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Developing Together? Understanding the Interaction between, Amenity-Based Tourism, Agriculture, and Extractive Industries in the Northern Rockies

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Abstract

The factors that lead to economic growth at the county level are not always easy to identify or explain, though surely both energy and amenity resources can influence county growth. However, there are many other factors that can also influence growth, such as amenities in surrounding counties, the specifics of oil and gas development, and land-use policies. In examining the factors that affect county economic growth, several key findings emerge: this study examines how counties balance energy extraction and development of amenities on their lands. It is important to note, however, that a county possesses only limited authority with respect to development issues; many dimensions of development lie outside of the county domain at the state or national levels.

Keywords: economic development, rural development, local government, energy economics, amenity economics

1. Introduction

Many areas of the United States that were previously largely rural have been and continue to be transformed by population growth and increases in the production of oil and natural gas. As a result of population increases cities have grown and expanded and are now abutting areas set aside for forests, national parks, and areas meant to “be held in public ownership because of their other resource values” [1, 2]. This expansion has contributed to growing levels of recreation on many public lands, which foster economic expansion based on those amenities. At the same time, advances in energy extraction, particularly hydraulic fracturing, has made it possible to extract oil and gas from many areas that were previously not economically or technologically feasible.

Throughout this chapter the terms “energy extraction,” “energy resources,” and “energy development” are used to refer to the exploration and/or production of oil and natural gas. The term “amenity development” was chosen to describe a variety of activities that contribute to the natural attractiveness and value of a given area, including wilderness or other designated lands, recreation opportunities in

those areas, and agricultural activity. The use of the term “amenity” as a means to describe areas with the presence of natural features comes from the Natural Amenities Scale created by the U.S. Department of Agriculture (USDA), which originally guided our decisions regarding what amenities to describe in this report [3]. The term “amenities” is commonly used to refer to the types of areas and activities discussed in this report, such as “clean beaches, hunting and fishing opportunities, forests to hike in, the view of green farmlands, and clean rivers for recreating in” [4].

It has become common to view energy development and amenity development as mutually exclusive, though this view is by no means dominant in the scholarly literature. This chapter explores the degree to which the two types of activities can coexist and make positive contributions to a county’s economic well-being. Three case studies that explore land use and economic outcomes across the spectrum of the energy/amenity plane are presented.

Counties were selected by region based largely on their blend of energy extraction and amenity development. The cases were chosen to illustrate the choices and trade-offs encountered when deciding whether to develop energy, amenities, or both.

1.1 Understanding divergent claims about the role of energy and amenities in economic development

There has always been debate about how best to develop energy and amenity resources within a county. Opponents of energy development often argue that the oil and gas industry cannot coexist with amenity-based industries. Further, some argue that amenity activities create better economic and employment opportunities than do extraction activities on public or protected lands.

This view that places amenities and energy extraction in conflict has been in part based on research that extrapolates from the positive correlations between amenity resources and economic growth. For example, using the USDA’s Natural Amenities Scale, Gebremariam et al. [5] finds a positive although not statistically significant relationship between employment growth rates and a county’s amenity rating and it and other similar literature has been used to suggest that that amenity development must occur without extractive industries. Further those extrapolations have suggested that “footloose” entrepreneurs are moving to areas with access to outdoor recreation and avoid those with extractive industries [6–10].

The evidence, however, is far from conclusive on the role amenities play in economic growth. One widely cited article found no evidence that federal wilderness designations within a county affected population-density or total employment-density growth in the Intermountain West during the 1980s [11, 12]. Further, counties with designated wilderness areas appear to be held back by relatively low-wage and seasonal service-sector jobs [13, 14]. Perhaps because of this, counties with primarily amenity-based growth rarely develop into economically and socially vibrant communities [14].

Further, research by Yonk, Simmons, and Steed [15] finds “a significant negative relationship between the presence of [designated wilderness lands] in county total payroll, county tax receipts, and county average household income.”

Though some research promotes one type of development as preferable to another, a more nuanced reading of the literature suggests that counties that try to balance energy extraction activities and amenity development have healthier economies [10, 14, 16].

This chapter is part of a larger project identified five states/regions as having counties with varying levels of energy and amenity development: California,

Colorado, Utah, the Northern Rockies, and the Northern Plains, during a period of high oil and gas production, namely the period through 2013. This chapter presents three cases from the Northern Rockies Region, but the full set of cases is available on request.

1.2 Data

The data used in this study came primarily from the U.S. Census Bureau and the Bureau of Labor Statistics (BLS). For each case study, data from 2001 through 2011 were compiled on a variety of economic indicators ranging from average annual pay to employment by industry sector. Data were also gathered from the U.S. Geological Survey (USGS), U.S. Energy Information Agency (EIA), and USDA. Other quantitative data, such as tax revenues raised from energy extraction industries, were collected by placing calls to county officials and accessing data on state and county websites.

