent is administered by the National Park Service. Lesser amounts are controlled by the U.S. Forest Service and the military.

The majority of the state land in Grand County is controlled by the Utah School and Institutional Trust Lands Administration (SITLA). SITLA administers 15 percent of the land in the county. Most of the SITLA land is a large block in the northern part of the county on the crest of the Book Cliffs. Lesser amounts are controlled by the Utah Division of Wildlife Resources and the Utah Division of State Parks and Recreation. Indian lands make up 8.4 percent of Grand County. The Indian lands are located in the northwest corner of the county where the Hill Creek Extension of the Uintah and Ouray Reservation extends south.

Table 2 Land Ownership in Grand County

	Grand County, acres	Percent of Total
Bureau of Land Management	1,559,814	66.0
National Park Service	75,362	3.2
U.S. Forest Service	57,321	2.4
Military	1,631	0.1
Total Federal	1,694,128	71.7
State Trust Lands	354,501	15.0
State Wildlife Lands	7,529	0.3
State Trust Parks	3,226	0.1
Total State Lands	365,255	15.5
Indian Lands	198,090	8.4
Private	100,763	4.3
Total	2,363,594	100.0
Source: Utah Governor's Office of Planning and Budget		

There are two major oil and gas producing areas in Grand County. The majority of the production occurs in the Uncompahgre Uplift in the northeast portion of the county. This area includes fields in the Book Cliffs and the Greater Cisco Field which is just north of Interstate-70. The other producing area in Grand County is in the southwest corner of the county, where the Paradox Basin extends into the county from the south. The Uncompahgre Uplift produces primarily natural gas while the Paradox Basin produces mostly crude oil. During 2006, 99.0 percent of the natural gas produced in Grand County was from the fields in the Book Cliffs and the Greater Cisco Field while 81.2 percent of the crude oil production was from five

fields west of Moab in the Paradox Basin. The majority of total production in the county occurs in the Book Cliffs and Greater Cisco Field. During 2006, these areas accounted for 90.9 percent of total oil and gas production in Grand County (measured in barrels of oil equivalent or BOE) while the remainder was from the fields in the Paradox Basin.

Aside from a dip in 2003 and a spike in 2004, production of both crude oil and natural gas has been fairly stable over the past 10 years (Table 3). Crude oil production in Grand County was 177,423 barrels in 1997, dropped to 98,975 barrels in 2003, rose to 233,686 barrels in 2004, and was 125,340 barrels in 2006. In 2006, Grand County was responsible for 0.7 percent of the crude oil produced in Utah.

Table 3 Grand County Crude Oil Production, 1997-2006

	Crude Oil, barrels	
	Grand County	State Total
1997	177,423	19,592,548
1998	141,786	19,223,542
1999	140,599	16,376,521
2000	197,559	15,609,030
2001	120,176	15,273,926
2002	121,091	13,770,860
2003	98,975	13,098,424
2004	233,686	14,799,208
2005	197,801	16,675,302
2006	125,340	17,926,580
Percent of State Total, 2006	0.7	100.00
Source: Utah Division of Oil, Gas and Mining		

Like crude oil, natural gas production from Grand County has been basically flat over the past 10 years (Table 4). From the 1997 production of 7.3 BCF, production dropped to 5.3 BCF in 2000, increased to 7.2 BCF in 2004 and was 6.9 BCF in 2006. During 2006, 1.9 percent of the natural gas produced in Utah originated in Grand County.

Table 4 Grand County Natural Gas Production (Gross Withdrawals), 1997-2006

	Natural Gas, MCF	
	Grand County	State Total
1997	7,321,799	272,553,774
1998	6,392,678	297,503,246
1999	6,309,417	277,494,312
2000	5,287,347	281,170,016
2001	5,600,641	300,975,578
2002	5,538,288	293,030,004
2003	5,623,912	287,141,238
2004	7,225,111	293,735,994
2005	6,580,723	313,465,305
2006	6,854,143	356,361,028
Percent of State Total, 2006	1.9	100.0
Source: Utah Division of Oil, Gas and Mining		

Although production has been flat over the past 10 years, rising prices have stimulated additional drilling in recent years (Table 5). From a low of only one well spudded in the county in 1999, drilling activity increased to between four and eight wells spudded each year from 2000 through 2004. Then, in 2005, 29 wells were spudded in the county and another 25 in 2006.

Table 5 Wells Spudded in Grand County, 1997-2006

	Wells Spudded	
	Grand County	State Total
1997	4	430
1998	6	430
1999	1	283
2000	4	540
2001	6	627
2002	4	391
2003	6	480
2004	8	659
2005	29	889
2006	25	1,057
Percent of State Total, 2006	2.4	100.00
Source: Utah Division of Oil, Gas and Mining		

3.1.1 Grand County Economy

While both crude oil and natural gas have been produced in Grand County for nearly 100 years, the production must be placed in the context of the total economy of the county.

Grand County had an estimated 2006 population of 9,024, up 6.6 percent from 2002 (Table 6). Incorporated areas in the county include Moab, with an estimated 2006 population of 4,875, and Castle Valley (364). The 2000 Decennial Census determined that 76.6 percent of the population lives in the urban area of Moab.² Although it contained over three-fourths of the population of the county, the urban area accounted for only 0.13 percent of the county's land area.

