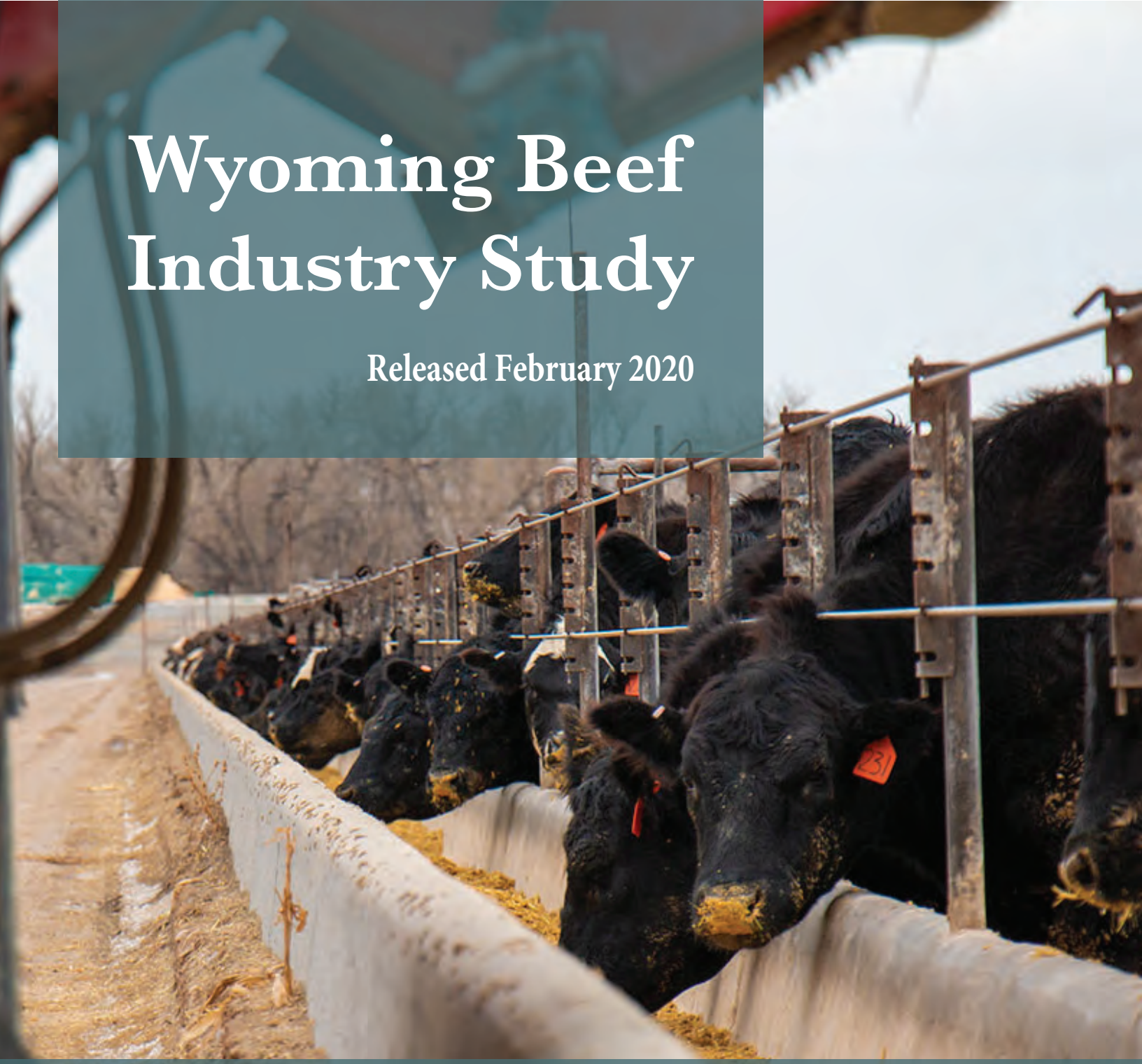


Wyoming Beef Industry Study

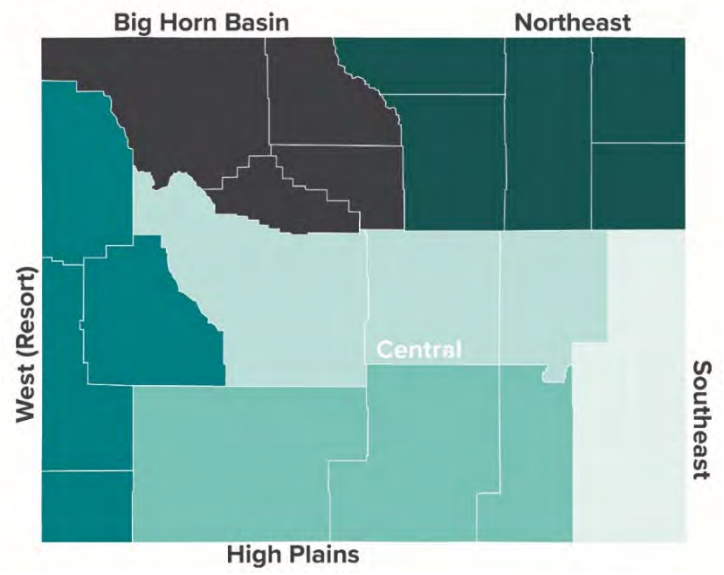
Released February 2020

This report examines domestic and international market opportunities for Wyoming beef, investigates opportunities for adding value to offal products, and considers the economic and workforce impacts of the industry. The study can be used to guide public policy for supporting the meat processing industry, options for the industry to improve efficiencies, and a reference for communities to encourage new business development in the industry.

Wyoming Business Council

Orbis Advantage, Inc.

This beef market study discusses industry trends from the historical perspective of marketing cattle and the evolution of the beef packing industry. By examining the beef value chain for Wyoming, we can identify opportunities in beef production and meat processing that have potential but are not currently represented or fully developed in Wyoming. The report provides an overview of the economic impact of the Wyoming meat processing industry and identifies business challenges and opportunities for existing companies. This information can be used by the State of Wyoming, communities, or industry groups to guide policy and allocate resources to support the meat industry. Finally, we offer strategies for existing companies to capture new markets, and for communities to attract new business investment in meat processing or support businesses. The executive summary highlights the key points from each section and key initiatives to expand the beef cluster in Wyoming. Our conclusion identifies the approach recommended from an industry perspective.



Throughout this report we refer to geographic regions of Wyoming as the following groups of counties:

- **Wyoming Big Horn Basin** (Park, Big Horn, Hot Springs, Washakie)
- **Northeast Wyoming** (Sheridan, Johnson, Campbell, Crook, Weston)
- **Central Wyoming** (Fremont, Natrona, Converse)
- **Western Wyoming** (Teton, Sublette, Lincoln, Uinta)
- **Wyoming High Plains** (Albany, Carbon, Sweetwater)
- **Southeast Wyoming** (Laramie, Goshen, Platte, Niobrara)

The Appendix includes regional profiles highlighting estimated beef production, feeding and slaughtering capacity; and a beef value chain to identify the products/services imported into each region to examine business opportunities.

OBJECTIVES

1. Beef Market Study

1.1. Assess currently operating meat processing plants in Wyoming and identify in-state, domestic and international market opportunities for existing Wyoming beef product lines.
1.2. Identify opportunities for Wyoming beef beyond premium cuts.
1.3. Assess beef industry trends in Wyoming, domestically, and internationally.
1.4. Identify consumer trends (Wyoming, domestic, international) affecting Wyoming producers (i.e. source verification, hormone-free, non-GMO, etc.) for beef.
1.5. Describe Wyoming, domestic and international beef consumption trends.

2. Offal Products Study

2.1. Identify beef offal and find value-added opportunities in Wyoming for the entire carcass.
2.2. Assess current and potential supply chain opportunities both in Wyoming and in surrounding states.
2.3. Rank all parts of the carcass by perceived value-added opportunities, market demand, strength of market, and location.
2.4. Identify value-added opportunities in Wyoming for disposal and/or further processing of the products.

3. Workforce Study

3.1. Identify Wyoming labor market and unemployment rates.
3.2. Identify the type and level of housing needed for the Wyoming beef slaughtering and processing industry workforce.
3.3. Examine the workforce impact on Wyoming communities that open or expand a processing facility.
3.4. Assess whether technological advances can help mitigate workforce factors.
3.5. Recommended training opportunities and needs (skills gap analysis).

Wyoming Meat Processing INDUSTRY PROFILE

Classification
- Federal inspection: 5
- State inspection: 11
- Custom-exempt: 27

Facilities
- State and federally inspected
  - 9 slaughter
  - 7 processing
- Average size: 5,455 sf
- Average age of facility: 30 years
- Average age of company: 17 years

Annual Production
- Total head beef commercially slaughtered: 5,100
- State: 1,820
- Federal: 416

Employment: 188

Average Wages
- Animal slaughtering: $24,896
- Meat processing: $26,307

This report examines the needs and opportunities of the beef industry cluster, comprised of four economic subsectors:

- Cattle ranching and farming
- Animal slaughtering
- Meat processed from carcasses
- Rendering and meat byproduct processing

Beef Market

Overview of Meat Processing Industry

- Nearly every meat processing plant in Wyoming faces a shortage of workers. This is a challenge for the industry nationwide.
- Unfilled positions directly impact the production capacity of the processing plant, eventually impacting the operation's bottom line.
- The estimated slaughtering capacity for Wyoming processors is 21,320 annually, with 7,020 head slaughtered at federally-inspected plants and 14,300 head slaughtered at state-inspected plants.
- Challenges in Wyoming include availability of raw materials, cost for disposal of byproducts, transportation, and lack of support industries.

Beef Industry Trends: Wyoming, U.S. & International

- Cattle production in Wyoming is relatively small compared to neighboring states, making it difficult to achieve economies of scale in beef processing.
- This section quantifies the cattle available for slaughtering and further processing and provides a historical perspective on marketing and adding value to Wyoming beef.
- Wyoming has the smallest population compared to other states that have large employment shares of the Beef Cluster.
- Job growth has been relatively consistent across the top Slaughter and Processing states.
- The top states not only have a high volume of jobs but also a large concentration of Slaughtering and Processing facilities.
- Slaughtering and Processing Facilities represent a substantial portion of GRP for the top producing states.
- The top slaughtering and processing states have higher industry wages compared to Wyoming.
- Rising middle classes and meat demands in emerging nations in Latin America and former Soviet nations present alternatives to Asian Pacific market.

Consumer Trends

- Consumer demand influences how cattle are produced and beef is marketed both domestically and internationally.
- Globally, food safety and security impact markets.
- In 2017, beef and beef variety meat exports amounted to 1.26 million metric tons worth $7.27 billion.
- The top 10 exported beef cuts represent 85 percent of total U.S. beef exports.
- The U.S. beef export value equated to $286.38 per head of each steer and heifer processed in 2017.
- 12.9 % of U.S. beef and variety meat production was exported in 2017.
- Utilizing more of the carcass in targeted export markets can increase value and profitability.
- Regional trade organizations can identify buyers for more cuts and variety meats.

Market Opportunities for Wyoming Beef

- Wyoming exports high quality cattle; imports lower price point meat.
- It is not economically feasible to market beef that is born-raised-fed-slaughtered in Wyoming; consumers are interested in where and how animals lived, so this story should concentrate on "born and raised.

- Small to midsize meat companies can realize much better margins without disposal costs of offal.
- Wyoming meat brands should target consumers who value convenience and independent restaurants seeking higher value meat cuts.

Offal Products

Byproducts Definition & Market Information

- Animal byproducts fall into three categories: hides, inedible offal, and edible offal, with variety meats being classified as a subcategory of edible offal.
- The annual estimated production of beef offal in Wyoming equates less than a tenth of a percent of the typical annual offal production in the United States.
- There are no established markets for offal in Wyoming, so processors are paying to dispose of the offal generated.
- This calculates to a disadvantage of $148.64 per head for Wyoming processors, compared to large beef processors.
- The ability for Wyoming processors to trade on national and international markets depends on the ability to fill full load lots.

Value-Added Opportunities

- Value-added opportunities for offal include regional aggregation and pet food manufacturing.
- Alternative disposal methods: composting, alkaline hydrolysis, anaerobic digestion, and biomal.

Supply Chain Opportunities

- For Wyoming slaughter and processing industries to operate, more than 88 percent of the goods and services they need must be imported
- Overall, just one-third of the beef cluster supply needs are met within the region, while the remaining two-thirds of requirements are purchased from outside.
- In total, the value of the cluster's supply chain is $985 billion.

Workforce

Economic Overview

- Wyoming has a higher rate of labor force participation compared to the United States but has declined in recent years.
- Wyoming has higher participation rates across all age groups compared to the U.S.
- Wyoming has a high concentration of jobs in government, construction, oil and gas, and agriculture, compared to the nation.
- Oil and gas extraction is highly concentrated in Wyoming.
- Wyoming's unemployment rate has closely mirrored the U.S. since 2016.
- Cattle ranching is growing in Wyoming, despite animal production shrinking.
- Beef slaughtering and processing have substantially smaller employment in Wyoming compared to ranching.
- Cattle ranching has a significant presence in Wyoming compared to the nation, yet slaughtering and processing lag behind national averages.
- Slaughtering and processing have high job multipliers relative to other industries, including cattle ranching.
- Current wages in the beef cluster are lower in Wyoming compared to the U.S., as well as all other industries in the state.
- The top slaughtering and processing states have higher industry average wages compared to Wyoming.

Technology

- Due to the varying sizes of carcasses, there is less automation in slaughtering facilities.
- Automation is becoming more prevalent in meat processing plants, as the size of equipment is sized for smaller plants.
- Companies should evaluate the cost savings in labor compared to capital costs to determine if it is cost-effective to utilize technological advances in equipment.

Skills Gap Analysis

- Most training is done on the job, with large companies having full training departments.
- Community colleges are offering a certificate for meat processing and mobile meat lab.
- Workforce recruitment is a greater need than training for the existing meat cluster in Wyoming.

Workforce Housing

- The average household income by region shows rental and mortgage costs by region are in the affordable range.
- In all cases, persons earning the median wage for the industry would have to pay greater than 30 percent of their income for housing, increasing the demand for more affordable housing.
- Regional housing supply and cost indicate there is adequate housing available in each region to meet the needs of the existing meat processing industry.

Economic & Workforce Impact

The economic multiplier effect of adding 60 jobs in Slaughtering or Processing throughout Wyoming would result in an average increase of:

- $3.6 to $4.3 million in regional earnings
- 120 jobs
- $560,000 in tax revenue

Key Initiatives

1. ***Traceability***. Support efforts for identification and beef traceability throughout the supply chain.
2. ***Marketing***. Help with marketing and sales for companies developing direct marketing programs.
3. ***Expansion.*** Support the expansion of existing slaughtering and meat processing companies through facility improvements and increased inspection.
4. ***Advocacy*****.** Strengthen the industry association through advocacy, group purchasing, and education and training.
5. ***Business Development*****.** Target segments of the beef cluster that are underrepresented in the state.
6. ***Offal Markets***. Add value to offal products through developing cold storage and aggregation.
7. ***Alternative Disposal***. Consider methods such as composting, Alkaline Hydrolysis, and biomal.
8. ***Training*****.** *Strategies include internships, apprenticeships, certificates.*
9. ***Recruitment*****.** Creative strategies include a cooperative employee benefits and recruiting workers from work-release programs, other regions, CTE students, temp agencies, and succession planning.

Conclusion

In general Wyoming has demand for beef processors under any inspection criteria, but the largest demand for beef processing is under USDA inspection. This correlates with the growth in the direct sales from cattle producer to beef consumer. Niche markets are growing for grain finished and grass finished beef, because consumers want to know 'the story' behind what they are eating…how the animal was raised, what inputs were used, etc.

To meet the demands of cattle producers and support more beef processing capacity, Wyoming should re-examine the business case to implement the Cooperative Interstate Shipment Program (CIS). The CIS program is the lowest barrier to entry for existing processors or new processors to meet USDA requirements or equivalency. For existing processors interested in gaining USDA inspection, it would likely require retrofitting, expanding or redesigning their facilities to meet CIS program requirements.

As Wyoming processors examine new markets, they must be very aware of their direct and indirect costs, efficiencies, and margins. If Wyoming processors want to sell directly, they must invest heavily in a sales force, and compete on a quality and convenience basis. The State of Wyoming could support the industry by using its purchasing power and serving Wyoming beef at public institutions. As demand grows, so will the ability of the processor to compete with the larger economies of scale that exist in the beef industry.

Beef processing and the beef industry takes many supporting businesses to make the system operate at high efficiency. The focus should be not only to grow processing capacity, but also to grow the businesses that populate the beef industry cluster.

Orbis

Emsi

Beef Value Chain in Wyoming, 2018					
Industry	**Demand met in-region**		**Demand met by imports**		**Total demand**
Animal Production	$154,016,389	53%	$134,565,389	47%	$288,581,778
Animal (except Poultry) Slaughtering	$24,603,322	23%	$82,896,061	77%	$107,499,383
Meat Processed from Carcasses	$1,520,283	1%	$100,080,955	99%	$101,601,238
Rendering and Meat Byproduct Processing	$0	0%	$7,738,402	100%	$7,738,402
Total, Beef Cluster	**$180,139,995**	**36%**	**$325,280,807**	**64%**	**$505,420,801**

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Wyoming Beef Industry Report

Preface

The Wyoming Business Council commissioned a Beef Industry Study to identify domestic and international market opportunities for beef and offal products, and assess workforce needs of the industry. The Council will use the study to guide the development of programs and strategies to support the growing meat processing industry in Wyoming, and garner added value for cattle producers.

The consulting team of Orbis Advantage, Inc., AG Protein Solutions LLC, and Emsi brings extensive experience in the meat industry, production agriculture, economic development, and labor force analysis. We hope the study will offer solutions for addressing the challenges identified by existing companies in the industry, and to foster entrepreneurship. Community economic development organizations can use the market research provided in the report to identify and support local and regional opportunities in this industry.

The 2018 Wyoming Legislature passed a bill (SF108) to expand the agriculture marketing program at the Wyoming Business Council, including developing new international markets for Wyoming products. This legislation was introduced because of the need for beef processing plants in Wyoming that are approved for interstate and international shipments by the United States Department of Agriculture. A short-term objective was met by introducing Wyoming beef in Taiwan. More study is needed to meet these long-term objectives:

- *Present a compelling business case for the expansion of existing meat processing plants and the attraction of new business investment in meat processing plants that are USDA approved for interstate and international shipments.*
- *Create new opportunities that foster growth in the Wyoming cattle industry.*

Section 1. Beef Market Study

Introduction

This beef market study discusses industry trends from the historical perspective of marketing cattle and the evolution of the beef packing industry. By examining the beef value chain for Wyoming, we can identify opportunities in beef production and meat processing that have potential but are not currently represented or fully developed in Wyoming. The report provides an overview of the economic impact of the Wyoming meat processing industry and identifies business challenges and opportunities for existing companies. This information can be used by the State of Wyoming, communities, or industry groups to guide policy and allocate resources to support the meat industry. Finally, we offer strategies for existing companies to capture new markets, and for communities to attract new business investment in meat processing or support businesses.

Beef Industry Cluster

Industry clusters are groups of companies in related economic sectors in a geographic region. Cluster-based economic development strategies improve the performance of the industry cluster by addressing common needs such as education, training, and infrastructure.

This report examines the needs and opportunities of the beef industry cluster, comprised of four economic subsectors:

- Cattle ranching and farming
- Animal slaughtering
- Meat processed from carcasses
- Rendering and meat byproduct processing

Cattle ranching and farming make up the majority of this cluster in Wyoming – 9 in 10 jobs for the cluster exist in ranching and farming. Despite low unemployment in other industries, agriculture presents excellent opportunities to strengthen and diversify Wyoming's economy, especially as it relates to the beef cluster. It is important to note no employment exists in Wyoming for rendering and meat byproduct processing; however, this industry is incorporated as part of the cluster to understand where it exists throughout the country. More labor force data for this cluster is included in Section 3.

The beef value chain shows the buyer-supplier relationships from cattle production, to slaughter and processing, and finally, to the consumer.

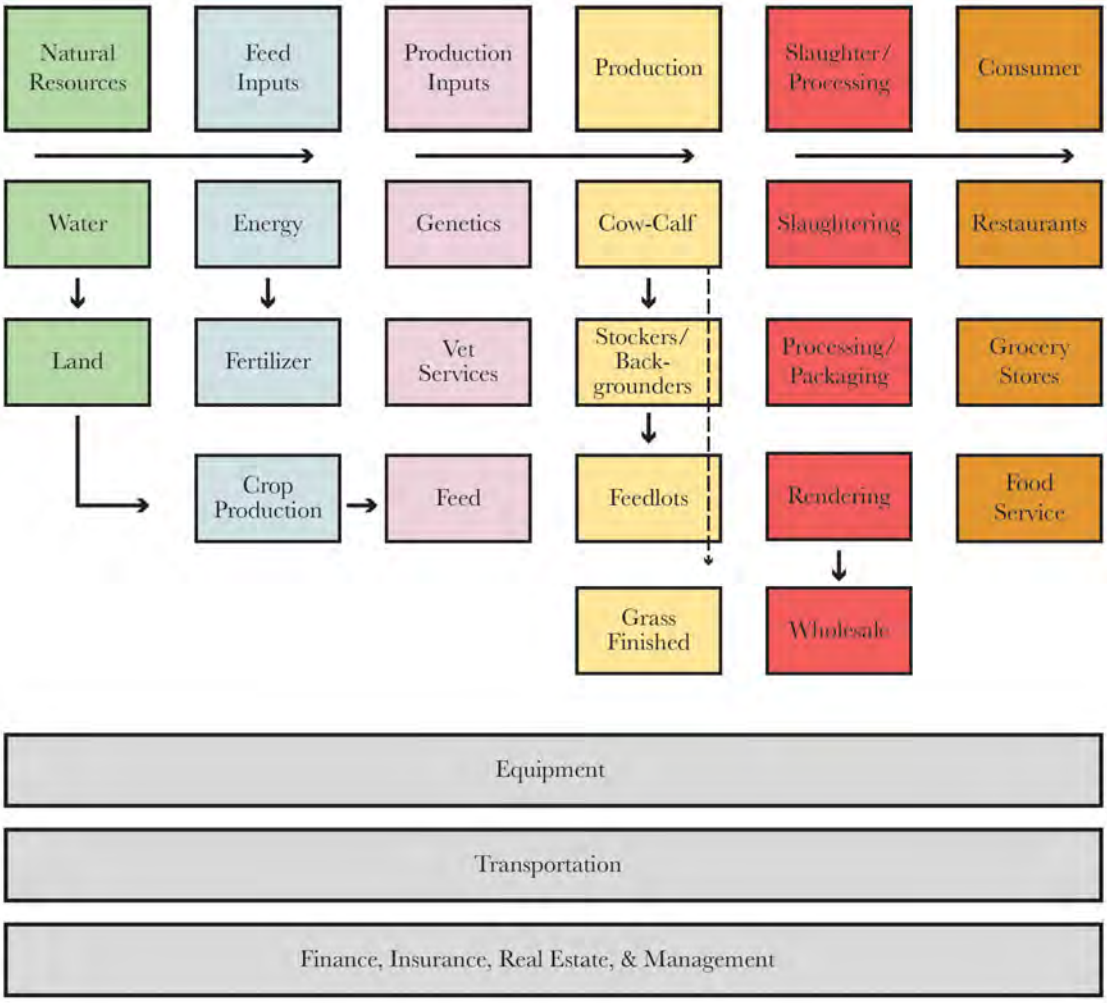


Figure 1. Beef Value Chain

This report provides an industry overview of two economic sub-sectors: cattle production and meat processing (both slaughtering and further processing). Rendering is virtually non-existent in Wyoming; however, the opportunities and challenges are addressed in Section 3. Offal Products.

Overview of Wyoming Meat Processing Industry

Key points

- *Nearly every meat processing plant in Wyoming faces a shortage of workers. This is a challenge for the industry nationwide.*
- *Unfilled positions directly impact the production capacity of the processing plant, eventually impacting the operation's bottom line.*
- *The estimated slaughtering capacity for Wyoming processors is 21,320 annually, with 7,020 head slaughtered at federally-inspected plants and 14,300 head slaughtered at state-inspected plants.*
- *Challenges in Wyoming include availability of raw materials, cost for disposal of byproducts, transportation, and lack of support industries.*

Part of the impetus for legislation in 2018 was the desire for more federally inspected meat processing plants in Wyoming, to increase the ability to market Wyoming beef out-of-state. Since that time, 3 federally inspected plants came online, and 2 more are planned to open in 2020.

Objective 1.1. Assess currently operating meat processing plants in Wyoming.

In Wyoming, there are a total of 51 meat processing facilities, including 8 that process wild game. The plants are categorized by types of inspection. There are 16 state and federally inspected beef processing plants in Wyoming. Of the 5 federally inspected meat processing plants in Wyoming, 2 slaughter cattle, and 3 are further processing plants. There are 11 state-inspected meat processing plants, including the University of Wyoming. Seven plants slaughter, and 4 are strictly processing plants.

To assess the existing meat processing industry in Wyoming, the consultants visited 6 slaughter facilities, met with principles of 2 planned slaughter facilities, and called and surveyed several other companies. The following key issues were identified:

- *Labor availability (wage competition, housing)*
- *Availability of state and federal inspectors*
- *Cost for disposal of offal*
- *Cost and availability of transportation*

In addition to these issues, this assessment considers production capacity, financial performance, and the supply of beef cattle available regionally.

Employment

The total employment in Wyoming slaughtering and meat processing facilities statewide is 188. This includes custom-exempt facilities and further processing plants. The seven current slaughter facilities under inspection in Wyoming employ 31 full-time employees, with approximately 29 unfilled positions. Three plants planned to open in the next year will need 28 employees. There is a need for additional employees at almost every plant we visited.