Qualitative data was gathered from a variety of sources including local newspapers, environmental group publications, and county websites. Personal interviews of local residents were also used when possible to explore local reactions to development in each county over time and to illustrate how development had influenced the lives of residents.

2. The Northern Rockies

The states of Montana and Wyoming make up the Northern Rockies area. In these states, whose landscapes and economies are diverse and varied, this study examines Teton County and Sublette County in Wyoming, and Sheridan County in Montana. In the Northern Rockies, the oil and gas industry and the tax revenues it generates play an important role in some county economies. The following cases explore the relationship between amenity development and energy extraction.

2.1 Economic development in the Northern Rockies

Amenities play an important role in Teton County, which has no energy extraction activities. While there are considerable amenity resources in Sublette County, they play a small role in the economy relative to oil and gas. Sublette County is the quintessential boomtown and demonstrates the rapid growth that can result during the start of energy extraction activities. Small, rural communities like Sheridan County rely heavily on tax revenues from the oil and gas industry to cover the costs of its school systems and other services.

Sublette County is most focused on energy development, Sheridan County more balanced, and Teton County currently without active oil and gas development. In Wyoming, the oil and gas industry supported¹ 61,065 jobs and contributed \$7 billion to the state economy in 2009. The average salary of oil and natural gas workers in Wyoming is \$74,538, which is \$33,200 higher than the state average of \$41,258 [17].

Similar economic benefits are observed in Montana, where 40,276 jobs were supported² by energy extraction in 2009, and \$4 billion was contributed to the state economy. The average salary of oil and natural gas workers in Montana is \$72,886, which is much higher than the state average of \$33,244 [18].

¹ This support includes direct, indirect, and induced jobs.

² This support includes direct, indirect, and induced jobs.

Table 1 shows that in Sublette and Sheridan counties, average annual pay (reported in nominal dollars) in the upstream oil and gas sector is significantly higher than in the sectors of hospitality and recreation, and agriculture. Teton County does not have pay information in upstream oil and gas due to the lack of petroleum activity, but its hospitality and recreation workers earn slightly more than workers in this same sector in Sublette and Sheridan counties.

Table 2 shows employment by sector for the civilian employed population over age 16 in Sheridan, Teton, and Sublette counties. Employment in oil and gas is included in the agriculture, forestry, fishing and hunting, and mining sector. As the table shows, Sublette County has the highest percentage employed in this sector. Sheridan County’s employment is more mixed, while Teton County has the highest percentage (25.11%) employed in the arts, entertainment, recreation, accommodation, and food services sector.

Small communities in the Northern Rockies often rely on the natural resources available in the county for developing their economic base. This dependence can lead to an uncertain economic climate and cyclical employment, regardless of the natural resources that are being developed. By diversifying their economies,

	Upstream Oil and Gas		Hospitality and Recreation		Agriculture	
	Employment	Average Annual Pay	Employment	Average Annual Pay	Employment	Average Annual Pay
Sublette, WY	1,408	\$ 76,947	458	\$ 22,858	72	\$ 34,715
Sheridan, MT	23	\$ 46,913	152	\$ 13,743	12	\$ 26,752
Teton, WY			6,633	\$ 24,896		

Source: BLS 2011

Table 1.
Employment and average annual pay.

	Sheridan	Montana	Teton	Sublette	Wyoming
Agriculture, forestry, fishing and hunting, and mining (oil and gas is included in this sector)	20.9%	7.10%	3.60%	32.70%	11.8%
Construction	8.80%	8.50%	13.30%	10.10%	8.7%
Manufacturing	1.50%	4.80%	1.40%	1.70%	5.00%
Wholesale trade	1.70%	2.70%	0.80%	0.70%	2.20%
Retail trade	11.90%	12.30%	8.60%	8.70%	11.20%
Transportation, warehousing, utilities	8.60%	5.00%	3.90%	5.60%	6.60%
Information	1.80%	1.90%	2.30%	1%	1.70%
Finance, insurance, real estate	6%	5.69%	7.66%	2.30%	4.42%
Professional, scientific management, administrative	3.88%	8.14%	10.97%	6.20%	6.55%
Educational services, health care, and social assistance	18.78%	22.42%	17.17%	15.50%	21.96%
Arts, entertainment, recreation, accommodation, and food services	5.59%	10.57%	25.11%	6.50%	9.25%
Public administration	5.53%	4.71%	3.17%	4%	4.26%
Other services	4.89%	6.11%	2.13%	4.90%	6.41%

Table 2.
Percent of the civilian population employed by sector.

communities in the Northern Rockies may improve economic outcomes and reduce the magnitude of cyclical fluctuations.

3. Sublette County, Wyoming

Sublette County residents are experiencing the benefits and challenges that come with developing energy and amenity resources in a -rural economy. Surrounded on three sides by wilderness and national forest lands, Sublette County has many amenity opportunities. The county also has concentrated pockets of oil and gas drilling. Both of these industries contribute to the economy, albeit in different ways. County Commissioner Joel Bousman describes the current economic climate of Sublette County as both “exciting and challenging” [19].