Table 6 Grand County Population, 2002-2006

	Population	
	Grand County	State Total
2002	8,468	2,358,330
2003	8,464	2,413,618
2004	8,611	2,469,230
2005	8,826	2,547,389
2006	9,024	2,615,129

Source: Utah Population Estimates Committee

Although Grand County has a population of less than 10,000 persons, Mesa County, Colorado, located immediately to the east of Grand County, had an estimated population of 134,189 in 2006. Grand Junction, the largest city in Mesa County, had an estimated population of 46,898. The natural gas fields in the Book Cliffs are approximately 40 to 50 miles from Grand Junction and 80 to 90 miles from Moab. Since the major gas-producing fields in Grand County are closer to Grand Junction than to Moab, almost all of the workers involved in operating these fields actually live in Colorado. This area of Colorado is also a major oil and gas producing area in its own right. Collectively, Garfield and Mesa counties, Colorado produced 1.2 million barrels of oil and 356 BCF of natural gas in 2006. Approximately 95 percent of this production occurred in Garfield County, but Grand Junction is the nearest sizeable city and the commercial center of the oil and gas industry in the area.

Unlike many areas known for oil and gas production, the Grand County economy is not based on energy production but on tourism. Arches National Park is located just

²The Bureau of the Census defines urban areas as census blocks that have a population density of at least 1,000 persons per square mile and surrounding census blocks with a population density of 500 persons per square mile. Adjacent census blocks with a lower population density are also included if they meet additional criteria established by the Bureau of the Census.

north of Moab, while Canyonlands National Park is located just south of the county line in San Juan County. River rafting and mountain biking also contribute to the tourism-based economy. The presence of these tourist attractions, coupled with many of the workers involved in the local oil and gas industry working out of Mesa County, Colorado, results in Grand County being more economically dependent on tourism than on oil and gas extraction.

The tourism industry is very seasonal and Grand County experiences large fluctuations throughout the year in both local employment and the unemployment rate (Figure 6). During the winter months, when tourism is at an ebb, the unemployment rate in Grand County routinely exceeds 10 percent and even hit 16.0 percent in January 2002. During the summer months, unemployment in the county drops to levels similar to that in the state as a whole. Conversely, employment in Grand County spikes during the summer months and drops during the winter. In recent years, total employment in Grand County has varied by about 35 percent from the winter low to the high point during the summer tourism season.

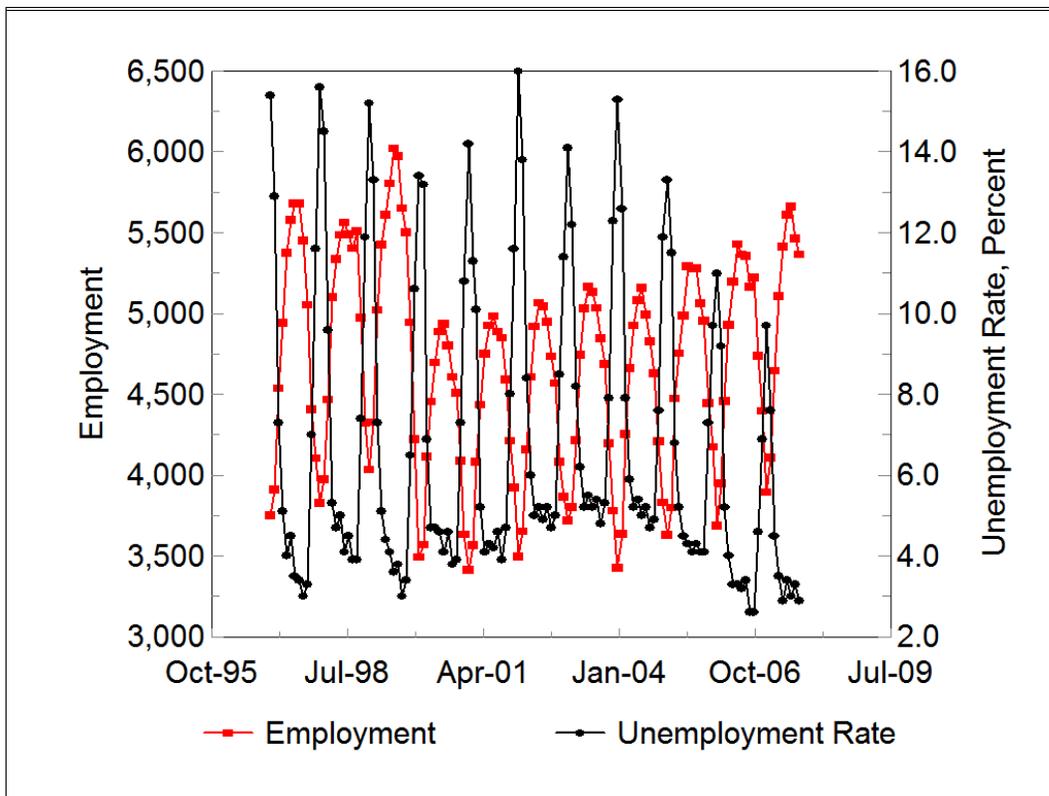


Figure 6 Employment and the Unemployment Rate in Grand County
 Source: BLS, Local Area Unemployment Statistics