Unfilled positions directly impact the production capacity of the processing plant, eventually impacting the operation's bottom line. The processors in Wyoming are unable to offer the same benefits and wages, that an employee can find from other employers. Specifically, we heard of cases where a processor had offered a starting wage of $23.50-$25.00 and was unable to fill the position. In that case, the processor essentially ended their search for new employees, and instead chose to operate at a reduced slaughter capacity.

Wyoming Meat Processing INDUSTRY PROFILE

Classification

- Federal inspection: 5
- State inspection: 11
- Custom-exempt: 27

Source: WY Dept. Agriculture

Facilities

- State and federally inspected
- 9 slaughter
- 7 processing
- Average size: 5,455 square feet
- Average age of facility: 30 years
- Average age of company: 17 years

Source: County assessors, Secretary of State

Annual Production

- Total head beef commercially slaughtered: 5,100
- State: 1,820
- Federal: 416

Employment: 188

Average wages

- Animal slaughtering: $24,896
- Meat processing: $26,307

The Workforce Study section of this report further addresses wage competition, housing affordability and availability, and continuing education needs. The strategy section suggests possible tactics for workforce recruitment.

State inspection vs. federal inspection

The Wyoming Department of Agriculture operates a state inspection program of meat slaughtering and processing plants. The Department periodically surveys plants to determine if additional inspection days are desired. In 2017, a survey of 6 state plants showed the number of slaughter days was 1-2 slaughter days per week with the need for 1-3 additional slaughter days. The number of processing days at state plants ranged from 1-5 days per week for 12 plants, with four plants requesting an additional 1-2 days. The Department expressed a willingness to request additional funding for state inspection, if it is requested by plants, and if they are willing to commit to a consistent schedule.

Establishments have the option to apply for state or federal inspection. States operate under a cooperative agreement with the United States Department of Agriculture, Federal Safety Inspection Service (FSIS). State program requirements must be "at least equal to" those imposed by the Federal Meat and Poultry Products Inspection Acts and the Humane Methods of

Slaughter Act of 1978. Meat and offal products inspected under a state program cannot be sold across state lines, unless the state opts into the Cooperative Interstate Shipment (CIS) Program.

Cooperative Interstate Shipment of Meat

The Federal Safety Inspection Service (FSIS) administers a voluntary program[1] for state plants with 25 or fewer employees to get the federal inspection mark. Meat products under the program that have been inspected and passed by designated State personnel are permitted to be distributed in interstate commerce and exported to foreign countries. FSIS provides oversight and enforcement of the program. This option was studied by the Wyoming Department of Agriculture (2013) and the Wyoming Business Council (2014) which estimated the cost at $1 million for the state to establish this equivalency.[2]

State officials question the cost-justification for doing the work of the federal inspection program, if they are already required to enforce regulations "at least equal to" the federal rules. Conversely, industry representatives would like to see the state be "strictly equal to" the federal rules, to prevent inspectors from interpreting the regulations in a more restrictive manner than the federal inspectors. Wyoming meat processors desire more consistency in interpretation of state and federal inspection regulations. For state-inspected plants to meet federal equivalent standards, it would take significant capital investment.

National industry issues

According to the American Association of Meat Processors (AAMP), two issues impacting processors in Wyoming and across the country are workforce issues and standards for humane handling of livestock. AAMP is the largest meat trade association, primarily representing small processors. The association assists companies with regulatory and production issues. The executive director of AAMP offered several strategies for recruiting workers, to be explored further in the Workforce Section.

Wyoming Meat Processors Association

In 1981, the federal government threatened to take over the meat inspection program from the State of Wyoming. Twenty-four meat processors saw the need to keep the state inspection program and united to form the Wyoming Meat Processors Association. Wyoming was the 28th state to become an affiliated member of the American Association of Meat Processors. The Association informs and educates members about issues impacting the industry, encourages efficiency, supports the humane treatment and handling of livestock, and works toward a safe, healthy meat and food supply for consumers.

www.wympa.com

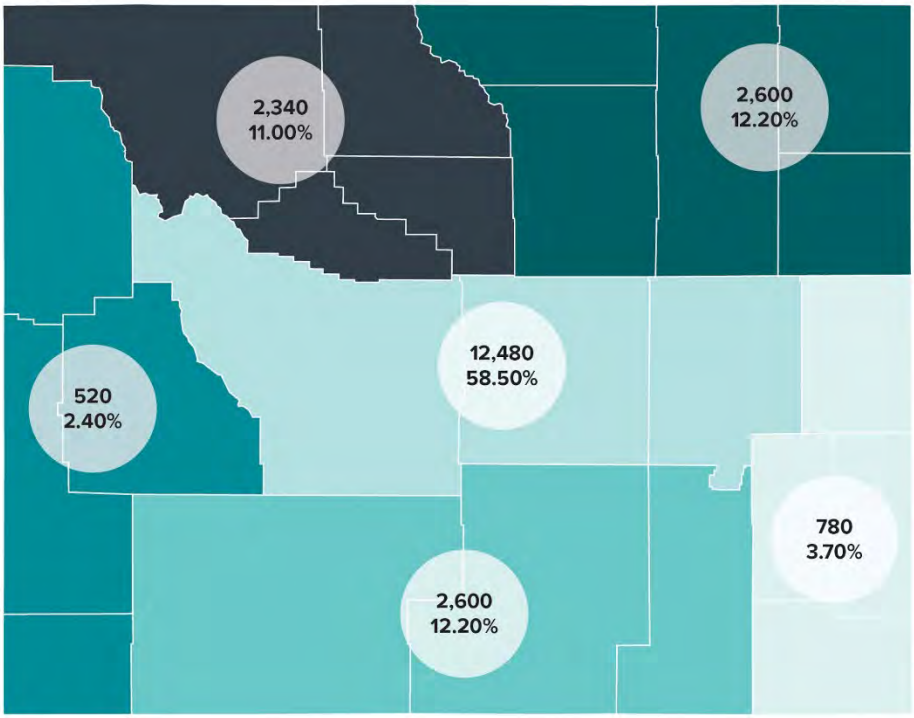
[1] (21 U.S.C. 683 and U.S.C. 472) (9 CFR 321.3, Part 332, 381.187, and Part 381 Subpart Z)

[2] Wyoming Business Council. (2014). *Cooperative Interstate Shipment of Meat*. Cheyenne, WY.

Lab services

Under federal inspection, in order to sell meat interstate, there must be carcass and environmental testing protocols in place. USDA certifies private labs on site, or processors can use commercial labs certified by USDA. The nearest accredited commercial lab for testing protocol is Greeley, Colorado or Billings, Montana.

Slaughter capacity



We estimate the annual capacity for Wyoming processors to be 21,320 annually, with 7,020 head slaughtered at federally-inspected plants and 14,300 head slaughtered at state-inspected plants. This number assumes that all existing state and federal inspected plants are operating at full capacity, with the addition of one plant that is currently under construction, and two additional plants that are currently in the planning phase.

Figure 2. Projected Beef Slaughtering Capacity, State & Federal-Inspected Plants

Management Training

We heard from processors and observed during our visits about the need for ongoing management training. It would be beneficial for plant managers and owners to undergo ongoing training to further their industry knowledge and job skills. It may be helpful for these managers to share best management practices and collaborate in opportunities for increased efficiency. With margins being so critical in the beef processing industry, continuing education for Wyoming processors would be a very valuable investment.

Financial and human resource training would be most beneficial. Major processors fully understand their fixed and variable costs, and because of this they create consistent margins and stable profits. Understandably, smaller producers have a harder time managing and understanding cost drivers in their business, so any additional training in this could improve the long-term vitality of Wyoming's beef processing industry.

Almost every plant has employee issues – from recruitment and retention to performance.

Human resources training would also benefit Wyoming processors because of their reliance on labor. Almost every plant we visited had an issue with employees, from recruitment and retention to job performance. Many of the plants do not have employee retention programs or policies in place to provide employee feedback. In contrast, large plants have very elaborate and established human resource practices to aid in managing their workforce.

Financial Performance

This report compares the financial performance of the Wyoming meat processing industry to national industry reports for companies with less than $5 million in sales, using financial ratios of key performance indicators: cash flow/solvency, profitability, efficiency, and debt-risk. We examine two types of businesses: slaughter facilities (NAICS 311611) and meat processing facilities (NAICS 311612). A comparison of profit and loss statements and balance sheets is included in the Appendix as a management tool.

The financial model of Wyoming processors as it exists today operates on a cost-plus basis, meaning that processors attempt to cover costs by charging a processing fee and passing along increased costs to their customers. Large beef processors operate under a different financial model. Large beef processors purchase their cattle for slaughter on a live weight basis, slaughter and further process the beef for the retail market. They sell meat as a value-added product, with profit margins that change frequently based on many factors including plant efficiency, live cattle prices, and dressed meat prices. The large beef processors use daily, weekly, monthly metrics that drive their financial performance. The most sustainable companies identify Key Performance Indicators (KPI) and monitor these for trends daily, monthly, and annually. KPI's should include financial performance indicators, metrics for humane animal handling, processing efficiency, and employee welfare.

A study of small meat processors by the Texas Department of Agriculture (2001) concluded that simple financial analysis may be misleading. Managers seeking top financial performance cannot simply look to other companies' performance and/or behavior as a guide. The quest for profit improvement may require a much more individualized solution than that which comes to light from simple comparisons. Secondly, product lines with high margins and low volume may not positively influence profits as much as lower margin, high volume products. In effect, volume does matter[3]. Still relevant today, we have found there is potential for Wyoming producers in grinding beef for ground beef sales.

[3] Siebert, J. W., Nayga, R. M., Thelen, G. C., & Kuker, D. (2000). Enhancing the financial performance of small meat processors. *International Food and Agribusiness Management Review*, *2*, 269–280. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.201.5229&rep=rep1&type=pdf

Beef Industry Trends: Wyoming, U.S. & International

Key points

- *Cattle production in Wyoming is relatively small compared to neighboring states, making it difficult to achieve economies of scale in beef processing.*
- *This section quantifies the cattle available for slaughtering and further processing and provides a historical perspective on marketing and adding value to Wyoming beef.*

Cattle Production in Wyoming

Objective 1.3. Assess beef industry trends in Wyoming.

Wyoming ranchers produce high quality cattle for national markets. Typically, the cattle sold at market in Wyoming are calves, yearlings, bred cows, and culled cows. Fat cattle are produced in Wyoming; however, the state lacks the capacity and scale that neighboring states do. The main feedstock for Wyoming cattle is native pasture, which limits the capacity of finished cattle available for slaughter in the state. Cattle are usually sold in Wyoming as yearlings coming off native pasture weighing 800 to 1,000 pounds or as weaner calves, weighing usually from 400 to 600 pounds.

Figure 3 illustrates the typical flow of calves from a cow-calf operation. In a 2010 report on the U.S. Beef Cattle Industry, the ability by producers to retain ownership further down the value chain, was directly connected to their ability to fill full loads of cattle for transportation.[4] Some cattle producers may own a grower feedlot where the stocker cattle are backgrounded for pasture (as yearlings) or to prepare the cattle for a finishing feedlot. Often a background lot will handle some of the more labor-intensive parts of the cattle cycle, weaning the calf, getting them started on feed, and vaccinations or implanting. The cattle are then fed a grower ration, typically lower in total energy than a ration that is fed when fattening cattle. Once the cattle are 'warmed up', weighing between 750-900 pounds, most feeder cattle will be transported to a larger feedlot where they will start to be fattened for slaughter. Fattening of a backgrounded calf usually takes 125-150 days. There are producers in Wyoming who retain ownership throughout the life cycle of the beef calf and in some cases, are responsible for feeding that animal the entire time as well. Fattening cattle or feeding cattle in a backgrounding lot, requires significant amounts of additional labor and financial requirements than the typical cow-calf operation. Cattle feeders must manage a variety of challenges for profitability, it is a challenging business with many barriers to entry.

Two large auction barns exist in Wyoming, Winter Livestock in Riverton and Torrington Livestock in Torrington. Cattle are typically marketed throughout the different categories in the flow chart, usually sold at these large auction barns or through private treaty. With the emergence of new technology and platforms, more and more cattle are being marketed online on the internet or through video auctions.

[4] McGrann, J. (2010). The United States Beef Cattle Industry: Production, Structure and Trends. Retrieved from http://agrilife.org/coastalbend/files/2012/06/The-United-States-Beef-Cattle-Industry-8-9-2010.pdf

The livestock barn is the primary marketplace for most cattle produced in the state of Wyoming and will remain so into the foreseeable future. Finished fat cattle are the exception, they are typically marketed to representatives of meat packing companies, by load lots, in the location they are held. These representatives will offer bids on the fat cattle available that week for slaughter, and the cattle owner will either sell or retain the cattle until a better price is offered.

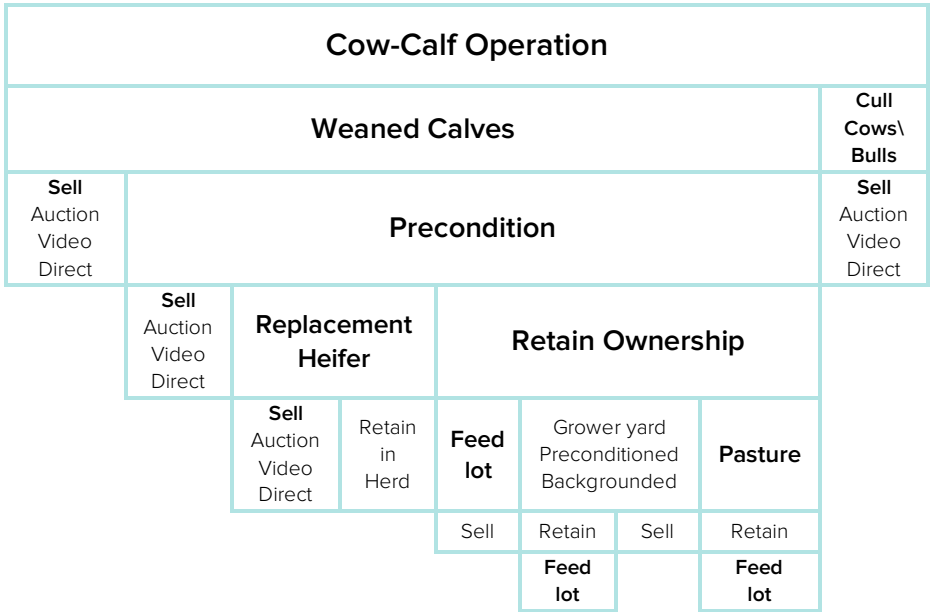


Figure 3. Cattle Production Chain

The challenge with this market is that fat cattle are perishable goods, fatter cattle often grade higher, however they take more inputs and the death loss may be higher, impacting return. Fat cattle are sometimes also purchased on certain formulation grids, these grids pay the producer back for higher quality cattle, offering premiums for how well the cattle grade, and of cattle of the same breed. Premiums are paid for prime and choice yield grading cattle, 1, 2, 3, and discounts are applied when carcasses grade at a 4 or 5. There are many programs and opportunities for producers to add value to their commodity.

Feeding cattle to fat takes large amounts of forage and grain, large feedlots are located in areas where there are a large amount of cattle, and also a large amount of grain produced. These states include Kansas, Colorado, Texas, and Nebraska. In Wyoming the only notable capacity for feeding cattle in a large capacity exists in Goshen and Platte counties. There are areas in the state that have a potential for feeding more cattle, like the Big Horn Basin; however, the cattle on feed in Wyoming will likely never be at the scale of which can be found in Nebraska or Colorado. As a state Wyoming does not have the natural resources to produce corn and feedstocks like its neighboring states.

Calves sold in Wyoming sale barns sell for higher than the national average.

There are also many opportunities for cattle ranches in Wyoming to add value to their cattle before the auction barn. Wyoming ranches evaluate their own operations when making production decisions, and one recommendation does not fit from ranch to ranch. Take for instance preconditioning calves before sale, this practice has been found to return up to $5/cwt[5], yet some ranches do not precondition their

[5] Donnell, J., Ward, C., & Swigert, S. (2005). *Costs and Benefits Associated with Preconditioning Calves*. Stillwater, OK: Oklahoma Cooperative Extension Service. Retrieved from http://agecon.okstate.edu/faculty/publications/

calves. There are many long standing, reputable ranches in Wyoming that have been producing cattle long before an economist or academic told them how to do so, and they will likely continue to produce cattle in the way that they see fit, regardless of possible premiums or new market opportunities.

When looking to add further value to a commodity that is already earning above average values, the incentives for producers to adopt new practices must be all the greater. There are ranches in Wyoming that are diversifying by direct marketing the cattle leaving their ranch. Adopting new practices or changing markets, will in most cases come down to each ranch or production manager's own evaluation of the potential Return on Investment.

Beef cattle are a soft commodity, meaning it is a grown commodity. Premiums can be found with different vaccination, certification, and identification programs. Most Wyoming beef producers operate a cow-calf, or yearling grazing operation, utilizing native pastures. Wyoming's neighboring states, Colorado, Nebraska, and Idaho, have much larger feeding capacities. Raising beef from calf to slaughter, requires more capital and labor than the typical cow-calf operation. Demand for new markets or programs, likely correlate to the price paid for calves. In a weak market, producers may be more inclined to add value to their cattle. In a strong market, the opposite may be true.

Cattle feeding capacity

Cattle and calves are the largest livestock commodity raised in Wyoming, yet the cattle population of Wyoming is relatively small in comparison to neighboring states. Figure 4 compares Wyoming cattle and calves sold, cattle on feed, and commercially slaughtered to the states of Nebraska, Colorado and South Dakota. It is interesting to note that 990,413 head of cattle and calves were sold in Wyoming, while just 75,000 head were on feed in Wyoming in 2017. In 2017, only 5,100 head of cattle were slaughtered commercially in Wyoming. Quantifying the one-time feeding capacity of feedlots in Wyoming is difficult, because USDA statistics about cattle on feed and the number of feedlots by state does not list Wyoming separately every year. It is included with "Other States" in a 2007 survey by the USDA Agricultural Statistics Service.[6]

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[6] https://quickstats.nass.usda.gov/results/1E882D5F-C585-37D5-9C0C-1F993B53E08A

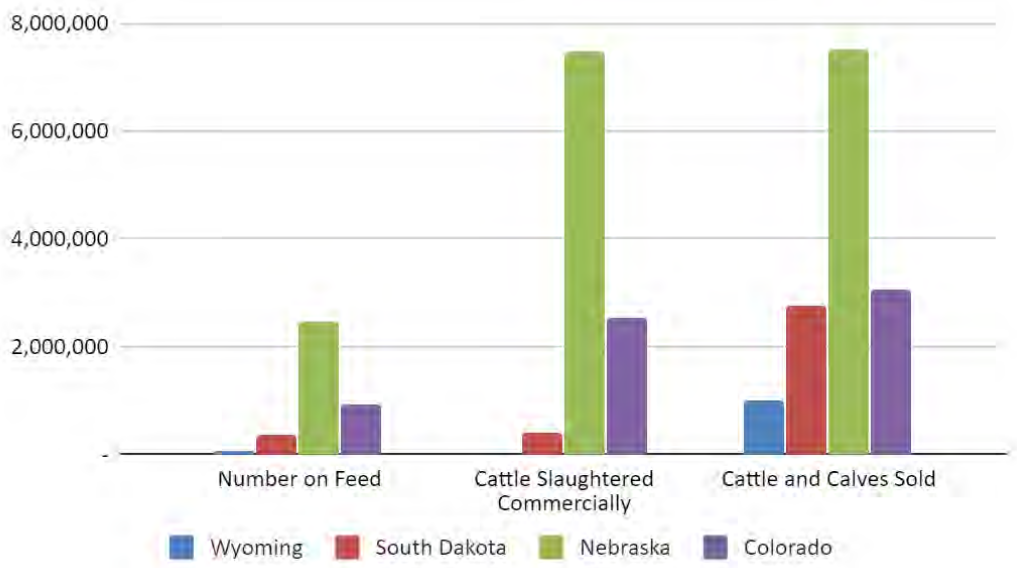

Figure 4. Cattle Populations in Wyoming & Surrounding States

The 2017 Census of Agriculture reports 109 operations with 72,128 head of cattle on feed, with most feeding less than 500 head. Most finishing feedlots are located in the Southeast region of the state.

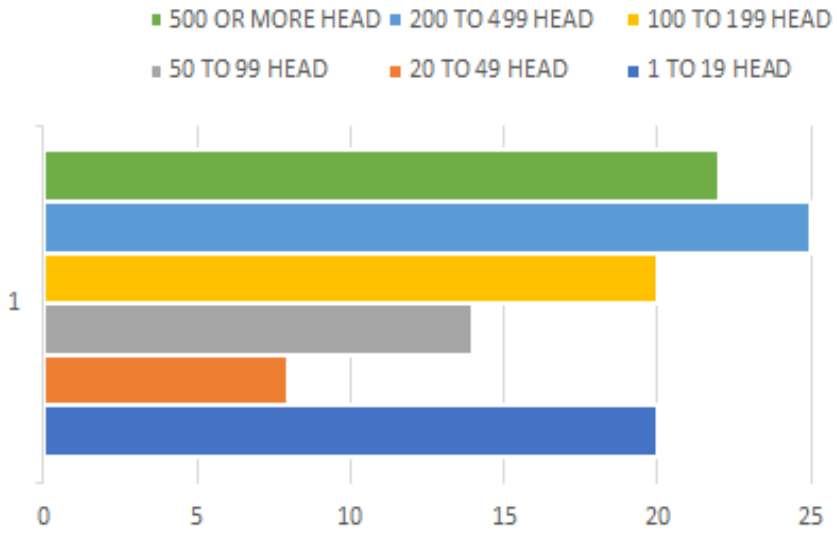

Figure 5. Feeding Operations by Inventory, Wyoming (2017)
Source: 2017 Ag Census

We estimated the percentage of fed cattle in each region by adding the proportion of the inventory of cattle and calves by county to the reported number on feed, as shown in Figure 6.

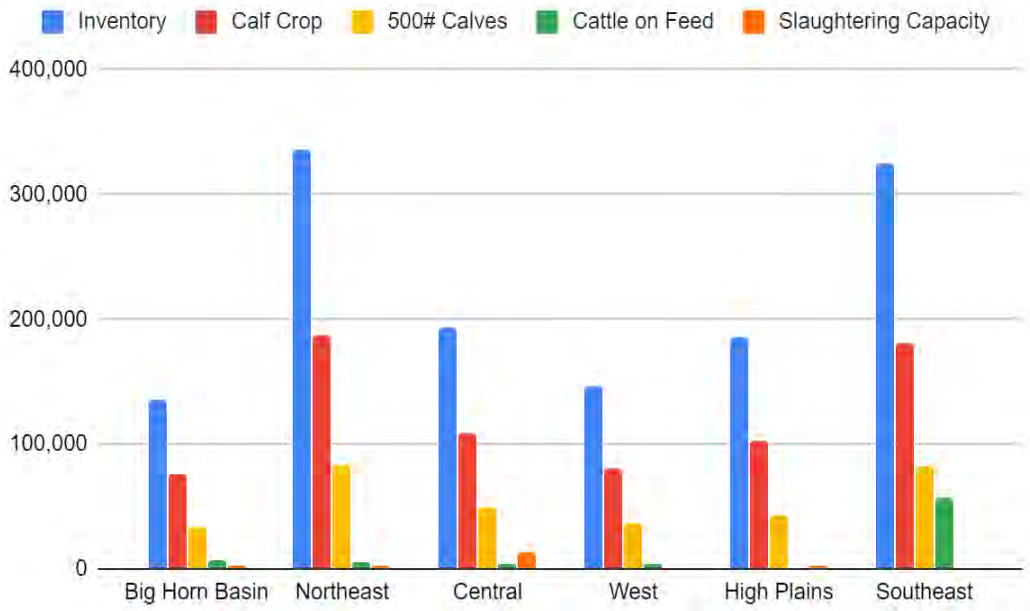

Figure 6. Regional Comparison of Beef Inventory and Slaughtering Capacity

It is important to look at the inventory of all cattle and calves in Wyoming[7], not just cattle on feed, because the slaughter of cull cows can significantly improve the cash flow in the meat processing business. We will address the potential of slaughtering culled cows in the strategic opportunities section.

Table 1. ***Regional Estimates of Cattle Inventory and Slaughtering Capacity, 2020***

Region	Inventory	Calf Crop	500# Calves	Cattle on Feed	Slaughtering Capacity
Big Horn Basin	136,000	75,683	34,057	6,328	2,340
Northeast	336,000	186,981	84,142	5,731	2,600
Central	194,000	107,960	48,582	3,107	12,480
West	146,000	81,248	36,562	3,168	520
High Plains	185,000	102,951	43,328	850	2,600
Southeast	325,000	180,860	81,387	57,651	780

[7] WYOMING - nass.usda.gov. (2019, August 31). Retrieved from https://www.nass.usda.gov/Statistics_by_State/Wyoming/Publications/Annual_Statistical_Bulletin/WY-2018-Bulletin.pdf

Slaughtering and Processing in U.S. Compared to Wyoming

Key findings

Objective 1.3. Assess beef industry trends domestically & internationally.

- *Wyoming has the smallest population compared to other states that have large employment shares of the Beef Cluster.*
- *Job growth has been relatively consistent across the top Slaughter and Processing states.*
- *The top states not only have a high volume of jobs but also a large concentration of Slaughtering and Processing facilities.*
- *Slaughtering and Processing Facilities represent a substantial portion of Gross Regional Product (GRP) for the top producing states.*
- *The top slaughtering and processing states have higher industry wages compared to Wyoming.*

Wyoming has the smallest population of all fifty states. States with large concentrations of the Beef Cluster tend to have smaller populations. Only Illinois and Texas rank in the top ten in terms of population.