Sublette is a small ranching community southeast of Jackson Hole. It has only 6000 residents [20]. The county is part of rural Wyoming—there are no stoplights anywhere in the county—where suburban developments are separated by hundreds of miles. A petroleum boom in the county has driven economic growth. While some drawbacks have accompanied this growth, including a reliance on a non-resident workforce and rising costs of living, Sublette County demonstrates the important role that the oil and gas industry can play in providing tax revenue and boosting the economy.

Oil and natural gas extraction occurs away from areas of the county where designated federal lands and wilderness amenities are located. Most extractive activities occur on lands administered by BLM and non-federal lands in the central and southern parts of the county. Parts of the Bridger Wilderness, Teton National Forest, Gros Ventre Wilderness, and Bridger National Forest are located within Sublette County, as well as some Bureau of Reclamation lands.

3.1 Energy development

The Pinedale Anticline Project Area consists of about 197,000 acres in central Sublette County and is the third largest gas field in the United States [21, 22]. The BLM operates 80% of the anticline’s surface. The remaining 20% is divided between the State of Wyoming (5%) and private ownership (15%). Gas reserves in the field are estimated at 40 trillion cubic feet, and the area is one of the most productive fields in the United States [21]. Operators first drilled there in 1939 looking for oil, but abandoned the site when they found gas instead. Subsequent activity in the field was difficult because the tight sandstone formations made conventional drilling methods nearly impossible. However, thanks to improvements in technology and high prices for natural gas in the early 2000s, extraction in the Pinedale Anticline began to flourish. Today, Shell, Ultra Petroleum, and QEP Energy are primary leaseholders in the field. Shell alone has “drilled more than 400 natural gas wells, operating 21,000 acres and producing 350 million cubic feet of natural gas per day” [22].

The Jonah Field, near the Pinedale Anticline, has a similar geographical makeup and was rediscovered in the early 1990s. It is considered one of the most significant recent natural gas discoveries. Covering 21,000 acres, the field is estimated to contain approximately 10.5 trillion cubic feet of natural gas, with 98% of the field managed by the BLM and the remaining portion split between state and private ownership [21].

Production in the Pinedale and Jonah fields began slowly as pipelines and infrastructure were needed to support significant production. However, once the infrastructure was in place, there was a jump from 150 wells in 1999 to 300 wells

by July 2001 [21]. This, combined with advances in technology and new methods of extraction, such as hydraulic fracturing, created a boom in gas production from these previously unproductive fields. During the 2008 recession, natural gas prices fell, reducing drilling activities in a slowdown that has persisted since [21].

Oil production in the county grew steadily from 2000 until 2009, peaking just below 8 billion barrels in 2009. Production has dropped off since 2009 to 6.8 million barrels of oil in 2012 [23].

Gas production, has experienced growth similar to oil. Production grew from 2000 to 2010, peaking at 1.2 TCF. Production has since declined, falling to a little under 1.1 TCF in 2012 [23].

3.2 Amenity development

In addition to its oil and natural gas resources, Sublette County has numerous amenity opportunities. Over 80% of Sublette County's lands are public [24] Sublette County includes parts of the Bridger National Forest, Bridger Wilderness, Gros Ventre Wilderness, and the Teton National Forest. The Wind River Mountains are also part of the county. The highest peak in Wyoming, Gannett Peak, along with 14 of the state's highest peaks, provides ample opportunities for hiking and recreation [25].

Freemont Lake, Wyoming's second largest natural lake and the seventh deepest in the United States, is located in the county, along with nearly 1300 other lakes, providing fishing and water recreation opportunities. Sublette County is home to more active glacial fields in the contiguous United States than any other county [20]. Big game from the Yellowstone ecosystem winters in the northern part of the county [26]. The natural environment of the county is ideal for backpacking, hiking, biking, four-wheeling, snowmobiling, golfing, hunting, skiing, and wildlife viewing.

Built in 1897, the Gros Ventre Lodge is believed to have been the first full-time dude ranch in Wyoming. Ranching became an industry in Sublette County after 1877, once the railroad made the shipping of stock possible from Wyoming to Oregon [25]. Some of the rancher families that first settled Sublette are still ranching in the county today, five or six generations later [27]. Ranchers continue to walk their cattle along the Green River drift, in use since 1896, to move their herd from summer to winter grazing areas [27].

3.3 Economic indicators

Ranching remained the primary source of economic activity in Sublette County until recently, when the petroleum boom caused a shift in the economy. Today, the county describes its major industries as oil and gas, tourism, recreation, and government [28]. Oil and natural gas provide the largest share of the county's revenue.