The industrial structure of Grand County is significantly different from that of the state of Utah (Table 7). The tourism-based economy results in Accommodation and Food

Services (NAICS 72), and Arts, Entertainment and Recreation (NAICS 71) being very important to the local economy, with location quotients³ of 3.62 and 3.33, respectively. Other important industrial sectors are Real Estate (NAICS 53) and Retail Trade (NAICS 44-45), with location quotients of 2.24 and 1.29, respectively. Industries of noticeably lesser importance in Grand County than the state of Utah are Manufacturing (NAICS 31-32), Information (NAICS 51), Finance and Insurance (NAICS 52), Wholesale Trade (NAICS 42) and Professional, Scientific and Technical Services (NAICS 54).

³Location quotients are the ratio of an industry's share of employment in a study area, in this case Grand County, to its share in a reference area, e.g., the state of Utah.

Table 7 Employment by Industry in Grand County, 2006

	Grand County	Distribution, Percent	Location Quotient
Private Employment			
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	ND	ND	ND
Mining (NAICS 21)	ND	ND	ND
Utilities (NAICS 22)	ND	ND	ND
Construction (NAICS 23)	327	7.4	0.91
Manufacturing (NAICS 31-32)	46	1.0	0.10
Wholesale Trade (NAICS 42)	59	1.3	0.35
Retail Trade (NAICS 44-45)	687	15.5	1.29
Transportation and Warehousing (NAICS 48-49)	ND	ND	ND
Information (NAICS 51)	32	0.7	0.27
Finance and Insurance (NAICS 52)	70	1.6	0.34
Real Estate (NAICS 53)	150	3.4	2.24
Professional, Scientific and Technical Services (NAICS 54)	116	2.6	0.50
Management of Companies and Enterprises (NAICS 55)	ND	ND	ND
Administrative and Support (NAICS 56)	ND	ND	ND
Educational Services (NAICS 61)	49	1.1	0.67
Health Care (NAICS 62)	258	5.8	0.67
Arts, Entertainment and Recreation (NAICS 71)	218	4.9	3.33
Accommodation and Food Services (NAICS 72)	1,251	28.2	3.62
Other Services (NAICS 81)	58	1.3	0.52
Government Employment	826	18.6	1.13
Total Employment	4,440	100.0	
ND: Not disclosed to protect individual company information. Data are included in the totals. Source: BLS, Quarterly Census of Employment and Wages			

There is little direct employment in the oil and gas industry in Grand County (Table 8). No operating companies maintain offices in the county, but instead work out of the Grand Junction area or contract with others for well operations. The Utah Department of Workforce Services lists two well-drilling companies (NAICS 213111) located in the county. Conversations with both of these companies indicated that they are involved in all aspects of the drilling industry and do not limit their business to oil and gas. During recent years, most of their business has been in uranium exploration and some drilling of water wells. Several oil service companies (NAICS 213112) are listed in the area and their total average employment during 2003 was 24 persons.

Table 8 Oil and Gas E&P Employment in Grand County, 2001-2006

	NAICS 211 Oil and Gas Extraction	NAICS 213111 Drilling Oil and Gas Wells	NAICS 213112 Support Activities for Oil and Gas Operations
Grand County			
2001	ND	0	ND
2002	0	0	ND
2003	ND	ND	ND
2004	0	ND	ND
2005	0	ND	ND
2006	0	ND	24
ND: Not disclosed to protect individual company data. Source: BLS, Quarterly Census of Employment and Wages			

Although no operating companies reported employment in Grand County during 2006, 40 companies reported production of crude oil and/or natural gas to the Utah Division of Oil, Gas and Mining.

The average annual wage in Grand County during 2006 was \$24,577, compared to \$35,130 for the state of Utah. A major reason for the relatively low annual wages in Grand County is the seasonal nature of its tourism-based economy. Many of the tourism-related jobs are only available during the summer months, when tourism is most active. The Arts, Entertainment and Recreation (NAICS 71) and the Accommodations and Food Service (NAICS 72) industries paid average annual salaries of only \$15,370 and \$14,141 during 2006. Again, many of these jobs are part-time and seasonal, resulting in low salaries.

