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The Relationship between Oil and Gas Development and Businesses In McKenzie, Richland, Sheridan, and Tioga Counties

Julia Haggerty | Montana State University

Tim Kelsey | The Pennsylvania State University

Alexandra Fahoome | The Pennsylvania State University

Roger Coupal | University of Wyoming

David Kay | Cornell University

Paul Lachapelle | Montana State University

Correspondence email: tkelsey@psu.edu

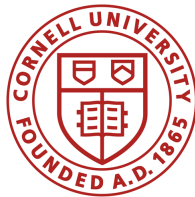


TABLE OF CONTENTS



I.	INTRODUCTION	4
II.	METHODOLOGY	5
	a. Survey administration.....	5
	b. Format.....	5
	c. Sampling.....	6
	d. Responses and response rate.....	6
III.	DEMOGRAPHICS OF RESPONDENTS	7
	a. Tenure in the community.....	7
	b. Personal characteristics.....	9
IV.	BUSINESS DATA	10
	a. Sector classification.....	10
	b. Business tenure.....	14
	c. Gross sales.....	15
	d. Business structure.....	16
V.	IMPACTS	19
	a. Overall sales changes and effects on business.....	19
	b. Sales changes and effects by sector.....	22
	c. Sales changes and effects by tenure.....	30
	d. Sales changes and effects by gross sales.....	32

TABLE OF CONTENTS, CONT.



VI. STRATEGIES	34
a. Information pathways.....	34
b. Peak-development business strategies.....	37
c. Post-development business strategies.....	41
d. Who they worked with to develop strategies.....	45
VII. EXPECTATIONS	47
a. Expected length of peak-development.....	47
VIII. COMMUNITY EFFECTS	50
a. Charitable giving.....	50
IX. IMPLICATIONS	51
X. APPENDIX	52

INTRODUCTION

The purpose of this survey was to identify specific short and long run strategies that landowners, farmers, and local businesses are using to manage and mitigate impacts of the unconventional energy development in their counties. It was sent to individuals in McKenzie County, North Dakota; Richland County, Montana; Sheridan County, Wyoming; and Tioga County, Pennsylvania. These counties were selected based on their background with unconventional oil and gas drilling, which is representative of a larger experience in each state.

Richland County is located in the rural, rolling landscapes of northeastern Montana and covers approximately 2,104 square miles, with a population of 11,576 (US Census 2014). More than 6,400 of those residing in Richland County live in Sidney, the largest city within the county. Regional oil and gas activities began here in the early 2000s, with the number of wells drilled peaking in 2006 with 164 new wells drilled that year. As of 2014, drilling activity has slowed and with it, Sidney is returning to “pre-boom” conditions such as less traffic, shorter lines, and a general slower pace of life.

McKenzie County is located on the Western side of North Dakota and borders the state of Montana. According to the U.S. Census, it spans 2,760 square miles and as of 2016, the population was estimated to be approximately 12,621. Unconventional oil and gas well drilling in McKenzie County peaked in 2011 with 457 new wells drilled in that year alone.

Sheridan County, Wyoming covers 2,527 square miles, including a large region in northeast Wyoming known as the Powder River Basin, where ranching and coal production are long mainstays of the local economy. There was a period of rapid and intensive coalbed methane development between 1998-2008, but after the decline in the natural gas market, there are approximately 4,000 abandoned wells that remain on farms and ranches throughout the state. As of 2015, the population was 29,738 (US Census 2015).

Tioga County, located in Northern Pennsylvania bordering New York, has among the largest number of wells drilled per county in PA. Well drilling in Tioga peaked in 2010 with 276 new wells drilled that year. Tioga is similar to a typical drilling county in Pennsylvania, but thus far less studied than others. The most recent county population estimate from the US Census is 41,467 (2016) and the land area is 1,134 square miles (US Census 2010).

This report will present the data that was collected from the business owner survey sent out in Richland, McKenzie, Sheridan, and Tioga counties, and will provide basic analysis of the responses. The study is primarily concerned with, but not limited to, comparisons made across the four participating states.

The analysis will identify trends in the data that demonstrate the effects that oil or gas development has had on local businesses in each of the four counties. By studying those trends, society can learn more about oil and gas development in general and how its effects vary in different locations, perhaps based on particular features of each county and/or state.

METHODOLOGY



SURVEY ADMINISTRATION

This survey was sent to individuals in McKenzie County, North Dakota; Richland County, Montana; Sheridan County, Wyoming; and Tioga County, Pennsylvania. The survey was administered in the spring of 2016 by Penn State's Survey Research Center to ensure consistency across the four states. Individuals sampled for the survey had the choice to respond by mail or by web. Selected individuals received three mailings: an initial mailing of the survey, a follow-up postcard, and a subsequent second full mailing to non-responders.

FORMAT

The business survey asked both business owners and managers about their businesses' experiences related to oil and gas development in their county. The survey consisted of five sections. The first section titled "Your Business, and Oil and Gas Activities" asked respondents about their businesses experiences before the beginning of major oil or gas activity, during the peak of oil and gas activity, and today. This included questions about observed changes in business activity and sales, and size of their workforce.

The second section "Overall Effects on Your Business" asked questions about the changes in their local business environment due to oil and gas development that are

currently affecting them and have affected them in the past (such as potential changes in local wage rates, and ease of finding and hiring workers).

The third section focused on “Business Strategies,” and asked respondents whether and how they may be adjusting their business’ focus (such as scale of operations, and diversity of activities), how they are using any windfall from the activity, their long run expectations for how the development activity will affect the local business climate and community, and their strategies (if any) for managing the ‘bust’ which could occur after the ‘boom’.

The fourth section titled “About Your Business” asked respondents questions related to the type of business they own or manage, how long the business has been operating, and the structure of the business.

The fifth and last section of the survey “About You as the Business Owner/Manager” collected demographic information about respondents and asked them about their role within the business and how long they have resided in the state their business is in.

At the end of the survey, respondents were asked to share any final comments they had relating to oil and gas development in their community. Respondents were also asked to indicate whether they would be interested in seeing the results of this study and were given space to provide an email address that would be used to send the final results electronically. These email addresses were separated from the survey responses to preserve the confidentiality of respondents. The survey instrument is included in the appendix.

SAMPLING

A total of 400 business operating in each of the 4 counties were selected, for a total sample size of 1,600 businesses. The sample frame was a list of businesses operating in each county, purchased by the Survey Research Center from a commercial vendor, with 400 businesses randomly selected from each county. The survey responses were coded and entered into a database for analysis using SAS. Primarily, this report uses bivariate techniques such as frequency counts, cross-tabulation, and descriptive statistics to observe trends in the data.

RESPONSES AND RESPONSE RATES

Of the surveys, 290 (18 percent) were reported undeliverable by the Post Office, a surprisingly large percentage, particularly for North Dakota (131 undeliverable, or 32.8% of all surveys mailed to North Dakota). This very likely reflects the sudden downturn in drilling activity there shortly before the survey, which made the list of businesses out of date. Notably the undeliverable rates in Montana (18.8%), Wyoming (13.5%) and Pennsylvania (6.5%) were much lower, reflecting that the drilling slowdowns in those

states occurred much earlier, so the list of businesses there had been updated since this change. Another 47 respondents were reported as deceased or closed by the addressees, leaving 1,263 surveys effectively delivered. In total, there were 154 respondents across all four counties, for an overall response rate of 12.2 percent. The most responses came from Pennsylvania, making up 37.7% of the total respondents. About 25% of respondents were from Montana, 23.3% were from Wyoming, and 13.6% were from North Dakota (see Table 1).

State	Mailed	Undeliverable by Post Office (percent)	Owner Deceased/ Closed (percent)	Number of Returned Surveys	Response Rate	Percent of responses
Montana	400	131 (32.8%)	4 (1%)	21	7.9%	13.6%
North Dakota	400	79 (18.1%)	13 (3.3%)	39	12.7%	25.3%
Wyoming	400	54 (13.5%)	11 (2.8%)	36	10.7%	23.4%
Pennsylvania	400	26 (6.5%)	19 (4.8%)	58	16.3%	37.7%
Total	1600	290 (18.1%)	47 (2.9%)	154	12.2%	100%

DEMOGRAPHICS OF RESPONDENTS



TENURE IN THE COMMUNITY

When asked to report how long respondents had lived in their respective states, 14.9% of respondents had lived in their state for 10 years or less (see Table 2). Only 7.1% said they had lived in their current state for more than 65 years. On the other hand, approximately 44% of people had lived in their current state for 11-50 years, and around 34% reported living in their current state for 51-65 years. In the cases of all four counties, this is well before increased oil and gas development activity took place, and long enough

for respondents to have strong personal and professional attachments to their homes. With additional consideration to the average age of respondents being 58 years old (see Table 3), many people had lived in their home states for nearly their entire lives.

There were slight differences in the average number of years reported for each state. The highest came from Pennsylvania, where on average, respondents had lived in their current state for 47.9 years, followed by North Dakota at 44.2 years, then Montana at 42.4 years and Wyoming at 37.4 years.

Table 2. How long have you resided in this state?				
	10 years or less	11-50 years	51-65 years	More than 65 years
North Dakota	33.3% (7)	23.8% (5)	33.3% (7)	9.5% (2)
Montana	18% (7)	38.5% (15)	38.5% (15)	5.1% (2)
Wyoming	13.9% (5)	61.1% (22)	16.7% (6)	8.3% (3)
Pennsylvania	6.9% (4)	44.8% (26)	41.4% (24)	6.9% (4)
Total	14.9% (23)	44.2% (68)	33.8% (52)	7.1% (11)

Frequency Missing=0

The majority of respondents said they did not move to their respective state due to oil or gas activity (see Table 3). North Dakota had the highest rate of respondents who reported they moved to the state because of oil or gas related activities, at 33%. They are followed by Montana who had 30% of respondents report yes, and then Wyoming who had 11.5% report yes. Only one respondent (4.2%) in Pennsylvania reported that they moved to Pennsylvania because of oil or gas related activities.

Table 3. If you moved to the state, did you do so due to oil/gas?		
	No	Yes
North Dakota	66.7% (6)	33.3% (3)
Montana	70% (14)	30% (6)
Wyoming	88.5% (23)	11.5% (3)
Pennsylvania	95.8% (23)	4.2% (1)
Total	83.5% (66)	16.5% (13)

Frequency Missing=75

PERSONAL CHARACTERISTICS

The average age of respondents was 59 in North Dakota, 58 in Wyoming, 57 in Pennsylvania and 56 in Montana. Out of all 154 respondents, the youngest was 25 years old and the oldest was 83 years old. Seventy percent of all respondents were 51 or older, leaving the remaining 30% between the ages of 25 and 50.

Table 4. Age				
	25 years old or less	26-50 years old	51-65 years old	More than 65 years old
North Dakota	9.5% (2)	14.3% (3)	61.9% (13)	14.3% (3)
Montana	10.3% (4)	18% (7)	61.5% (24)	10.3% (4)
Wyoming	8.3% (3)	25% (9)	41.7% (15)	25% (9)
Pennsylvania	6.9% (4)	24.1% (14)	55.2% (32)	13.8% (8)
Total	8.4% (13)	21.4% (33)	54.5% (84)	15.6% (24)

Frequency Missing=0

Regarding gender, 73.4% of total respondents were men and 26.6% were women. Across all four counties, men made up the majority of respondents. North Dakota had the lowest percentage of female respondents at 10.5 percent and Pennsylvania had the highest at 32.7%.

Table 5. Gender		
State	Male	Female
North Dakota	89.5% (17)	10.5% (2)
Montana	75% (27)	25% (9)
Wyoming	72.7% (24)	27.3% (9)
Pennsylvania	67.3% (37)	32.7% (18)
Total	73.4% (105)	26.6% (38)

Frequency Missing=11

Almost all respondents identified as white when asked what their races were (see Table 6). In North Dakota, one person identified as black, one identified as American Indian, and two identified as “other”. In Montana, two people identified as American Indian and one person identified as American Indian in Wyoming. Although in both Montana and Wyoming, 100% of respondents identified as white, meaning that those three individuals identify themselves as part of more than one race. In Pennsylvania, all but one individual (who identified him or herself as an “other” race), reported that they were white.