Increasing demand for natural gas dramatically changed Sublette County's economy. From 2000 to 2005, Sublette County's permanent population grew by 20% and 500 new homes were built [29]. By 2007, 50% of those employed in the county worked in the natural gas industry. Of dollar spent in the county, 50 cents was directly tied to the natural gas industry [29]. This growth spiked the median household income to \$70,147 in 2010, 30% higher than the state average. This also reduced the poverty level to less than half of the state average [30]. Today, energy extraction remains an important economic base for Sublette County.

Between 2001 and 2006, sales tax revenue in Sublette County increased by 271%, while use tax revenue increased by over 300% [31]. The mining industry, which includes oil and gas activity, accounted for 51% of the sales tax revenue and 45.6%

of the use tax revenue [31]. In 2006, despite its low population, Sublette County ranked sixth in the state for tax revenue generation and fifth for total taxable sales transactions. Sublette County accounts for 6.5% of sales and use tax revenue in the state and 7.21% of total sales activity in the state [31].

Sublette County sees large contributions to its budget from oil and gas companies. In 2012 oil and gas companies comprised the top 10 taxpayers in Sublette County, with a total assessed value of \$3.9 billion [31]. Energy companies in Sublette paid \$1.1 billion in taxes on oil and gas production in 2008 and Sublette County and its municipalities received 5.86% of that revenue [19]. Also in 2012, Sublette collected almost \$31 million in sales tax from the mining industry, which includes oil and gas. These revenues offset the costs associated with increased energy development. Funding for infrastructure improvements has been identified as the biggest challenge facing local governments in Sublette County [19].

Tax revenue is also generated by the recreation and hospitality sector, though not to the same magnitude as the oil and gas industry. In 2012 agriculture, forestry, fishing and hunting contributed \$1523 in sales taxes to Sublette County [32]. The leisure and hospitality sector meanwhile contributed almost \$985,000 in sales taxes the same year (p. 27). In 2012 the retail trade, accommodation, and food services sector generated nearly \$8.3 million in sales tax revenue for the county [32]. Only Pinedale, Sublette County's seat, imposes a lodging tax, for which it collected about \$200,000 in revenue in 2012 [32].

Employment in upstream oil and gas, although only recently publicly available, is much higher than that of agriculture or hospitality and recreation. With over 1400 employees, upstream oil and gas employed 950 more people than did the hospitality and recreation sector in 2011. Employment in hospitality and recreation grew from 2001 to 2006 by 190 employees, but has since slightly declined, employing about 460 people in 2011. Employment in agriculture has been quite steady, with an average of 75 employees [33].

With the advent of energy extraction activity in Sublette County, the nature of employment and wages has changed drastically. For example, before the natural gas boom in the early 2000s, seasonal unemployment was high due to the county's focus on tourism, agriculture, and ranching. Since 2000, however, these fluctuations have been greatly reduced [34]. Sublette County's unemployment rate has hovered around 4%. Wages in the petroleum industry are now some of the highest in Sublette County, even for unskilled workers, and ample opportunities exist for wage advancement and overtime [34]. The cost of living in Sublette County, however, is about 19% higher than the rest of Wyoming, and second only to Teton County [35]. Those employed in upstream oil and gas make far more annually than those employed in amenity sectors—almost three times as much in years for which data is available.

Just over 32.7% of Sublette County's civilian population over age 16 is employed in agriculture, forestry, fishing and hunting, and mining, of which oil and gas is a subset. This percentage is much higher than the Wyoming average of 11.8% for employment in the same sector. Employment in arts, entertainment, recreation, accommodation, and food services at 6.6% is lower in Sublette County than in the state [33].

3.4 Development strategies

Sublette County is an example of an area with a booming energy industry that has not detracted from amenity development. The county retains its strong amenity sector thanks to its many natural attractions and its conscious development policies. Mary Lynn Worl, a board member of Wyoming's Citizens United for Responsible Energy

Development, said, “We don’t believe that public health and the quality of life in our communities need to be traded away for economic activity. We can have both” [36].

With the arrival of the oil and natural gas boom, Sublette County has seen many positive changes. The county has collected millions of tax dollars as a result of petroleum production, which is money that can be spent on community improvement projects and infrastructure—projects that improve the county now as well as help develop the area for future potential enterprises. Numerous jobs have been created for local residents, and companies active in Sublette County’s gas fields have invested heavily in organizations serving the community and improving the environment [21]. Many of these activities have sprung up out of necessity to lessen the impacts of energy development on the environment. For example, a portion of the increased tax revenue the county receives is used to build infrastructure such as underground pipelines for material transport, lessening the need for above-ground transport and its impacts on the community [21].

Energy development has also brought changes to Sublette County’s local community. Housing, schools, and public services like law enforcement and health care, have been stretched thin as a large, primarily non-resident and temporary workforce has moved into the community [21]. The county has been able to adjust fairly well to the increased non-resident and temporary workforce, however, and private sector housing and services have experienced rapid growth in response to the increased demand [21]. The petroleum companies operating in Sublette have contributed to the community by funding infrastructure such as road improvement, a drug counseling center, a domestic abuse shelter, a new sheriff’s office and jail, and an indoor community swimming pool [26]. Further, natural gas workers book nearly 75% of hotel rooms, helping hoteliers during the winter months [29].