Table 9 Average Annual Wages by Industry in Grand County, 2006

	Grand County
Private Employment	
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	ND
Mining (NAICS 21)	ND
Utilities (NAICS 22)	ND
Construction (NAICS 23)	\$29,559
Manufacturing (NAICS 31-32)	23,938
Wholesale Trade (NAICS 42)	44,817
Retail Trade (NAICS 44-45)	20,328
Transportation and Warehousing (NAICS 48-49)	ND
Information (NAICS 51)	27,783
Finance and Insurance (NAICS 52)	29,066
Real Estate (NAICS 53)	23,120
Professional, Scientific and Technical Services (NAICS 54)	30,964
Management of Companies and Enterprises (NAICS 55)	ND
Administrative and Support (NAICS 56)	ND
Educational Services (NAICS 61)	17,080
Health Care (NAICS 62)	33,044
Arts, Entertainment and Recreation (NAICS 71)	15,370
Accommodation and Food Services (NAICS 72)	14,141
Other Services (NAICS 81)	22,715
Government Employment	34,367
All Employment	24,577
ND: Not disclosed to protect individual company information.	
Source: BLS, Quarterly Census of Employment and Wages	

Wages for the mining industry are not disclosed but the statewide average wage for Other Nonmetallic Mineral Mining (NAICS 21239), the industrial code that includes Intrepid Moab – Potash LLC, was \$53,612 during 2006. The oil service companies (NAICS 213112) in Grand County paid an average wage of \$34,421 during 2006 (Table 10). This is a higher average wage than all industrial sectors in Grand County for which data are disclosed (at the two-digit NAICS level) except Wholesale Trade.

Table 10 Oil and Gas E&P Average Annual Wages in Grand County, 2001-2006

	NAICS 211 Oil and Gas Extraction	NAICS 213111 Drilling Oil and Gas Wells	NAICS 213112 Support Activities for Oil and Gas Operations
Grand County			
2001	ND	0	ND
2002	0	0	ND
2003	ND	ND	ND
2004	0	ND	ND
2005	0	ND	ND
2006	0	ND	\$34,421
ND: Not disclosed to protect individual company data.			
Source: BLS, Quarterly Census of Employment and Wages			

4 Economic Impacts

While rising energy prices are translating into rising employment and wages in the producing areas, not all of the economic gains are occurring in the oil and gas industry. The total increase in local economic conditions due to oil and gas activity is greater than the direct gain in the industry. This is the “multiplier effect” often referred to in economics and is a result of local spending by the industry for goods and services and spending of wages by the industry’s employees. These additional economic benefits are known as the indirect and induced benefits, respectively.

In this study, economic impact is defined as the effect on employment and wages in the subject areas. Additional information on economic impact is available in Section 6 and in several listed references.

4.1 Grand County

While most of the persons involved in oil and gas production in Grand County actually live in Colorado, Grand County does benefit economically from the industry. The wells west of Moab in the Paradox Basin are operated by companies that contract with the well owners. Additionally, the service companies in the area purchase operating supplies from local merchants, and employee spending also benefits the local economy. Direct employment in the oil service companies located in Grand County accounted for 0.5 percent of total employment and 0.8 percent of total wages in the county in 2006 (Table 11).

Table 11 Direct Employment and Wages in the E&P Industry in Grand County, 2006

	Grand County	
	Employment	Wages, 1,000
Total	4,440	\$109,122
E&P Industry, Direct	24	829
E&P Industry, percent of total	0.5	0.8

Source: BLS, Quarterly Census of Employment and Wages; author's estimates.

In addition to the direct employment, additional jobs and wages due to spending by the industry and its employees results in additional employment in Grand County (Table 12). The industry other than mining with the most employment due to oil and gas operations is Retail Trade (NAICS 44-45), with 11 to 12 employees. In total, oil and gas extraction is responsible for an estimated 49 jobs in Grand County. This includes the 24 direct jobs in the oil service companies located in the area and an additional 25 jobs due to spending by the companies and their employees.

Table 12 Employment Due to Oil and Gas E&P in Grand County, 2006

	Grand County Total Employment	Employment Due to Oil and Gas E&P	Oil and Gas E&P Employment, percent of total
Private Employment			
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	ND	0.0	NA
Mining (NAICS 21)	ND	24.0	NA
Utilities (NAICS 22)	ND	0.1	NA
Construction (NAICS 23)	327	0.9	0.3
Manufacturing (NAICS 31-32)	46	0.0	0.1
Wholesale Trade (NAICS 42)	59	0.1	0.2
Retail Trade (NAICS 44-45)	687	11.6	1.7
Transportation and Warehousing (NAICS 48-49)	ND	0.3	NA
Information (NAICS 51)	32	0.1	0.3
Finance and Insurance (NAICS 52)	70	0.3	0.4
Real Estate (NAICS 53)	150	2.2	1.4
Professional, Scientific and Technical Services (NAICS 54)	116	0.4	0.3
Management of Companies and Enterprises (NAICS 55)	ND	0.0	NA
Administrative and Support (NAICS 56)	ND	0.5	NA
Educational Services (NAICS 61)	49	0.1	0.2
Health Care (NAICS 62)	258	0.7	0.3
Arts, Entertainment and Recreation (NAICS 71)	218	0.2	0.1
Accommodation and Food Services (NAICS 72)	1,251	0.9	0.1
Other Services (NAICS 81)	58	6.1	10.5
Households	NA	NA	NA
Government Employment	826	NA	NA
All Employment	4,440	49.0	1.1

ND: not disclosed. Data are included in the totals. NA: not applicable.
Source: BLS, Quarterly Census of Employment and Wages; author's calculations.

Oil and gas E&P accounts for approximately \$1.5 million of wages paid in Grand County (Table 13). The industry is responsible for a higher percentage of wages than employment due to oil and gas E&P paying above average wages. Other than Mining (NAICS 21), the industry with the highest amount of wages due to oil and gas operations in the county is Retail Trade (NAICS 44-45) with \$261,000 in wages during 2006.