Wyoming has the smallest population compared to other states that have large employment shares of the Beef Cluster

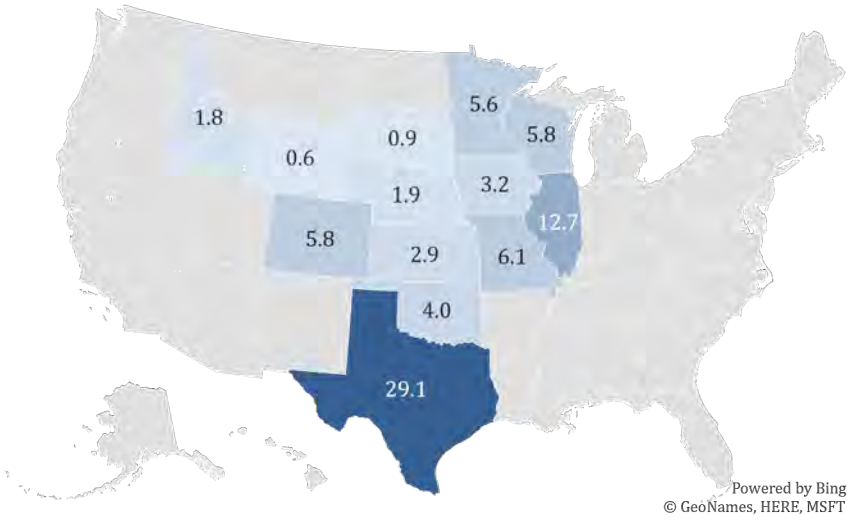

Figure 7. Population in Millions for Beef Cluster States, 2019
Source: Emsi

Evolution of the Meat Packing Industry

Meat packing plants spread westward from Chicago after the railroads were built in the late 1800s, with locations in St. Paul, St. Louis, Sioux City, Omaha, Kansas City, Oklahoma City and Denver.[8] In the 1940s transporting cattle using stock trucks became more popular, coupling that with the completion of the US interstate system, by the 1960s most transportation of beef cattle was done by truck.

Innovations in refrigeration and packing around the same time allowed consumers to store meat in their own homes. These innovations allowed grocery stores to sell prepackaged meat cuts without the need to employ a butcher. The 1960s marked a changing environment in the beef industry, because of a new business on the scene Iowa Beef Packers (IBP).

Starting on a three hundred thousand dollar note from the Small Business Administration, IBP built a processing plant in Denison, Iowa, that opened on March 21, 1961.[9] IBP recognized that there were efficiencies in the beef industry that had yet to be realized, specifically in labor and transportation. The first plant that IBP opened processed eight hundred head of cattle per day, a number that would allow them to operate under the radar of the major processors in America, for at least a while.

The first idea for efficiency by IBP was to bring the processing plant closer to the feed yard. Historically, cattle were fed near the feedstock and then transported to larger metropolitan type areas for slaughter and processing. This model now is typical of every packer in the country, moving their processing and slaughter facilities away from big cities and to the Midwest where the fat cattle are located. The next innovation by IBP was to design the processing of beef cattle on a production line. Requiring one laborer to make one cut multiple times per day, instead of making multiple cuts on one carcass, which drove down labor costs in processing facilities because it reduced the amount of training and specialized knowledge needed by meat cutters. The IBP model forever changed how beef would be processed in America, and worldwide. IBP wasn't done transforming the beef industry. Their final key to success was the production of boxed beef.[10] IBP didn't invent boxed beef, but it did use the invention to propel its business to become the most innovative beef packer in the 1980s. Boxed beef allowed meat processors further shipping efficiency, cutting down on wasted space by shipping boxes instead of cumbersome, non-stackable cuts of beef.

IBP became the largest processor of beef in the United States, with 11 cattle processing plants, 13,000 employees and slaughtering 6 million head of cattle per year. In 2001, Tyson Foods Inc. acquired IBP in what the *New York Times* called a $3.2 billion deal that would create the world's largest meat producer and processor, with revenues of $23 Billion.[11]

Just shy of twenty years later from that major merger of meat processors, about 80 percent of the cattle trade is controlled by multinational corporations, Tyson, Cargill, JBS and National Beef, known as "the big four". The last three years the live cattle price has remained mostly stagnant, hovering right around the production costs for feeders, after reaching an all-time high in October of 2014.

Over the years, the big four companies have been accused of animal welfare issues, workforce rights violations, workforce immigration violations, and price fixing, to name a few.

Despite the sometimes-negative reputation of meat processors, the big four processors have a positive outlook on the future of the beef industry, as they continue to invest in companies along the value stream. The world will continue to demand protein to support a growing population into the foreseeable future.

[8] Retrieved from http://www.depts.ttu.edu/meatscience/History_of_the_Meat_Industry.pdf

[9] Noble, A. (1982, September 20). Quick rise of Iowa Beef Processors is 'Cinderella story' disputed by unions. Retrieved from https://www.upi.com/Archives/1982/09/20/Quick-rise-of-Iowa-Beef-Processors-is-Cinderella-story-disputed-by-unions/4224401342400/.

[10] Friedman, T. L. (1981, June 2). Iowa beef revolutionized the meat-packing industry. Retrieved from https://www.nytimes.com/1981/06/02/business/iowa-beef-revolutionized-meat-packing-industry.html.

[11] Barboza, D., & Sorkin, A. R. (2001, January 2). Tyson to Acquire IBP in $3.2 Billion Deal. Retrieved from https://www.nytimes.com/2001/01/02/us/tyson-to-acquire-ibp-in-3.2-billion-deal.html.

Population density

Wyoming has the second smallest population density of all fifty states, ahead of just Alaska. The average population density in the U.S. is 108 persons per square mile. States with large concentrations of the Beef Cluster tend to have smaller, sprawling populations, as evidenced by only Illinois having a population density greater than the U.S. average.

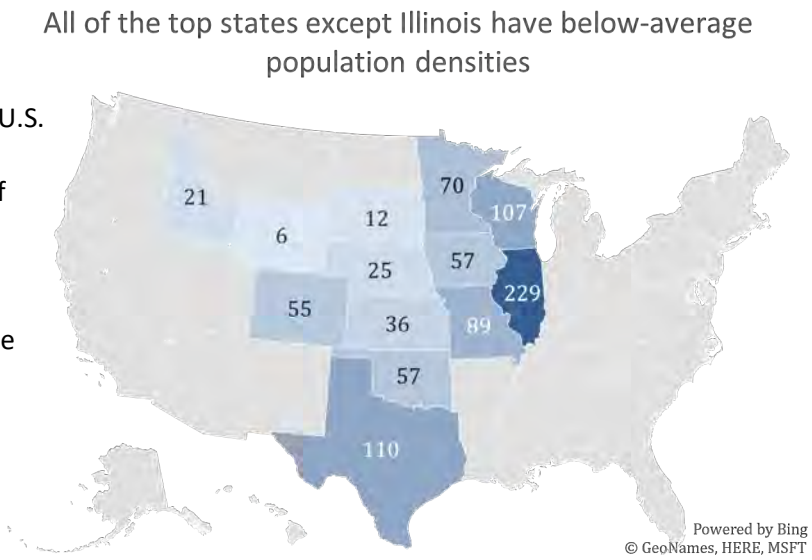

Figure 8. Population Density for States with Greatest Concentration of Beef Cluster & Wyoming, 2019
Source: Emsi

Job growth

Job growth has been relatively consistent across the top Slaughtering and Processing states. Nearly all of the top states for the Slaughtering and Processing industries have seen growth from 2014 to 2019, with the only exception being Wisconsin. The near-consensus growth indicates that growing demand exists for these industries throughout the country.

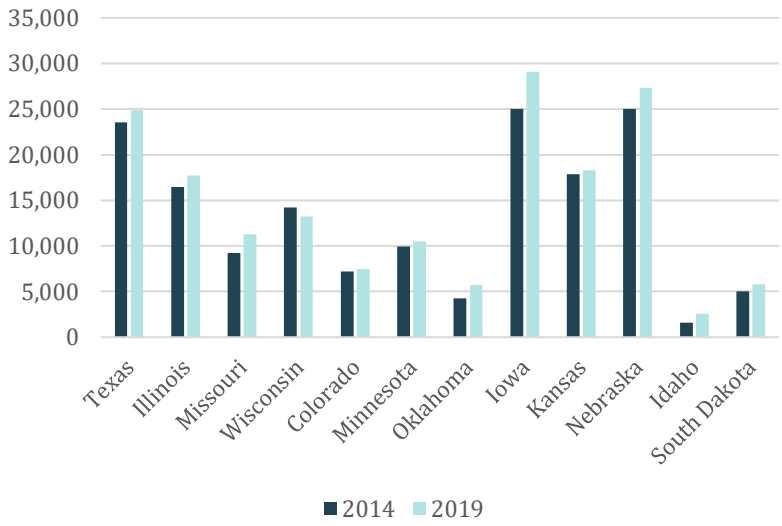

Figure 9. Job Growth for Slaughtering & Processing States, 2014-2019
Source: Emsi

Concentration of slaughtering and processing

Wyoming's neighboring states have high concentrations of employment in Slaughtering and Processing facilities, particularly South Dakota, Nebraska, and Kansas. A high concentration of these industries in states near in proximity provide promising growth opportunity to Wyoming to recruit skilled employees into the state to work in the industry.

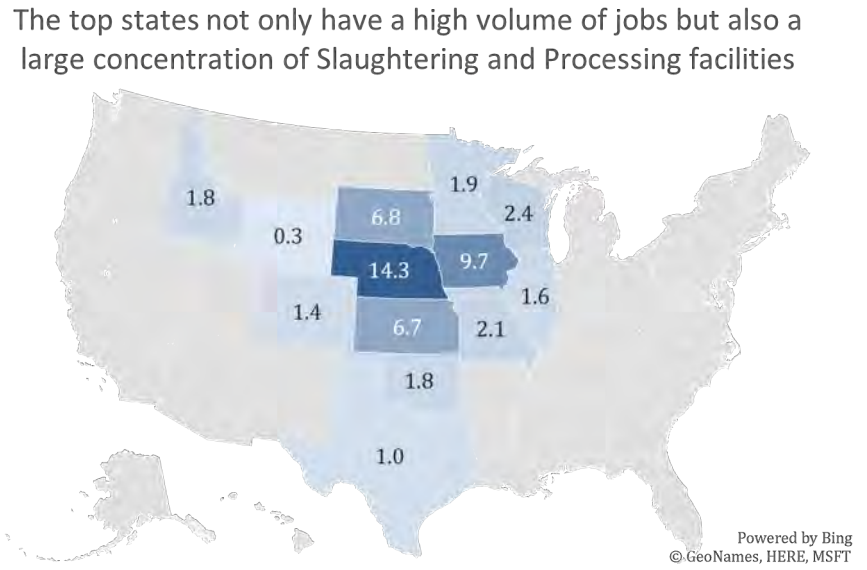

Figure 10. Industry Concentration for Top Slaughtering & Processing States, 2019
Source: Emsi

Gross regional product

Slaughtering and Processing facilities provide billions of dollars in gross regional product (GRP) for the top states. GRP is the sum of total industry earnings, taxes on production & imports, and profits, less subsidies. In states like Iowa, Kansas, Nebraska, and South Dakota, these industries represent 1.2 to 2.5 percent of total state GRP. Since the industries are currently relatively small in Wyoming, they represent just 0.03 percent of state gross domestic product (GDP). Increased investment in the state would result in a higher GRP for these industries, resulting in a higher share of state GDP.

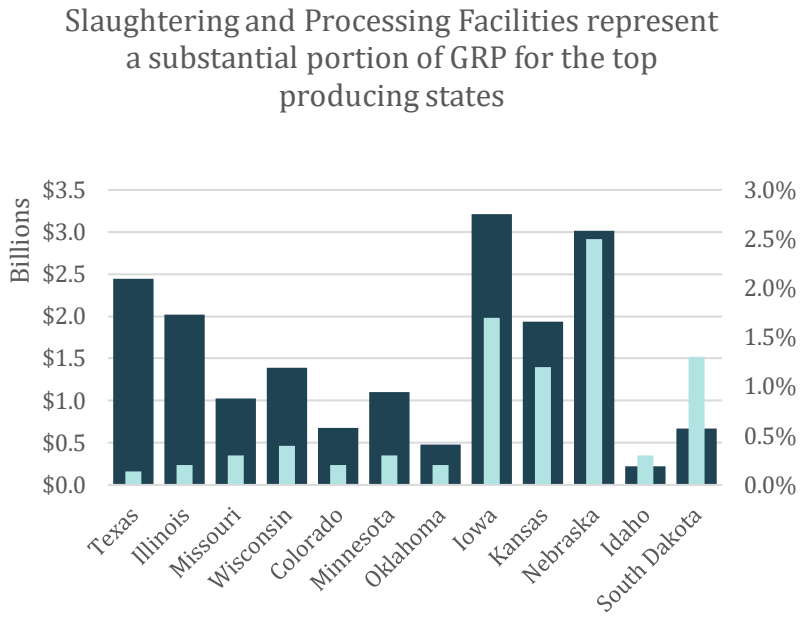

Figure 11. Slaughtering & Processing Industries GRP and Share of GRP for Top States, 2019
Source: Emsi

Industry wage comparison

Compared to the top Slaughtering and Processing states, Wyoming facilities offer low wages, on average. As occupation data will demonstrate, however, many of the occupations employed in Slaughtering and Processing earn higher wages in Wyoming than other states. Occupational data is discussed further in Section 3. Workforce Study.

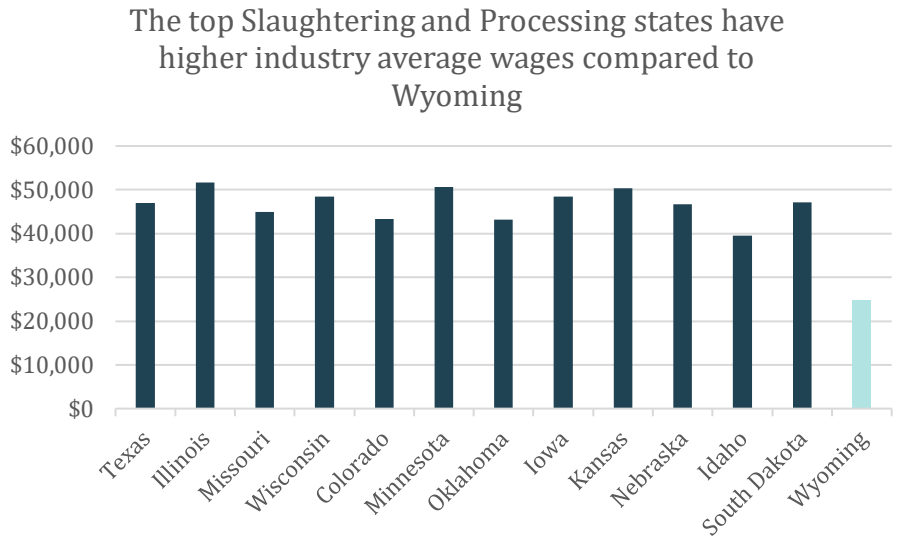

Figure 12. Industry Average Wages in Slaughtering & Processing Across Top States, 2019

Source: Emsi

Export market trends

The U.S. Meat Export Federation actively promotes the superior quality of U.S. beef, highlighting how cattle are safely raised on farms and ranches and the factors that enhance the flavor of U.S. grain-fed beef. For the past ten years, leading export markets for U.S. beef, including variety meat, include: Japan, South Korea, Mexico, Hong Kong, Canada, and Taiwan.

"Rising middle classes and meat demand in emerging nations present U.S. exporters with timely alternatives to the Asia Pacific market," Eugene Gerden, *Meatingplace Magazine*. While the Asia Pacific Market is well-established and will continue to grow, with ongoing trade disputes and animal disease outbreaks, the US Meat Export Federation has identified markets in the emerging nations of Latin America (Columbia, Chile and Peru), the former Soviet nations (Ukraine and Baltic states) and Africa.

The USDA Foreign Agricultural Service publishes period GAIN reports, highlighting the following market opportunities by country for U.S. beef.

Japan

- #1 overseas market for U.S. beef
- U.S.-Japan Trade Agreement (eff. Jan. 1, 2020) makes U.S. food and agricultural products duty-free or receive preferential tariff access
- Consumer preferences shifting away from heavily marbled Japanese wagyu beef toward thicker, leaner, cuts of imported grain-fed beef
- U.S.-style steak now readily available at family restaurants and fast-casual style restaurants
- Lifted long-standing age restrictions on U.S. beef, paving the way for greater imports of trimmings and offal products

South Korea

- Food consumption trends reflect rise of affluent consumer groups
- Local processing, retail, and hotel/restaurant/institutional (HRI) foodservice industries continue to expand
- Consumers pay extra attention to value, quality and safety of food; recognize U.S. as trusted origin for quality agricultural food products

Mexico

- Proximity, highly integrated economies
- Major retailers are developing increasingly sophisticated distribution systems, which will provide more space and better cold chain technology for high value imports
- Local investment from restaurant chains continues to grow

Canada

- #1 export market for U.S. food and agricultural products
- Proximity
- Similar consumption and shopping patterns as U.S.

Hong Kong

- 5th largest market for U.S. consumer-oriented agricultural products
- A top world market for food and beverages, processed, fresh and frozen gourmet products
- Quality and trend-driven market, so price not always most important factor for food and beverage purchases
- Strengthening U.S. dollar will make U.S. products less price competitive

Taiwan

- USA top supplier of beef and beef offal (chilled and high-end beef products), while Australia and New Zealand dominate market for cheaper beef cuts
- Consumers have high regard for quality and safety of U.S. beef
- Growing modern retail industry is looking for new imported food products
- Majority of consumers more health conscious and tend to be less concerned about costs
- Popularity of American holidays and culture/lifestyle lead to promotional events organized around these themes by restaurants and hotels throughout the year
- Increasing growth of fast food chains and casual dining restaurants is a key to industry growth
- Expanding tourism industry and solid domestic consumer demand present opportunities in hotel and restaurant industry
- Socializing in hotel restaurants is common
- Total U.S. agricultural exports to Taiwan amounted to more than $3.9 billion in 2018, of which 43 percent was consumer-oriented products. Beef, poultry, and fresh fruit were top products among the $1.7 billion in consumer-oriented exports
- Taiwan's households spent more money on meat products than any other type of food, on average about $1,500, in 2017
- Beef is Taiwan's most-imported meat product, with imports valued at > $1 billion in 2018
- U.S. holds largest market share of beef (55%)
- Taiwan's imports of U.S. beef continue to increase because of high growth in per capita beef consumption

China

- Several overlapping regional, cultural and consumer markets (taste preferences vary)
- Meat and meat products top list of U.S. exports with best prospects; still difficult to compete with Brazil, Australia
- U.S. products retain high brand-awareness with consumers, food manufacturers, food service
- 96% of beef imported is frozen
- Recent trade agreement opens new markets
- Fast-growing middle and upper middle-class increasing demand for high quality meat proteins

Columbia

- U.S. exports of meat such as beef and pork, and raw materials like corn and soybean meal, have experienced tremendous growth.
- Imported beef and beef products have grown from $3 million to $20 million, or 496% since 2012, with the implementation of the U.S.-Columbia Trade Promotion Agreement.
- Over the past decade, Colombian retail food and non-alcoholic beverage sales have grown by 36 percent compared to only 19 percent in the rest of South America.
- Higher levels of disposable income have shifted purchasing decisions to the quality, variety and convenience of products, not solely price.
- Retailers and food manufacturers believe that the demand for imported U.S. goods will remain strong and continue to grow.

Chile

- Rising purchasing power of middle and upper-middle income
- Zero duties for all agricultural products
- Gateway to Latin American markets
- American brands regarded as high quality
- Favorable business climate, open to investment
- Beef identified as a top product desired by Chile's modern and dynamic food retail industry (following beer/craft beer and spirits)
- Portion-controlled beef cuts in demand by high-end hotels and restaurants

Consumer Trends

Key findings:

- *Consumer demand influences how cattle are produced and beef is marketed both domestically and internationally.*
- *Globally, food safety and security impact markets.*

The beef industry addresses nutrition and food security concerns through traceability and quality standards verified by the USDA Agricultural Marketing Service (AMS). AMS quality standards, grading, certification, auditing, and inspection are voluntary tools and services that industry can use to help promote and communicate quality and wholesomeness to consumers. These services assist businesses in differentiating themselves from their competition.[12] Producers that wish to include marketing claims on packaging must submit a proposed label and supporting documentation to the federal Food Safety and Inspection Service (FSIS).

Objective 1.4. Identify consumer trends in-state, domestically and internationally affecting Wyoming producers (i.e. source verification, hormone-free, non-GMO, etc.) for beef.

Objective 1.5. Identify in-state, domestic, and international beef consumption trends.

[12] Services. (n.d.). Retrieved from https://www.ams.usda.gov/services.

Traceability

Age and Source Verification

The USDA operates a quality assurance program for marketing U.S. beef from cattle less than 30 months old at the time of harvest. The program requires that cattle can be traced to production records that indicate the birth date and ranch location. Cattle must be uniquely identified with marks that are transferable through processing, packaging, storage, and shipping to ensure the integrity of the process and the product.[13]

Country of Origin Labeling

Requirements to label products imported to the U.S. originated with the Tariff Act of 1930. USDA defines Country of Origin Labeling (COOL) as a labeling law that requires retailers, such as full-line grocery stores, supermarkets and club warehouse stores, to notify their customers with information regarding the source of certain foods, including muscle cut and ground meat.[14] COOL, implemented in 2009, was challenged by Mexico and Canada. The World Trade Organization found that "COOL treats imported livestock less favorably than U.S. livestock and does not meet its objective to provide complete information to consumers on the origin of meat products," (Greene)[15]. Congress amended the COOL statute to make COOL voluntary, and finally repealed the measure in 2016. "USDA found that the lack of voluntary country of origin labeling programs, including labeling for beef and pork products, was evidence that consumers did not have strong enough preferences to support price premiums sufficient for firms in the supply chain to recoup the costs of labeling."[16] This is estimated to save $1.8 billion in costs for producers, processors, wholesalers, and retailers of previously covered beef and pork products. In 2018, Wyoming legislation failed which would have required retailers to display a placard identifying the country of origin for beef for sale in Wyoming.[17]

NHTC

In the U.S., the Non-Hormone Treated Cattle program (NHTC) certifies beef that was produced without the use of growth hormones. The program aids producers who export to nations that ban the use of growth hormones.[18] Packers like Tyson are expanding NHTC programs to meet the growing demand.

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[13] USDA Agricultural Marketing Service. (2019). *USDA Quality System Assessment (QSA) Program Specified Product Requirements for Age and Source Verification*. Retrieved from https://www.ams.usda.gov/sites/default/files/media/QAD1002BPROCQSAProgramforAgeandSourceVerification.pdf

[14] Country of Origin Labeling (COOL). (n.d.). Retrieved from https://www.ams.usda.gov/rules-regulations/cool.

[15] Greene, J. L. (2015). *Country-of-Origin Labeling for Foods and the Wto Trade Dispute on Meat Labeling*. *Country-of-Origin Labeling for Foods and the WTO Trade Dispute on Meat Labeling*. Congressional Research Service. Retrieved from https://fas.org/sgp/crs/misc/RS22955.pdf

[16] Removal of Mandatory Country of Origin Labeling Requirements for Beef and Pork Muscle Cuts, Ground Beef, and Ground Pork. 7 CFR Parts 60 and 65 (2016).

[17] H.B. 90, Sixty-fourth Legislature, 2018 Budget Sess. (Wyo. 2018).

[18] Food Safety Testing and Beef Growth Hormones. (2011). Retrieved from http://www.naturalcheck.com/support01.php#5

Premiums for Marketing Claims

Cattle producers, feeders, and processors who wish to capture added value for their animals and products utilize a number of marketing claims verified by the USDA AMS through its Process Verified Program (PVP). Some process points verified by USDA include production and management standards and handling practices that provide specific information to consumers about the products they buy, characteristics about animals (size, weight or age), or a practice specifically requested by a customer. As mentioned in the previous discussion about cattle production, ranchers may be hesitant to participate in programs unless a significant premium can be realized. It is also important to note that international trade policies and consumer concerns about a safe food supply will have an increasing influence on the cattle industry and the need for PVPs. Some of the popular marketing claims are all natural, hormone-free, non-GMO and Non-Hormone Treated Cattle (NHTC).

Finished Type

The majority of cattle (97 percent) are fattened in feedlots, or grain-finished, prior to slaughter. Between 80-90 percent of all grain-finished cattle are fed in large feedlots concentrated in Texas, Kansas, Nebraska and Colorado. In the last decade, consumer sentiment around sustainability, animal welfare, and nutrition have spurred interest in grass-finished, or pasture-raised beef. Cattle consume grass and/or forage after weaning. Proponents of grass-fed beef say the it is leaner and higher in omega-3 fats.[19]

The emerging grass-finished beef sector does not occupy a huge market share currently (estimated between 3% and 7%). However, some experts believe that if grass-fed beef continues its current growth rate of 35-50% annually, it will take over 30% of the market share in only ten years.[20] The USDA Agricultural Marketing Service verifies grass-fed beef marketing programs and provides monthly market reports on the value of grass-fed cattle and beef online at: https://www.ams.usda.gov/mnreports/lsmngfbeef.pdf.