Table 6. Race <i>Select all that apply</i>						
	White	Black	American Indian	Asian/Pacific Islander	Other	Total
North Dakota	83.3% (15)	5.6% (1)	5.6% (1)	0% (0)	11.1% (2)	18
Montana	100% (37)	0% (0)	5.4% (2)	0% (0)	0% (0)	37
Wyoming	100% (31)	0% (0)	3.2% (1)	0% (0)	0% (0)	31
Pennsylvania	98.1% (53)	0% (0)	0% (0)	0% (0)	1.9% (1)	54
Total	97.1% (136)	0.7% (1)	2.9% (4)	0% (0)	2.1% (3)	140

SECTOR CLASSIFICATION

The survey asked respondents to classify their business into one of the following categories of business sectors:

- Oil and gas
- Agriculture (farming, ranching, ag support, processing, forestry, fishing)
- Hospitality (eating, drinking, hotels, campground)
- Trade (wholesale, retail)
- Services (business, professional, FIRE)
- Manufacturing
- Construction
- Health
- Other

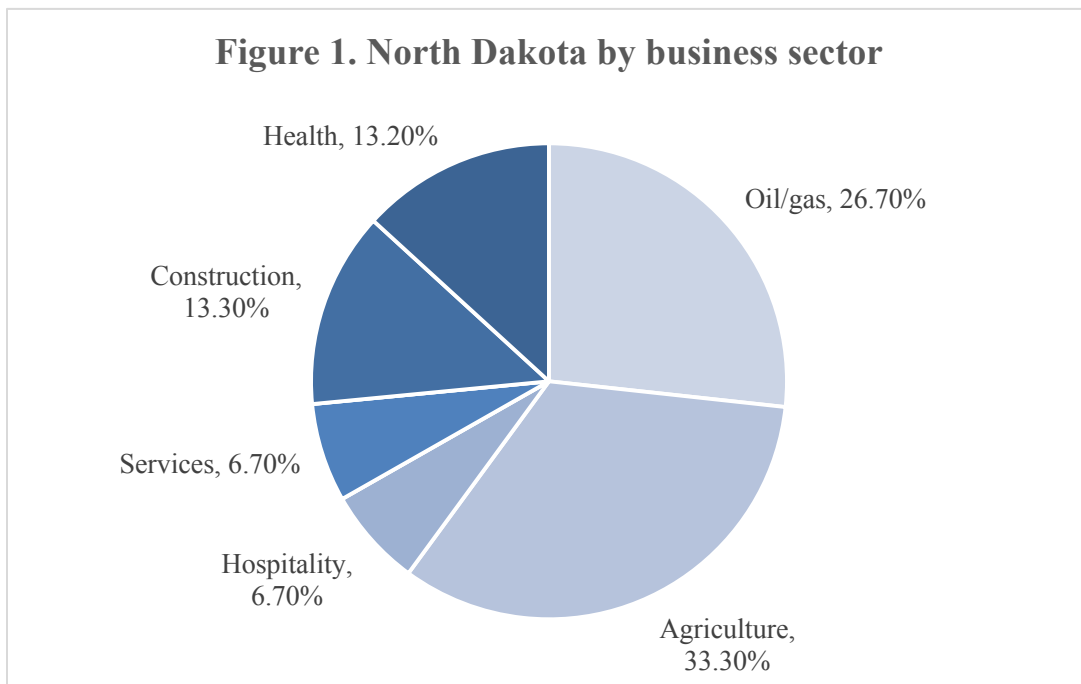
Collectively, the largest sector was services, which accounted for about 28% of respondents from all four states (see Table 7). Those businesses classified as services included business and professional services and finance, insurance, and real estate services. The next largest category was agriculture totaling 19.1% of total respondents, and the oil and gas sector followed at 11.5%. The agriculture category included farming, ranching, support, processing, forestry, and fishing. The rest of the categories were ranked by number of total respondents in the following order: Construction and trade (each at 9.9%), hospitality and other (each at 6.1%), and manufacturing and health (each at 4.6%).

Table 7. Business Sector					
	North Dakota	Montana	Wyoming	Pennsylvania	Total
Oil/gas	26.7% (4)	16.7% (6)	13.3% (4)	2% (1)	11.5% (15)
Agriculture	33.3% (5)	22.2% (8)	16.7% (5)	14% (7)	19.1% (25)
Hospitality	6.7% (1)	5.6% (2)	6.7% (2)	6% (3)	6.1% (8)
Trade	0% (0)	5.6% (2)	10% (3)	16% (8)	9.9% (13)

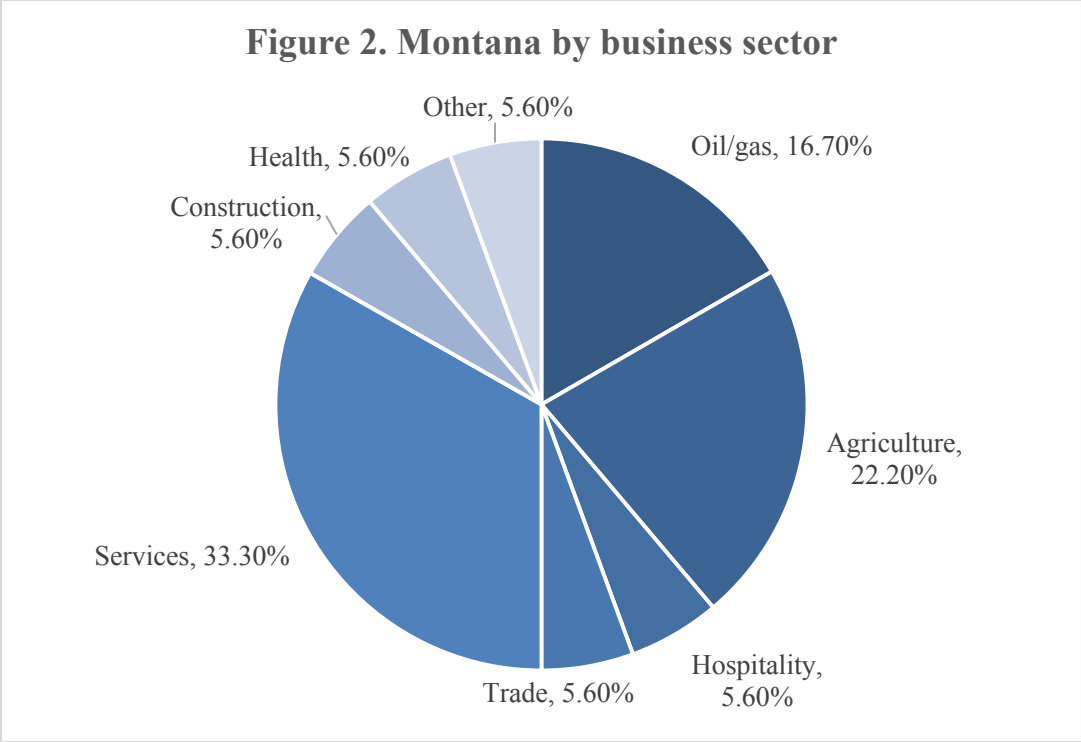
Services	6.7% (1)	33.3% (12)	36.7% (11)	26% (13)	28.2% (37)
Manufacturing	0% (0)	0% (0)	6.7% (2)	8% (4)	4.6% (6)
Construction	13.3% (2)	5.6% (2)	6.7% (2)	14% (7)	9.9% (13)
Health	13.2% (2)	5.6% (2)	0% (0)	4% (2)	4.6% (6)
Other	0% (0)	5.6% (2)	3.3% (1)	10% (5)	6.1% (8)

Frequency missing= 23

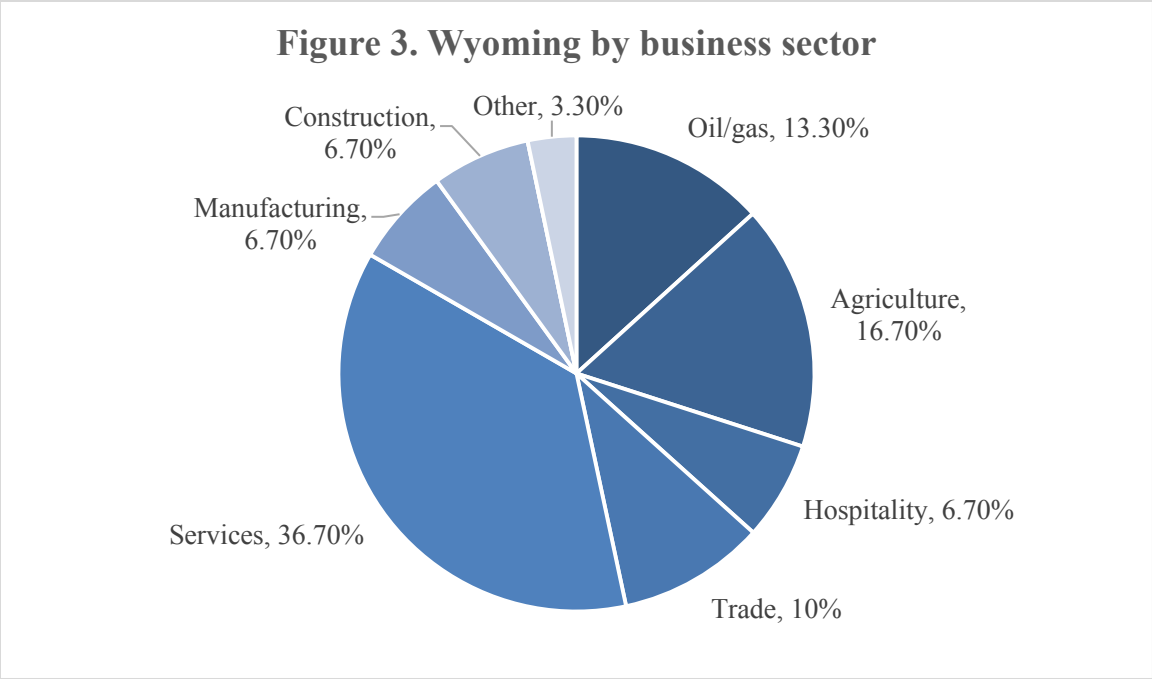
In North Dakota, the largest business sectors were agriculture at 33.3% and oil and gas at 26.7% (see Figure 1). Construction and health followed with approximately 13% each. No respondents reported being part of the trade, manufacturing, or “other” sectors.



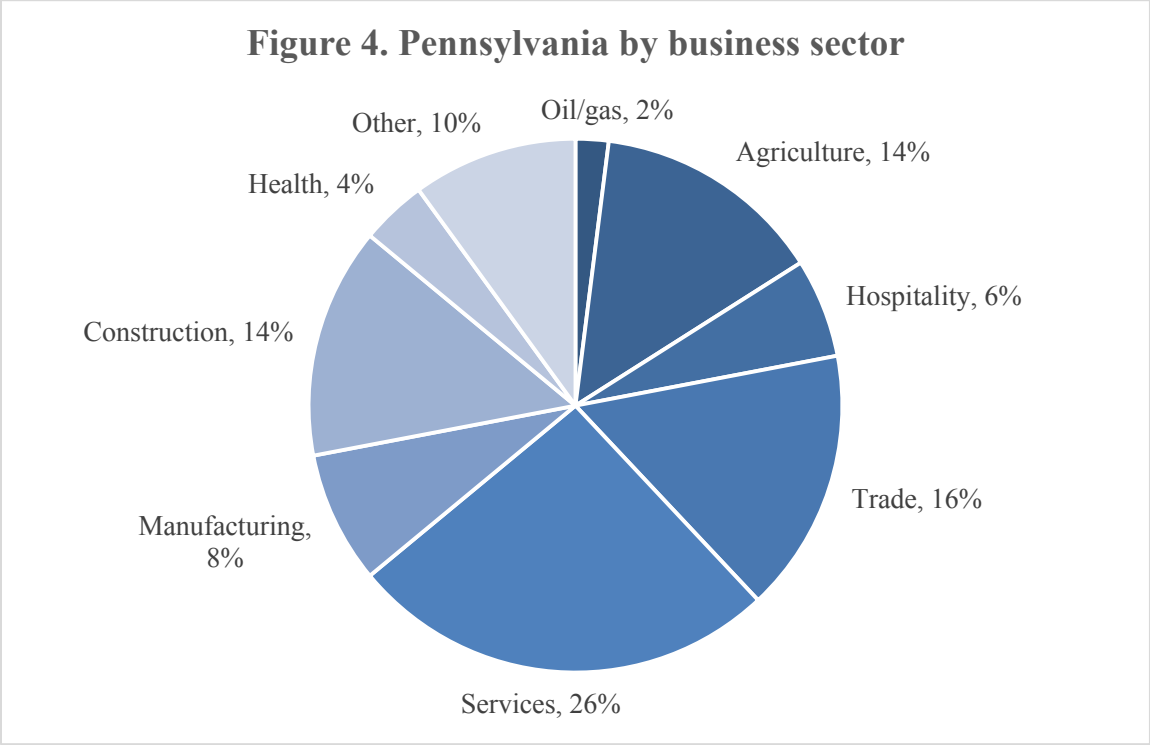
In Montana, the three largest sectors were services at 33.3%, agriculture at 22.2%, and oil and gas at 16.7% (see Figure 2). The “other”, health, construction, trade, and hospitality sectors each made up for 5.6% of respondents from Montana.



In Wyoming, services made up 36.7% of respondents, followed by agriculture at 16.7% and oil and gas at 13.3%. No one in Wyoming claimed their business as part of the health sector (see Figure 3).



In Pennsylvania, the largest sector was services at 26%, followed by trade at 16%, and construction and agriculture at 14% each. Oil and gas only made up 2% of respondents from Pennsylvania (see Figure 4).



BUSINESS TENURE

The majority of respondent businesses (83.7%) have been operating in their county for less than 50 years (see Table 8). For those that have been operating for more than 50 years, 7.1% have been operating for 60-79 years, 2.8% for 80-99 years, and 2.8% have been operating in their country for 100 years or more. These numbers are consistent with the fact that most respondents are between the ages of 55-59 years old and that most individuals reported being the owner of their business (see Table 13).