Table 13 Wages Due to Oil and Gas E&P in Grand County, 2006

	Grand County Total Wages, \$1,000	Wages Due to Oil and Gas E&P, \$1,000	Oil and Gas E&P Wages, percent of total
Private Employment			
Agriculture, Forestry, Fishing and Hunting (NAICS 11)	ND	1	NA
Mining (NAICS 21)	ND	829	NA
Utilities (NAICS 22)	ND	5	NA
Construction (NAICS 23)	9,654	37	0.4
Manufacturing (NAICS 31-32)	1,107	2	0.2
Wholesale Trade (NAICS 42)	2,640	5	0.2
Retail Trade (NAICS 44-45)	13,960	261	1.9
Transportation and Warehousing (NAICS 48-49)	ND	11	NA
Information (NAICS 51)	896	5	0.5
Finance and Insurance (NAICS 52)	2,044	10	0.5
Real Estate (NAICS 53)	3,468	72	2.1
Professional, Scientific and Technical Services (NAICS 54)	3,587	18	0.5
Management of Companies and Enterprises (NAICS 55)	ND	2	NA
Administrative and Support (NAICS 56)	ND	10	NA
Educational Services (NAICS 61)	831	2	0.2
Health Care (NAICS 62)	8,531	25	0.3
Arts, Entertainment and Recreation (NAICS 71)	3,356	3	0.1
Accommodation and Food Services (NAICS 72)	17,685	12	0.1
Other Services (NAICS 81)	1,310	156	11.9
Households	NA	NA	NA
Government Employment	28,387	NA	NA
All Employment	109,122	1,468	1.3
ND: not disclosed; NA: not applicable.			
Source: BLS, Quarterly Census of Employment and Wages; author's calculations.			

5 Fiscal Impacts

The oil and gas industry also has fiscal impacts on the local areas. Fiscal impacts refer to impacts on government finances and tax collections. The oil and gas industry is subject to the tax laws common to all businesses. There are also impacts unique to the industry. Production on federal land is subject to a royalty payment under the Mineral Lands Leasing Act of 1920. This royalty is paid to the Minerals Management Service, an agency within the U.S. Department of Interior. A portion of the federal mineral royalties is returned to the state of origin, generally one-half. Royalties from

production on Indian lands are returned to the appropriate tribe, not to the state government. Since a large portion of the crude oil production in Utah occurs on Indian lands, especially in Duchesne and San Juan Counties, the amount of crude oil royalty returned to the state government is significantly less than one-half of the amount paid to the Minerals Management Service. The states have full discretion as to the distribution of federal mineral royalties as long as priority is given to areas with economic and/or social impacts from leasing activities. The Minerals Management Service does not release federal mineral royalty data at the county level, but statewide data are available.

Federal mineral royalties due to oil and gas production in Utah have increased dramatically from \$91 million in 2001 to nearly \$300 million in 2006, a 228 percent rise (Table 14). Oil and gas production accounted for 91.3 percent of the royalties paid for mineral production on federal land in Utah during 2006. There was also an additional \$103 million paid in bonuses and rents on federal mineral leases. These are fees associated with awarding federal mineral leases and maintaining the leases until production is initiated. Table 14 includes royalties due to oil and gas production, but does not include bonus or rent payments for federal oil and gas leases. Of the nearly \$300 million paid in federal mineral royalties by the oil and gas industry in Utah, \$109 million was returned to the state government.

Table 14 Federal Mineral Royalty Payments and Disbursements for Utah, 2001-2006

	Oil		Natural Gas		Total	
	Royalties	Disbursements	Royalties	Disbursements	Royalties	Disbursements
2001	\$32,799,794	\$4,392,667	\$58,553,527	\$26,210,621	\$91,353,321	\$30,603,288
2002	26,028,911	3,493,794	37,653,050	11,921,373	63,681,961	15,415,167
2003	37,462,357	5,575,810	55,369,036	26,040,706	92,831,293	31,616,515
2004	45,743,590	7,235,629	87,075,857	38,228,494	132,819,447	45,464,122
2005	66,900,212	10,405,687	118,132,687	53,647,636	185,032,900	64,053,323
2006	106,457,298	21,866,066	193,416,183	87,551,457	299,873,481	109,417,522

Note: Years are federal fiscal years. Natural gas includes natural gas liquids from gas processing plants.
Source: Minerals Management Service

In Utah, federal mineral royalties are distributed to several different accounts according to state law (Table 15). The largest recipients of federal mineral royalties in Utah are the Department of Transportation and the Permanent Community Impact Fund. The funds distributed to the Department of Transportation are then distributed to local governments to fund local highways in proportion to the amount of mineral lease money generated by each county. The Permanent Community Impact Fund makes loans and grants to state agencies and subdivisions of state government impacted by mineral resource development. Unlike the funds administered by the Department of Transportation, which are distributed in proportion to royalties generated in the county, the Permanent Community Impact Fund is distributed by a

state-appointed board in response to proposals submitted by state agencies and local governments. Therefore, the distribution of funds by the Permanent Community Impact Fund to the various counties may vary from the amount of royalty generated. The payments in lieu of taxes cited in Table 14 are not the payments in lieu of taxes made by the federal government for federal land in Utah but are payments made by the state government to counties for lands controlled by the School and Institutional Trust Lands Administration, state Division of Parks and Recreation and the state Division of Wildlife Resources.