Protein Alternatives

New to many mainstream food retailers in 2019, was a meat replica product, called Impossible Meat. Impossible meat is a soyburger (primarily composed of water, soy protein, coconut oil, and sunflower oil)[21] designed to rival ground beef. According to the Impossible Foods website the four main ingredients are water, soy protein, coconut oil, and sunflower oil. "Plant-based foods are purposely formulated to mimic animal-based foods, so plant-based milk is enriched with calcium and vitamin D to mimic cow's milk, while veggie burgers are rich in protein and made with iron and zinc to imitate beef. But they aren't always made to reduce the presence of

[19] Morris, C. (2016, January 20). Retrieved from https://www.ams.usda.gov/blog-post/understanding-ams'-withdrawal-two-voluntary-marketing-claim-standards

[20] Bussard, J. (2016, February 04). Grass-fed growth brings challenges, opportunity and a few fringe benefits. Retrieved from www.beefmagazine.com

[21] What are the ingredients? (n.d.). Retrieved from https://faq.impossiblefoods.com

less-healthy nutrients," (Rosenbloom, 2019).[22] Plant-based foods can range from unprocessed or minimally processed, to ultra-processed industrial formulations with five or more ingredients including flavor enhancers and preservatives. Plant-based meats and culture-based meats are alternative proteins offered to consumers interested in reducing their consumption of animal products.

U.S. trends

Consumers

U.S. consumers are looking for health and convenience when shopping, pointing to a $1.5 billion increase in sales of refrigerated packaged meat since 2013. This has led to declines in traditional categories, such as round steak and fresh ground beef, which need to be prepared before cooking. Ground beef is among the bottom eight categories of fresh foods, ranked by change in dollars and volume, decreasing in revenue by $80 million for the 52-week period ending in September of 2019.[23]

Information Resources, Inc. the global data company that tracks these consumer trends and helps retail, health and media companies grow their businesses, recommends showcasing sustainability and local connections with suppliers, in addition to bundling items like ground beef with all the fixings for a convenient meal.

Foodservice

Food service includes restaurants and bars, lodging, retail, recreation, healthcare, colleges, schools, business and industry, military, corrections, and continuing care retirement communities. In 2018, beef represented 15 percent of total food purchases by the foodservice industry, purchased by 99 percent of operators. One trend to note is the significant increase in operators purchasing pre-cooked roast beef. [24] In the full-service restaurant segment, growth is being driven by independent operators as the economy supports strong higher end steak restaurant growth. Increases in beef prices hurt sales in the cost-conscious healthcare and education sectors.

In examining the demand for pre-cut steaks, emerging steak cuts all gained volume except sirloin. Traditional cut steaks gained $500 million in total value, yet decline in volume, driven by rib, ribeye and ribeye cap. Brisket and petite tender roast gained significant volume, while demand for prime rib and sirloin roast declined. Ground beef is the most popular beef cut purchased by 75 percent of food service operators, followed by subprimal roasts (46%), pre-cut steaks (42%), pre-cooked roast beef (28%) and ribs (24%).

[22] Rosenbloom, C. (2019, September 9). Is it really possible that plant-based foods such as the Impossible Whopper are healthful? Retrieved from https://www.washingtonpost.com/lifestyle/wellness/is-it-really-possible-that-plant-based-foods-such-as-the-impossible-whopper-are-healthful/2019/09/06/ceb1dcac-c806-11e9-a1fe-ca46e8d573c0_story.html.

[23] Wyatt, S. L., & Parker, J. (2019). Bringing to Life: Top trends in fresh foods. In *Powering the Path Forward*. Retrieved from https://www.iriworldwide.com/IRI/media/Library/webinar/Balancing-Consumer-Pendulum.pdf

[24] Technomic. (2018). *Usage and volumetric assessment of beef in foodservice*. Retrieved from https://www.beefresearch.org/CMDocs/BeefResearch/MR_Presentations/4_26_19 2018 Volumetric Summary for Beef Research.pdf

When food service operators were asked what percentage of total beef purchases came with a production or marketing claim, they indicated a slight increase in breed/grade and natural/naturally raised. Grass-fed beef is down, while organic is basically unchanged.

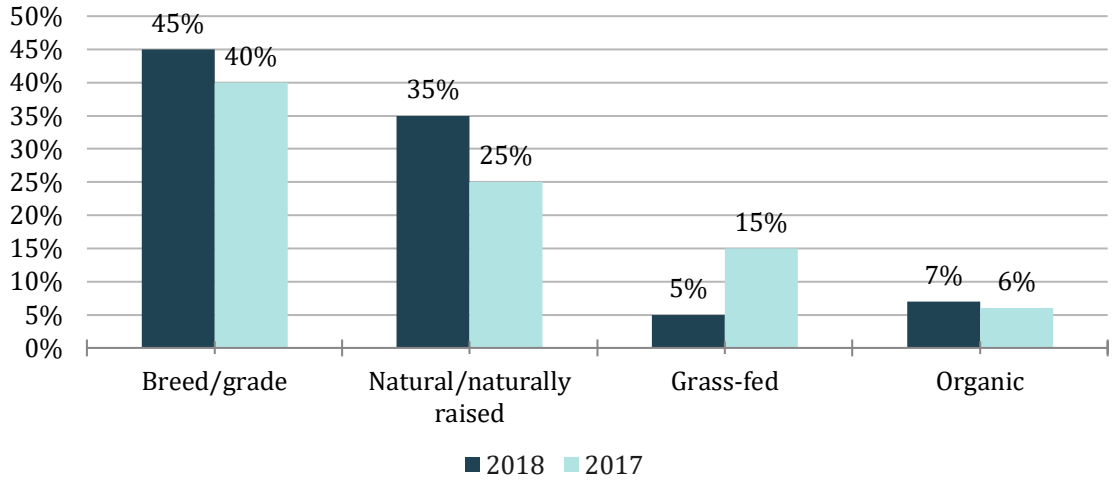

Figure 13. Average Percent Foodservice Purchases with Marketing Claims
Source: Technomic Inc.

International trends

Key points

- *In 2017, beef and beef variety meat exports amounted to 1.26 million metric tons worth $7.27 billion.*
- *The top 10 exported beef cuts represent 85 percent of total U.S. beef exports.*
- *The U.S. beef export value equated to $286.38 per head of each steer and heifer processed in 2017.*
- *12.9 percent of U.S. beef and variety meat production was exported in 2017.*[25]

Wyoming ranks 40th among states for agricultural exports, and 15th for exporting beef. The total value of ag products exported in 2017 was $304 million. Beef and veal, valued at $97 million, is the top Wyoming ag export, according to the Office of the United States Trade Representative. Worldwide, the average per capita meat consumption is increasing for all types of protein, with pork and poultry having the largest share, followed by beef and buffalo.

[25] https://www.usmef.org/about-usmef/faq/

Beyond premium cuts

Key points

- *Utilizing more of the carcass in targeted export markets can increase value and profitability.*
- *Regional trade organizations can identify buyers for more cuts and variety meats.*

Objective 1.2. Identify opportunities for Wyoming beef beyond premium cuts.

Utilizing more of the carcass in targeted export markets can increase value and profitability for U.S. beef. Figure 14 shows cuts for global markets identified by U.S. Meat Export Federation.

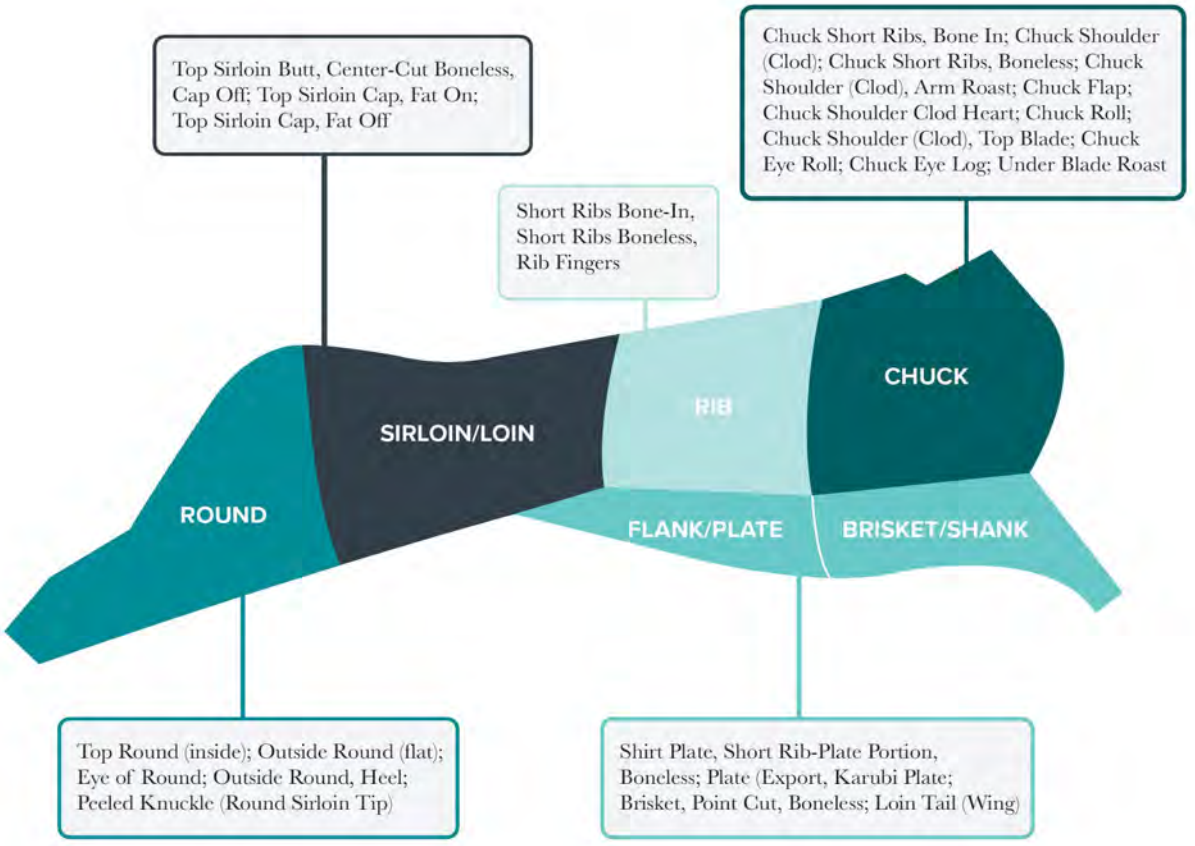

Figure 14. U.S. Beef Cuts for Global Markets

There is also an international market for variety meats such as: Achilles tendon (also known as the gambrel cord, aorta, backstrap, brain, cheek meat, scalded feet, femur bone, head meat, heat-cap off, whole heart, large and small intestines, kidney, lips, liver, oxtail, pizzle, rectum, salivary glands, skirt sinew, sweetbread, testicles, tongue, trachea, tripe, and weasland. Depending on a country's classification, hanging tender, inside skirt and outside skirt may be considered variety meat or carcass subprimal (muscle meat).[26]

[26] U.S. Meat Export Federation. (1012). *U.S. Beef Variety Meat Cuts, International Guide*. Denver, Co.

Distribution channels

Large companies, like the big four packers, maintain international offices and sales representatives in foreign markets. Trade groups like the U.S. Meat Export Federation and Western U.S. Agricultural Trade Association (WUSATA) help small to midsize U.S. companies establish business relationships with importers and distributors, who sell to end users, like hotels, restaurants and institutions. As was the case for the Wyoming Business Council in introducing Wyoming beef to the Taiwan market, "Importers prefer to see product samples whenever possible and will often place small initial shipments to test the market response. Imported goods must conform to local standards and labeling regulations required for importing products into this market. A local agent or distributor should be able to assist with obtaining the necessary certifications and permits needed for importation."[27]

Figure 15. Export Market Structure
Source: USDA Foreign Agricultural Service

The majority of hotel, restaurant and institutional (HRI) companies purchase most of their food products from importers, distributors, wholesalers, regional wholesale markets, wet markets, supermarkets, and hypermarkets,[28] as illustrated in Figure 15. Imported fresh beef is usually purchased and delivered directly from importers or through distributors or wholesalers. Institutional users buy most products from local distributors or import directly.

[27] Fu, C. (2017). *Taiwan Exporter Guide*. USDA Foreign Agricultural Service. Retrieved from https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Exporter%20Guide%20_Taipei%20ATO_Taiwan_12-5-2017.pdf

[28] Fu, C. (2018). *Taiwan Food Service - Hotel Restaurant Institutional*. USDA Foreign Agricultural Service. Retrieved from https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Food%20Service%20-%20Hotel%20Restaurant%20Institutional_Taipei%20ATO_Taiwan_10-15-2018.pdf

Other export market trends identified by the USDA Foreign Agricultural Service are:

- Key purchasing decisions are made by food and beverage managers and executive chefs working in the major international hotels.
- Retail outlets such as Costco, are frequented by many small foodservice/HRI operators who buy items in bulk at the lowest possible cost, thereby avoiding the need to source from multiple sources.

Market Opportunities for Wyoming Beef

Key points

- *Wyoming exports high quality cattle; imports lower price point meat.*
- *It is not economically feasible to market beef that is born-raised-fed-slaughtered in Wyoming; consumers are interested in where and how animals lived, so this story should concentrate on "born and raised."*
- *Small to midsize meat companies can realize much better margins without disposal costs of offal.*
- *Wyoming meat brands should target consumers who value convenience and independent restaurants seeking higher value meat cuts.*

Figure 16 represents the typical US Beef production and demand. Production of beef that grades prime and upper two-third choice does not meet consumer demand. The chart shows the grading percentage of beef typically slaughtered, overlapped with demand of what is produced. Large packers expand their profit margins with the difference between production and demand in prime and upper ⅔ choice. Packers make higher profit margins on the left side of the curve with various premium programs. Packers push the "middle" area (low choice or select) for commodity sales. The top of the demand curve, lower 1/3 choice and select, are commodities with demand driven by price, rather than tenderness or eating experience. The lower end dubbed "no roll" means meat that is not graded and offered at discount prices.

Cattle produced in Wyoming typically grade higher than the average, as evidenced by Wyoming calves consistently selling higher than the national average when they are marketed. However, Wyoming consumer demand is similar to the typical beef demand curve, so we can assume that beef in Wyoming that is produced and exported may become high value retail cuts, while much of what is imported back into the state is ground beef.

Objective 1.1. Identify in-state, domestic and international market opportunities for existing Wyoming beef product lines.

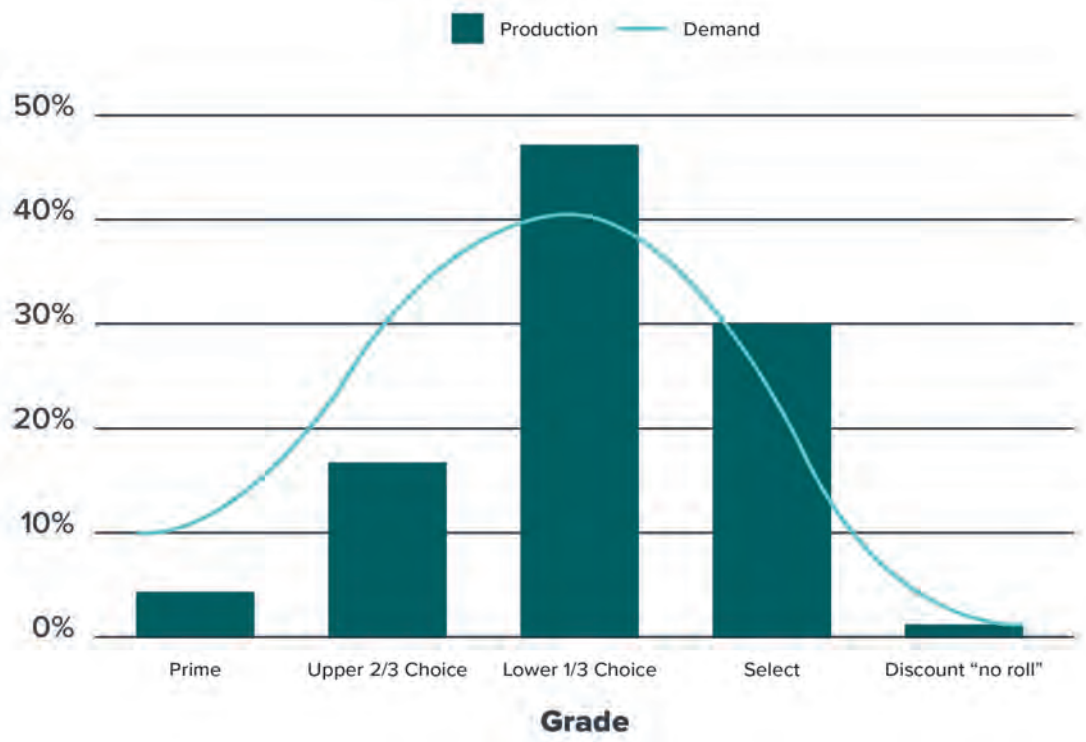

Figure 16. Beef Production and Demand

As Wyoming strives to produce and market more products on the left side of the bell curve, several factors must be addressed. Increased slaughtering and processing capacity in Wyoming requires an economy of scale for production. Market expansion is fueled by product differentiation, developing niche markets, and establishing sales and distribution infrastructure.

This section offers important considerations for companies entering or expanding in local, domestic or international markets.

Direct Marketing

Wyoming beef is satisfying the demand for high quality beef because of its genetics and grazing environment. The state's producers need to be aware of opportunities to add value or premiums in the market. If Wyoming producers wish to retain value of their beef further along the value chain, their best opportunity is to do so through direct marketing or through contracts with retailers, restaurants, or other beef labels. Wyoming also is in proximity to several urban markets, Salt Lake, Billings, Denver, that have consumers who want to know their farmer/rancher and buy directly from them. Currently in the state there are many ranchers who are direct marketing in this manner, and are having success. These ranchers do have a need for a greater capacity of USDA inspection.

Local Food

The local food movement has been gaining popularity for the last decade nationally. There are some consumers who are demanding a product that makes them feel more connected to where their food comes from. This can be seen also with the popularity of direct to consumer sales done by some cattle producers. These consumers are more conscientious about where their food comes from and how it was grown, be it produce or, beef cattle. The same consumer may be willing to pay more to ensure their food meets their own moral requirements, and so producers may be able to demand a premium from beef that they produce this way.

There is also a resurgence of the small butcher shop or meat counter. Areas in Wyoming that have high tourism traffic, may be able to capitalize on demand from tourists wanting a Wyoming grown and raised product. Fremont County is emerging as an example of a community looking to grow their local beef cluster, through further processing, mobile processing, more USDA inspection, and workforce training, and could serve as an example for other Wyoming regions.

Restaurants

As mentioned previously, national trends show growth in independent restaurants and steakhouses in particular. This, coupled with consumer interest in food safety and origin, points to the need to focus on point of sale marketing, such as table tents, menu promotion, and programs that encourage local and regional restaurants to serve Wyoming sourced beef.

Anchor Institutions

In 2019 the Wyoming Business Council teamed up with the Wyoming Beef Council, the Wyoming Stock Growers Association and the Wyoming Meat Processors Association to promote Wyoming grown beef. This was done by making Wyoming grown hamburgers available for sale at a football game at the University of Wyoming. This is a great example of how to grow the demand for Wyoming beef through collaboration between State agencies, anchor institutions, and private Wyoming business. All signs point to this initial event being very successful, and it can serve as a model for the future. Key anchor institutions that could purchase Wyoming beef, would include the University, community colleges, and also Wyoming school districts. There are already some districts in the state that serve beef, often donated by local ranchers. It would be economically beneficial for the state to use its purchasing power to drive demand for Wyoming beef.

The challenge with marketing Wyoming beef to anchor institutions such as the University of Wyoming, community colleges, school districts, national park vendors, and even correctional facilities, is these institutions are cost-conscious. A large amount of this demand would be for ground beef and other lower-end cuts on the right side of the bell curve shown in Figure 17, not the high value larger margin cuts that drive profit.

Wyoming Branded Beef

There has been interest in marketing beef that is born, raised, fed and slaughtered in Wyoming. Even if there was enough USDA-approved slaughtering capacity, there is not enough market data to support the consumer demand for beef that meet all four criteria. It is more economically feasible to market beef that are born and raised in Wyoming.

In comparing other state-branded beef programs, most are driven by private companies rather than state government. Under the USDA Certified Beef Program, there are 56 beef brands, marketed by 39 companies, with 10 brands containing a geographic reference, such as "Iowa Premium Angus". These numbers are down slightly from 2018, when there were 45 companies, 90 certified beef brands and 12 geographically specific brands. Wyoming should start by developing a certification program that would complement Wyoming branded products.

There is momentum in the state for attracting and growing block chain technology development. A Wyoming company, BeefChain is already working in this space, and there is potentially room for more companies like it. Consumers are demanding more and more to know where their food comes from, and if it is an animal protein, they want to ensure the animal was raised humanely. Consumers are seeking a connection to the producer. In addition, traceability is important to food security, and the demands for this throughout the supply chain will only grow.

With technology like BeefChain, one area of opportunity may be in the hide market, because leather has been associated with negative messages. Traceability in the hide market would allow leather producers to ensure they are sourcing hides from producers that are meeting certain qualifiers. This may be one way of potentially alleviating the consumers' negative mindset when it comes to products that are sourced from beef hides.

Wyoming Verified Beef Program

From 2006-2018, the Wyoming Business Council sponsored the Wyoming Verified Program, offering age and source verification through a USDA Process Verified Program. Non-USDA marketing claims included natural and Nutrivac. About 40 ranches participated in the program, enrolling about 9,000 to 15,000 head of cattle annually.

In 2018, the Wyoming Business Council, together with the Wyoming Department of Agriculture and Wyoming Stock Growers Association, explored the possibility of developing a program for promoting beef from Wyoming in new international and domestic markets. This will be accomplished through a brand image of quality Wyoming beef through promotions to capture additional market share and reinforce customer loyalty. The program is designed for the Wyoming beef brand to complement the seller's label.

This label would be available for use on meat products from cattle verified by an independent third-party approved by the USDA Process Verified Program to meet the following criteria:

1. Wyoming born and raised. All animals must be source-verified to the ranch of origin and traceable using live animal production records. The criteria for "born and raised" will be developed in a manner that assures the credibility of advertising while maximizing the opportunity for widespread participation in the program by Wyoming cattle producers with diverse operations.
2. Individual animal ID, which could include RFID or blockchain.
3. Responsible animal handling, which could include BQA certified.

Further Processing

Slaughter is but one step in the process for marketing beef that is born and raised in Wyoming. Through USDA inspection, Wyoming beef can be slaughtered out of state, imported back instate, and then further processed for sales and distribution. There are growth opportunities in the further processing category. Advantages for companies that do not handle the direct slaughter are less capital investment required and zero offal disposal costs.

Cooperative Interstate Shipment of Meat

In a 2014 study by the Wyoming Business Council, it was concluded that the cooperative interstate shipment (CIS) of meat could be beneficial for Wyoming producers. The state found that many producers could experience a significant increase in customers and market opportunities. Additionally, it was noted that several existing facilities would be interested in participating if the program was implemented. For Wyoming producers to meet CIS requirements additional inspection and infrastructure would be required of them. At that time it was recommended for the legislature to provide funds to implement the program and then the Wyoming Department of Agriculture could apply to the USDA for CIS status. It would be advantageous for the legislature to appropriate these funds, because if the USDA inspection demand is as great as it is perceived to be in the state, the CIS program would be the lowest barrier to entry for existing producers or new businesses.

Exporting

There has been some great work done by both the state and its producers to connect Wyoming ranchers to Taiwan beef consumers. The opportunity internationally is to connect with a broker that can sell many cuts to many different outlets, so that as much as possible of the carcass can be utilized. As with in the United States, the ability to compete on the international market comes with the ability to fill full load lots. There are additional constraints for beef processors to ship internationally, that further add to the cost including further inspection, packaging, and transportation requirements.

Section 2. Offal Products Study

Key findings:

- *Animal byproducts fall into three categories: hides, inedible offal, and edible offal, with variety meats being classified as a subcategory of edible offal.*
- *The annual estimated production of beef offal in Wyoming equates less than one tenth of a percent of the typical annual offal production in the United States.*

Byproducts Definition and Market Information

The Drop Credit

Animals byproducts, or offal, is considered everything that is not part of the dressed carcass. Byproducts constitute an estimated 44 percent of the live weight of cattle.[29] In the United States, animal byproducts fall into three categories: hides, inedible offal, and edible offal, with variety meats being classified as a subcategory of edible offal. Based on a live value, animal byproducts account for more than 10 percent of the value for cattle. The value of the offal is often referred to as the drop credit. Historically, hides have been the most valuable piece of beef carcass, accounting for approximately 70% of the drop credit.

Inedible animal byproducts include hide or skin, hair, horns, teeth, fats, bone, ligaments and cartilage, feet, glands, blood, and lungs. These byproducts are inedible to humans, but have many other uses including being made into animal feed products, gelatin, and pharmaceutical products.[30] Edible byproducts include; livers, hearts, tongues, tails, kidneys, brains, sweetbreads (thymus or pancreas gland), tripe (stomach), melt (spleen), fries (testicles), head meat, lips, fats, and other trimmings, blood, and certain bones. Typically, edible byproduct yield is around 12 percent of the live weight of cattle.

Objective 2.1. Define beef offal and value-added opportunities in Wyoming for the entire carcass.

[29] Marti, D. L., Johnson, R. J., & Mathews, K. H. (2011). *Where's the (Not) Meat? Byproducts from beef and pork production*. Retrieved from https://www.ers.usda.gov/webdocs/publications/37427/8801_ldpm20901.pdf?v=0

[30] Alao, B., Falowo, A., Chulayo, A. Y. & Muchenje, V. (2017). The Potential of Animal Byproducts in Food Systems: Production, Prospects and Challenges. Sustainability. 9. 1089. 10.3390/su9071089.