The natural gas boom in Sublette has impacted the environment, but the impacts are being addressed. Though air pollution has significantly increased since 2005 [37], air quality monitoring is now required and actions are in place to help reduce the problem. Companies have generally been responsive to the ozone advisories, reducing or suspending operations until the advisories end. Although natural gas production increased 8% from 2008 to 2010, emissions actually decreased, attributable to increased regulation and voluntary actions from the industry [38].

Wildlife in the county is also being impacted by the development. The Pinedale Anticline includes important migration corridors and habitat for species such as mule deer, pronghorn antelope, pygmy rabbits, sage grouse, and bald eagles [22]. To mitigate impacts, wells were initially required to be 80 acres apart. Since then however, spacing has been reduced to 5 acres between some wells [26]. Ongoing efforts to mitigate impact have led many companies to use directional drilling. Directional drilling concentrates several wells in a single site to reduce the need for roads and reduces the number of pad sites. These efforts have resulted in 70% fewer roads and 100 fewer well pads [21].

Sublette County has certainly faced, and will continue to face, tradeoffs between a healthy outdoor amenity sector and energy development. The advent of natural gas development in Sublette County has brought some challenges, but it has also greatly lifted the county’s economy and led to many positive economic outcomes. Sublette County continues to learn how to manage the tradeoffs in order to continue to see energy and amenities develop together, bolstering the county economy.

4. Sheridan County, Montana

Sheridan County is a small, rural community located in the northeastern corner of Montana. Sheridan County’s economy is focused on oil and gas and agriculture,

with a brief yearly economic boost during the hunting season. Flat and largely treeless, Sheridan County attracts few tourists. The majority of the land is private, with about 14% under the jurisdiction of the federal government or Native American Tribes [39]. The county's history demonstrates the vital role the oil and gas industry plays in rural communities, particularly where amenity development is not a viable economic option. The county population and employment trends closely follow the cyclical booms and busts of the local oil and gas industry [40].

Continued expansion of drilling in the Bakken Shale formation, which extends into Sheridan County, presents the single biggest potential for economic growth in the area. Very little of Sheridan County's land area is federally owned. Medicine Lake National Wildlife Refuge and Medicine Lake Wilderness are the exceptions, and both are located in the southeastern portion of the county.

4.1 Energy development

Oil was first discovered in Sheridan County in 1951, and the county experienced its first oil boom from the late 1950s into the early 1960s. As demand later declined, so did the county's production. Oil output in Sheridan County flattened again through the late 1970s and then peaked in 1985. After 1985 the area's oil industry entered a period of long decline that has continued until the present day. The county's negative population growth correlates with the drop in oil production. Population peaked around 1985 at about 5800 people, fell to a low of approximately 3200 around 2007, and has since recovered slightly; the county population is now about 3400 [39].

Oil production varied slightly between 2000 and 2007 and declined after 2008, though there was slight growth from 2011 to 2012. In 2011 Sheridan County produced nearly 1.3 million barrels of oil and in 2012 production increased to 1.4 million barrels [40]. This accounted for about 5% of total oil production in Montana in 2012 [40].

Along with oil, Sheridan County also produces natural gas. Gas production reached a high, during the decade shown, of 997.6 million cubic feet of gas in 2002. Sheridan County's gas production has trended downward and substantially declined after 2007, reaching 511.3 million cubic feet in 2012, representing only about 2.5% of total gas production in the state that year [40].

Sheridan County is geographically similar to the neighboring counties of Daniels and Roosevelt, but has historically produced more oil and gas than either of them. In the past few years, however, Roosevelt County has significantly increased its production of oil, surpassing Sheridan County. This change is due to activity in Roosevelt County in the Bakken Shale formation. Though Sheridan County is also geographically part of the formation, County Commissioner Bill Nyby reports that they have not yet begun energy extraction operations in the county. Companies, however, have already begun purchasing land in the area in preparation for future development, and one company has acquired as much as 24,000 acres there [41]. With farming and trade in decline, future expansion of Bakken Shale oil and gas extraction into Sheridan County is the single largest potential source of economic growth for the county.

4.2 Amenity development

Sheridan County has limited amenity opportunities, though the county does have a few attractions. The county has the fifth largest population of white pelicans and 225 other bird species. Many of these bird species reside in Medicine Lake National Wildlife Refuge. The site is a sanctuary for duck and

geese populations, and serves as a breeding habitat for the migrating waterfowl [42]. Administered by the USFWS, the refuge reported 16,000 visitors in 2004 [43]. The refuge's most popular attractions are the nature trails and observation platforms. Hunting and fishing is also prevalent on the land, and attracted 3000 visitors also in 2004 [43].