In North Dakota, the average number of years that a business had been operating in their county was 37.2. Yet nearly half of the North Dakota respondents reported that their businesses had been operating in their county for less than 10 years. This large number of relatively young businesses reflects the unconventional oil and gas development activity that peaked in 2011, with one third of North Dakota respondents reporting having moved to the state because of oil and gas activity (see Table 3). On the other hand, 16.8% of respondents from this county reported that their business had been operating in their county for 80 years or more (including 5.6% for 100 years or more)!

In Montana, the average number of years that a business had been operating in Richland County was 30.9. A quarter of respondents had been operating for 30-39 years, and another quarter had been operating for less than 10 years. As was the case in North Dakota, oil and gas activity peaked in Richland County in the last 10 years (2006 with 164 new wells drilled), so not surprisingly, 30% of respondents said that they moved to Montana because of oil and gas development. As far as long-running businesses in Richland County go, 16.8% had been operating for 50 years or more.

Respondents from Pennsylvania reported their business operating 29.8 years on average, and 85% had been operating for less than 40 years (18.5% for less than 10 years). About six percent of respondents from Pennsylvania reported their business had been operating for 100 years or more. Oil and gas drilling in Tioga County peaked in 2010 when 276 new wells were drilled that year. However, only 4.2% of respondents reported having moved to Pennsylvania because of oil and gas activity.

Finally, in Sheridan County, Wyoming, respondents reported the lowest average number of years that businesses had been operating, Sheridan County at 25.6 years. Wyoming also had the youngest aged survey respondents, on average, and the lowest average number of years that respondents have lived in their counties. Similar to Pennsylvania, nearly 88% of respondents from Sheridan County had lived in the county for 39 years or less, and 12.1% for less than 10 years. Only 11.5% of respondents reported having moved to Wyoming because of oil and gas development activity.

Table 8. Business Tenure					
	North Dakota	Montana	Wyoming	Pennsylvania	Total
Less than 10 years	44.4% (8)	25% (9)	12.1% (4)	18.5% (10)	22% (31)
10-19 years	0% (0)	11.1% (4)	24.2% (8)	18.5% (10)	15.6% (22)
20-29 years	0% (0)	8.3% (3)	36.4% (12)	20.4% (11)	18.4% (26)
30-39 years	11.1% (2)	25% (9)	15.2% (5)	27.8% (15)	22% (31)
40-49 years	5.6% (1)	13.9% (5)	0% (0)	3.7% (2)	5.7% (8)
50-59 years	5.6% (1)	2.8% (1)	6.1% (2)	1.9% (1)	3.5% (5)
60-69 years	16.7% (3)	5.6% (2)	0% (0)	3.7% (2)	5% (7)
70-79 years	0% (0)	5.6% (2)	3% (1)	0% (0)	2.1% (3)
80-89 years	5.6% (1)	0% (0)	3% (1)	0% (0)	1.4% (2)
90-99 years	5.6% (1)	2.8% (1)	0% (0)	0% (0)	1.4% (2)
100 years or more	5.6% (1)	0% (0)	0% (0)	5.6% (3)	2.8% (4)

Frequency Missing=13

GROSS SALES

Respondents were asked to report the approximate total gross sales from their business (before taxes) in the year 2015, since it was the last complete calendar year before the survey was sent out. Here, we use gross sales as an indicator of business size. In total, 33.3% of respondents reported that the gross sales at their business location is less than \$100,000 per year. About, 24% reported \$250,000-\$999,000 a year, 23.3% reported \$1 million to \$4.9 million per year, 16.7% of total respondents reported \$100,000-\$249,000 a year, 1.7% reported \$5-\$9.9 million a year and 1.7% reported gross sales at more than \$10 million per year.

Pennsylvania had the largest percentage of businesses that reported grossing less than \$100,000 in the year 2015, with half of the businesses there reporting sales at that level. Pennsylvania had 20% report grossing \$250,000-\$999,000 and 12.5% reported \$1 million-\$4.9 million in 2015 gross sales. Wyoming also reported a large number of business grossing less than \$100,000 in the year 2015 at 45.5%. The rest of responses varied though from \$100,000-\$249,000 all the way to \$5 million-\$9.9 million. In Montana, while no one reported grossing more than \$5 million a year, the respondents were split approximately into fourths, reporting anywhere from less than \$100,000 to \$1 million-\$4.9 million a year. North Dakota had the widest range with 25% grossing less than \$100,000,

25% grossing more than \$10 million, and 50% grossing between \$1 million and \$4.9 million.

State	<\$100K	\$100K to \$249K	\$250K to \$999K	\$1 mil to \$4.9 mil	\$5 mil to \$9.9 mil	\$10 mil+	Total
North Dakota	38.9% (7)	5.6% (1)	11.1% (2)	27.8% (5)	0% (0)	16.7% (3)	18
Montana	27% (10)	24.3% (9)	27% (10)	21.6% (8)	0% (0)	0% (0)	37
Wyoming	31.3% (10)	21.9% (7)	18.8% (6)	18.8% (6)	6.3% (2)	3.1% (1)	32
Pennsylvania	40% (18)	24.4% (11)	20% (9)	11.1% (5)	2.2% (1)	2.2% (1)	45
Total	34.1% (45)	21.2% (28)	20.5% (27)	18.2% (24)	2.3% (3)	3.8% (5)	132

Frequency Missing= 22



BUSINESS STRUCTURE

At least half of the respondents in all states except Wyoming reported that their business operates solely in their counties (see Table 10). In Wyoming, about 47% operate solely in Sheridan County. Overall though, there were still a noticeable number of businesses that operated in other counties within their state and that operated both in other counties within their states *and* other states.

Table 10. Is your company in other counties? Other states?				
	Operates solely in this county	Yes, other counties in this state	Yes, other states	Both in other counties in this state AND other states
North Dakota	55.6% (10)	27.8% (5)	0% (0)	16.7% (3)
Montana	70.6% (24)	0% (0)	0% (0)	29.4% (10)
Wyoming	46.9% (15)	25% (8)	3.1% (1)	25% (8)
Pennsylvania	53.7% (29)	20.4% (11)	1.9% (1)	24.1% (13)
Total	56.5% (78)	17.4% (24)	1.4% (2)	24.6% (34)

Frequency Missing= North Dakota=3; Montana=5; Wyoming=4; Pennsylvania=4

Half of the respondents reported a sole-proprietorship (see Table 11), and nearly 20% reported being a family-owned corporation. Wyoming had the highest reported proportion of family-owned corporations at 34.4%, followed by North Dakota and Montana who both had 22.2% of family-owned corporations, and Pennsylvania with 7.7% of family owned corporations.

Table 11. Ownership Structure					
	Sole proprietor	Partnership	Family-owned corporation	Non-family owned corporation	Other
North Dakota	44.4% (8)	11.1% (2)	22.2% (4)	11.1% (2)	11.1% (2)
Montana	47.2% (17)	19.4% (7)	22.2% (8)	0% (0)	11.1% (4)
Wyoming	34.4% (11)	12.5% (4)	34.4% (11)	3.1% (1)	15.6% (5)
Pennsylvania	65.4% (34)	5.8% (3)	7.7% (4)	11.5% (6)	9.6% (5)
Total	50.7% (70)	11.6% (16)	19.6% (27)	6.5% (9)	11.6% (16)

Frequency Missing=16

Sole proprietorship was the most reported ownership structure in every sector besides oil/gas (see Table 12). In the oil/gas industry, partnership was the highest reported ownership structure, followed by “other” at approximately 27% and sole proprietorship at 20%. The agriculture, construction, manufacturing, trade, and hospitality sectors all had at least one quarter of respondents report a family-owned corporation structure.

Table 12. Ownership Structure by Business Sector					
	Sole proprietor	Partnership	Family-owned corporation	Non-family owned corporation	Other
Agriculture	62.5% (15)	8.3% (2)	25% (6)	4.2% (1)	0% (0)
Oil/gas	20% (3)	33.3% (5)	6.7% (1)	13.3% (2)	26.7% (4)
Construction	69.2% (9)	0% (0)	30.8% (4)	0% (0)	0% (0)
Manufacturing	33.3% (1)	0% (0)	33.3% (1)	0% (0)	33.3% (1)
Trade	58.3% (7)	8.3% (1)	25% (3)	8.3% (1)	0% (0)
Services	63.3% (19)	16.7% (5)	6.7% (2)	6.7% (2)	6.7% (2)
Hospitality	57.1% (4)	0% (0)	42.9% (3)	0% (0)	0% (0)
Other	40% (10)	8% (2)	16% (4)	4% (1)	32% (8)

Frequency Missing= 25

Exactly half of businesses organized as partnerships that moved, did so for oil and gas related activities (see Table 13). Non-family owned corporations and “other” businesses that moved also had noticeable proportions of respondents say that their reason for moving was related to oil or gas activities. Only 3% of sole proprietors who moved did so for oil or gas reasons.

Table 13. Ownership structure and motives for moving		
	<i>Did not</i> move because of oil or gas related activities	Moved because of oil or gas related activities
Sole proprietor	97.1% (33)	2.9% (1)
Partnership	50% (4)	50% (4)
Family-owned corporation	88.2% (15)	11.8% (2)
Non-family owned corporation	71.4% (5)	28.6% (2)
Other	63.6% (7)	36.4% (4)
Total	83.1% (64)	16.9% (13)

Frequency Missing=77

It is noteworthy that 75.8% of total respondents were the owner of their business. About 14% of total respondents reported holding the role of manager and the remaining 10.6% held “other” roles.

Table 14. Respondents role within business			
	Owner	Manager	Other
North Dakota	77.8% (14)	16.7% (3)	5.6% (1)
Montana	80% (24)	10% (3)	10% (3)
Wyoming	65.6% (21)	21.9% (7)	12.5% (4)
Pennsylvania	78.9% (41)	9.6% (5)	11.5% (6)
Total	75.8% (100)	13.6% (18)	10.6% (14)

Frequency Missing= 22

OVERALL SALES CHANGES AND EFFECTS ON BUSINESS

Perhaps two of the most important questions on the survey were those asking about whether the businesses’ sales changed during the peak of oil and gas activity, and during the decline of oil and gas activity. These questions are important because they provide some insight of the effects that oil and gas activity had on the businesses located in areas with high oil and gas activity.

More than half of the total respondents (55.5%) saw an increase in their business sales during the peak of oil and gas development activities in their counties (see Table 15). Additionally, 40.4% of total respondents reported “no change” in sales activities during these time periods. That means that 95.9% of total survey respondents reported that their sales either increased or did not change in these time periods.

North Dakota had the highest percent of people (73.7%) reporting an increase in annual sales during the peak of activity. Montana reported the next highest percent who saw an increase at 66.7%, followed by Wyoming at 55.6% and Pennsylvania at 41.8%. Neither North Dakota or Montana had any reports of a decrease in annual sales, compared to Wyoming which had 13.9% report a decrease in annual sales during the peak of activity.

Table 15. Sales change during peak of activity				
State	Increase	No change	Decrease	Total
North Dakota	73.7% (14)	26.3% (5)	0% (0)	19
Montana	66.7% (24)	33.3% (12)	0% (0)	36
Wyoming	55.6% (20)	30.6% (11)	13.9% (5)	36
Pennsylvania	41.8% (23)	56.4% (31)	1.8% (1)	55
Total	55.5% (81)	40.4% (59)	4.1% (6)	146

Frequency Missing= 8

About 59% of respondents reported the overall impact during peak was either positive or very positive on their business, compared with only 11.3% who reported that the overall impact during peak was either negative or very negative (see Table 16).

As with changes in annual sales, North Dakota respondents were most likely to report overall positive impacts during the peak of activity in their county, with 78.9% reporting positive or very positive. Surprisingly, North Dakota also had the highest percent of respondents report feeling negative or very negative about the overall impact during the peak of activity (21.1%). This would suggest that respondents there felt negatively about the overall impacts based on factors other than sales. This was also the case in Montana and Pennsylvania where the percentage of respondents who felt negative or very negative about the effects of oil/gas development on their business, was higher than the percent who reported that the development caused a decrease in their sales.

Table 16. Overall impact during peak of activity				
State	Positive or very positive	Neutral	Negative or very negative	Total
North Dakota	78.9% (15)	0% (0)	21.1% (4)	19
Montana	61.1% (22)	22.2% (8)	16.7% (6)	36
Wyoming	69.7% (23)	27.3% (9)	3% (1)	33
Pennsylvania	42.6% (23)	48.2% (26)	9.3% (5)	54
Total	58.5% (83)	30.3% (43)	11.3% (16)	142

Frequency Missing= 12

This data is particularly compelling when placed next to data on businesses sales change after the *decline* of oil and gas development activity. About 44% of total respondents reported that their annual sales decreased due to the decline of oil and gas development activities in their counties (see Table 17). This is significantly higher than the mere 4.1% that reported a decline in sales during the peak of activity in their counties. Only 15.6% of respondents reported their sales increased during the decline of drilling activity, compared to the 55.5% who reported sales increased during the peak of activity.