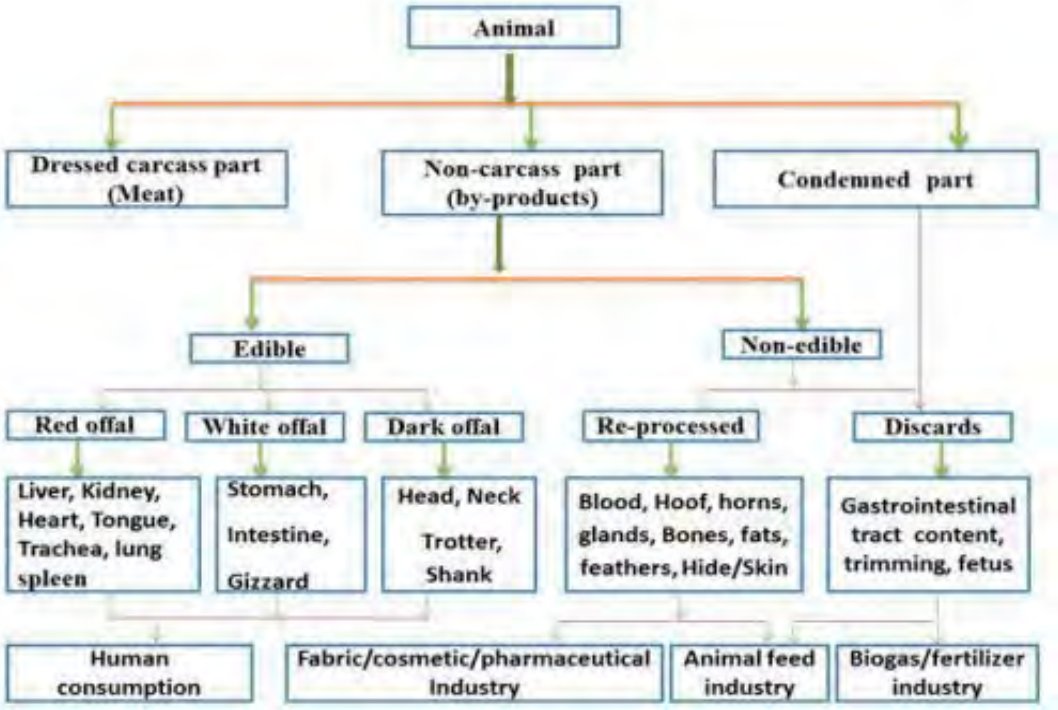

Figure 17. Potential for Animal Byproducts in Food Systems
Source: USDA

Total Wholesale Value Calculation

Animal byproducts are a realized value stream for major beef processors, and the USDA reports on these values to equate to a drop value for the beef carcass. The USDA has an equation for identifying the total wholesale value of the beef animal. The calculation is:

$$(TWv) = (COv) \times (COdw) + (BPv) \times (BPlw)$$

TWv	=	The total wholesale value of the animal
COv	=	Weighted Average cutout value of the animal's dressed carcass
COdw	=	Cutout dressed weight of the animal's carcass
BPv	=	Byproduct drop value per live weight of an animal
BPlw	=	Live weight of the animal

The USDA Agricultural Marketing Service (AMS) reports the weekly average amount and value of offal generated per head. AMS also reports data in its Pork and Beef Variety Meats Report on the number of 40,000-pound loads of various by products that are sold each month. The items detailed in the AMS report include only those sold direct for human consumption or those sold to multiple companies. Thus, recorded byproduct levels may not be consistent with potential

quantities because the data does not cover byproducts sold exclusively to one company for the production of speciality products. [31]

Table 2 illustrates how the value of offal products are calculated. The weekly AMS report lists the reported price of the byproduct category and then uses calculations to equate the value on a per head average for each category. That value can then be figured to find a total per head byproduct value, or drop credit, for a particular week reported at $124.45. Yields remain stable on a per head basis, not dependent on carcass size. [32]

Table 2. ***Weekly Market Report, USDA Byproduct Drop Value***

Category	LBS	Price	Value
Steer Hide, butt brand/Pc	4.83	36.50	2.61
Tallow, Edible (2)	1.2	31.25	0.38
Tallow, packer bleachable	4.5	23.75	1.07
Tongues, Swiss #1 0-3%, exp	0.24	370.00	0.89
Cheek Meat, trmd	0.32	183.00	0.59
Head Meat	0.13	82.00	0.11
Oxtail, selected	0.24	325.00	0.78
Hearts, reg, bone out	0.38	68.00	0.26
Lips, unscaled	0.13	183.00	0.24
Livers, slcted, export	0.96	22.00	0.21
Tripe, scaled edible	0.65	146.00	0.95
Tripe, honeycomb bleached	0.15	200.00	0.30
Lungs, inedible	0.47	5.63	0.03
Melts	0.14	6.75	0.01
Meat & bone ml 50% blk/ton	3.7	155.00	0.29
Blood meal 85% blk/ton pnh	0.6	575.00	0.17
Totals	18.64		8.89
Dressed Equivalent Basis (63%)			14.11
Typical Slaughter Wt (1400)		882.000	$ 124.45
Total Byproduct Value			$ 124.45

Source: USDA Market News Des Moines, IA

[31] Marti, D. L., Johnson, R. J., & Matthews, K. H. (2011). *Where's the (Not) Meat? Byproducts From Beef and Pork Production*. USDA. Retrieved from https://www.ers.usda.gov/webdocs/publications/37427/8801ldpm20901.pdf?v=0

[32] USDA. (2015, Oct. 25). *USDA Byproduct Drop Value (Steer) An Overview*. Retrieved from https://www.ams.usda.gov/sites/default/files/media/ByProduct DropValue(Steer)Overview.pdf

Drop Credit Market

In Figure 18 we graphed the Cow and Steer Byproduct Drop Value from 2000 to 2019 as reported by the AMS. Note the rise in value from 2005 to the year 2015, where the drop value declined faster than it rose, to almost historical millenium lows in 2019.

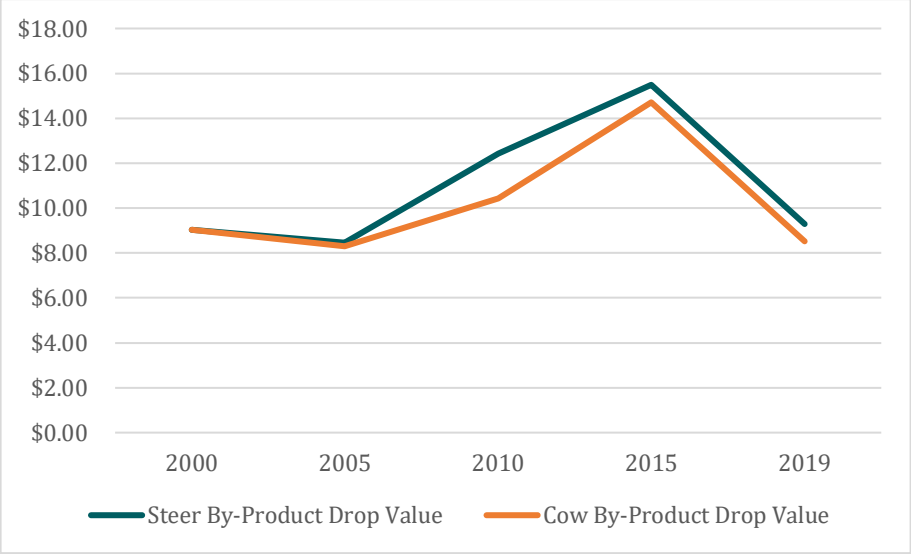

Figure 18. Cow & Steer Byproduct Drop Value, 2000-2019

Changes in the drop credit largely correlate to the hide market, because of its high value as compared to other offal products. Large importers of bovine hides include China, Italy, Mexico, and South Korea. The total value of bovine hides, whole, fresh, or salted dropped from an export value high of almost two billion dollars in 2015, to a level under two hundred million dollars by the end of 2017. Note that most products on the AMS report remain consistent from 2015-2019, as highlighted in Figure 19.

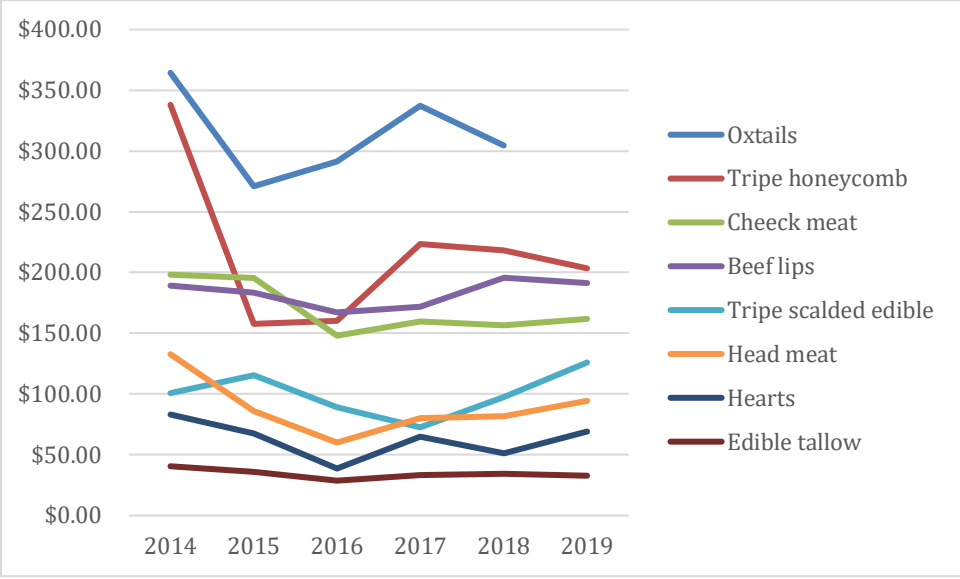

Figure 19. Historical Price Comparison of Beef Byproducts, 2014-2019

During the market high of 2014, beef hides were bringing all time high values, which had a negative impact in the long-term market because it forced manufacturers to find leather alternatives. That, combined with consumers demanding products that are leather-free or "vegan clothing", has caused demand to be slow to return to historic levels. [33]

The hide industry is suffering globally, there have been many new developments in the apparel industry that allows them to create products that imitate leather very well and can be made completely synthetically. Finding alternative markets for hides, and keeping a natural product out of a landfill, is a challenge the entire globe is facing.

Wyoming Drop Credit Value

Large beef processors utilize virtually every part of the beef carcass. In contrast, Wyoming producers are disposing of most of the offal they generate, usually at a cost. This isn't because Wyoming processors like throwing away dollar bills; it is due to the fact that there are no established markets for offal in the state. The statewide lack of an offal market equates to nearly a ten percent reduction in value of the live animal at slaughter. This number is important to explaining the economics of the beef cattle market in the state of Wyoming. The disposal of offal products usually costs between ($65-$85 a ton), and in some cases much higher. For Wyoming producers not currently able to utilize any byproduct value the calculation is:

(TWv) = (COv) x (COdw) - (BPv) x (BPIw)

Table 3. ***Difference in Carcass Value***

	National Processor	**Wyoming Processor**
Carcass Weight	1400	1400
Per Lb. Value	$1.90	$1.90
Dressed Meat Value	$1,672.00	$1,672.00
Drop Credit	$124.00	-$24.64
Total Value	$1,796.00	$1,647.36
Wyoming Processor Per Head Disadvantage		**$148.64**

Based upon the AMS Byproduct report noted earlier, the difference in value for Wyoming processors was found. For the purpose of the calculation we used a landfill fee of $80 per ton applied to Wyoming processors. The difference in value that is realized between large packers and Wyoming processors is quite vast, and it will be realized at other places in the value chain. This only adds to the market power leveraged by large beef packers.

Wyoming processors must either pass the offal costs along to their customers or see a significant impact in their margins based upon the value of the drop credit. The impact on margins will be unsustainable in direct competition with large packers. Profit margins are

[33] Mulvany, L., & Tsekova, D. (2019, August 19). America is obsessed with beef. But it has no use for hides, so leather prices plunge. *Los Angeles Times*. Retrieved from https://www.latimes.com/business/story/2019-08-18/america-is-obsessed-with-beef-but-it-has-no-use-for-hides-so-leather-prices-plunge

already sensitive for small to midsize beef processors. In our visits around the state we found that typically the disposal costs are passed directly along to the customer paying for the carcass processing.

On the domestic and international market, edible and non-edible offal are traded in full truckload lots, usually weighing 55,000 lbs. The ability for Wyoming producers to trade on these markets in dependent on their ability to fill full load lots, much like the cow-calf producer. Wyoming processors have a long way to go to be able to fill full load lots of beef offal to any market, and if one is exported domestically or internationally it must originate from a plant with the proper inspection credentials.

Wyoming Offal Supply

Objective 2.3. Rank all parts of the carcass by perceived value-added opportunities, market demand, strength of market, and location.

Calculating the Offal Supply in Wyoming

It is important to highlight a few economic conditions that impact the market for Beef byproducts in Wyoming. One of the main challenges is that the scale of production in Wyoming means that there is not a market for most offal products. In visits to Wyoming processors, it was found that most are throwing most offal products away, at a cost.

Table 4 uses the USDA Byproduct report to calculate both the value of a full load of the byproduct category, as well as the total head that are needed to produce a full load of the same category. Some of the categories are not feasible in Wyoming currently, because of an estimated slaughter capacity in Wyoming of just over 21,000 head annually.

Table 4. ***Value and Quantity of Byproducts by Truckload***

	Lbs. per 100 weight of carcass	Total lbs. generated per head	Head needed to make load	Days to generate load (statewide)	Value per 100wt	Total load value
Steer hide, butt brand/Pc	4.83	67.62	592	7	$ 2.61	$ 1,044.00
Tallow, edible (2)	1.2	16.8	2,381	30	$ 0.38	$ 152.00
Tallow, packer bleachable	4.5	63	635	8	$ 1.07	$ 428.00
Tongues, Swiss #1 0-3%, exp	0.24	3.36	11,905	149	$ 0.89	$ 356.00
Cheek meat, trimmed	0.32	4.48	8,929	112	$ 0.59	$ 236.00
Head meat	0.13	1.82	21,978	275	$ 0.11	$ 44.00
Oxtail, selected	0.24	3.36	11,905	149	$ 0.78	$ 312.00
Hearts, reg, bone out	0.38	5.32	7,519	94	$ 0.26	$ 104.00
Lips, unscaled	0.13	1.82	21,978	275	$ 0.24	$ 96.00
Livers, selected, export	0.96	13.44	2,976	37	$ 0.21	$ 84.00
Tripe, scaled edible	0.65	9.1	4,396	55	$ 0.95	$ 380.00
Tripe, honeycomb bleached	0.15	2.1	19,048	238	$ 0.30	$ 120.00
Lungs, inedible	0.47	6.58	6,079	76	$ 0.03	$ 12.00
Melts	0.14	1.96	20,408	255	$ 0.01	$ 4.00
Meat & bone ml 50% blk/ton	3.7	51.8	772	10	$ 0.29	$ 116.00
Blood meal 85% blk/ton pnh	0.6	8.4	4,762	60	$ 0.17	$ 68.00
Totals	**18.64**	**260.96**				

Table 5 illustrates the amount of offal products that would be available in Wyoming by region. Assuming the planned facilities all came online and all plants operated at full capacity, the annual production of offal in Wyoming would be 5.5 million pounds. That amount of production would supply thirty-six, 40,000 pound loads of beef hides, and 34 loads of bleachable tallow annually.

Table 5. ***Annual Regional Offal Production***

Region	Slaughter capacity	Offal production	Annual full load		
			Hides	Bleachable tallow	Livers for export
Big Horn Basin	2340	610,646	4	4	0.8
Northeast	2600	678,496	4	4	0.9
Central	12480	3,256,781	21	20	4.2
West	520	135,699	1	1	0.2
High Plains	2600	678,496	4	4	0.9
Southeast	780	203,549	1	1	0.3
Total	**21320**	**5,563,667**	**36**	**34**	**7.2**

The annual estimated production of beef offal in Wyoming equates to less than a tenth of a percent of the typical annual offal production in the United States.

Value Added Opportunities

Objective 2.4. Identify value-added opportunities in Wyoming for disposal and/or further processing of offal products.

Aggregation

The estimates in Table 5 highlight the possibility for regions to aggregate the offal they produce into a central location. Because the estimated production is highest in the central region, naturally it may make economic sense for any aggregation facility to also be in that area. The numbers may be large enough to attract a rendering company located in the front range of Colorado to transport byproducts back to their rendering facility.

Pet Food

There are some pet owners, most specifically, dog owners that desire an alternative source of food than the typical dog food found in stores. Emerging trends to market dog food as 'grain free' and even 'human grade', suggest changing consumer demands. There are pet owners wanting to serve their dogs or cats a diet based on raw meat, which could be a great opportunity for the small beef processor. Raw pet food requires little, as far as added production costs go, except for the added cost to refrigerate the product. Some consumers may be unaware that natural products which could be fed to dogs to other animals are being thrown away, at a cost to the abattoir.

Alternative Disposal Options

Composting

Composting is an anaerobic process by which organic materials are degraded through the activities of successive groups of microorganisms.[34] Composting provides an inexpensive alternative and environmentally acceptable method for the disposal of slaughterhouse wastes. The barrier to entry for composting is that composting animal carcasses requires a permit with the Department of Environmental Quality.

Alkaline Hydrolysis

Alkaline Hydrolysis is a process which uses sodium or potassium hydroxide to catalyze the hydrolysis of biological materials (proteins, nucleic acids, carbohydrates, lipids, etc.) into a sterile aqueous solution consisting of small peptides, amino acids, sugars, and soaps. In order to accelerate the hydrolysis, the process is usually conducted with pressure and temperature. Studies conducted have shown that by bubbling carbon dioxide into the hydrolysate at the end of digestion, the pH of the end product can be reduced into the range of pH 8 or less. The hydrolysate will be comprised of nutrients that make it ideal for microorganisms. It may be possible to apply this product as a fertilizer or use it as an input into the Anaerobic Digestor.

Anaerobic Digestion

Anaerobic Digestion is a process in which organic or natural wastes are decomposed in the absence of oxygen, producing a sludge or fiber of agricultural value, as well as biogas, which can be used to generate energy. The best process of anaerobic digestion to manage agricultural wastes, especially abattoir waste, is done under thermophilic conditions which requires heating the digester to 130 degrees Fahrenheit. A Swedish study determined that if properly managed, digestion can be conducted successfully on slaughterhouse wastes with high methane production.

Biomal

Another Swedish waste-to-energy strategy takes form in their use of generated electricity and heat in combined power plants. In 2005, in a project called the LIFE Environmental project BIOMAL, a fuel preparation plant was constructed in Karlskoga, Sweden, which would produce 85,000 tons of Biomal fuel annually. Biomal fuel starts as a raw material, byproducts and wastes from abattoirs, and then crushed/grinded to be used as a fuel in their combined plants. Many cities and towns are heated on a public system, so in the end what would be wasted, becomes a combustion source for energy. The other benefit of such a grinding plant is that in this case, it was found that energy demand was about 90% lower than a rendering plant, and the wash water is collected and recirculated.

[34] Dees, P.M., Ghiorse, W.C. Microbial diversity in hot synthetic compost as revealed by PCR-amplified rRNA sequences from cultivated isolates and extracted DNA. *FEMS Microbiol Ecol*. (2001);35:207–216.

Section 3. Supply Chain Opportunities in Wyoming

Key points

Objective 2.2. Assess current and potential supply chain opportunities both in Wyoming and surrounding states.

- *For Wyoming slaughter and processing industries to operate, more than 88 percent of the goods and services they need must be imported. There is potential for businesses to fill this need, the main challenge however in Wyoming, is scale.*
- *Overall, just one-third of the beef cluster supply needs are met within the region, while the remaining two-thirds of requirements are purchased from outside. In total, the value of the cluster's supply chain is $985 billion.*
- *Wyoming can embark on several key initiatives to expand the beef cluster driven by supply chain opportunities, explained at the end of this section.*

Slaughtering and processing industries rely heavily on imports in Wyoming to satisfy their operational requirements. About three-fourths of slaughtering value chain demand is required by imports while effectively all of Processing value chain demand is met outside Wyoming. Combined, Slaughtering and Processing value chain demand met by imports accounts for nearly $191 million—or 88 percent of total value chain demand for these industries in Wyoming. This means for Wyoming slaughter and processing industries to operate, more than 88 percent of the goods and services they need must be imported. There is potential for businesses to fill this need, the main challenge however in Wyoming, is scale.

Table 6 presents a breakdown of total demand—from both Wyoming businesses and residents—for beef industry goods/services by how much is met by firms in Wyoming and demand met by importing from other regions. As seen previously, Animal Production dominates total demand for the Beef Cluster, accounting for more than $288 million in 2018 alone (57 percent of total Beef Cluster demand). The percent met in-region (53 percent) is roughly on par with other top states in Animal Production.

Table 6. ***Beef Value Chain in Wyoming, 2018***

Industry	Demand met in-region	% demand met in-region	Demand met by imports	% demand met by imports	Total demand
Animal Production	$154,016,389	53%	$134,565,389	47%	$288,581,778
Animal (except Poultry) Slaughtering	$24,603,322	23%	$82,896,061	77%	$107,499,383
Meat Processed from Carcasses	$1,520,283	1%	$100,080,955	99%	$101,601,238
Rendering and Meat Byproduct Processing	$0	0%	$7,738,402	100%	$7,738,402
Total, Beef Cluster	**$180,139,995**	**36%**	**$325,280,807**	**64%**	**$505,420,801**

Source: Emsi

Tables 6 through 8 present the economic development opportunity to build up the state's supply chain supporting the Beef Cluster. Overall, just one-third of the beef cluster supply needs are met within the state, while the remaining two-thirds of requirements are purchased from outside. In total, the value of the cluster's supply chain is $985 billion. Just six percent of purchases required from the broader manufacturing industry, which includes slaughtering and processing facilities, are supplied by manufacturing firms within Wyoming. For animal and slaughtering facilities alone, more than $7 million—74 percent—of purchases are imported (Table 7).

Table 7. ***Beef Cluster, Detailed Supply Chain for Top Industries, 2018 (3-digit NAICS code)***

Purchases from	In-region purchases		Imported purchases		Total purchases
Animal Production	$131,494,883	53.9%	$112,463,803	46.1%	$243,958,685
Animal Food Manufacturing	$3,655,534	1.6%	$220,990,243	98.4%	$224,645,777
Crop Production	$25,744,906	40.3%	$38,094,329	59.7%	$63,839,235
Miscellaneous Nondurable Goods Merchant Wholesalers	$14,791,106	33.2%	$29,735,062	66.8%	$44,526,168
General Freight Trucking	$17,779,459	49.8%	$17,928,774	50.2%	$35,708,233
Beer, Wine, and Distilled Alcoholic Beverage Merchant Wholesalers	$7,901,049	26.7%	$21,665,220	73.3%	$29,566,270
Petroleum and Coal Products Mfg	$10,017,799	48.8%	$10,513,910	51.2%	$20,531,709
Support Activities for Crop Production	$7,930,916	61.8%	$4,907,790	38.2%	$12,838,706
Specialized Freight Trucking	$8,011,599	70.6%	$3,341,660	29.4%	$11,353,259
Animal Slaughtering and Processing	$2,514,692	26.3%	$7,053,499	73.7%	$9,568,192
Grain and Oilseed Milling	$38,474	0.4%	$8,551,743	99.6%	$8,590,216
Farm Product Raw Material Merchant Wholesalers	$2,685,976	32.0%	$5,702,693	68.0%	$8,388,669
Petroleum and Petroleum Products Merchant Wholesalers	$5,551,806	68.4%	$2,567,245	31.6%	$8,119,050
Rail Transportation	$6,928,647	89.9%	$776,021	10.1%	$7,704,668
Spring and Wire Product Manufacturing	$227,454	3.0%	$7,245,317	97.0%	$7,472,771
Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing	$515,324	11.5%	$3,947,888	88.5%	$4,463,212
Agriculture, Construction, and Mining Machinery Manufacturing	$104,911	2.4%	$4,188,892	97.6%	$4,293,803

Source: Emsi

Supply chains, otherwise known as value chains, provide critical information regarding purchases made by companies in the Beef Cluster broken down by product or service. Each product or service is then broken down by demand met by Wyoming businesses and demand fulfilled by imports.

Specific opportunities from the supply chain include, Animal Food Manufacturing, General Freight Trucking, Animal Slaughtering and Processing, Grain and Oilseed Milling, Spring and Wire Product Manufacturing, Agricultural Chemical Manufacturing, and Agriculture, Construction and Mining Machinery Manufacturing.

There are opportunities from Table 8 in manufacturing, wholesale trade, management, and in arts, entertainment and recreation. This information highlights the imbalances between imported and in-region purchases for the beef cluster. Growing the amount of purchases met by in-region purchases is a strategy for economic sustainability. Additionally, regional businesses may be able to provide services and goods at a better price point for Wyoming processors, if they are in close proximity.