Brush Lake State Park, also known as "Oasis on the Prairie," is a spring-fed lake that became a state park in 2003 [44]. The lake is less than 300 acres, but is popular with locals for water sports [45].

Because Sheridan County is very rural, it does not boast the same visitation as other counties profiled in this report. It is expected the county will have a difficult time attracting the large number of tourists seen in Teton County, for example, due to the lack of internationally—or even nationally—known landmarks.

Though the tourism industry is limited, Sheridan County does have agricultural activities. There were 1.06 million acres of land in farms in the county in 2007—almost 98% of the county's total 1.09 million acres [46]. Three quarters of the land in the county is tillable land, with soil that is of glacier origin, which makes it ideal for grain production. Sheridan County's agricultural sector produces mostly durum wheat, which is used in pastas and cereals, and also has significant lentil and dry edible peas production. Each year the county hosts a Farm Expo, which brings together farmers from Montana and Canada for seminars, a Farm and Ranch Appreciation Breakfast, and a bread fair for kids [47].

4.3 Economic indicators

U.S. Census Bureau data shows that the number of individuals employed in the agricultural sector has decreased significantly over time, from 2352 individuals in 1978 (a full 40% of county residents at the time) to only 648 individuals in 2005 (only 18% of residents that year) [39].

Sheridan County has seen significant growth in tax revenues from the petroleum industry. Nyby reported that revenues have increased significantly in the past 10 years, despite a decrease in gas production. In 2003 Sheridan County received just over \$5 million in revenues from the petroleum industry, and by 2011 that number had increased to nearly \$11 million. Between 2003 and 2011, Sheridan County received a total of \$90 million in revenues from petroleum, \$23 million of which was specifically allocated to county schools. Tax revenues represent an important benefit that oil and gas development bring to Sheridan County. Future development of the Bakken Shale formation would likely increase these revenues even more, bringing added benefits to the local economy.

The oil and gas industry makes up a small but significant portion of employment in Sheridan County. In Sheridan County nearly 21% of employment is in this sector. That number is nearly three times the state average of 7.10%, and reflects the importance of extractive industries and agriculture within Sheridan County. Only 5.59% of the county's employment was in arts, entertainment, recreation, accommodation, and food services; that number is much lower than the state average of 10.57%, reflecting the county's limited amenity development.

Oil and gas production has a significant impact on workers the county in the form of higher average annual pay. Average annual pay in the upstream oil and gas sector is much higher than annual pay in agriculture or hospitality and recreation. Hospitality and recreation saw a pay increase of about \$4000 from 2009 to 2011. In recent years, average annual pay in oil and gas has also moved upwards, increasing by \$6500 from 2010 to 2011, while pay has decreased slightly in agriculture. In 2011 average annual pay for upstream oil and gas workers was about three times the average annual pay for hospitality and recreation [48].

4.4 Development strategies

Sheridan County has chosen a development path consistent with its resource endowments and has both energy and amenity development. The county participates in programs like the state-funded Reclamation and Development Grants Program (RDGP), a portion of which is funded by oil and gas taxes. The RDGP allows Montana communities, counties, universities, conservation districts, and others to apply for funding to complete projects that “indemnify the people of the state for the effects of mineral development on public resources” [49].

In Sheridan County, extractive industries have developed alongside the county’s natural amenities, mainly its agricultural sector as Sheridan County’s other amenity potential is limited. Some oil and gas development is occurring alongside amenity development (e.g. in the Medicine Lake National Wildlife Refuge).

With little opportunity to develop amenities and decreasing trade, oil and gas production is expected to become more prominent in the Sheridan County economy. Oil and gas production brings in millions of dollars in tax revenue each year. Although decreased production in the past has proved challenging to the county, Sheridan potentially could gain enormously from expanding development of extractive industries in the Bakken Shale formation.

5. Teton County, Wyoming

Located in the northwestern corner of Wyoming, Teton County was established as a small ranching community at the base of the majestic Teton Mountain Range. The area remained primarily ranching land until the creation of Teton National Park in 1929, when economic focus shifted from ranching to tourism and recreation. The county contains many protected public lands, including national parks, national forests, wilderness areas, and a wildlife refuge. Federal lands, which include Grand Teton National Park, Targhee National Forest, Teton National Forest, the National Elk Refuge, Jackson Lake, the Gros Ventre Wilderness, the Teton Wilderness, and over 40% of Yellowstone Park are located in the county. These public lands comprise 97% of the county, private lands make up the remaining 3% [50]. Because Teton County is overwhelmingly owned by the federal government, county officials have limited influence over what happens in their county and instead are subject to decisions at the federal level.

Natural recreation sites within Teton County attract more than 2.7 million visitors each year, fueling the area’s tourism and amenity-based economy [51]. During the winter, local ski resorts attract tourists; however, the majority of visitors come to Teton County in the summer months. This seasonal cycle of tourism can be difficult for the county economy; this is an issue that faces many counties with single-focus economies, including counties that focus exclusively on oil and gas development. While not as predictable as seasonal cycles, the oil and gas sector also faces boom and bust periods. Teton County has no active oil and gas activity, which is not surprising based on its land composition.