Table 17. Sales change due to decline in activity				
State	Increase	No change	Decrease	Total
North Dakota	20% (4)	25% (5)	55% (11)	20
Montana	18.9% (7)	40.5% (15)	40.5% (15)	37
Wyoming	11.1% (4)	30.6% (11)	58.3% (21)	36
Pennsylvania	14.8% (8)	53.7% (29)	31.5% (17)	54
Total	15.6% (23)	40.8% (60)	43.5% (64)	147

Frequency Missing= 7

When asked to report how oil or gas development activities in their counties currently are impacting their business (post-decline), 39.4% reported negative or very negative (see Table 18). Again, this is a significant spike from the 11.3% that reported negative or very negative overall impacts during the peak of oil and gas development activities. Such negative impacts were particularly strong in Wyoming, with 69.7% of respondents from there reporting that the impacts currently were negative or very negative.

Across all four states, approximately 20% of respondents reported feeling positive or very positive about the overall impacts of oil and gas development currently, which is a 38.5% decrease from those who reported feeling positively during the peak of activity. These results also seem to fall in line with the data presented in Table 17, similarly to how the results from Tables 15 and 16 paralleled one another. Both cases display correlation between change in sales and respondents perceptions of the effects that different levels of oil and gas activities had on their businesses. In general, more people felt positively about the effects of oil and gas development during the peak of activity, than they do currently.

It is noteworthy though that a significant proportion of respondents felt neutral as well, especially in the state of Pennsylvania where 68.5% felt neutral about the overall impacts of activity post-decline, and 48.2% felt neutral about the overall impacts during the peak of activity.

Table 18. Overall current impact of oil/gas development				
State	Positive or very positive	Neutral	Negative or very negative	Total
North Dakota	44.5% (8)	16.7% (3)	38.9% (7)	18
Montana	32.4% (12)	27% (10)	40.5% (15)	37
Wyoming	6.1% (2)	24.2% (8)	69.7% (23)	33
Pennsylvania	11.1% (6)	68.5% (37)	20.4% (11)	54
Total	19.7% (28)	40.8% (58)	39.4% (56)	142

Frequency Missing= 12

Additionally, regardless of whether effects of development were positive or negative, it is clear that about two thirds (59.6%) of respondents reported some sort of impact of peak development activity on their business's sales, and almost an identical percentage (59.2%) reported the same due to the decline in activity. Whether or not we can ever be certain of claims stating how good or bad oil and gas development activities were for businesses, we can say that from the results of this survey, the peak and decline of oil and gas development activities had an influence on the sales of businesses in Richland, McKenzie, Sheridan, and Tioga counties.

SALES CHANGES AND EFFECTS BY SECTOR

There are similar findings when the responses are considered across business sectors, and by business sector in each state. In every sector, the number of respondents who reported an increase in sales after the decline of oil and gas activity is significantly lower than the percentage who reported an increase in sales during the peak of oil and gas activity (see Table 19). On average, there was a 45 percentage point difference between the “during peak” increase column to the “after decline” increase column. Inversely, the percentage of individuals who reported a decrease in sales during the peak of activity is significantly lower than the percentage who reported a decrease in sales after the decline in activity. On average, there was an increase in 48.7 percentage points from column to column. The hospitality sector had the most drastic change in the percentage of people who saw an increase in sales due to development (85.7%) to the number who saw an increase after the decline of development (0%).

Unsurprisingly, the oil and gas sector had the highest proportion of respondents who said that they saw an increase in sales due to the peak of oil and gas development in their county (86.7%), and the highest proportion who said that they saw a decrease in sales after the decline in activity (86.7%). Respondents from the Trade (which includes retail

and wholesale trade) and Hospitality sectors reported similarly were very likely to report increases in overall sales during the peak, with 83.3% and 85.7%, respectively, though the percentage reporting declining sales during the decline was slightly less than oil/gas companies (both were 75%). A majority of respondents in the Construction and Service sectors similarly reported increases during the peak of activity.

A majority of respondents in the agriculture, construction, manufacturing, services, and “other” sectors had large shares of respondents who reported that they saw no change in sales based off oil and gas activities during the peak of development, as well as after the decline in development.

Table 19. Overall sales change by sector						
	During peak			After decline		
	Increase	No change	Decrease	Increase	No change	Decrease
Agriculture	37.5% (9)	58.3% (14)	4.2% (1)	20.8% (5)	62.5% (15)	16.7% (4)
Oil/gas	86.7% (13)	6.7% (1)	6.7% (1)	13.3% (2)	0% (0)	86.7% (13)
Construction	53.9% (7)	46.2% (6)	0% (0)	23.1% (3)	46.2% (6)	30.8% (4)
Manufacturing	33.3% (1)	66.7% (2)	0% (0)	0% (0)	33.3% (1)	66.7% (2)
Trade	83.3% (10)	8.3% (1)	8.3% (1)	25% (3)	0% (0)	75% (9)
Services	51.7% (15)	48.3% (14)	0% (0)	17.2% (5)	41.4% (12)	41.4% (12)
Hospitality	85.7% (6)	14.3% (1)	0% (0)	0% (0)	25% (2)	75% (6)
Other	47.8% (11)	47.8% (11)	4.4% (1)	20.8% (5)	58.3% (14)	20.8% (5)
Total	57.1% (72)	39.7% (50)	3.2% (4)	18% (23)	39% (50)	43% (55)

Frequency Missing= 28

Frequency Missing= 26

Table 20 displays the same pattern that appears in Tables 16 and 18. During the peak of oil and gas activity, respondents in every business sector (save manufacturing), reported higher levels of feeling positive or very positive about the effects of development on their business, than they did after the decline of activity (In the manufacturing sector, there was no change from the “during peak” positive column to the “after decline” positive column). On average, there was a drop in 39.6 percentage points from the positive or very positive columns, from during the peak of oil and gas activity to after the decline in activity. There was also, on average, an increase in 32.7 percentage points from the “during peak” negative or very negative column to the “after decline” negative or very negative column.

Essentially, both Tables 19 and 20 show that regardless of sector, more respondents felt more positively about the effects that oil and gas development had on their business during the peak of activity than during the decline, based on change in sales and overall attitudes toward the development. Further, respondents felt more negatively about the effects that development had on their businesses after the decline of activity than during the peak.

Table 20. Overall effects on business by sector

	During peak			After decline		
	Positive or very positive	Neutral	Negative or very negative	Positive or very positive	Neutral	Negative or very negative
Agriculture	36.4% (8)	36.4% (8)	27.3% (6)	22.7% (5)	36.4% (8)	40.9% (9)
Oil/gas	100% (15)	0% (0)	0% (0)	20% (3)	0% (0)	80% (12)
Construction	53.8% (7)	38.5% (5)	7.7% (1)	16.7% (2)	41.7% (5)	41.7% (5)
Manufacturing	33.3% (1)	66.7% (2)	0% (0)	33.3% (1)	33.3% (1)	33.3% (1)
Trade	83.3% (10)	0% (0)	16.7% (2)	15.4% (2)	23.1% (3)	61.5% (8)
Services	56.7% (17)	36.7% (11)	6.7% (2)	13.3% (4)	53.3% (16)	33.3% (10)
Hospitality	75% (6)	12.5% (1)	12.5% (1)	25% (2)	37.5% (3)	37.5% (3)
Other	45.8% (11)	41.7% (10)	12.5% (3)	20.8% (5)	62.5% (15)	16.7% (4)
Total	59.1% (75)	29.1% (37)	11.8% (15)	18.9% (24)	40.2% (51)	40.9% (52)

Frequency Missing= 27

Frequency Missing= 27

In North Dakota, there were no respondents that reported a decrease in annual sales during the peak of activity. While 80% of the agricultural sector saw no change in sales during this time, the remaining 20% of agricultural businesses, and 100% of the other sectors saw an increase in sales. After the decline, the agriculture, oil/gas, construction, hospitality, and other sectors all had some number of respondents report that they saw a decrease in sales.

When asked about the overall effects of the development on their businesses, the businesses in North Dakota responded similarly. Overall, 73 percent of the businesses said the effects were positive or very positive during the peak of development, and only about 27 percent said the effects were negative (see Table 22). None of the businesses said the effects were neutral. All of those reporting negative or very negative effects, with the exception of one respondent, were in the agriculture sector. When asked about the effects after the decline, respondents were evenly split between positive or very positive effects (42.9%) and negative or very negative effects (42.9%). Businesses in the agriculture, oil/gas, and construction sectors were most likely to report negative or very negative effects.

Table 21. North Dakota sales change by sector

	During peak			After decline		
	Increase	No change	Decrease	Increase	No change	Decrease
Agriculture	20% (1)	80% (4)	0% (0)	20% (1)	60% (3)	20% (1)
Oil/gas	100% (4)	0% (0)	0% (0)	25% (1)	0% (0)	75% (3)
Construction	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)
Services	100% (1)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)
Hospitality	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)
Other	100% (2)	0% (0)	0% (0)	50% (1)	0% (0)	50% (1)
Total	71.4% (10)	28.6% (4)	0% (0)	26.7% (4)	20% (3)	53.3% (8)

Frequency Missing= 7

Frequency Missing= 6

Table 22. North Dakota overall effects on business by sector

	During peak			After decline		
	Positive or very positive	Neutral	Negative or very negative	Positive or very positive	Neutral	Negative or very negative
Agriculture	40% (2)	0% (0)	60% (3)	20% (1)	40% (2)	40% (2)
Oil/gas	100% (4)	0% (0)	0% (0)	25% (1)	0% (0)	75% (3)
Construction	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)
Services	100% (1)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)
Hospitality	100% (1)	0% (0)	0% (0)	100% (1)	0% (0)	0% (0)
Other	50% (1)	0% (0)	50% (1)	100% (2)	0% (0)	0% (0)
Total	73.3% (11)	0% (0)	26.7% (4)	42.9% (6)	14.3% (2)	42.9% (6)

Frequency Missing=6

Frequency Missing=7

As was the case in North Dakota, there were no respondents in Montana that reported a decrease in sales during the peak of oil and gas activity in their county (see Table 23). In the oil/gas, construction, trade, and hospitality sectors, 100% claimed an increase in sales and overall positive or very positive effects during the peak. In the agricultural sector, almost two thirds (62.5%) of respondents reported no change in sales during this time, and nearly 38% reported feeling overall negative or very negative about the effects of oil and gas activity on their business during the peak of activity. In addition, 28.6% of the service industry in Montana felt that the overall effects on their business during the peak were negative or very negative.

After the decline, every sector (except manufacturing; nonexistent among respondents from Montana) had at least 12% report a decrease in sales, including 100% of both the trade (retail and wholesale) and hospitality sectors. At least 22% of each sector reported feeling negative or very negative about the effects of oil and gas activity on their business after the decline, including 83.3% of the oil and gas industry, 50% of construction, 50% of trade, and 50% of the hospitality sector.

Table 23. Montana sales change by sector						
	During peak			After decline		
	Increase	No change	Decrease	Increase	No change	Decrease
Agriculture	37.5% (3)	62.5% (5)	0% (0)	12.5% (1)	75% (6)	12.5% (1)
Oil/gas	100% (6)	0% (0)	0% (0)	16.7% (1)	0% (0)	83.3% (5)
Construction	100% (2)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)
Trade	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)
Services	66.7% (4)	33.3% (2)	0% (0)	50% (3)	16.7% (1)	33.3% (2)
Hospitality	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	100% (2)
Other	55.6% (5)	44.4% (4)	0% (0)	22.2% (2)	55.6% (5)	22.2% (2)
Total	67.6% (23)	32.4% (11)	0% (0)	20% (7)	37.1% (13)	42.9% (15)

Frequency Missing= 5

Frequency Missing= 4

Table 24. Montana overall effects on business by sector

	During peak			After decline		
	Positive or very positive	Neutral	Negative or very negative	Positive or very positive	Neutral	Negative or very negative
Agriculture	25% (2)	37.5% (3)	37.5% (3)	25% (2)	37.5% (3)	37.5% (3)
Oil/gas	100% (6)	0% (0)	0% (0)	16.7% (1)	0% (0)	83.3% (5)
Construction	100% (2)	0% (0)	0% (0)	50% (1)	0% (0)	50% (1)
Trade	100% (1)	0% (0)	0% (0)	50% (1)	0% (0)	50% (1)
Services	57.1% (4)	14.3% (1)	28.6% (2)	42.9% (3)	28.6% (2)	28.6% (2)
Hospitality	100% (2)	0% (0)	0% (0)	50% (1)	0% (0)	50% (1)
Other	55.6% (5)	33.3% (3)	11.1% (1)	33.3% (3)	33.3% (3)	22.2% (2)
Total	62.9% (22)	20% (7)	17.1% (6)	34.3% (12)	22.9% (8)	42.9% (15)

Frequency Missing= 4

Frequency Missing= 3

In Wyoming, 56.7% of all respondents said that sales increased during the peak of oil and gas development activities in their county (see Table 25), including 100% of the construction and hospitality sectors, and 66.7% of the trade sector. A quarter of both the agricultural and oil and gas sectors reported a decrease in sales during the peak of activity, as well as one third of “other” sectors as well. After the decline in activity though, more than half of all respondents then said that their sales decreased, including 100% of the oil and gas, manufacturing, and trade sectors. Interestingly though, 100% of the construction sector still felt that sales increased even after the decline in activity.