Table 8. ***Beef Cluster Detailed Supply Chain for Top Supply Purchases, 2018 (2 digit NAICS code)***					
Purchases from	**In-region purchases**		**Imported purchases**		**Total purchases**
Agriculture, Forestry, Fishing and Hunting	$167,764,236	52%	$156,325,820	48%	$324,090,055
Manufacturing	$18,516,184	6%	$283,181,728	94%	$301,697,912
Wholesale Trade	$51,109,925	27%	$136,937,601	73%	$188,047,526
Real Estate and Rental and Leasing	$41,848,205	71%	$16,885,498	29%	$58,733,703
Transportation and Warehousing	$33,344,243	57%	$25,100,396	43%	$58,444,639
Finance and Insurance	$5,068,950	44%	$6,402,484	56%	$11,471,434
Utilities	$7,037,363	68%	$3,246,440	32%	$10,283,803
Professional, Scientific, and Technical Services	$4,968,979	59%	$3,500,201	41%	$8,469,181
Mining, Quarrying, and Oil and Gas Extraction	$3,551,012	49%	$3,690,566	51%	$7,241,577
Information	$1,379,197	34%	$2,666,898	66%	$4,046,095
Retail Trade	$2,545,745	67%	$1,272,866	33%	$3,818,612
Administrative and Support and Waste Management and Remediation Services	$1,171,929	44%	$1,478,012	56%	$2,649,941
Construction	$1,263,521	63%	$755,205	37%	$2,018,727
Accommodation and Food Services	$1,198,340	74%	$426,551	26%	$1,624,891
Management of Companies and Enterprises	$32,726	3%	$1,043,622	97%	$1,076,349
Other Services (except Public Administration)	$464,329	58%	$336,757	42%	$801,086
Arts, Entertainment, and Recreation	$108,143	30%	$255,722	70%	$363,865
Government	$254,094	91%	$24,234	9%	$278,328
Health Care and Social Assistance	$57,715	40%	$86,037	60%	$143,752
Educational Services	$5,396	4%	$129,762	96%	$135,157
Total Beef Cluster Supply Chain	**$341,690,231**	**35%**	**$643,746,402**	**65%**	**$985,436,633**
Source: Emsi					

Based on the market data presented in this study, we highlight key initiatives to better position Wyoming beef in niche domestic and international markets and outline strategies to advance the beef cluster in the state.

Key Initiatives

Growing Wyoming Beef Demand

The marketing power of the state as a whole is much greater than the ability for individual companies to market on their own. There is an opportunity for a Wyoming beef marketing program, for cattle producers, feeders, processors and retailers to leverage higher premiums through a certification program to complement Wyoming products. Wyoming companies should focus on developing markets for beef products in two categories: convenience-packaged products for consumers and independent restaurants. Marketing resources to assist with packaging and point-of-sale materials would bring the most value to Wyoming companies.

1. ***Traceability***. Support efforts for identification and beef traceability throughout the supply chain.
    1.1. Develop Verified Wyoming born and raised program to augment domestic and international marketing efforts.
    1.2. Determine if there is interest in adding a state beef checkoff program (as have Alabama, Idaho, Louisiana, Oregon, Tennessee, Utah and Washington, Ohio and Texas) for increased opportunities to market, promote and educate consumers about beef and beef producers.

2. ***Marketing***. Offer assistance with marketing and sales for companies developing direct marketing programs.
    2.1. Develop an online marketplace that would connect Wyoming producers selling meat to consumers that want to buy Wyoming beef.
    2.2. Connect Wyoming companies to regional and national trade associations to assist with market research and exploration, product analysis, identification of international buyers and distributors, and logistics.

Growth of Beef Cluster

Growth of the beef cluster is necessary for meeting more demand for goods and services that are produced in the state, versus beef processors meeting their demands through imports. Research suggests that there may be opportunities located in Animal Food Manufacturing, General Freight Trucking, Animal Slaughtering and Processing, Grain and Oilseed Milling, Spring and Wire Product Manufacturing, Agricultural Chemical Manufacturing, and Agriculture, Construction and Mining Machinery Manufacturing. These are all categories with a disproportionate number of imported purchases versus in-state purchases.

In addition to growing the beef cluster statewide, the state should support, study, and potentially replicate the strategic growth of the local beef cluster in Riverton and Fremont

County. There is a lot of intentional growth and history in the area to support local beef by growing processing capacity, training the workforce, and selling Wyoming beef at retail locations. If successful, this could be a model for other communities to replicate.

The Wyoming Department of Agriculture should revisit the need for the Voluntary Cooperative Interstate Shipment Program. If the demand for beef processing under USDA inspection is as great as it is perceived to be in the state, the lowest barrier to entry would be through the CIS program. There will likely be a need for additional funding to grow this program.

3. **Support the expansion of existing slaughtering and meat processing companies through facility improvements and increased inspection.**
    - **3.1.** ***Finance***. Offer finance programs for capital improvements for businesses interested in federal inspection, to address issues such as biosecurity, employee welfare, etc.
    - **3.2.** ***Inspection***. Re-visit the need for the Voluntary cooperative interstate shipment program.

4. **Advocate for the meat processing industry in Wyoming by strengthening the industry association.**
    - **4.1.** ***Public Policy***. Advocate for state funding for additional plant inspection.
    - **4.2.** ***Group Purchasing***. Grow membership by offering group purchasing (i.e. materials) and other services, such as health insurance and benefits.
    - **4.3.** ***Education & Training***. Offer education and training on topics such as: sales and use tax (consistency in rules for collection), and State, FSIS and Federal Inspection Requirements.
    - **4.4.** ***Workforce Development***. Collectively address workforce shortages through strategies described in **Section 4. Workforce Study**.

5. **Target segments of the beef cluster that are underrepresented in the state,** through encouraging existing businesses to expand products or services, supporting entrepreneurs to enter the market, or attracting new business development to the state.
    - 5.1. Further Processing Plants
    - 5.2. Cold Storage
    - 5.3. Transportation

Regional Offal Aggregation

In the Offal study, the amount of beef offal production was estimated if all Wyoming plants current and under planning operated at full capacity for a year. These numbers can serve as a baseline for rendering or other beef byproduct companies to analyze the business case for offal aggregation in the state. Currently, the best options for Wyoming include at a minimum, utilizing ways to dispose of offal that do not cost the arbitior or the cattle producer any additional fee. The best way to create a market for Wyoming offal products is through aggregating the products in a central location, so that a larger amount of the offal could be accumulated and then perhaps shipped to an existing renderer on the Front Range of Colorado. Based upon the calculations if a regional offal collection facility was not feasible, the largest amount of offal will be produced in the central region.

Management of the offal generated from smaller slaughterhouses has been a challenge the industry has been trying to solve for a long time. We analyzed large and small beef processors domestically and internationally, and the main challenge is establishing a profitable economy of scale. As the amount of slaughter grows in Wyoming the offal will create business opportunities, and as of now the best opportunities lie on the local and hyper local end of the supply chain for animal food, aggregation or in innovative ways to convert waste to energy.

6. Add value to offal products.

- **6.1.** ***Cold Storage***. Develop regional cold storage capacity for edible and inedible meat products, produce and other food products.
- **6.2.** ***Aggregation***. Establish a regional collection facility to aggregate supply of offal to produce value-added products.
- **6.3.** ***Alternative Uses***. Study further the business case for alternative disposal methods such as composting, Alkaline Hydrolysis, and biomal (as identified in Section 3).

Section 4. Workforce Study

Economic Overview

This section provides an economic overview of the State of Wyoming and the beef cluster. The economic overview examines the labor market participation, unemployment, educational attainment, net commuter data and key industries for the state. The beef cluster wage and occupation data compares national trends in occupations to the segments of the beef industry.

Key points

- *Wyoming has a higher rate of labor force participation compared to the United States but has declined in recent years.*
- *Wyoming has higher participation rates across all age groups compared to the U.S.*
- *Wyoming has a high concentration of jobs in government, construction, oil and gas, and agriculture, compared to the nation.*
- *Oil and gas extraction is highly concentrated in Wyoming.*
- *Wyoming's unemployment rate has closely mirrored the U.S. since 2016.*
- *Cattle ranching is growing in Wyoming, despite animal production shrinking.*
- *Beef slaughtering and processing have substantially smaller employment in Wyoming compared to ranching.*
- *Cattle ranching has a significant presence in Wyoming compared to the nation, yet slaughtering and processing lag behind national averages.*
- *Slaughtering and processing have high job multipliers relative to other industries, including cattle ranching.*
- *Current wages in the beef cluster are lower in Wyoming compared to the U.S., as well as all other industries in the state.*
- *The top slaughtering and processing states have higher industry average wages compared to Wyoming.*

Objective 3.1. Identify Wyoming labor market and unemployment rates.

Labor force participation

Wyoming has higher participation rates across all age groups compared to the United States. Of the nearly 450,000 Wyomingite's that are of working age, approximately 290,000 are participating in the labor force, for a participation rate of about 62 percent (2018 figures). This is 1.4 percentage points higher than the participation rate for the U.S. (60.6 percent). The national participation rate has remained relatively stagnant over the past few years while Wyoming's declined by three percentage points between 2014 and 2018.

Figure 20. Labor Market and Unemployment Rate, 2018
Source: Emsi

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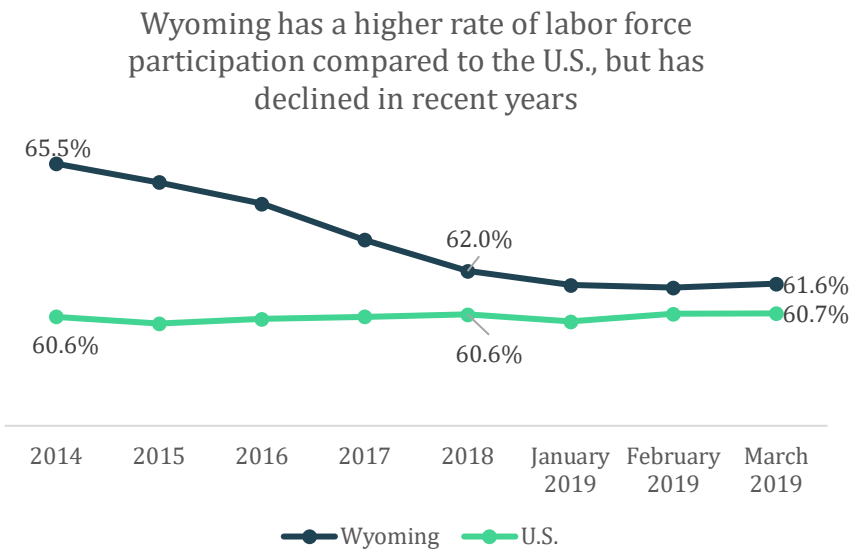


Figure 21. Labor Force Participation Rate Over Time
Source: Ems

Overall, Wyoming has strong participation rates across the board regardless of age group. Participation rates are particularly strong in the prime working-age group (25 to 44) at 85 percent. Conversely, the participation rate is just 82 percent for this age group across the U.S.

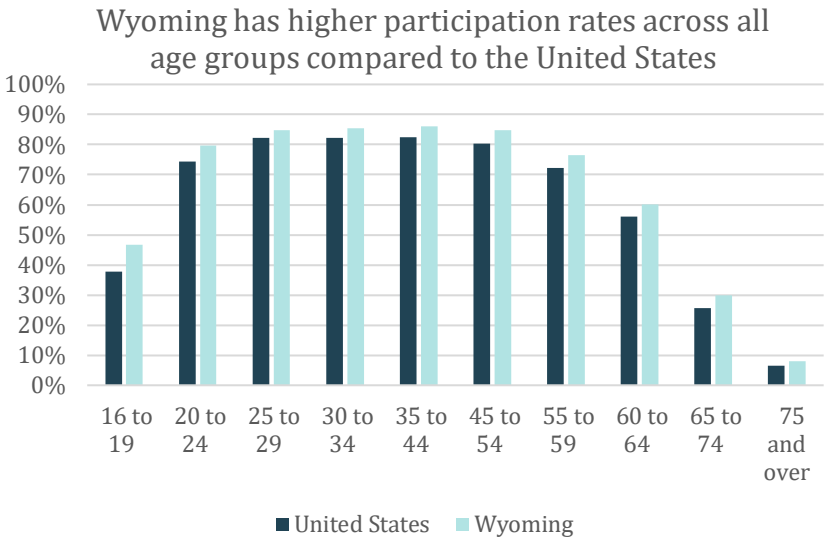


Figure 22. Labor Force Participation Rate, Wyoming vs. U.S., 2017
Source: American Community Survey

Unemployment

The U.S. has been experiencing historically low levels of unemployment over the past few years. Wyoming, too, has experienced the same trend, closely mirroring the U.S. rate trend since 2016. The most recent data show Wyoming unemployment at 3.5 percent, 0.3 percentage points lower than the national rate of 3.8 percent.

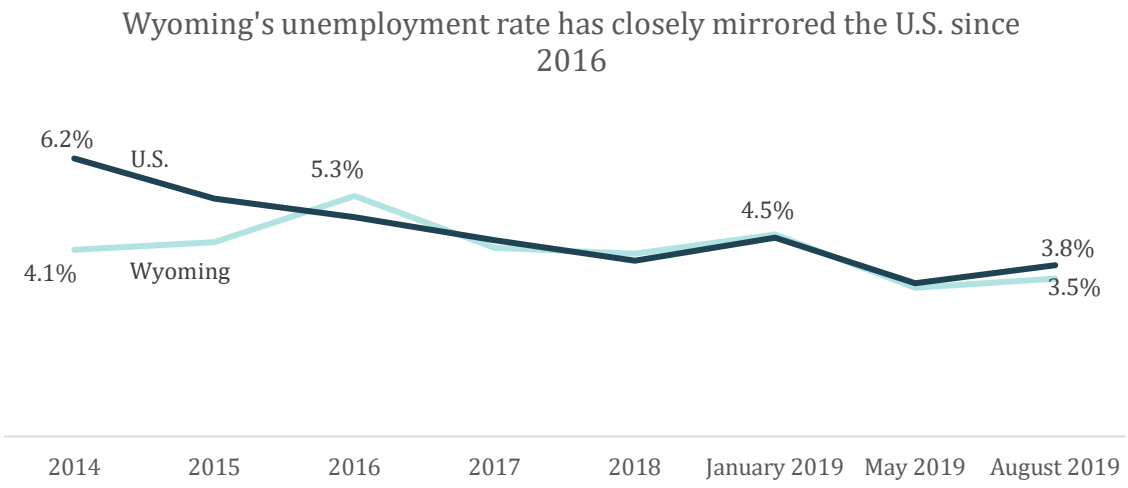


Figure 23. Unemployment Rates for Wyoming and U.S. Over Time
Source: Emsi

While the state overall has a relatively low unemployment rate, local unemployment rates vary by county. Areas with larger shares of employment typically have unemployment rates at or below three percent, with Teton County having the lowest rate of 2.0 percent. Other counties like Campbell and Fremont, however, have unemployment rates in excess of four percent.

Campbell County's high unemployment rate is likely the result of layoffs in mining while Fremont County includes the Wind River Reservation, which experiences above-average unemployment rates—the most recent Census estimates (2017) have an unemployment rate of 7.4% on the Reservation. Meanwhile, the state's unemployment rate was 2.7 percentage points lower at 4.7%.

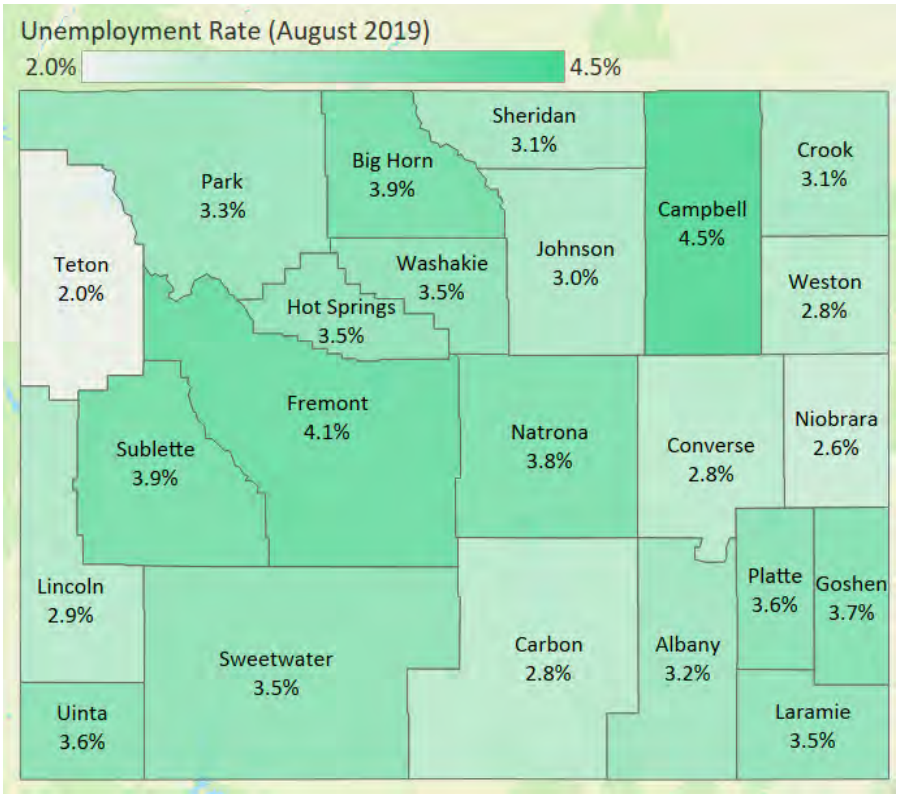
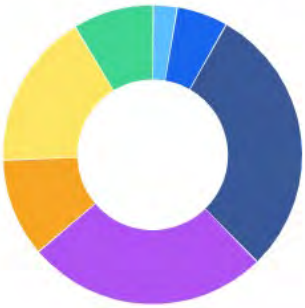


Figure 24. Unemployment Rate by County in Wyoming
Source: Emsi

Educational attainment

Concerning educational attainment, roughly 17 percent of Wyoming residents possess a Bachelor's Degree (1.7 percentage points below the national average), and 10.6 percent hold an Associate's Degree (2.6 percentage points above the national average). Wyoming has a substantially larger share of residents with Some College—26.1 percent compared to just 20.6 percent nationally. This indicates a strong, skilled workforce for jobs requiring postsecondary education less than a Bachelor's.



Level of Educational Attainment	Percent of Population	Population
Less than 9th Grade	2.6%	10,143
9th Grade to 12th Grade	5.5%	21,725
High School Diploma	29.5%	115,813
Some College	26.1%	102,559
Associate's Degree	10.6%	41,749
Bachelor's Degree	16.9%	66,349
Graduate Degree and Higher	8.7%	34,313

Figure 25. Educational Attainment in Wyoming

Net commuter data

Net Commuters are the difference between the residents in a region and the occupational employment in a region. A negative number indicates there are more residents working than jobs available, causing them to leave the area for work. In Wyoming, areas with cities tend to attract workers while more sparsely populated areas have more residents leaving than workers commuting in for work. Figure 28 demonstrates this phenomenon with darker blue areas representing high levels of positive net commuters. Conversely, darker red regions indicate Wyoming zip codes with a high number of residents traveling elsewhere for work.

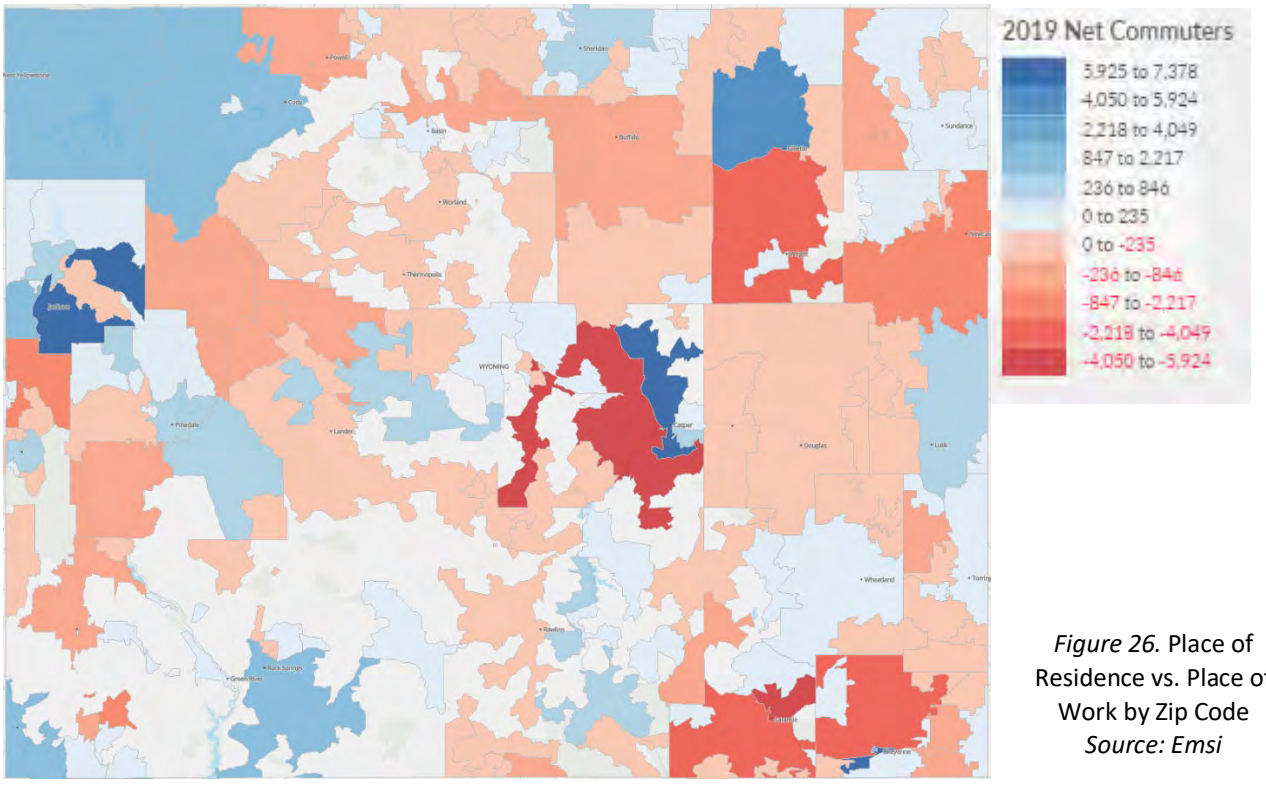


Figure 26. Place of Residence vs. Place of Work by Zip Code
Source: Emsi

Key industries

Wyoming has a high concentration of jobs in government, construction, oil and gas, and agriculture, compared to the nation. The top four industries by number of jobs in Wyoming reflect the top four industries across the United States. In Wyoming, however, Accommodation and Food Services have a higher representative share compared to the U.S. while Health Care and Social Assistance has a slightly lower share. Manufacturing—of which slaughtering and processing facilities fall under—is particularly low in the state.

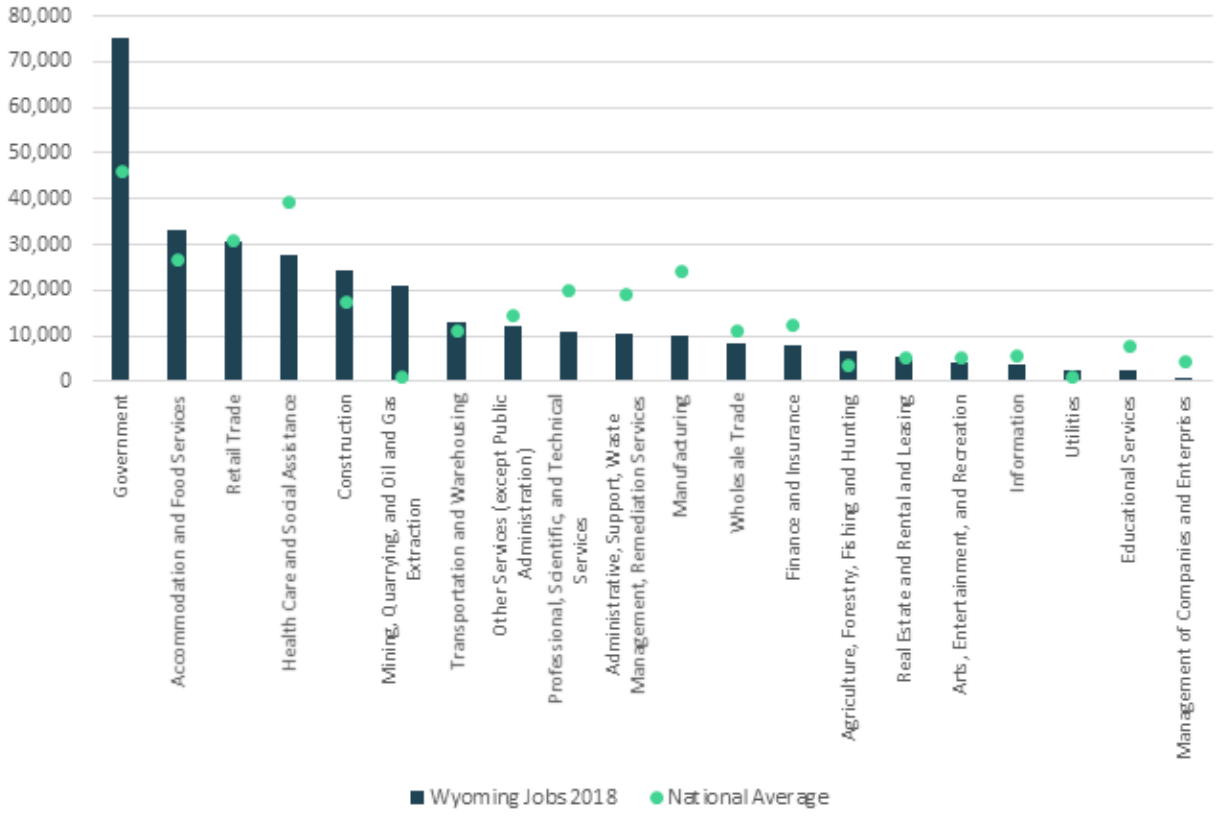


Figure 27. Jobs by Industry in Wyoming
Source: Emsi

Location Quotient

A location quotient (or LQ) can help identify the strength of an industry cluster. The LQ for a specific industry or cluster benchmarks its share of regional employment compared to the share of employment nationally. The base rate, or national rate for an LQ is 1.0. If an industry or cluster has an LQ of 2.0, then that is an indication that it has twice the share of employment regionally than it would nationally. Conversely, an LQ below 1.0 indicates that the share of employment is less than the national average. Industries with a high LQ are considered specialized in a region.