5.1 Energy development

According to data from the Wyoming Oil and Gas Conservation Commission, there are no active oil and gas wells or visible potential for petroleum development in Teton County [23]. Additionally, even if gas and oil resources were found in Teton County, it could be difficult to access because 97% of Teton County consists of protected federal lands.

5.2 Amenity development

With Grand Teton National Park, John D. Rockefeller National Monument, and large portions of Yellowstone National Park all located within Teton County, there is a large seasonal influx of tourists. During the months of June, July, and August, Teton County receives the most visitors; these months are the most popular time to visit Teton County to take advantage of the many outdoor recreation opportunities, like hiking and camping, that the county offers [52].

Visitation to Grand Teton National Park increased almost every year from 1952 to 1970. After 1970 visitation was more variable and dropped significantly from 1983 to 1992. After 1992 visitation picked up and remained fairly constant with visitation dipping below 2.5 million only 5 years between 1992 and 2010 [51].

The Grand Teton National Park is located in central Teton County. The national park offers backcountry camping, rock climbing, and cross-country skiing. The truly adventurous can climb the granite summit of the Grand Teton that rises 13,770 feet above sea level [53]. Visitors can also hike, boat, fish, kayak, and photograph the mountain scenery. This national park is also home to over 300 species of birds, 6 species of game fish, and 60 mammal species [53]. Within this park is a portion of the Snake River offering world-class fishing, as well as 11 lakes that allow recreation, ranging from jet skiing to windsurfing [54]. In the winter the visitors can enjoy private Snowcat rentals, snowshoeing, backcountry and snowmobile tours, sleigh ride dinners, and skiing and snowboarding on the Grand Tetons [55].

In 1972 Congress created the John D. Rockefeller Jr. Memorial Parkway between Grand Teton National Park and Yellowstone National Park. Grand Teton National Park administers this parkway. The sloping hills at the end of the Teton Range characterize this parkway and provide “a natural link between the two national parks,” as these slopes give way to the volcanic flows of Yellowstone [56].

Yellowstone National Park is one of America’s most iconic national parks. Designated as a National Park in 1872, Yellowstone is considered by some to be a “living museum,” and covers over 2.2 million acres in Wyoming, Montana, and Idaho [56]. The most famous sites inside the national park include Old Faithful, Lower Falls, and Yellowstone Lake. Visitors are cautioned to drive slowly and plan extra time to account for wildlife that often crosses the roads within the park [56]. Visitation to the national park has generally increased since 1946. In 2010 the park saw a record 3.6 million visitors [56].

Yellowstone offers activities outside of those normally offered within a park including pack trips, stagecoach rides, and old west cookouts. More traditional national park activities are also offered; visitors can hike, view wildlife, take horseback tours, fish, and boat. In the winter, when road conditions allow, visitors can cross-country ski and snowshoe. Visitors who want to stay within the park have lodging options that offer more amenities than a traditional campground, although that option is also available; within the park there are eight hotels or cabins [56].

Teton County also has the National Elk Refuge, which celebrated its centennial in 2012 [57]. Composed of almost 25,000 acres, this reserve has been designated to conserve the Jackson elk population after development in the late 1800s pushed the animals out of their traditional habitat into much more difficult terrain [57].

Jackson Hole, Wyoming, is a popular, year-round destination in Teton County. This area includes the Jackson Hole Mountain Resort with an average of 459 inches of snow each year [58]. The city of Jackson has over 20 art galleries, restaurants that have been featured on the Food Network, and is home to the Grand Teton Music Festival, during which live broadcasts from the Met Opera in Manhattan are shown to “complement the flow downslope” of the Tetons [59]. Overall, Teton County

hosts almost every recreation activity available in the western United States, and Jackson Hole offers a small-town, yet urban vibe.

5.3 Economic indicators

Teton County's primary economic focus has been, and will continue to be, tourism encouraged by its abundant natural amenities. The county's vision is to "preserve and protect the area's ecosystem in order to ensure a healthy environment, community, and economy" [60]. This focus on tourism provides important jobs and revenue to the county, and also brings some challenges, such as low-wages and seasonality [61].

The unemployment rate spikes in Teton County during the winter months, reflecting the seasonal nature of the tourism industry. Sublette County's unemployment rate, also shown on the graph, is much more stable, reflecting its more balanced economy that does not rely so heavily on seasonal industries. When tourism hits its peak in July, with a visitor count of about 643,000, county employment also reaches its peak with almost 21,000 employees [48]. As visitors to the county increase, seasonal jobs are created; however, at the end of the season the visitor count decreases and the demand for seasonal jobs declines.