As was the case in the other states, when asked to report their overall feelings toward oil and gas development before and after the peak of activity, respondents felt mostly positive or very positive during the peak (69%), and mostly negative or very negative after the decline (69%) (See Table 26). People from the agricultural, manufacturing, services, hospitality, and other sectors also reported feeling neutral during the peak of activity. Although, after the decline in activity, there are lower percentages of those from the agricultural and manufacturing sectors that still felt neutral about the overall effects on their business.

Table 25. Wyoming sales change by sector

	During peak			After decline		
	Increase	No change	Decrease	Increase	No change	Decrease
Agriculture	50% (2)	25% (1)	25% (1)	25% (1)	75% (3)	0% (0)
Oil/gas	50% (2)	25% (1)	25% (1)	0% (0)	0% (0)	100% (4)
Construction	100% (2)	0% (0)	0% (0)	100% (2)	0% (0)	0% (0)
Manufacturing	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	100% (1)
Trade	66.7% (2)	33.3% (1)	0% (0)	0% (0)	0% (0)	100% (3)
Services	54.6% (6)	45.4% (5)	0% (0)	9.1% (1)	27.3% (3)	63.6% (7)
Hospitality	100% (2)	0% (0)	0% (0)	0% (0)	50% (1)	50% (1)
Other	33.3% (1)	33.3% (1)	33.3% (1)	0% (0)	100% (3)	0% (0)
Total	56.7% (17)	33.3% (10)	10% (3)	13.3% (4)	33.3% (10)	53.3% (16)

Frequency Missing= 6

Frequency Missing= 6

Table 26. Wyoming overall effects on business by sector

	During peak			After decline		
	Positive or very positive	Neutral	Negative or very negative	Positive or very positive	Neutral	Negative or very negative
Agriculture	33.3% (1)	66.7% (2)	0% (0)	33.3% (1)	33.3 (1)	33.3% (1)
Oil/gas	100% (4)	0% (0)	0% (0)	25% (1)	0% (0)	75% (3)
Construction	100% (2)	0% (0)	0% (0)	0% (0)	0% (0)	50% (2)
Manufacturing	0% (0)	100% (1)	0% (0)	0% (0)	0% (0)	100% (1)
Trade	100% (3)	0% (0)	0% (0)	0% (0)	0% (0)	100% (3)
Services	72.7% (8)	27.3% (3)	0% (0)	0% (0)	27.3% (3)	72.7% (8)
Hospitality	50% (1)	50% (1)	0% (0)	0% (0)	50% (1)	50% (1)
Other	33.3% (1)	33.3% (1)	33.3% (1)	0% (0)	66.7% (2)	33.3% (1)
Total	69% (20)	27.6% (8)	3.4% (1)	6.9% (2)	24.1% (7)	69% (20)

Frequency Missing= 7

Frequency Missing= 7

In Pennsylvania, almost all respondents across all sectors reported either an increase or no change in sales during the peak of activity. In the agriculture, construction, manufacturing, services, and other sectors, at least half of respondents said there was no change in sales, while the hospitality, trade, and oil and gas sectors had more than half of respondents reporting an increase in sales. Only 12.5% of the trade sector said their sales decreased during this time. Interestingly, 85.7% of construction said there was no change in sales during the peak, compared to all other states in which 0% of the construction sector reported no change during the peak. Business owners from Pennsylvania were also more likely to have felt positive, very positive, or neutral about the overall effects during the peak, than negatively. Although, one third of the hospitality sector and one quarter of the trade sector did report feeling negative or very negative at this time.

After the decline in activity in Pennsylvania, more individuals from every sector said that their sales decreased, including 100% of the oil and gas sector, 66.7% of the hospitality sector and 57.1% of the trade sector. Although 42.9% of the trade sector still reported an increase in sales after the decline in activity. Almost three quarters of both the construction and services sectors said there was no change in sales at this time.

Table 27. Pennsylvania sales change by sector

	During peak			After decline		
	Increase	No change	Decrease	Increase	No change	Decrease
Agriculture	42.9% (3)	57.1% (4)	0% (0)	28.6% (2)	42.9% (3)	28.6% (2)
Oil/gas	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)
Construction	14.3% (1)	85.7% (6)	0% (0)	14.3% (1)	71.4% (5)	14.3% (1)
Manufacturing	50% (1)	50% (1)	0% (0)	0% (0)	50% (1)	50% (1)
Trade	87.5% (7)	0% (0)	12.5% (1)	42.9% (3)	0% (0)	57.1% (4)
Services	36.4% (4)	63.6% (7)	0% (0)	0% (0)	72.7% (8)	27.3% (3)
Hospitality	66.7% (2)	33.3% (1)	0% (0)	0% (0)	33.3% (1)	66.7% (2)
Other	33.3% (3)	66.7% (6)	0% (0)	20% (2)	60% (6)	20% (2)
Total	45.8% (22)	52.1% (25)	2.1% (1)	16.7% (8)	50% (24)	33.3% (16)

Frequency Missing= 10

Frequency Missing= 10

Table 28. Pennsylvania overall effects on business by sector

	During peak			After decline		
	Positive or very positive	Neutral	Negative or very negative	Positive or very positive	Neutral	Negative or very negative
Agriculture	50% (3)	50% (3)	0% (0)	16.7% (1)	33.3% (2)	50% (3)
Oil/gas	100% (1)	0% (0)	0% (0)	0% (0)	0% (0)	100% (1)
Construction	14.3% (1)	71.4% (5)	14.3% (1)	14.3% (1)	71.4% (5)	14.3% (1)
Manufacturing	50% (1)	50% (1)	0% (0)	50% (1)	50% (1)	0% (0)
Trade	75% (6)	0% (0)	25% (2)	12.5% (1)	37.5% (3)	50% (4)
Services	36.4% (4)	63.6% (7)	0% (0)	0% (0)	100% (11)	0% (0)
Hospitality	66.7% (2)	0% (0)	33.3% (1)	0% (0)	66.7% (2)	33.3% (1)
Other	40% (4)	60% (6)	0% (0)	0% (0)	90% (9)	10% (1)
Total	45.8% (22)	45.8% (22)	8.3% (4)	8.3% (4)	68.8% (33)	22.9% (11)

Frequency Missing= 10

Frequency Missing= 10

SALES CHANGES AND EFFECTS BY TENURE

The longevity of firms in the community appear related to whether sales changed during the peak of development, and after the decline of that development. For example, about 63% of firms who had been in the community less than 10 years reported sales increases during the peak of activity, compared to 53 percent of those businesses who had been in the community 10 or more years (see Table 29). Firms who moved more recently into the community similarly were more likely to report sales decreases than were firms who had been in the community longer (58.5% compared to 37.7%). These differences may occur if these newer firms moved into the community specifically because of the gas development.

Even when the data is broken down in this way, we still see that generally, more people felt positivity about the effects of oil and gas development during the peak of activity, and felt more negatively after the decline in activity, regardless of tenure. In Tables 29 and 30, there are noticeable drops in the percentages from the “during peak” increase columns

to the “after decline” increase columns, and noticeable increases from the “during peak” decrease columns to the “after decline” decrease columns.

Table 29. Sales change vs. 10 year tenure						
	During peak			After decline		
	Increase	No change	Decrease	Increase	No change	Decrease
Less than 10 years	63.2% (24)	31.6% (12)	5.3% (2)	17.1% (7)	24.4% (10)	58.5% (24)
10+ years	52.8% (57)	43.5% (47)	3.7% (4)	15.1% (16)	47.2% (50)	37.7% (40)

Frequency Missing= 8 Frequency Missing= 7

Table 30. Sales change vs. 25 year tenure						
	During peak			After decline		
	Increase	No change	Decrease	Increase	No change	Decrease
Less than 25 years	52.7% (39)	40.5% (30)	6.8% (5)	15.6% (12)	36.4% (28)	48.1% (37)
25+ years	58.3% (42)	40.3% (29)	1.4% (1)	15.7% (11)	45.7% (32)	38.6% (27)

Frequency Missing= 8 Frequency Missing= 7

The same pattern appears when considering the reported overall effects on firms (see Tables 31 and 32). Newer firms were more likely to report positive or very positive effects during the peak of activity, and negative or very negative effects after the decline, than were firms with longer tenure in the community. When these comparisons were made on a state-by-state basis, the same patterns appeared in all four counties as do here in these tables.

Table 31. Overall effects vs. 10 year tenure						
	During peak			After decline		
	Positive or very positive	Neutral	Negative or very negative	Positive or very positive	Neutral	Negative or very negative
Less than 10 years	66.7% (24)	27.8% (10)	5.6% (2)	28.6% (10)	22.9% (8)	48.6% (17)
10+ years	55.7% (59)	31.1% (33)	13.2% (14)	16.8% (18)	46.7% (50)	36.4% (39)
	Frequency Missing= 12			Frequency Missing= 12		

Table 32. Overall effects vs. 25 year tenure						
	During peak			After decline		
	Positive or very positive	Neutral	Negative or very negative	Positive or very positive	Neutral	Negative or very negative
Less than 25 years	57.5% (42)	34.3% (25)	8.2% (6)	16.7% (12)	40.3% (29)	43.1% (31)
25+ years	59.4% (41)	26.1% (18)	14.5% (10)	22.9% (16)	41.4% (29)	35.7% (25)
	Frequency Missing= 12			Frequency Missing= 12		

SALES CHANGES AND EFFECTS BY GROSS SALES

How sales changed during the peak and after the decline appears related to the overall size of the firms, as measured by annual gross sales. Larger firms were more likely to report sales increases during the boom than were smaller firms, and similarly were more likely to report decreases after the decline (see Table 33).

For example, businesses grossing \$5 million to \$9.9 million annually had 100% of respondents report an increase in sales at this same and 100% report feeling positively or very positively about development at that time. After the decline in activity, only 33% reported an increase in sales and 0% reported feeling positively or very positively. Businesses grossing \$10 million or more annually had 80% report an increase in sales during the peak and 0% report an increase in sales after the decline.

Table 33. Sales change vs. gross sales

Annual gross sales of Firm	During peak			After decline		
	Increase	No change	Decrease	Increase	No change	Decrease
<\$100K	50% (22)	47.7% (21)	2.3% (1)	6.7% (3)	48.9% (22)	44.4% (20)
\$100K to \$249K	44.4% (12)	51.9% (14)	3.7% (1)	18.5% (5)	48.2% (13)	33.3% (9)
\$250K to \$999K	60% (15)	36% (9)	4% (1)	24% (6)	32% (8)	44% (11)
\$1 mil to \$4.9 mil	75% (18)	20.8% (5)	4.2% (1)	25% (6)	25% (6)	50% (12)
\$5 mil to \$9.9 mil	100% (3)	0% (0)	0% (0)	33.3% (1)	0% (0)	66.7% (2)
\$10 mil+	80% (4)	20% (1)	0% (0)	0% (0)	20% (1)	80% (4)
Total	57.8% (74)	39.1% (50)	3.1% (4)	16.3% (21)	38.8% (50)	45% (58)

Frequency Missing= 26

Frequency Missing= 25

This pattern exists, but does not hold as strongly, when considering the overall effects of the development. Slightly more than half of the firms with less than \$250,000 in annual sales said the overall effects were positive, while larger firms were more likely to report positive effects (see Table 34).