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Natural resource extraction industries (including oil and gas) have an overwhelmingly large representation in Wyoming—16 times greater concentration in the state compared to the nation. North Dakota has the next highest concentration with an LQ of 10.4.

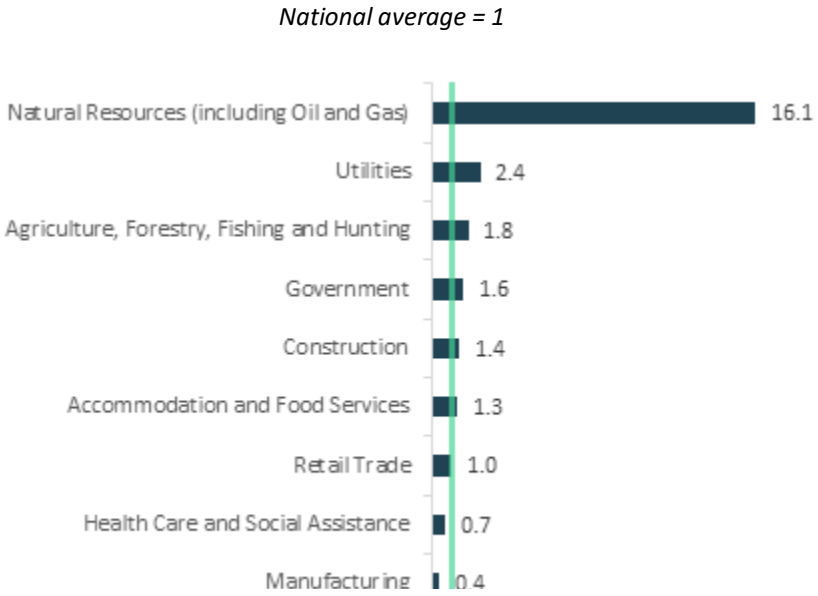


Figure 28. Location Quotient (LQ) for Select Industries in Wyoming
Source: Emsi

Location quotients (LQ) measure a sector's employment concentration in an area. Cattle Ranching and Farming has an impressive LQ of 5.67, meaning that this industry is 467% more concentrated in Wyoming than throughout the country. Meanwhile, Animal Slaughtering and Meat Processed from Carcasses have a much smaller presence. Slaughtering in Wyoming has just about half of the concentration compared to the nation while Processing has an LQ of just 0.12. A jobs multiplier indicates how important an industry is in regional job creation. For example, the Slaughtering and Processing industries have job multipliers slightly over 2, meaning that for every job created in these industries, 1 other job would be created in other industries (for a total of 2 jobs created).

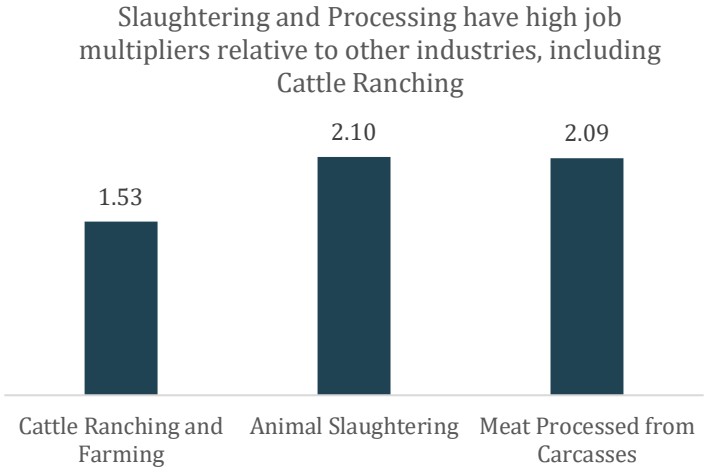


Figure 29. Job Multipliers for Beef Cluster Industries
Source: Emsi

Beef Cluster Wage & Occupation Data

Cattle Ranching and Farming makes up much of this cluster in Wyoming—nine in ten jobs for the cluster exist in ranching and farming. Despite low unemployment in other industries, they nonetheless present excellent opportunities to strengthen and diversify Wyoming's economy especially as it relates to the Beef cluster.

Beef Cluster in Wyoming

- Cattle Ranching and Farming
- Animal Slaughtering
- Meat Process from Carcasses
- Rendering and Meat Byproduct Processing

Throughout this report, any mention of the Beef Cluster refers to four industries (left). In other instances, just Slaughtering and Processing are analyzed, referring to the three industries above not including Cattle Ranching and Farming. It is important to note no employment exists in Wyoming for Rendering and Meat Byproduct Processing; however, this industry is incorporated as part of the cluster to understand where it exists throughout the country.

The Quarterly Census of Employment and Wages (QCEW) is a dataset published by the Bureau of Labor Statistics (LBS). QCEW provides establishment counts, monthly employment, and quarterly wages, by NAICS industry, by county, and by ownership sector, for the entire United States. While QCEW data is highly reliable and often considered the "gold standard" of industry data and employment counts in the United States, it does have some weaknesses. One particular weakness is that QCEW does not report on some entities such as the self-employed and certain farms. Consequently, certain data for the Beef Cluster, especially at the county level may not include all employment counts. Additionally, because certain industries are small in Wyoming, such as processing and slaughtering facilities, not enough wage data may be present for reliable estimates.

Between 2013 and 2018, Cattle Ranching added nearly 140 jobs, increasing employment by more than ten percent. The industry has grown across the U.S. at a similar rate. Animal Production represents a broader industry of which Cattle Ranching exists within. In contrast, the broader industry of Animal Production has lost over 250 jobs since 2013, representing a six percent drop in employment.

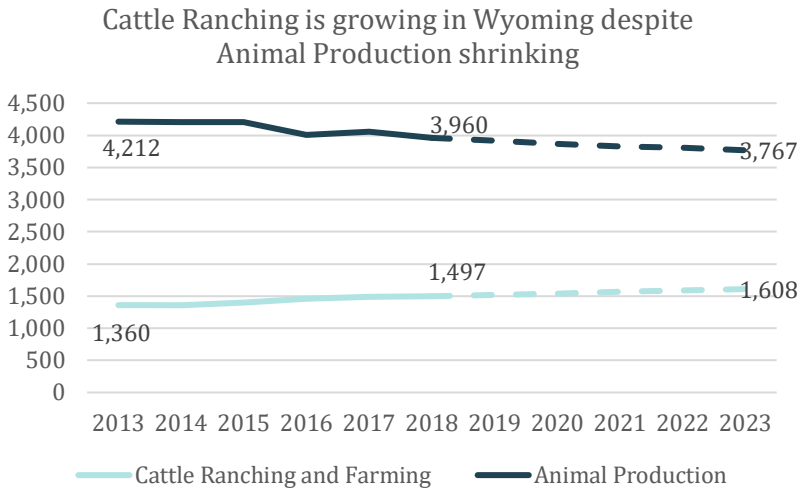


Figure 30. Cattle Ranching & Farming, Employment Trends, Wyoming, 2013-2023
Source: Emsi

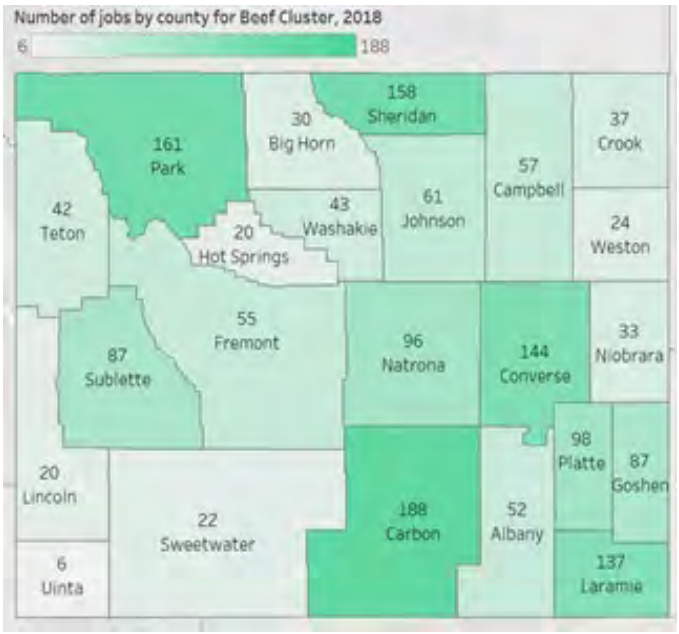


Figure 31. Jobs by County for Beef Cluster, Wyoming, 2018
Source: Emsi

Counties that have a large Cattle Ranching and Farming presence tend to top the list of employment by county. These include Park, Sheridan, Converse, Carbon, and Laramie counties. The employment numbers provided in Figure 31 may not be entirely representative of the Beef Cluster in each region. The way in which employment data is collected means that smaller businesses may not be required to provide employment numbers. Consequently, areas with high concentrations of small farms and feedlots (less than 10 employees) may have higher levels of employment than provided here.

While representing just ten percent of the beef cluster, Slaughtering and Processing plants do have a presence in Wyoming. Job growth has been relatively stagnant, however, with a slight drop in Slaughtering and slight increase in Processing. Current projections are based on historical trends. Increased investment in slaughtering and processing facilities would provide corresponding increased employment beyond current projections.

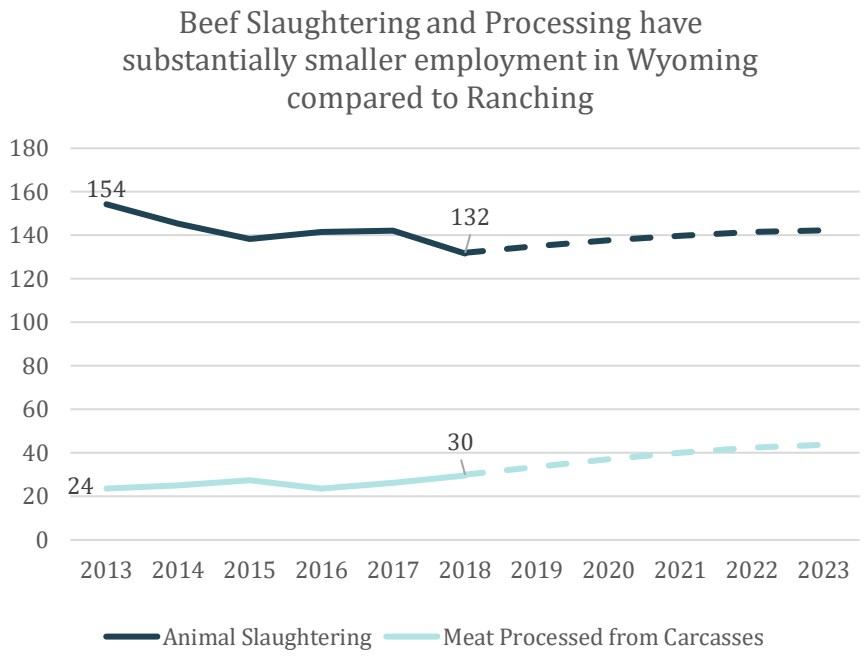


Figure 32. Animal Slaughtering & Meat Processing, Job Trends, 2013-2023
Source: Emsi

Since Slaughtering and Processing facilities primarily exist as small operations, heavy concentrations do not exist in specific counties. Instead, these facilities are present throughout the state, with just Natrona and Sweetwater Counties having approximately 20 employees.

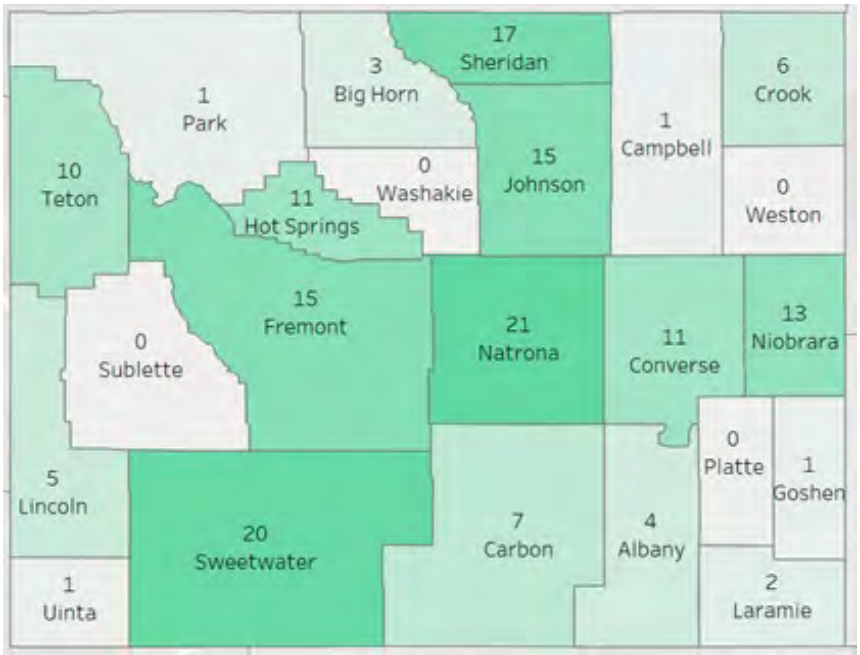


Figure 33. Slaughtering and Processing Employment by County, 2019
Source: Emsi

Current wages in the Beef cluster are lower in Wyoming compared to the U.S. as well as all other industries in the state. Across all industries that do not comprise the Beef cluster, the average wages per job are approximately $47,000. In contrast, average wages in the Beef cluster industries are smaller. Salaries in Cattle Ranching average $35,550, just 76 percent of the state's average. The roughly $24,900 average wages for Animal Slaughtering jobs represents just 53 percent of the average $47,000 earned in other industries.

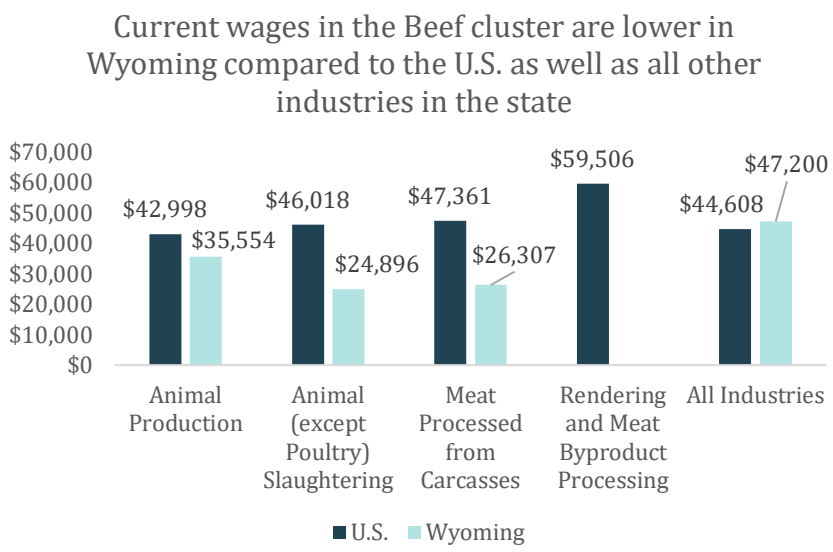


Figure 34. Average wage by Industry, Beef Cluster, Wyoming vs. U.S., 2019
Source: Emsi

The backbone of wage data comes from the QCEW, a typically reliable source of employment and industry data across the U.S. However, since slaughtering and processing facilities are usually small in Wyoming and because QCEW does not always report data on certain types of farms, the industry wage data above may not entirely capture Wyoming's economy. Consequently, the U.S. averages should be considered a benchmark to assess average wages typically earned in these industries across the whole nation.

Occupation data

The following tables (from Emsi) provide information on for the 25 most frequently employed occupations by the Beef Cluster in Wyoming. Table 9 shows recent job growth for the top 25 occupations in terms of employment in the Beef cluster. While agriculture jobs related to cattle production dominate the list, the top jobs employed by slaughtering and processing facilities specifically are highlighted.

Table 9. ***Top 25 Occupations in Beef Cluster by Employment Growth, Wyoming (2013-2018)***

Occupation	Beef Cluster Employment		Change 2013-2018		% of Total Jobs in Beef Cluster (2018)
	2013	2018			
Farmers, Ranchers, and Other Agricultural Managers	2,673	2,210	-463	-17%	54%
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	630	621	-9	-1%	15%
Farmworkers, Farm, Ranch, and Aquacultural Animals	276	373	97	35%	9%
Agricultural Workers, All Other	98	180	82	84%	4%
Agricultural Equipment Operators	68	78	11	16%	2%
Animal Trainers	44	50	6	14%	1%
First-Line Supervisors of Farming, Fishing, and Forestry	55	46	-9	-17%	1%
Meat, Poultry, and Fish Cutters and Trimmers	41	36	-5	-11%	1%
Heavy and Tractor-Trailer Truck Drivers	32	32	0	1%	1%
Nonfarm Animal Caretakers	24	25	1	4%	1%
Managers, All Other	23	24	1	6%	1%
Bookkeeping, Accounting, and Auditing Clerks	22	22	-1	-3%	1%
Maintenance and Repair Workers, General	18	20	2	10%	0.5%
Packers and Packagers, Hand	21	19	-2	-10%	0.5%
Janitors and Cleaners, Except Maids and Housekeeping	15	17	2	15%	0.4%
Secretaries &Admin. Assistants, except Legal, Medical, Exec.	15	16	1	6%	0.4%
Light Truck or Delivery Services Drivers	14	15	1	9%	0.4%
Laborers and Freight, Stock, and Material Movers, Hand	14	12	-2	-14%	0.3%
First-Line Supervisors of Production and Operating Workers	11	12	1	11%	0.3%
Industrial Machinery Mechanics	11	12	1	14%	0.3%

Table 9 continued

Occupation	Beef Cluster Employment 2013	2018	Change 2013-2018		% of Total Jobs in Beef Cluster (2018)
Packaging and Filling Machine Operators and Tenders	9	10			0.3%
Landscaping and Groundskeeping Workers	11	10	-1	-6%	0.2%
Cleaners of Vehicles and Equipment	8	9	1	9%	0.2%
Helpers--Production Workers	7	9	1	17%	0.2%
Executive Secretaries and Executive Administrative Assistants	10	9	-2	-17%	0.2%

Table 10 provides data regarding traditional levels of education required and wages for the top jobs in the cluster. While many do not require education beyond high school, many do require some form of on-the-job training. Requiring on-the-job training (OJT) typically signals that a worker needs to complete some form of training or earn a short-term credential in order to become gainfully employed.

Table 10. ***Top 25 Beef Cluster Occupations in Earnings, Education, Eperience in Wyoming (2018)***

Occupation	Beef Cluster Employment	Median Hourly Earnings	Typical Entry Level Education	Work Experience Required	Typical OJT
Farmers, Ranchers, and Other Agricultural Managers	2,210	$14.54	HS diploma or equivalent	> 5 years	None
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	621	$12.82	No formal credential	None	Short-term
Farmworkers, Farm, Ranch, and Aquacultural Animals	373	$13.14	No formal credential	None	Short-term
Agricultural Workers, All Other	180	$13.08	No formal credential	None	Short-term
Agricultural Equipment Operators	78	$22.04	No formal credential	None	Moderate-term
Animal Trainers	50	$16.77	HS diploma or equivalent	None	Moderate-term
First-Line Supervisors of Farming, Fishing, and Forestry Workers	46	$27.41	HS diploma or equivalent	> 5 years	None
Meat, Poultry, and Fish Cutters and Trimmers	36	$12.71	No formal credential	None	Short-term

Table 10 continued

Occupation	Beef Cluster Employment	Median Hourly Earnings	Typical Entry Level Education	Work Experience Required	Typical OJT
Heavy and Tractor-Trailer Truck Drivers	32	$23.07	Postsecondary nondegree	None	Short-term
Nonfarm Animal Caretakers	25	$10.47	HS diploma or equivalent	None	Short-term
Managers, All Other	24	$37.87	Bachelor's degree	< 5 years	None
Bookkeeping, Accounting, and Auditing Clerks	22	$17.84	Some college	None	Moderate-term
Maintenance and Repair Workers, General	20	$17.88	HS diploma or equivalent	None	Moderate-term
Packers and Packagers, Hand	19	$10.11	No formal credential	None	Short-term
Janitors and Cleaners, except Maids and Housekeeping Cleaners	17	$13.46	No formal credential	None	Short-term
Secretaries and Admin. Assistants, except Legal, Medical, and Exec.	16	$17.84	HS diploma or equivalent	None	Short-term
Light Truck or Delivery Services Drivers	15	$17.16	HS diploma or equivalent	None	Short-term
Laborers and Freight, Stock, and Material Movers, Hand	12	$15.66	No formal credential	None	Short-term
First-Line Supervisors of Production and Operating Workers	12	$39.45	HS diploma or equivalent	> 5 years	None
Industrial Machinery Mechanics	12	$32.27	HS diploma or equivalent	None	Long-term
Packaging and Filling Machine Operators and Tenders	10	$18.30	HS diploma or equivalent	None	Moderate-term
Landscaping and Groundskeeping Workers	10	$14.42	No formal credential	None	Short-term
Cleaners of Vehicles and Equipment	9	$12.50	No formal credential	None	Short-term
Helpers--Production Workers	9	$16.25	HS diploma or equivalent	None	Short-term
Executive Secretaries and Executive Admin. Assistants	9	$21.84	HS diploma or equivalent	> 5 years	None

Table 11 shows the total number of workers in the top occupations that live in Wyoming. These numbers show employment across all industries, not just the Beef cluster. The large numbers of workers in many of these occupations indicate that there is a readily available workforce within Wyoming that can help grow the Beef cluster.

Table 11. ***Top 25 Occupations in Beef Cluster, Employment Across All Industries Resident Workers and Net Commuters, Wyoming (2018)***

Occupation	Employed in Industry Group	Employed in other industries	Employed in WY, all industries	All Resident Workers	All Net Commuters
Farmers, Ranchers, and Other Agricultural Managers	2,210	653	2,863	2,842	21
Farmworkers and Laborers, Crop, Nursery, Greenhouse	621	910	1,531	1,529	2
Farmworkers, Farm, Ranch, and Aquacultural Animals	373	379	752	735	17
Ag. Workers, All Other	180	73	253	247	6
Ag. Equipment Operators	78	73	151	145	6
Animal Trainers	50	63	112	103	9
First-Line Supervisors of Farming, Fishing, and Forestry	46	86	132	120	12
Meat, Poultry, and Fish Cutters and Trimmers	36	35	71	65	6
Heavy and Tractor-Trailer Truck Drivers	32	7,049	7,081	7,046	35
Nonfarm Animal Caretakers	25	523	549	526	23
Managers, All Other	24	1,679	1,703	1,652	51
Bookkeeping, Accounting, and Auditing Clerks	22	3,256	3,278	3,208	70
Gen. Maint. and Repair Workers	20	3,713	3,733	3,550	183
Packers and Packagers, Hand	19	618	638	604	34
Janitors and Cleaners, except Maids and Housekeeping	17	5,576	5,593	5,398	195
Secretaries & Admin. Assistants, except Legal, Medical, & Exec.	16	3,974	3,990	3,959	31
Light Truck or Delivery Services Drivers	15	1,615	1,630	1,626	4

Table 11 continued

Occupation	Employed in Industry Group	Employed in other industries	Employed in WY, all industries	All Resident Workers	All Net Commuters
Laborers and Freight, Stock, and Material Movers, Hand	12	2,912	2,925	2,878	47
First-Line Supervisors of Production & Operating Workers	12	1,178	1,190	1,059	131
Industrial Machinery Mechanics	12	2,307	2,319	2,199	120
Packaging and Filling Machine Operators & Tenders	10	350	360	331	29
Landscaping and Groundskeeping Workers	10	2,286	2,296	2,168	128
Cleaners of Vehicles and Equipment	9	698	707	694	13
Helpers--Production Workers	9	283	292	272	20
Executive Secretaries and Executive Admin. Assistants	9	747	756	724	32

National trends in occupation data

The top occupations in slaughtering and processing have typically seen growth in the past five years across the top states, indicative of the industry growth throughout the country. These workers represent an available workforce that Wyoming can attract for growth. Based on net commuting data, most of the jobs employed by the Beef Cluster had higher shares of workers commuting into Wyoming than leaving. Consequently, there may be an opportunity to attract workers in surrounding states if Wyoming facilities are within commuting distance. Occupational wages are provided across all industries rather than being industry-specific, so are not necessarily indicative of wages for workers specifically in Slaughtering or Processing.

Table 12. ***Top Occupations in Slaughtering and Processing Across Top States***

Occupation	Employed in Industry		Change 2014 - 2019	
	2014	2019		
Meat, Poultry, Fish Cutters & Trimmers	29,157	32,801	3,644	12%
Slaughterers and Meat Packers	22,409	20,067	-2,341	-10%
Packaging and Filling Machine Operators and Tenders	6,785	7,853	1,068	16%
Helpers--Production Workers	5,465	7,087	1,623	30%
Laborers and Freight, Stock, and Material Movers, Hand	5,743	6,638	894	16%
Packers and Packagers, Hand	6,624	6,246	-378	-6%
First-Line Supervisors of Production and Operating Workers	3,987	4,747	760	19%
Inspectors, Testers, Sorters, Samplers, and Weighers	3,320	3,924	605	18%
Maintenance and Repair Workers, General	3,094	3,703	609	20%
Food Processing Workers, All Other	2,975	3,167	192	6%
Food Batchmakers	3,376	2,705	-671	-20%
Butchers and Meat Cutters	3,023	2,700	-323	-11%
Industrial Machinery Mechanics	2,297	2,694	398	17%
Industrial Truck and Tractor Operators	2,004	2,627	623	31%
Cleaners of Vehicles and Equipment	2,200	2,537	337	15%
Food Cooking Machine Operators and Tenders	1,749	2,074	325	19%
Machine Feeders and Offbearers	1,126	1,921	794	71%
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	1,539	1,846	307	20%
Shipping, Receiving, and Traffic Clerks	1,047	1,603	557	53%
Graders and Sorters, Agricultural Products	961	1,594	632	66%
Heavy and Tractor-Trailer Truck Drivers	1,404	1,586	181	13%
Production Workers, All Other	1,264	1,206	-59	-5%
Cooling and Freezing Equipment Operators and Tenders	719	1,092	373	52%
Cutting and Slicing Machine Setters, Operators, and Tenders	1,644	1,085	-559	-34%
Stock Clerks and Order Fillers	658	1,082	424	64%

Source: Emsi

Technology

Objective 3.2. Assess whether technological advances can help mitigate workforce factors.