One notable aspect of the seasonal job growth and off-season decline is the attraction of non-resident employees to the area. In fact, seasonal jobs offered by Teton County attract nearly 5000 out-of-state employees [60]. Seasonal, non-resident employees tend to spend their wages outside of Teton County, mostly benefitting the communities where these employees live (though some do reside in the county during their working period), and Teton County is unable to capture the potential benefits these jobs create in the form of tax revenues. Aiming to increase both year-round occupancy and visitor spending to capture more benefits within the county, Teton County is working to attract more second home owners and retirees to their communities [60].

Recognizing the need for greater stability, the Teton County Planning Commission, in conjunction with Jackson County, included "[promoting] a stable and diverse economy" as one of its principles in the 2012 comprehensive county plan (the county plan focuses on the 3% of land in the county that is private). The commission is careful to note, however, that "tourism will continue to be the basis of our economy," and aims to create more stability and diversification by enhancing tourism, encouraging local entrepreneurial opportunities (particularly "green" opportunities), and promoting "light industry" [60]. The goal is to "develop the existing economy to be better, not necessarily bigger" [60].

The hospitality and recreation sector has grown for the majority of the decade. Employment began with about 5500 individuals in 2001 and grew to almost 7000 in 2008. After a decrease of over 500 employees in 2009 this sector grew slightly to 6600 employees in 2012 [48].

In 2010 one quarter of Teton County's civilian employees over the age of 16 were employed in the arts, entertainment, recreation, accommodation and food services sector; this is almost 16% higher than the state average. Teton County also has significant portions of its civilians employed in the construction; professional scientific, management, administrative, and waste management; and education services, health care, and social assistance sectors [48].

Although hospitality and recreation provides more jobs in Teton County than does agriculture, employees in hospitality and recreation earn lower wages than those working in agriculture. Over the decade, those employed in hospitality and recreation did see steadily increasing wages, from just over \$17,000 in 2001 to just under \$25,000 7 years later, though this data is reported in nominal dollars and has

not been adjusted for inflation. Since 2008 wages have remained fairly static for this sector. Though limited data is available for the agriculture sector, average annual pay here appears to have been growing in recent years.

In 2012 Teton County collected almost \$41 million in taxes from retail, trade, accommodation and food services sectors, nearly \$11.7 million of which came from accommodation alone [32].

5.4 Development strategies

Teton County has developed a vibrant community with well-known amenities that attract millions of tourists each year. The Teton County Commission believes, however, that the county would benefit by diversifying the tourism industry that has grown out of what was once a small ranch community [60]. In order to maintain their community's roots and grow the economy, officials have developed a plan for growth that focuses on ecosystem stewardship, growth management, and quality of life [60]. Officials are using existing policy tools to protect wildlife habitats, natural skylines, and sustainability programs. Additionally, county officials work closely with towns to ensure that there is affordable housing and "year-round lifestyle-based tourism" that will create a more insulated economy [60]. Diversification of the economy would create jobs valuable to the local community [61]. Teton County demonstrates that county economic growth can occur in a way that is consistent with the community's character and resources.

6. Developing together energy and amenities

The factors that lead to economic growth at the county level are not always easy to identify or explain, though surely both energy and amenity resources can influence county growth. However, there are many other factors that can also influence growth, such as amenities in surrounding counties, the specifics of oil and gas development, and land-use policies. In examining the factors that affect county economic growth, several key findings emerge:

This study examines how counties balance energy extraction and development of amenities on their lands. It is important to note, however, that a county possesses only limited authority with respect to development issues; many dimensions of development lie outside of the county domain at the state or national levels.

Finding One: Counties tend to develop both energy extraction and amenity resources when possible.

Finding Two: In cases in which a county focuses exclusively on either energy or amenity development, it is usually because of constraints beyond the control of that county (e.g., a lack of natural amenities or land-use policy that prohibits energy exploration) and not because the county considers exclusivity the best option.

Finding Three: Energy extraction can directly advance the development of amenities.

Finding Four: The energy and amenity sectors can both be cyclical, although they tend to follow different cycles.

Finding Five: Energy extraction operations offer higher-paying jobs, while hospitality and recreation operations employ greater numbers of people. A county's economic well-being depends on having both high-paying jobs and a large number of jobs.

Across all our cases show consistent evidence that that energy and amenity development are not mutually exclusive. Further the evidence suggests the prominence of one industry over another is less a result of through planning and conscious choice but is more closely related to the geographic and resource endowment the county has. Further the cases we reviewed show that the development of one sector does not necessarily inherently limit growth in the other sector if a county has resource endowments in both areas.

Further because both energy and amenity resources provide value to a county, when counties have both resources they tend to develop both, and in a way that allows both sectors to grow. Further, energy development can directly promote the amenity sector by providing counties the funding necessary to develop and market available amenities. Together, these two sectors can comprise an integral part of a county's economy. They provide an employment base with diverse pay and employment levels, and they expand local revenue streams, which help furnish needed local resources like infrastructure and improved government services.

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