Table 34. Overall effects vs. gross sales

Annual gross sales of Firm	During peak			After decline		
	Positive or very positive	Neutral	Negative or very negative	Positive or very positive	Neutral	Negative or very negative
<\$100K	54.5% (24)	31.8% (14)	13.6% (6)	8.9% (4)	44.4% (20)	46.7% (21)
\$100K to \$249K	50% (13)	42.3% (11)	7.7% (2)	24% (6)	52% (13)	24% (6)
\$250K to \$999K	65.4% (17)	19.2% (5)	15.4% (4)	37% (10)	29.6% (8)	33.3% (9)
\$1 mil to \$4.9 mil	70.8% (17)	20.8% (5)	8.3% (2)	20.8% (5)	25% (6)	54.2% (13)
\$5 mil to \$9.9 mil	100% (3)	0% (0)	0% (0)	0% (0)	33.3% (1)	66.7% (2)
\$10 mil+	60% (3)	20% (1)	20% (1)	40% (2)	20% (1)	40% (2)
Total	60.2% (77)	28.1% (36)	11.7% (15)	20.9% (27)	38% (49)	41.1% (53)

Frequency Missing= 26

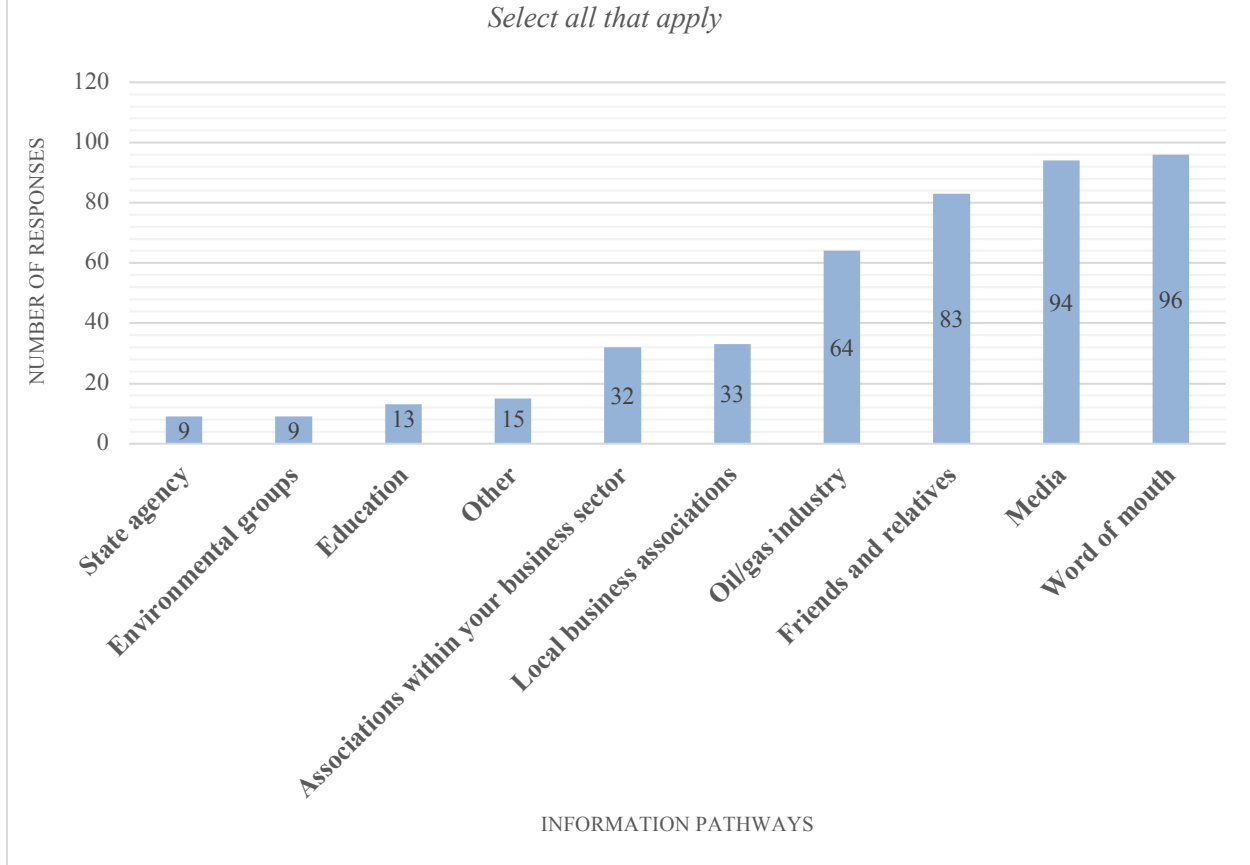
Frequency Missing= 25

Ultimately, in every way that it was observed, regardless of state, business sector, tenure, or annual gross sales, most respondents perceived that oil and gas development at its peak of activity had a relatively positive impact on their business. After the decline in oil and gas activity, all respondents were more likely to report a subsequent decrease in sales and feeling more negatively about the overall effects that the activity had on their businesses

INFORMATION PATHWAYS

The survey also posed important questions relating to information pathways for oil and gas development activities. More than two thirds of the respondents said they learned about oil or gas trends happening in their county through the media (69%). Word of mouth at 65.8%, and friends and relatives at 60.5% were almost as commonly mentioned. When asked to specify other ways in which he or she heard about oil/gas trends from, one respondent even replied, “I learned more about events occurring in Tioga County through media in counties not affected by the gas development. It seems that the local media was ‘influenced’ by the gas industry”. Friends and family and “word of mouth” are also information pathways that tend to be more biased than not. State agencies, environmental groups, and universities/colleges/extension were the least common ways that respondents heard about trends in oil and gas development (see Table 35).

Figure 6. From where does your business learn about oil or gas trends happening in your county?
Select all that apply



In North Dakota the most popular information pathway reported was media at 82.4%, followed by the oil/gas industry at 76.5% (see Table 35). This was by far the highest percentage of respondents who learned about trends from the oil/gas industry. They also had the highest percentage of respondents who learned about trends from local business associations (29.4%). State agencies, environmental groups, and universities/colleges/extension each came in at about 21%, and “other” was the least popular way in which respondents heard about trends.

As expected, media, word of mouth, and friends and family, and the oil/gas industry were the top four information pathways in both Montana and Wyoming as well. Both states also had nearly 1/3 of respondents indicate that they heard about trends from business or trade associations within their own business sectors. No respondents from Montana reported hearing about trends from environmental groups or from universities/colleges/extension, and only 5.6% heard from state agencies. In Wyoming, only 3% heard from both state agencies and universities/colleges/extension, while 9.1% heard from environmental groups.

Accordingly, the top three ways in which respondents in Pennsylvania reported hearing about oil/gas trends from were word of mouth, friends and relatives, and the media.

Compared to the other states, they had the lowest percent of people that heard about oil/gas trends from the oil/gas industry (34%), but had the highest percent of people that heard about trends from universities, colleges, and/or extension (19.2%). The least popular information pathways in Pennsylvania were state agencies and environmental groups (7.7% each).

Table 35. How business learned about oil/gas development trends in their county

	North Dakota	Montana	Wyoming	Pennsylvania	Total
State agency	11.8% (2)	5.6% (2)	3% (1)	7.7% (4)	6.5% (9)
Environmental groups	11.8% (2)	0% (0)	9.1% (3)	7.7% (4)	6.5% (9)
Universities/colleges/ extension	11.8% (2)	0% (0)	3% (1)	19.2% (10)	9.4% (13)
Other	5.9% (1)	8.3% (3)	6.1% (2)	17.3% (9)	10.9% (15)
Business/trade association within business sector	17.7% (3)	30.6% (11)	33.3% (11)	13.5% (7)	23.2% (32)
Local business association	29.4% (5)	25% (9)	15.2% (5)	26.9% (14)	23.9% (33)
Oil/gas industry	76.5% (13)	47.2% (17)	48.5% (16)	34.6% (18)	46.4% (64)
Friends and relatives	64.7% (11)	63.9% (23)	48.5% (16)	63.5% (33)	60.1% (83)
Media	82.4% (14)	72.2% (26)	72.7% (24)	57.7% (30)	68.1% (94)
Word of mouth	64.7% (11)	66.7% (24)	69.7% (23)	73.1% (38)	69.6% (96)
Total	17	36	33	52	138

Frequency Missing= 16

For the “other” option, respondents could write-in from where they heard about oil and gas trends from. Responses included legislators or representatives, and groups such as the Montana Board of Oil & Gas, the Department of Environmental Protection, the Wyoming Department of Environmental Quality, or the North Dakota Industrial Commission. Besides other types of state agencies, responses varied from business contacts, to coffee shops, to the National Organization of Royalty Owners.

Only a relatively small share of the businesses reporting increases in annual sales due to oil or gas development (18.5%) reported that they proactively approached the oil/gas industry (see Table 36). About two-thirds of the respondents (64.2%) instead said the

industry sought them out. This was particularly high in North Dakota and Montana, where more than 71% said that the industry sought them out. In contrast, about 21% reported that the connections were made some other way.

Table 36. Sales increase and approaches to/from industry <i>Select all that apply</i>			
	Proactively approached the industry	Industry sought out goods or services offered	Other
North Dakota	35.7% (5)	71.4% (10)	14.3% (2)
Montana	12.5% (3)	79.2% (19)	16.7% (4)
Wyoming	5% (1)	50% (10)	35% (7)
Pennsylvania	26.1% (6)	56.5% (13)	17.4% (4)
Total	18.5% (15)	64.2% (52)	21% (17)

PEAK-DEVELOPMENT BUSINESS STRATEGIES

About three-quarters 72.3% of all respondents reported that they did not implement any special business strategies to take advantage of opportunities or minimize challenged during the peak years of oil and gas development (see Table 37). About 28% of respondents reported that they did. The highest response rate of those who did implement business strategies during the peak years came from 50% of respondents in North Dakota (see Figure 7). The lowest response rate was 12.7% of respondents in Pennsylvania (see Figure 10).

Table 37. Business strategies during peak years		
State	No	Yes
North Dakota	50% (9)	50% (9)
Montana	75% (27)	25% (9)
Wyoming	56.2% (18)	43.8% (14)
Pennsylvania	87.3% (48)	12.7% (7)
Total	72.3% (102)	27.7% (39)

Frequency Missing=13

The business strategies reported are categorized into the following super groups:

1. **Diversification:** Actions taken to grow and expand business in some way, either geographically or professionally (i.e. adding the number and types of services offered)
2. **Capital adjustments:** Purchasing, selling, or leasing factors of production such as equipment, land, or facilities
3. **Lower costs:** Efforts to minimize particular aspects of spending within a business
4. **Financial management:** Actions taken to improve business fiscal operations
5. **Employment:** Any adjustments made to staffing such as hiring, firing, or providing additional training to employees
6. **Behavioral:** Modifying personal conduct and attitudes
7. **Other:** These strategies remain unclassified either because they are unique and/or location-specific (i.e. state or county programs)

During the peak years of the oil/gas activity, the most popular business strategies were capital adjustments, reported by 23.9% of all respondents reporting using some type of business strategy during that time (see Table 38). The next most common strategies were diversification and employment at 17.9% each, then financial management and “other” at 11.9% each, lower costs at 10.4%, and behavioral changes at 6%.

Table 38. Peak business strategy by type

**response was classified in more than one category*

Table 38. Peak business strategy by type <i>*response was classified in more than one category</i>	
<p style="text-align: center;">Diversification 17.9% (12)</p> <ul style="list-style-type: none"> ● Service diversification 9% (6) <ul style="list-style-type: none"> ○ Diversification into other markets ○ Diversified (didn't rely on) ○ Service diversification ○ Increase programming ○ Opened Urgent Care services ○ Provide full-package solutions rather than one-off services ● Geographic diversification 4.5% (3) <ul style="list-style-type: none"> ○ Expanded a portion of our business to geographical radius of 500 miles ○ Expanded to other areas ○ Service area expansion 	<p style="text-align: center;">Capital adjustments 23.9% (16)</p> <ul style="list-style-type: none"> ● Upgrade equipment 7.5% (5) <ul style="list-style-type: none"> ○ Upgrade equipment ○ Bigger equipment ○ Buy new equipment for the right job ○ Keep costs to a minimum and replaced equipment with new* ○ Increased inventory of equipment when sales increased ● Land/building acquisition 4.5% (3) <ul style="list-style-type: none"> ○ Purchased building ○ Purchased land and subdivided into 30 lots to put my homes on

<ul style="list-style-type: none"> ● Miscellaneous (each mentioned by 1 respondent) 4.5% (3) <ul style="list-style-type: none"> ○ Set up outside dining ○ Increased subcontractors ○ I purchased more lots and became a manufactured home sales dealer in 2012* 	<ul style="list-style-type: none"> ○ Purchased more lots and became a manufactured home sales dealer in 2012* ● Land/building renovations 6% (4) <ul style="list-style-type: none"> ○ Built bigger office ○ Renovated dining room faster, more efficient service ○ Gravel pit developed on property ○ Developed subdivision ● Miscellaneous (each mentioned by 1 respondent) 6% (4) <ul style="list-style-type: none"> ○ Leased equipment ○ Sold land for commercial use ○ Less capital investment* ○ Purchased POS system to improve efficiency
<p style="text-align: center;">Lower costs 10.4% (7)</p> <ul style="list-style-type: none"> ● Did not overspend or buy on credit ● Keep costs to a minimum and replaced equipment with new* ● Reduce labor and housing costs ● Less capital investment ● Reduce inventory overhead ● Save 30% ● Reduce services 	<p style="text-align: center;">Financial management 11.9% (8)</p> <ul style="list-style-type: none"> ● Savings 3% (2) <ul style="list-style-type: none"> ○ Create savings account to survive slowdown ○ Saving back funds ● Generate revenue 3% (2) <ul style="list-style-type: none"> ○ We were able to introduce a revenue strategy in to increase revenue ○ Increase fundraising activities ● Miscellaneous 6% (4) <ul style="list-style-type: none"> ○ Manage price expectations ○ Our payment strategies had to be changed with all the shipouts ○ Pay off debt first ○ Implemented up-front payments for non-emergent services
<p style="text-align: center;">Employment 17.9% (12)</p> <ul style="list-style-type: none"> ● Hire more employees 6% (4) <ul style="list-style-type: none"> ○ Add additional employees ○ Added staff to handle increased workload 	<p style="text-align: center;">Other 11.9% (8)</p> <ul style="list-style-type: none"> ● As a 501-C-3 we requested they help with various building projects ● Housing for Help

<ul style="list-style-type: none"> ○ Additional staff ○ Increased staffing levels ● Hire a certain type of employee 4.5% (3) <ul style="list-style-type: none"> ○ Hired foreign nursing staff ○ Hired the right people ○ Added more techs and encouraged more service ● Training 3% (2) <ul style="list-style-type: none"> ○ More training ○ Better training ● Miscellaneous 4.5% (3) <ul style="list-style-type: none"> ○ Advertised for skilled workers in Michigan newspapers ○ Employee bonuses ○ Put more people on a shift 	<ul style="list-style-type: none"> ● Stay in stock on all high velocity products ● Targeted physicians doing CDL physicals to gain referrals for CRAP ● We continued to try to build up the business^ ● Act marketing of mineral rights ● Increase work comp access ● Master Service Agreements
<p style="text-align: center;">Behavioral 6% (4)</p> <ul style="list-style-type: none"> ● Communicate daily with industry/company men ● Be very hands-on in the day-to-day business ● Lower tolerance for risk ● Treat our customers well 	

When asked how effective those strategies were, the vast majority of respondents said they were at least somewhat effective (95.4%) (See Table 39). Respondents were most likely to report their strategies as “very effective,” representing 43.9% of all peak strategies reported. Capital adjustment strategies had the highest rate of “very effective” strategies at nearly 70%, followed by diversification at 58.3%. Additionally, “other” strategies seemed to be more effective than very effective.