Table 15 Distribution of Federal Mineral Royalties in Utah

	Percent
Department of Transportation	40.00
Permanent Community Impact Fund	32.50
Department of Community and Culture	5.00
State Board of Education	2.25
Utah Geological Survey	2.25
Water Research Laboratory	2.25
Payments in Lieu of Taxes	52 cents per acre
Permanent Community Impact Fund	Remainder
Note: The amount paid for Payments in Lieu of Taxes has been adjusted annually since 1994 according to the Consumer Price Index. Source: Utah State Code, Title 59, Chapter 21.	

The School and Institutional Trust Lands Administration (SITLA) controls mineral rights on approximately 4.4 million acres in Utah. These lands are held in trust for the public schools in Utah and 11 other beneficiaries. They were established at statehood and through subsequent land exchanges with the federal government. During 2006, royalties paid for oil and gas extraction on SITLA lands totaled \$82.7 million. This was 51.0 percent of total SITLA revenue for 2006. These funds are not returned to the county of origin, but are placed in a permanent fund managed by the state treasurer on behalf of the public schools or distributed to the appropriate beneficiary as mandated. Dividends and interest from the Public School Fund are distributed annually to all Utah public schools based on an established formula.

In addition to royalties, there is an Oil and Gas Severance Tax in Utah and an Oil and Gas Conservation Fee that are levied on all production in the state. Revenue from the Oil and Gas Severance Tax is placed in the state general fund and the tax rate varies from 3 to 5 percent of the sales price. The Oil and Gas Conservation Fee funds the state Division of Oil, Gas and Mining. The fee is imposed at a rate of 0.2 percent of the value of production.

Both the Oil and Gas Severance Tax and the Oil and Gas Conservation Fee have significantly increased in recent years (Table 16). The Oil and Gas Severance Tax increased by 82 percent from 2001 to 2006, while the Oil and Gas Conservation Fee

increased by 102 percent. The drop from 2001 to 2002 was due to the decline of the wellhead price of natural gas produced in Utah from \$3.52 per MCF to \$1.99 per MCF. These data reflect statewide oil and gas operations and are not specific to Grand County.

Table 16 State Tax Collections Related to Oil and Gas Production, 2001-2006

	Oil and Gas Severance Tax	Oil and Gas Conservation Fee
2001	\$39,357,798	\$2,748,318
2002	18,893,082	1,710,219
2003	26,745,279	1,943,755
2004	36,659,808	2,696,250
2005	53,484,320	3,631,963
2006	71,513,869	5,560,449

Note: Years are state fiscal years.
Source: Utah State Tax Commission

5.1 Grand County

The largest direct fiscal impacts on Grand County due to oil and gas operations in the area are property taxes paid by the operating companies and federal mineral royalties distributed to the local governments by the Utah Department of Transportation. The Utah State Tax Commission centrally assesses oil and gas properties using a net present value approach applied to future production. The local county treasurers bill and collect the taxes. Property taxes are levied by numerous units of local government, including county and city governments, school districts, and special service districts.

Property taxes paid on oil and gas properties in Grand County have been rising in recent years (Table 17). During 2006, the oil and gas industry paid 7.3 percent of total property taxes in Grand County, up from a recent low of 4.4 percent in 2002. The amount of property tax paid has also been rising. The \$593,754 paid in 2006 was a 102 percent increase over the amount paid in 1997. Table 17 refers to all property taxes paid to various government entities in the county, not just the county government. As prices of crude oil and natural gas have increased in recent years, the net present value of future production has increased. This has raised the amount of property taxes paid by the oil and gas industry despite production in the county being relatively constant. Given the forecast for continued high energy prices (see Section 2, Background), the level of property taxes paid by the oil and gas production industry in Grand County should continue at or near current levels into the future.

Table 17 Oil and Gas Property Tax Payments in Grand County, 1997-2006

	Grand County Total	
	Oil & Gas Property Tax	Percent of Total Property Tax
1997	\$293,475	4.9
1998	278,908	4.8
1999	252,618	4.4
2000	286,132	4.6
2001	300,119	4.6
2002	289,734	4.4
2003	303,209	4.5
2004	378,763	5.4
2005	491,535	6.7
2006	593,754	7.3

Source: Utah State Tax Commission, Property Tax Division Annual Reports

The funds generated through federal mineral royalties that are returned to Grand County through the Utah Department of Transportation are also a significant source of revenue for the local governments. These funds actually exceed the amount of property tax paid by the oil and gas industry. During 2006, Grand County received \$783,048 dollars in federal mineral royalties returned by the Department of Transportation (Table 18). This was a 21 percent increase over the amount returned in 2001 and 151 percent greater than the low of \$312,191 received in 2003. The total fiscal impact on Grand County of oil and gas E&P activity was nearly \$1.4 million in 2006.