Employment related and financial strategies appeared to be less effective than these, with only 25% of respondents identifying these as very effective, and another 25% reporting these as only somewhat effective. In addition, one respondent identified financial management strategies as very ineffective.

Table 39. Effectiveness of peak strategies by type						
	Very Effective	Effective	Somewhat effective	Ineffective	Very ineffective	Total
Diversification	58.3% (7)	16.7% (2)	16.7% (2)	8.3% (1)	0% (0)	100% (12)
Capital adjustments	68.8% (11)	18.8% (3)	12.5% (2)	0% (0)	0% (0)	100% (16)
Lower costs	42.9% (3)	42.9% (3)	14.3% (1)	0% (0)	0% (0)	100% (7)
Financial management	25% (2)	37.5% (3)	25% (2)	0% (0)	12.5% (1)	100% (8)
Employment	25% (3)	50% (6)	25% (3)	0% (0)	0% (0)	100% (12)
Behavioral	50% (2)	25% (1)	25% (1)	0% (0)	0% (0)	100% (4)
Other	14.3% (1)	71.4% (5)	0% (0)	14.3% (1)	0% (0)	100% (7)
Total	43.9% (29)	34.8% (23)	16.7% (11)	3% (2)	1.5% (1)	100% (66)

By state, business strategies implemented by respondents in Pennsylvania appeared the most effective with 100% of strategies being reported as effective or very effective (see Table 40). However, all four states had high rates of effective or very effective strategies as well. North Dakota had the highest rate of somewhat effective strategies (25%) and ineffective or very ineffective strategies (12.5%).

Table 40. Effectiveness of peak strategies by state			
	Effective or very effective	Somewhat effective	Ineffective or very ineffective
North Dakota	62.5% (10)	25% (4)	12.5% (2)
Montana	81.8% (18)	18.2% (4)	0% (0)
Wyoming	78.9% (15)	15.8% (3)	5.3% (1)
Pennsylvania	100% (10)	0% (0)	0% (0)
Total	79.1% (53)	16.4% (11)	4.5% (3)

Frequency Missing= 3

POST-DEVELOPMENT BUSINESS STRATEGIES

Fewer respondents reported implementing business strategies to prepare for or manage the decline in oil or gas development activities in their counties. Only 20.7% of all respondents implemented business strategies to manage the decline in oil or gas development in their county (compared to 27.7% who implemented strategies at the peak of activity) (see Table 41). As with business strategies at the peak, respondents from North Dakota were the most likely to use strategies to mitigate the impacts of a decline in oil and gas activity with 35.3% reporting doing so. In contrast, only about 4% of respondents from Pennsylvania reported that they used business strategies at this time.

Table 41. Business strategies for decline		
State	No	Yes
North Dakota	64.7% (11)	35.3% (6)
Montana	73% (27)	27% (10)
Wyoming	65.6% (21)	34.4% (11)
Pennsylvania	96.3% (52)	3.7% (2)
Total	79.3% (111)	20.7% (29)

Frequency Missing= 14

Business strategies for managing the decline in oil and gas development were classified similarly to the strategies for a boom. Financial management was the most common strategy used for managing the decline of oil and gas activity, and was implemented by 22.9% of respondents who reported using a strategy during such a time (during the peak of development, financial management was only the fourth most popular type of strategy) (see Table 42). Within this category, 10.6% of all strategies were savings related and 6.4% had to do with avoiding overspending. Employment strategies were the next most popular at 16.7%, then “other” with 14.6%. Diversification, capital adjustments, and lower costs each came in at 12.5% and behavioral strategies made up for 6.3% of all strategies.

Table 42. Decline business strategy classification

**response was classified in more than 1 category*

<p>Diversification 12.5% (6)</p> <ul style="list-style-type: none"> ● Service/product diversification 8.5% (4) <ul style="list-style-type: none"> ○ Diversified (didn't rely on) ○ Diversity what we produced and sought a larger geographic region to work ○ Added back to the menu, brought in new products ○ Setting up for internet sales ● Miscellaneous 4.3% (2) <ul style="list-style-type: none"> ○ Develop new industry clients ○ Join larger company 	<p>Capital adjustments 12.5% (6)</p> <ul style="list-style-type: none"> ● Equipment management 6.4% (3) <ul style="list-style-type: none"> ○ We upgraded our equipment, but did not change our business strategy that I have used for 40 years ○ Keep equipment repaired ○ Stopped spending money on new equipment* ● Miscellaneous 6.4% (3) <ul style="list-style-type: none"> ○ Capital preservation ○ Sold property ○ Reduce shop space and reduce the cost of rents*
<p>Lower costs 12.5% (6)</p> <ul style="list-style-type: none"> ● Inventory reduction 4.3% (2) <ul style="list-style-type: none"> ○ Reduce inventory ○ Reduce excess inventory ● Miscellaneous 8.5% (4) <ul style="list-style-type: none"> ○ Stopped bonuses ○ Reduce advertising ○ Stopped spending money on new equipment* ○ Reduce shop space and reduce the cost of rents* 	<p>Financial management 22.9% (11)</p> <ul style="list-style-type: none"> ● Savings 10.6% (5) <ul style="list-style-type: none"> ○ Saved money ○ Put money into savings ○ Savings ○ Build cash reserves ○ Invested and saved ● Avoid overspending 6.4% (3) <ul style="list-style-type: none"> ○ Don't spend what you don't have ○ Kept spending to a minimum ○ Did not overspend or buy on credit ● Miscellaneous 8.5% (4) <ul style="list-style-type: none"> ○ Very low debt ○ Paid off all debt^

	<ul style="list-style-type: none"> ○ On my rentals I set out a price that if the boom busted I could manage my loan payments ○ We put hedges in place to smooth out the up and down of the market prices
<p>Employment 16.7% (8)</p> <ul style="list-style-type: none"> ● Reduce employment 10.6% (5) <ul style="list-style-type: none"> ○ Cut labor ○ Reduced labor force ○ Reduced staff ○ Reduced staff by relocation and attrition ○ Stop hiring ● Miscellaneous 6.4% (3) <ul style="list-style-type: none"> ○ Keep all EG's employed ○ Cross trained employees ○ Labor that quit we did not rehire 	<p>Other 14.6% (7)</p> <ul style="list-style-type: none"> ● Did not grow our company to keep pace with the industry at the time ● Dissolved company ● We just kept doing what we've always done ● Downsizing ● Land and home sales business part of it ● Locked down property info and databases ● Steady- I went through oil bust of 1980-1981 when most contractors in this area went bankrupt
<p>Behavioral 6.3% (3)</p> <ul style="list-style-type: none"> ● Strong relationships ● Get away from business partner ● Stayed on top of safety 	

Similar to the peak business strategies, respondents reported that almost all of the decline strategies were at least somewhat effective (97.9%) (See Table 43). "Other" strategies had the highest rate of being very effective (71.4%) but also had the highest rate of strategies being very ineffective at 12.5%. Most strategies had at least one third of respondents identifying the strategy as very effective, with capital adjustments (50%) and financial management (45.5%) being most commonly reported as very effective. Behavioral and employment strategies were the most likely to be reported as only somewhat effective, with 33.3% and 25% of respondents using these saying this.

	Very Effective	Effective	Somewhat effective	Ineffective	Very ineffective
Diversification	33.3% (2)	50% (3)	16.7% (1)	0% (0)	0% (0)
Capital adjustments	50% (3)	33.3% (2)	16.7% (1)	0% (0)	0% (0)
Lower costs	33.3% (2)	50% (3)	16.7% (1)	0% (0)	0% (0)
Financial management	45.5% (5)	45.5% (5)	9.1% (1)	0% (0)	0% (0)
Employment	25% (2)	50% (4)	25% (2)	0% (0)	0% (0)
Behavioral	33.3% (1)	33.3% (1)	33.3% (1)	0% (0)	0% (0)
Other	71.4% (5)	0% (0)	12.5% (1)	0% (0)	12.5% (1)
Total	42.6% (20)	38.3% (18)	17% (8)	0% (0)	2.1% (1)

When looked at by state, again, Pennsylvania had 100% of all strategies being reported as effective or very effective. Almost 27% of all strategies used in Wyoming were reported as only somewhat effective. Montana was the only state that had any strategies reported as ineffective or very ineffective.

	Effective or very effective	Somewhat effective	Ineffective or very ineffective
North Dakota	90% (9)	10% (1)	0% (0)
Montana	84.2% (16)	10.5% (2)	5.3% (1)
Wyoming	73.3% (11)	26.7% (4)	0% (0)
Pennsylvania	100% (4)	0% (0)	0% (0)
Total	83.3% (40)	14.6% (7)	2.1% (1)

Frequency Missing= 1,15, 23

WHO THEY WORKED WITH TO DEVELOP STRATEGIES

Respondents who implemented business strategies generally sought feedback from a variety of sources, such as family members, lawyers, business consultants, financial managers, local business associations, the oil/gas industry, extension educators/specialists, local governments, and “other” agents (see Table 45). At least 45% of people consulted with each of the nine sources. The most popular answer was “other” at 56.4%. Following, local governments and the oil/gas industry themselves each had nearly 54% of all respondents consult with them when developing their business strategies during the peak of development in their counties.

	North Dakota	Montana	Wyoming	Pennsylvania	Total
Family members	44.4% (4)	22.2% (2)	78.6% (11)	42.9% (3)	51.3% (20)
Lawyer	44.4% (4)	33.3% (3)	64.3% (9)	42.9% (3)	48.7% (19)
Business consultant	44.4% (4)	44.4% (4)	64.3% (9)	42.9% (3)	51.3% (20)
Financial manager	44.4% (4)	22.2% (2)	64.3% (9)	42.9% (3)	46.2% (18)
Local business association	44.4% (4)	33.3% (3)	64.3% (9)	28.6% (2)	46.2% (18)
Oil/gas industry	55.6% (5)	44.4% (4)	64.3% (9)	42.9% (3)	53.8% (21)
Extension educator/specialist	44.4% (4)	22.2% (2)	71.4% (10)	28.6% (2)	46.2% (18)
Local government	44.4% (4)	33.3% (3)	71.4% (10)	57.1% (4)	53.8% (21)
Other	55.6% (5)	44.4% (4)	71.4% (10)	42.9% (3)	56.4% (22)
Total	23.1% (9)	23.1% (9)	35.9% (14)	17.9% (7)	39

Most respondents did not seek feedback from anyone, such as 61.9% of respondents in North Dakota, and 77.6% of respondents in Pennsylvania (see Table 46). Only a relatively small percentage of respondents talked to one, two, three, or four contacts in each state. In contrast, about 22 percent of respondents indicated that they sought advice from all of these sources.

Table 46. Number of contacts for strategy feedback during peak					
	North Dakota	Montana	Wyoming	Pennsylvania	Total
0	61.9% (13)	69.2% (27)	44.4% (16)	77.6% (45)	65.6% (101)
1	14.3% (3)	2.6% (1)	11.1% (4)	3.5% (2)	6.5% (10)
2	0% (0)	5.1% (2)	2.8% (1)	1.7% (1)	2.6% (4)
3	0% (0)	2.6% (1)	2.8% (1)	1.7% (1)	1.9% (3)
4	0% (0)	0% (0)	2.8% (1)	1.7% (1)	1.3% (2)
5	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
6	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
7	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
8	23.8% (5)	20.5% (8)	36.1% (13)	13.8% (8)	22.1% (34)

The same general pattern for seeking advice occurred related to business strategies for managing the decline in oil and gas development versus the peak (see Table 47). Respondents most commonly sought advice from family members (48.3%).

Table 47. Strategy feedback after decline

	North Dakota	Montana	Wyoming	Pennsylvania	Total
Family members	16.7% (1)	40% (4)	63.6% (7)	100% (2)	48.3% (14)
Lawyer	16.7% (1)	10% (1)	54.6% (6)	50% (1)	31% (9)
Business consultant	16.7% (1)	10% (1)	54.6% (6)	50% (1)	31% (9)
Financial manager	33.3% (2)	10% (1)	54.6% (6)	50% (1)	34.5% (10)
Local business association	16.7% (1)	10% (1)	54.6% (6)	50% (1)	31% (9)
Oil/gas industry	33.3% (2)	10% (1)	54.6% (6)	50% (1)	34.5% (10)
Extension educator/specialist	16.7% (1)	10% (1)	54.6% (6)	50% (1)	31% (9)
Local government	16.7% (1)	10% (1)	54.6% (6)	50% (1)	31% (9)
Other	16.7% (1)	30% (3)	72.7% (8)	50% (1)	44.8% (13)
Total	6	10	11	12	29

Similarly here, the survey data showed that the same few individuals in each state spoke with several agents when developing strategies to manage the decline of oil and gas activity in their counties. Overall, the majority of people (70.8%) talked with no one when developing their decline strategies (see Table 48). This was mostly the case in all four states, except in Wyoming where closer to half (55.6%) spoke with no one. In every state, the next highest percent came from those who spoke with all eight different types of contacts. Overall, this made up 22.1% of respondents. Anywhere from 1-15% of people in each state spoke with one contact when developing business strategies to manage the decline of oil and gas activities in their counties.

Table 48. Number of contacts for strategy feedback after decline					
	North Dakota	Montana	Wyoming	Pennsylvania	Total
0	61.9% (13)	71.8% (28)	55.6% (20)	82.8% (48)	70.8% (109)
1	14.3% (3)	7.7% (3)	5.6% (2)	1.7% (1)	5.8% (9)
2	0% (0)	0% (0)	2.8% (1)	0% (0)	0.7% (1)
3	0% (0)	0% (0)	0% (0)	1.7% (1)	0.7% (1)
8	23.8% (5)	20.5% (8)	36.1% (13)	13.8% (8)	22.1% (34)

EXPECTATIONS

VII

EXPECTED LENGTH OF PEAK-DEVELOPMENT

The majority of respondents reported having inaccurate perceptions of how long the boom would last in their community. When asked how long he or she expected the level of oil and gas activity to last *during the years of the most oil or gas development activity*, only about 41% of correctly expected the peak level of activity to last for less than 10 years. About 52% expected peak levels of activity to occur for ten to 20 years, while 7% expected it to last for more than 20 years (except in Wyoming where 0% recorded more than 20 years) (see Table 49).

Table 49. How long did you expect peak to last?			
	Less than 10 years	10-20 years	More than 20 years
North Dakota	31.6% (6)	57.9% (11)	10.5% (2)
Montana	43.2% (16)	46% (17)	10.8% (4)
Wyoming	46.2% (12)	53.8% (14)	0% (0)
Pennsylvania	40.4% (19)	53.2% (25)	6.4% (3)
Total	41.1% (53)	51.9% (67)	7% (9)

Frequency Missing= 24

Only about a quarter of all respondents (22.5%) expected oil and gas activity in their counties to decline when it did (see Table 50). Of those who were not expecting the decline when it occurred, 41% thought it would happen later, 5% thought it would happen earlier, and 32% did not think oil and gas activity would decline at all. Especially in Pennsylvania, 40% of respondents did not expect the decline at all. This data shows that in general, business owners were surprised when oil and gas development in their counties declined when it did. Most people thought that the decline in activity would take place much later, or not take place at all.

Table 50. Were you expecting oil/gas activity to decline when it did?				
	No, did not expect decline	No, expected decline earlier	No, expected decline later	Yes
North Dakota	26.3% (5)	10.5% (2)	36.8% (7)	26.3% (5)
Montana	24.3% (9)	8.1% (3)	46% (17)	21.6% (8)
Wyoming	28.1% (9)	3.1% (1)	46.9% (15)	21.9% (7)
Pennsylvania	40% (22)	1.8% (1)	36.4% (20)	21.8% (12)
Total	31.5% (45)	4.9% (7)	41.3% (59)	22.4% (32)

Frequency Missing=11

When expectations are compared to where respondents sought advice on strategies, respondents with the most accurate expectations were those who had sought advice with environmental groups. For example, 37.5% of respondents who talked with environmental groups said they expected the decline to occur when it did (see Table 51). Those who

sought advice from state agencies were almost as accurate with 33.3% reporting that the decline occurred when they expected.

Respondents who relied upon business associations were the least likely to report expecting the decline to occur when it did (only 9.1% of those talking with local business associations, and 16.1% talking with business associations within their sector). About a quarter of those who talked with universities, colleges, or extension had accurate expectations of when the decline would occur, yet an additional 41.7% of these respondents did not expect a decline, the largest share of any sources other than 'other' (and worse than the 25.8% of those who relied upon the oil and gas industry for advice).

For the most part, people did not expect the decline at all or they expected it to occur at a later time. More than half of those who spoke about trends with business or trade associations within their business sector said that they expected the decline in activity later, and nearly half (46.8%) of those who spoke about trends with the oil and gas industry themselves expected the decline in activity to occur at a later time.

	No, did not expect decline	No, expected decline earlier	No, expected decline later	Yes
Friends and relatives	30.9% (25)	7.4% (6)	37% (30)	24.7% (20)
Media	30.4% (28)	4.3% (4)	41.3% (38)	23.9% (22)
Business/trade associations within business sector	25.8% (8)	3.2% (1)	54.8% (17)	16.1% (5)
Local business associations	39.4% (13)	6.1% (2)	45.5% (15)	9.1% (3)
Oil/gas industry	25.8% (16)	4.8% (3)	46.8% (29)	22.6% (14)
State agency	22.2% (2)	0% (0)	44.4% (4)	33.3% (3)
Environmental groups	12.5% (1)	12.5% (1)	37.5% (3)	37.5% (3)
Universities/colleges/extension	41.7% (5)	0% (0)	33.3% (4)	25% (3)
Word of mouth	34.4% (33)	4.2% (4)	43.8% (42)	17.7% (17)
Other	42.9% (6)	0% (0)	42.9% (6)	14.3% (2)

Frequency Missing= 19

CHARITABLE GIVING

About 71% of respondents reported that their businesses currently make monetary or in-kind donations to local groups, non-profit organizations, or other charities in their county (see Table 52) Wyoming businesses were the most likely to report giving to local charities, 84.4%, while Pennsylvania businesses were the least likely (38%).

Table 52. Currently make monetary or in-kind contributions to local charities		
State	No	Yes
North Dakota	31.6% (6)	68.4% (13)
Montana	25.7% (9)	74.3% (26)
Wyoming	15.6% (5)	84.4% (27)
Pennsylvania	38% (19)	62% (31)
Total	28.7% (39)	71.3% (97)

Frequency Missing= 18

Just over half of all respondents from all four counties reported making contributions to local charities during the peak of development, as well as currently (see Table 54). Almost 30% of respondents report currently giving to charities, but not doing so during the peak of oil and gas development. In contrast, about 11% gave to charities during the peak of development but do not do so currently, and 9.2% never gave to charities during the peak and also do give now.

Table 54. Changes in charitable giving over time				
	Never gave or give	Give now but not during peak	Gave during peak but not now	Gave during peak and now
North Dakota	11.1% (2)	22.2% (4)	16.7% (3)	50% (9)
Montana	6.5% (2)	35.5% (11)	9.7% (3)	48.4% (15)
Wyoming	13.3% (4)	33.3% (10)	0% (0)	53.3% (16)
Pennsylvania	7.5% (3)	22.5% (9)	17.5% (7)	52.5% (21)
Total	9.2% (11)	28.6% (34)	10.9% (13)	51.3% (61)

Frequency Missing= 35

Many respondents indicated that they gave more during the time of peak oil and gas development, with about 36.9% saying they did so compared to now (see Table 52). About 60.7% of businesses said they currently give about the same as they gave during the peak, and very few reported giving less (2.5%). Wyoming reported they gave more during the time of peak development (45.2%) and Montana followed close behind with about 41%.

Table 53. Amount given in contributions to local charities during peak time compared to current giving			
State	More during the peak than now	About the same	Less during the peak than now
North Dakota	33.3% (6)	66.7% (12)	0% (0)
Montana	40.6% (13)	56.3% (18)	3.1% (1)
Wyoming	45.2% (14)	51.6% (16)	3.2% (1)
Pennsylvania	29.3% (12)	68.3% (28)	2.4% (1)
Total	36.9% (45)	60.7% (74)	2.5% (3)

Frequency Missing= 32

The responses from businesses in the four shale oil and gas counties in this study indicate that oil and gas development affects local businesses. More than half (55.5%) of the businesses indicated that their sales increased during the peak of drilling activity, and about the same percentage (58.5%) said the overall impacts of the activity on their business was either positive or very positive. For the majority of the remaining businesses the impacts largely were neutral; only four percent of the businesses reported sales decreases, and only 11.3% said the overall impacts were negative or very negative. Much of this changed economic activity was transitory, with 43.5% of businesses reporting falling sales in sales as the oil and gas development declined. Another 40.8 percent of businesses reported no changes in their sales.

These impacts varied across the states, with businesses in North Dakota being most likely to report sales increases (73.7%), and positive or very positive overall impacts (78.9%), and Pennsylvania businesses being the least likely (41.8% and 42.6%, respectively) during the peak of activity. These differences likely are due to differences in population size, mix of businesses, and distance to other economic centers.

Not surprisingly, the type of impacts individual businesses reported seemed associated with the business sector in which they operated. All businesses in the oil/gas sector reported positive or very positive impacts during the peak of activity, for example. Other sectors with large proportions of businesses reporting positive effects included trade (83.3%), and hospitality (75%). Businesses in manufacturing (33.3%) and agriculture (36.4%) were least likely to report positive or very positive impacts. About a quarter of the agricultural firms reported negative or very negative effects, the most of any business sector.

When the oil or gas development activity declined, 80% of the oil/gas businesses reported negative or very negative impacts, the most of any sector, as did 61.5% of businesses in the trade sector. In contrast, manufacturing businesses and agricultural businesses were the most likely to report positive or very positive impacts of the decline (33.3% and 22.7%, respectively).

An important focus of this study was identifying which strategies, if any, businesses used to manage the challenges and opportunities of oil and gas development. The vast majority of businesses (72.3%) said they did not implement any special strategies for dealing with the development. This varied between the states, with 50% of the businesses in North Dakota and 43.8% of businesses in Wyoming reporting use of strategies, compared to only 25% of businesses in Montana and 12.7% in Pennsylvania.

The most common strategies used by businesses to manage the peak of activity included capital investments like upgrading equipment, buildings, or land (23.9% of businesses reporting using strategies), diversifying the mix of goods or services they provided (17.9%), and improving their workforce (17.9%). Of these strategies, the businesses were most likely to report capital adjustments and diversification were very effective (68.8% and 58.3%, respectively).

Similar percentages reported using strategies for managing the decline of the oil and gas development, with only 20.7% of businesses doing so. This varied by state, with 35.5%, 34.4%, and 27% of the North Dakota, Wyoming, and Montana businesses using strategies, compared to only 3.7 of Pennsylvania businesses. The mostly commonly mentioned strategies for managing declines included financial management (22.9%) and employment/workforce changes (16.7%). About 45% of the firms doing financial management reported it was very effective, with another 45% reporting it was effective. Employment strategies were reported as less effective, with only 25% of the firms using it saying it was very effective.

Business owners' expectations of how business activity will change in the future is important because such expectations affect their investments and other actions. The survey responses suggest that the majority of businesses in these four counties had unrealistic and inaccurate expectations of how long the oil and gas development activity would continue. Only 22.4% of the respondents said they expected the oil and gas activity to end when it did, while 31.5% did not expect it to decline at all and another 41.3% expected the decline to occur later than it actually did. These responses indicate that the business owners were overly optimistic about the oil and gas activity in their communities. Such expectations are particularly surprising considering that oil and gas is a nonrenewable resource, so by its nature oil and gas development cannot last indefinitely in any one location. These survey responses differ across the information sources that businesses relied upon, suggesting that where businesses get their information is particularly important. Businesses relying upon universities, colleges, and extension, and local business associations were most likely to report not expecting that activity to decline at all (41.7% and 39.4%, respectively), in contrast to those who relied upon environmental groups (only 12.5%). Those relying upon environmental groups and state agencies were the most likely to report accurately predicting the decline in activity (37.5% and 33.3% of

such businesses), yet these percentages aren't very large. Respondents relying upon local business associations had the most inaccurate expectations, with only 9% being accurate.

The survey demonstrates that the majority of business owners in areas of oil and gas development experience clear impacts from that activity, with most reporting the impacts as positive but transient, primarily occurring during the boom years before fading as the drilling activity declines. Importantly, most businesses do not implement specific strategies to take advantage of the opportunities and minimize challenges from the activity. Furthermore, most business owners have inaccurate expectations of how long such activity will last, which makes such strategizing and planning more haphazard. These results suggest a clear need for groups working with businesses to improve their own expectations of the potential duration of oil and gas development, to identify successful strategies that businesses can take to manage the opportunities and challenges, and to help businesses successfully adopt these strategies.