Table 18 Federal Mineral Royalties Returned by UDOT to Grand County, 2001-2006

	Grand County
2001	\$647,287
2002	373,319
2003	312,191
2004	552,098
2005	656,995
2006	783,048

Note: Years are state fiscal years.
Source: Utah Department of Transportation

Royalties paid to SITLA due to production of oil and gas in Grand County dropped by approximately 50 percent from 2005 to 2006 (Table 19).

Table 19 Royalties Paid for Production on SITLA Lands in Grand County, 2005-2006

	Grand County
2005	\$2,541,161
2006	1,287,352
Note: Years are state fiscal years.	
Source: School and Institutional Trust Lands Administration	

State personal income taxes as a result of oil and gas E&P activities in Grand County are estimated at \$55,000 for 2006 (Table 20).

Table 20 Personal State Income Taxes Due to Oil and Gas E&P in Grand County

	Grand County Total
Total Wages due to Oil and Gas E&P, \$1,000	1,468
State Personal Income Taxes, \$1,000	55
Source: Author's Calculations. Details of the estimation are in Section 6.	

6 Technical Notes and Methodology

Industries are classified by economists according to the North American Industry Classification System (NAICS), which was developed by the Office of Management and Budget in cooperation with other federal agencies and foreign governments (Office of Management and Budget, 2007). The NAICS codes replaced the Standard Industrial Classification (SIC) codes that had been used since the 1930s. This change was prompted by structural changes in the U.S. economy, with the services sector becoming a much larger portion of the economy and more complex than when the SIC codes were developed. In the switch, the 10 major industrial sectors under the SIC system were replaced with 20 major sectors under the NAICS system. Many of the industrial sectors under the SIC codes were split among two or more of the redefined NAICS sectors, making comparisons difficult. The NAICS codes better explain the current structure of the economy but make time series data difficult to compile.

Under the NAICS system, 20 major industrial categories are further subdivided as needed. To demonstrate the level of detail obtained, Table 21 presents the divisions of the Mining (NAICS 21) sector. The Mining sector is divided into a total of 28 different industries. The other 19 industrial sectors are similarly subdivided.

Other local businesses and industries benefit from E&P activities. Examples of these are seismic companies, regulatory and environmental consulting firms,

Table 21 NAICS Codes Related to the Mining Industry

NAICS Code	Industry
21	Mining, Quarrying, and Oil and Gas Extraction
211	Oil and Gas Extraction
2111	Oil and Gas Extraction
21111	Oil and Gas Extraction
211111	Crude Petroleum and Natural Gas Extraction
211112	Natural Gas Liquid Extraction
212	Mining (except Oil and Gas)
2121	Coal Mining
21211	Coal Mining
212111	Bituminous Coal and Lignite Surface Mining
212112	Bituminous Coal Underground Mining
212113	Anthracite Mining
2122	Metal Ore Mining
21221	Iron Ore Mining
212210	Iron Ore Mining
21222	Gold and Silver Ore Mining
212221	Gold Ore Mining
212222	Silver Ore Mining
21223	Copper, Nickel, Lead and Zinc Mining
212231	Lead Ore and Zinc Ore Mining
212234	Copper Ore and Nickel Ore Mining
21229	Other Metal Ore Mining
212291	Uranium-Radium-Vanadium Ore Mining
212299	All Other Metal Ore Mining
2123	Nonmetallic Mineral Mining and Quarrying
21231	Stone Mining and Quarrying
212311	Dimension Stone Mining and Quarrying
212312	Crushed and Broken Limestone Mining and Quarrying
212313	Crushed and Broken Granite Mining and Quarrying
212319	Other Crushed and Broken Stone Mining and Quarrying
21232	Sand, Gravel, Clay and Ceramic and Refractory Minerals Mining and Quarrying
212321	Construction Sand and Gravel Mining
212322	Industrial Sand and Gravel Mining
212324	Kaoline and Ball Clay Mining
212325	Clay and Ceramic and Refractory Minerals Mining
21239	Other Nonmetallic Mineral Mining and Quarrying
212391	Potash, Soda, and Borate Mineral Mining
212392	Phosphate Rock Mining
212393	Other Chemical and Fertilizer Mineral Mining
212399	All Other Nonmetallic Mineral Mining
213	Support Activities for Mining
2131	Support Activities for Mining
21311	Support Activities for Mining
213111	Drilling Oil and Gas Wells
213112	Support Activities for Oil and Gas Operations
213113	Support Activities for Coal Mining
213114	Support Activities for Metal Mining
213115	Support Activities for Nonmetallic Minerals (except Fuels) Mining

consulting geologists, trenching and dirtwork, and electric utilities. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. These types of effects are referred to as the indirect and induced impacts. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses using input-output economic models.

6.1 NAICS Codes Related to Oil and Gas Production

There are three classifications directly related to the oil and gas exploration and production industry. These are NAICS 211 – Oil and Gas Extraction, NAICS 213111 – Drilling Oil and Gas Wells, and NAICS 213112 – Support Activities for Oil and Gas Operations. These three classifications cover the operating companies, drilling companies, and service companies, respectively. For this study, we consider them collectively as the oil and gas E&P industry. The definitions listed are those developed by the Office of Management and Budget.

NAICS 211 – Oil and Gas Extraction Industries in the Oil and Gas Extraction subsector operate and/or develop oil and gas field properties. Such activities may include exploration for crude petroleum and natural gas; drilling, completing, and equipping wells; operation of separators, emulsion breakers, desilting equipment and field gathering lines for crude petroleum and natural gas; and all other activities in the preparation of oil and gas up to the point of shipment from the producing property. The subsector includes the production of crude petroleum, the mining and extraction of oil from oil shale and oil sands, and the production of natural gas, sulfur recovery from natural gas, and recovery of hydrocarbon liquids.

Establishments in this subsector include those that operate oil and gas wells on their own account and for others on a contract or fee basis. Establishments primarily engaged in providing support services, on a fee or contract basis, required for the drilling or operation of oil and gas wells (except geophysical surveying and mapping, mine site preparation, and construction of oil/gas pipelines) are classified in Subsector 213, Support Activities for Mining.

NAICS 213111 – Drilling Oil and Gas Wells This U.S. industry comprises establishments primarily engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, re-drilling, and directional drilling.

NAICS 213112 – Support Activities for Oil and Gas Operations This U.S. industry comprises establishments primarily engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related activities). Services included are exploration (except geophysical surveying and mapping); excavating slush pits and cellars; well surveying; running, cutting, and

pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells.

6.2 Economic Impact Modeling

Economic impacts on an economy arise from exogenous sources or activities that inject new funds into the economy. Examples include products that are exported and new construction funding. It is important for outside funds to be injected into a regional economy for economic impacts to occur. If an activity is financed by funds from inside a regional economy, known as residentary spending, then the funds are diverted from one industrial sector to another and there is no net multiplier effect or economic impact. Crude oil and natural gas from the producing areas in Utah are exported to refineries and markets in other portions of the country. Exporting oil and gas results in an inflow of funds, which creates a positive economic impact on the area.

In this study, economic impact is used to mean the impact of oil and gas E&P activities on the amount of employment and wages paid in the various producing regions in Utah. Many similar studies present the total economic output of an activity as the economic impact; this is the sum of all transactions in a supply chain and can be much larger than the value of the final good or service provided to the end consumer. Similarly, many authors apply economic output multipliers to all spending related to an activity, with no distinction between export-based and residentary spending. The result is often termed “economic contribution” and presented as economic impact. As with all economic output calculations, the result is much larger than the value of the final product delivered to an end consumer.

The oil and gas exploration and production industry has a direct impact on the local economy through employment and wages paid. In addition, there are additional indirect and induced impacts. Indirect impacts result from local spending by the E&P industry and induced impacts arise from employees of the E&P industry spending their earnings.

Examples of indirect impacts are employment and wages at seismic companies, regulatory and environmental consulting firms, consulting geologists, trenching and dirtwork, and utilities providing electricity. Other benefits accrue to local hotels and restaurants as a result of spending by visiting workers. The indirect and induced impacts can be calculated from the value of transactions between the E&P industry and these other businesses.

The RIMS II input-output model developed by the Bureau of Economic Analysis was used to determine the indirect and induced economic impacts of the oil and gas

exploration and production industry in Grand County. The RIMS II model is based on an accounting framework called an input-output table. From each industry, an input-output table shows the industrial distribution of inputs purchased and outputs sold. The Bureau of Economic Analysis has developed a national input-output table (Bureau of Economic Analysis, 1997). To develop region-specific input-output tables, the national input-output table is modified using regional economic data. The producer portion of the input-output table is modified using location quotients at the six-digit NAICS level based on personal income data for service industries and wage and salary data for nonservice industries. Household data is modified to account for commuting across regional boundaries and savings and taxes. Once the national input-output table is regionalized, the multipliers are estimated through the use of matrix algebra. The RIMS II model estimates the employment and wage impacts by major NAICS industry.

Data on spending by the E&P industry in Grand County was obtained via a survey of operating, drilling and service companies operating in the area. Personnel with the Bureau of Economic and Business Research at the University of Utah worked with the Independent Petroleum Association of the Mountain States (IPAMS) to develop survey forms with input from several representatives of the petroleum industry. IPAMS distributed the survey forms to operating, drilling and service companies operating in Grand County and the forms were returned to the Bureau of Economic and Business Research. Data from returned survey forms were totaled by spending category. Using data on total production of oil and gas, number of wells spudded and employment reported by government agencies, the total spending reported by responding companies was expanded to total industry spending in the region. The multipliers from the RIMS II model were then applied to the total spending by category to determine the indirect and induced employment and wages. Trade margins were applied to the Retail Trade, Wholesale Trade, and Transportation industries.

State income tax impacts were estimated by calculating the ratio of the Utah income tax liability for Grand County to the sum of the total earnings by place of work for the county as determined by the Bureau of Economic Analysis. The average of this ratio for the years 2003 through 2005 was 3.78 percent. This ratio was then applied to the total estimated earnings due to oil and gas E&P in Grand County of \$22.2 million to estimate the state personal income tax.

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