Key points

- *Due to the varying sizes of carcasses, there is less automation in slaughtering facilities.*
- *Automation is becoming more prevalent in meat processing plants, as the size of equipment is sized for smaller plants.*
- *Companies should evaluate the cost savings in labor compared to capital costs to determine if it is cost-effective to utilize technological advances in equipment.*

In slaughtering plants, automation is not prevalent due to the difference in each animal carcass. For meat fabrication, automated equipment is possible, yet small to midsize plants must have the space and capital available to invest in this technology. We observed that the economics for major automation doesn't exist yet in Wyoming because of the number of cattle the average plant in Wyoming would process per day. Still, for plants interested in increasing efficiency through automation, the American Meat Processors Association has observed changes in packaging equipment, making large equipment now easier to fit into small plants. For example, to figure the pay-off for financing equipment, a company can figure it takes 2 people to run equipment, instead of 6 people fabricating by hand (C. Young, personal communication, November 12, 2019).

Skills Gap Analysis

Objective 3.3. Recommend training opportunities and needs (skills gap analysis).

Key points

- *Most training is done on the job, with large companies having full training departments.*
- *Central Wyoming College is opening a meat processing certificate program.*
- *Workforce recruitment is a greater need than training for the existing meat cluster in Wyoming.*

As table 13 shows, many of the top jobs in slaughtering and processing do not require formal post-secondary education. Consequently, just two occupations have annual completions in relevant fields of study from Wyoming post-secondary institutions. Completions data come from the Integrated Postsecondary Education Data System, the primary source for information on U.S. colleges, universities, and technical and vocational institutions. The typical entry-level education is what normally is required across the nation—education requirements can vary from state to state.

Annual openings data provides a snapshot of the anticipated need for these workers over the next five years. Openings result from new jobs being created, retirements, and individuals permanently leaving a job. Comparing the projected annual openings with completions can demonstrate where training needs may be required.

While many of the jobs do not require formal post-secondary education, they do require some form of training—all but one (supervisors) require on-the-job training. Requiring on-the-job training, especially those without post-secondary education requirements, typically indicates that a worker will need a formal training process in order to being work—whether actual training provided by the employer, or in many cases, needing to earn a certificate or proof of completion to gain employment.

There are numerous opportunities in Wyoming to build a pipeline of talent to fuel growth in slaughtering and processing facilities. One notable example is the Meat Lab at the University of Wyoming—a 9,720 square foot facility built in 1986 for education and research for food processing facilities.

Other training facilities exist throughout Wyoming but do not currently provide any training. Ensuring enough resources are available to train a viable workforce is critical to helping facilities grow in the state. The following is a list of opportunities in the state:

- Central Wyoming College is in the process of developing a certificate program in meat cutting.
- University of Wyoming has the aforementioned meat lab as well as Food Science courses.
- Casper College offers two meat-related courses in their Animal Science Program
- Northwest Community College offers a Fresh Meat Processing course

Of the 25 occupations listed, annual completions in relevant fields of study was only available for the following:

- Industrial Machinery Mechanics: 35
- Shipping, Receiving, and Traffic Clerks: 2

Wages

Tables 14 and 15 demonstrate the opportunity in Wyoming to grow its slaughtering and processing facilities. Table 14 shows median hourly earnings by occupation for the top states in these industries. Table 15 then takes the earnings found in Table 14 to show the net difference between Wyoming's wages and those in other states.

As seen in Table 15, an overwhelming majority of the top occupations employed in facilities earn more in Wyoming than the other states, on average. While most of these workers in Wyoming are employed outside of the beef industry, their wages indicate that if facilities in the state can match the broader average, an opportunity to attract workers from surrounding states by promoting increased wages is a viable option.

Note: Occupational wages are provided across all industries rather than being industry-specific, so are not necessarily indicative of wages for workers specifically in slaughtering or processing facilities.

Table 13. ***Top Occupations Based on Employment in Slaughtering and Processing***

Occupation	Typical Entry Level Education	Typical OJT	Annual openings
Meat, Poultry, and Fish Cutters and Trimmers	No formal credential	Short-term	15
Slaughterers and Meat Packers	No formal credential	Short-term	-
Packaging & Filling Machine Operators and Tenders	H.S. diploma or equivalent	Moderate-term	55
Helpers--Production Workers	H.S. diploma or equivalent	Short-term	59
Laborers & Freight, Stock, & Material Movers, Hand	No formal credential	Short-term	490
Packers and Packagers, Hand	No formal credential	Short-term	116
First-Line Supervisors of Production & Operating	H.S. diploma or equivalent	None	139
Inspectors, Testers, Sorters, Samplers, and Weighers	H.S. diploma or equivalent	Moderate-term	136
Maintenance and Repair Workers, General	H.S. diploma or equivalent	Moderate-term	414
Food Processing Workers, All Other	No formal credential	Moderate-term	1
Food Batchmakers	H.S. diploma or equivalent	Moderate-term	22
Butchers and Meat Cutters	No formal credential	Long-term	33
Industrial Machinery Mechanics	H.S. diploma or equivalent	Long-term	253
Industrial Truck and Tractor Operators	No formal credential	Short-term	164
Cleaners of Vehicles and Equipment	No formal credential	Short-term	118
Food Cooking Machine Operators and Tenders	H.S. diploma or equivalent	Moderate-term	1
Machine Feeders and Offbearers	No formal credential	Short-term	16
Janitors & Cleaners, except Maids & Housekeeping	No formal credential	Short-term	811
Shipping, Receiving, and Traffic Clerks	H.S. diploma or equivalent	Short-term	72
Graders and Sorters, Agricultural Products	No formal credential	Short-term	10
Heavy and Tractor-Trailer Truck Drivers	Postsecondary nondegree	Short-term	907
Production Workers, All Other	H.S. diploma or equivalent	Moderate-term	31
Cooling & Freezing Equipment Operators &Tenders	H.S. diploma or equivalent	Moderate-term	-
Cutting & Slicing Machine Setters, Oper. &Tenders	H.S. diploma or equivalent	Moderate-term	5
Stock Clerks and Order Fillers	H.S. diploma or equivalent	Short-term	456

Source: Emsi

Table 14. Top occupations in Slaughtering and Processing, median hourly earnings for top states and Wyoming, 2019

Occupation	WY	NE	IA	KS	MN	CO	ID	SD	MO	OK	TX
Meat, Poultry, Fish Cutters and Trimmers	$12.73	$16.69	$16.17	$14.69	$15.08	$14.29	$11.37	$14.22	$14.28	$10.99	$12.85
Slaughterers and Meat Packers		$16.04	$15.53	$15.80	$15.35	$15.23	$10.87	$14.29	$13.96	$11.17	$11.33
Packaging and Filling Machine Operators and Tenders	$18.29	$15.39	$14.38	$16.45	$16.64	$14.93	$16.40	$14.41	$15.70	$12.92	$13.46
Helpers--Production Workers	$16.25	$14.88	$14.09	$15.81	$14.27	$14.01	$14.69	$9.73	$14.07	$14.06	$13.49
Laborers and Freight, Stock, and Material Movers, Hand	$15.66	$14.86	$15.08	$14.71	$15.96	$14.52	$13.76	$13.14	$13.87	$13.47	$13.02
Packers and Packagers, Hand	$10.11	$12.42	$13.94	$12.21	$12.62	$11.81	$11.17	$11.95	$11.83	$11.10	$10.63
First-Line Supervisors of Production and Operating Workers	$39.45	$28.38	$26.44	$28.41	$29.80	$31.17	$26.61	$28.17	$26.92	$27.57	$30.39
Inspectors, Testers, Sorters, Samplers, and Weighers	$23.73	$18.68	$19.16	$20.10	$19.74	$19.96	$16.36	$16.88	$18.96	$20.14	$18.55
Maintenance and Repair Workers, General	$17.88	$18.22	$19.37	$17.14	$20.72	$18.72	$16.34	$17.43	$17.35	$15.56	$17.14
Food Processing Workers, All Other		$14.10	$17.02	$15.87	$13.79	$13.19	$15.51	$9.57	$12.26	$11.63	$12.26
Food Batchmakers	$13.37	$14.88	$16.51	$13.93	$16.36	$13.70	$14.47	$14.13	$15.94	$13.35	$12.91
Butchers and Meat Cutters	$16.93	$15.96	$11.81	$15.11	$17.26	$16.47	$16.41	$14.90	$15.79	$13.23	$11.73
Industrial Machinery Mechanics	$32.27	$23.90	$23.95	$24.52	$26.48	$28.28	$23.95	$21.66	$25.16	$24.69	$25.65
Industrial Truck and Tractor Operators	$17.75	$15.74	$17.98	$16.97	$19.22	$16.90	$16.83	$16.61	$16.39	$16.57	$15.49
Cleaners of Vehicles and Equipment	$12.50	$12.44	$11.92	$12.26	$13.09	$12.47	$10.92	$11.23	$11.29	$11.47	$11.25
Food Cooking Machine Operators and Tenders		$17.38	$15.03	$17.24	$15.78	$13.82	$15.04	$14.53	$13.79	$14.18	$12.52
Machine Feeders and Offbearers	$21.89	$17.55	$17.85	$18.49	$17.68	$14.07	$16.13	$12.27	$13.13	$12.07	$13.31
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	$13.46	$12.19	$12.51	$11.68	$14.17	$13.00	$11.69	$11.96	$12.35	$10.87	$11.26
Shipping, Receiving, and Traffic Clerks	$15.71	$16.26	$16.63	$15.50	$17.30	$15.75	$14.97	$15.53	$15.82	$15.66	$15.10
Graders and Sorters, Agricultural Products	$11.21	$14.54	$14.78	$16.29	$17.11	$10.47	$9.07	$13.17	$12.97	$12.05	$11.44
Heavy and Tractor-Trailer Truck Drivers	$23.08	$20.96	$19.93	$21.03	$22.68	$22.38	$19.09	$19.36	$21.13	$20.02	$20.04
Production Workers, All Other	$24.57	$11.64	$21.49	$12.88	$17.02	$14.84	$13.15	$22.67	$13.47	$14.55	$14.35
Cooling and Freezing Equipment Operators and Tenders	$0.00	$15.58	$18.32	$17.29	$20.94	$14.80	$11.63	$16.12	$17.46	$19.41	$15.12
Cutting and Slicing Machine Setters, Operators, and Tenders	$15.84	$17.19	$20.65	$15.27	$19.22	$16.94	$20.07	$17.05	$18.13	$15.00	$14.99
Stock Clerks and Order Fillers	$13.77	$12.59	$12.56	$12.10	$13.47	$13.86	$12.49	$11.93	$11.87	$11.55	$12.63

Table 15. Top occupations in Slaughtering & Processing, median hourly earnings for Wyoming and net difference compared to other top states

Occupation	WY	NE	IA	KS	MN	CO	ID	SD	MO	OK	TX
Meat, Poultry, and Fish Cutters and Trimmers	$12.73	$3.96	$3.45	$1.96	$2.35	$1.57	-$1.35	$1.49	$1.55	-$1.73	$0.12
Packaging and Filling Machine Operators and Tenders	$18.29	-$2.91	-$3.92	-$1.85	-$1.66	-$3.36	-$1.90	-$3.89	-$2.60	-$5.38	-$4.84
Helpers--Production Workers	$16.25	-$1.37	-$2.16	-$0.44	-$1.98	-$2.24	-$1.56	-$6.51	-$2.18	-$2.19	-$2.76
Laborers and Freight, Stock, and Material Movers, Hand	$15.66	-$0.80	-$0.58	-$0.95	$0.29	-$1.15	-$1.91	-$2.53	-$1.79	-$2.20	-$2.65
Packers and Packagers, Hand	$10.11	$2.31	$3.83	$2.10	$2.51	$1.70	$1.06	$1.84	$1.72	$0.99	$0.52
First-Line Supervisors of Production and Operating Workers	$39.45	-$11.07	-$13.01	-$11.04	-$9.65	-$8.28	-$12.84	-$11.28	-$12.53	-$11.88	-$9.06
Inspectors, Testers, Sorters, Samplers, and Weighers	$23.73	-$5.05	-$4.57	-$3.62	-$3.99	-$3.77	-$7.37	-$6.85	-$4.77	-$3.58	-$5.17
Maintenance and Repair Workers, General	$17.88	$0.34	$1.50	-$0.73	$2.84	$0.85	-$1.53	-$0.44	-$0.52	-$2.31	-$0.73
Food Batchmakers	$13.37	$1.50	$3.14	$0.56	$2.99	$0.33	$1.10	$0.75	$2.56	-$0.03	-$0.46
Butchers and Meat Cutters	$16.93	-$0.97	-$5.12	-$1.81	$0.33	-$0.46	-$0.52	-$2.03	-$1.13	-$3.70	-$5.20
Industrial Machinery Mechanics	$32.27	-$8.37	-$8.32	-$7.75	-$5.79	-$3.99	-$8.32	-$10.61	-$7.12	-$7.58	-$6.62
Industrial Truck and Tractor Operators	$17.75	-$2.01	$0.23	-$0.78	$1.47	-$0.84	-$0.92	-$1.14	-$1.36	-$1.18	-$2.26
Cleaners of Vehicles and Equipment	$12.50	-$0.06	-$0.58	-$0.24	$0.59	-$0.03	-$1.59	-$1.27	-$1.22	-$1.04	-$1.25
Machine Feeders and Offbearers	$21.89	-$4.34	-$4.04	-$3.40	-$4.21	-$7.82	-$5.76	-$9.62	-$8.76	-$9.82	-$8.58
Janitors and Cleaners, except Maids and Housekeeping Cleaners	$13.46	-$1.26	-$0.95	-$1.78	$0.71	-$0.46	-$1.76	-$1.49	-$1.11	-$2.58	-$2.20
Shipping, Receiving, and Traffic Clerks	$15.71	$0.54	$0.92	-$0.22	$1.58	$0.04	-$0.74	-$0.18	$0.11	-$0.05	-$0.61
Graders and Sorters, Agricultural Products	$11.21	$3.33	$3.57	$5.08	$5.90	-$0.74	-$2.14	$1.96	$1.76	$0.84	$0.23
Heavy and Tractor-Trailer Truck Drivers	$23.08	-$2.12	-$3.15	-$2.05	-$0.40	-$0.70	-$4.00	-$3.72	-$1.96	-$3.06	-$3.04
Production Workers, All Other	$24.57	-$12.93	-$3.07	-$11.68	-$7.54	-$9.72	-$11.42	-$1.90	-$11.10	-$10.02	-$10.22
Cutting and Slicing Machine Setters, Operators, and Tenders	$15.84	$1.35	$4.81	-$0.57	$3.38	$1.11	$4.23	$1.21	$2.29	-$0.84	-$0.85
Stock Clerks and Order Fillers	$13.77	-$1.18	-$1.21	-$1.67	-$0.30	$0.09	-$1.27	-$1.84	-$1.89	-$2.22	-$1.14

Source: Emsi (2019)

Workforce Housing

Key points

- *The average household income by region shows rental and mortgage costs by region are in the affordable range.*
- *In all cases, persons earning the median wage for the industry would have to pay greater than 30 percent of their income for housing, increasing the demand for more affordable housing.*
- *Regional housing supply and cost indicate there is adequate housing available in each region to meet the needs of the existing meat processing industry.*

Objective 3.4. Identify the type and level of housing needed for the Wyoming beef processing industry workforce.

The median hourly wage for slaughtering and processing industries (2019) is $15.50. The high end of the wage scale based on our conversations with existing meat companies is $25 per hour. This gives us an annual income range of $32,240 - 52,000. In most cases, employees of the meat processing industry earn less than the average household income by region. Housing affordability is calculated by determining the percentage of earnings for housing costs. Generally, households paying more than 30 percent of their income for housing are considered cost-burdened. Figure 35 depicts the median and top industry wages for the state and the average household income by region. Figure 36 shows the annual housing costs by region for rentals and home ownership is below the threshold of 30 percent of household. In all cases, persons earning the median wage for the industry would have to pay greater than 30 percent of their income for housing, increasing the demand for more affordable housing.

With wages at the top range for the industry, workers in every region except the resort community of Teton County would be able to afford the median rental or mortgage costs without being cost-burdened. If workers in the industry were not the sole wage earner in the household, average housing costs fall within the level of affordability.

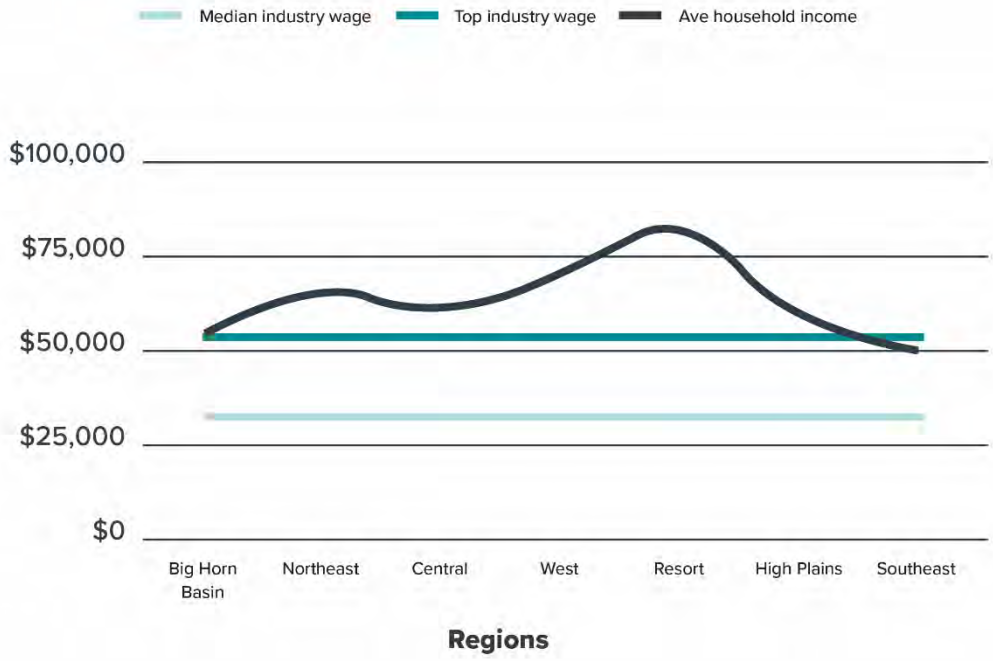


Figure 35. Annual Income Comparison, By Region

Figure 36. Annual Housing Cost Comparison, By Region

Housing costs

For the purposes of this study, the average rent in table 16 is based on a three-bedroom unit. We examined the fair market rent for each county to determine the regional average. The fair market rent includes utilities (except telephone), to rent privately owned, existing, decent, safe and sanitary rental housing of modest (non-luxury) nature with suitable amenities. Fair Market Rent (FMR) is defined as the 40th percentile of rents paid by recent movers (renters who moved in the last 24 months) in a given area. The median rent and median home values reported by the Wyoming Community Development Authority (WCDA) are lower than our sources, so we chose the higher values to calculate housing need. For example, in Albany County the five-year average rent according to WCDA is $678 compared to the FMR of $1,158. The average home value from WCDA is $223,000 compared to $245,700 according to Zillow.

Housing supply

Typically, the vacancy rate of a healthy rental market is assumed to be 3-5 percent. The vacancy rate for all regions is significantly higher, indicating an available supply of rental housing. Across the state, Sheridan County has consistently had a rental vacancy rate in the 3-4 percent for the past ten years. Teton County has the lowest rental vacancy rate of two percent, following a high of more than 10 percent in 2009. Uinta County is another outlier, with a high vacancy rate since 2008, following a low rate between 2005-2008.

The number of net drivers' licenses surrendered to the Wyoming Department of Transportation is an indicator of outmigration that could lessen the need for rental housing. Every region showed people leaving the state. Laramie, Platte, Park, Sheridan, and Teton counties showed out migration for the first time since 2000. Natrona County has been losing population since 2014. Lincoln County was the only county with a net increase in the number of drivers' licenses issued.

In 2017, a total of 1,107 single family housing permits and 413 multi-family housing permits were issued statewide. The greatest multi-family housing growth is in Laramie, Natrona and Lincoln counties, with more than 100 permits issued in each county. Niobrara and Hot Springs counties issued zero building permits in 2017; however, the vacancy rates in both counties is higher than ten percent.

Table 16. ***Regional Housing Indicators, 2018***

Indicator	Big Horn Basin	Northeast	Central	West	High Plains	Southeast
Ave. household income	$53,077	$63,119	$59,063	$70,847	$58,181	$48,869
Average rent	$973	$1,153	$1,126	$1,248	$1,159	$1,007
Average home price	$197,567	$236,450	$227,467	$425,533	$236,250	$209,600
Vacancy rates	8%	12.24%	6.33%	6.55%	10.30%	9.63%
Building permits	141	234	291	542	255	599
Outmigration	-195	-1,152	-1,815	-490	-1,850	-902

Source: Wyoming Profile of Demographics, Economics, and Housing[35]

This overview of regional housing supply and cost indicate there is adequate housing available in each region to meet the needs of the existing meat processing industry.

[35] Wyoming Community Development Authority. (2018). *The 2018 Wyoming Profile of Demographics, Economics, and Housing,* (Vol. 1). Casper, Wyoming. Retrieved from https://www.westernes.com/wypdfs/Volume%20I.pdf

Economic and Workforce Impact

Objective 3.5. Examine the workforce impact on Wyoming communities that open or expand a processing facility.

This section examines the economic and workforce impact on Wyoming communities that open or expand a processing facility. Impact scenarios showcase the potential impact by region. Most existing slaughtering and processing companies are categorized as small to average size facilities. Orbis Advantage Inc. determined in previous research the largest regional slaughtering and processing facility that could be supported in Wyoming would be approximately 15,000 square-feet and employ 60 people.

Table 17. Scale of Meat Processing Plants

Plant Type	Very small	Small	Average	Regional
Inspection	Exempt	State or USDA	USDA	USDA and 3rd party audits
Size	2,000 sf	4,000 sf	6, 000 sf	15,000 sf
FTE	4	10	12	60
Annual Expenses	$250,317	$623,085	$1,277,451	$4,813,481
# head Break-even	442	1,104	2,034	8,577
# head 10% ROI	530	1,315	1,315	10,103

Emsi's custom economic input-output model provides a detailed estimation of how different Wyoming regions could set to benefit from growth in slaughtering and processing industries. The following section includes charts demonstrating impacts based on projected changes in earnings, jobs, and taxes for various Wyoming regions. Each impact scenario showcases the projected changes based on an increase of 60 jobs.[36]

The economic multiplier effect of adding 60 jobs in Slaughtering or Processing throughout Wyoming would result in:

- average regional earnings increase of $3.6 to $4.3 million
- average total increase of 120 jobs
- average increase of $560,000 in tax revenue

[36] Sixty jobs represent the initial impact of job growth for either the slaughtering or processing industry. Total change in jobs counts also include direct, indirect, and induced job growth in the region.

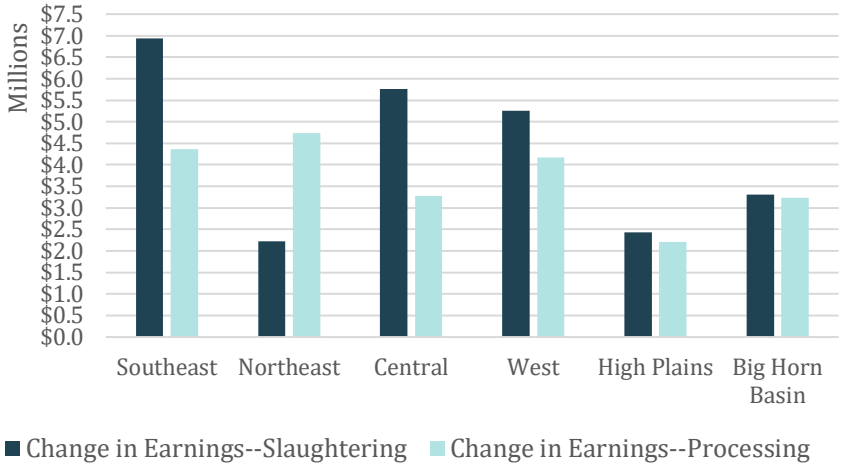


Figure 37. Expected Change in Earnings by Region, 2018

In all but one region, adding a 60-job slaughtering facility would increase earnings more than a processing facility, except in the Northeast. Establishing the proposed facility in the Southeast region would result in estimated earnings change of nearly $7 million. Adding 60 jobs in Slaughtering or Processing throughout Wyoming would result in average regional earnings increases of $3.6 to $4.3 million.

Figure 38. Expected Change in Jobs by Region, 2018

Similar to earnings changes, all regions except the Northeast would see greater job changes by adding jobs in a slaughtering facility. Once again, the Southeast region would result in the greatest amount of job change. Adding 60 jobs in Slaughtering or Processing throughout Wyoming would result in an average increase of 120 total jobs.

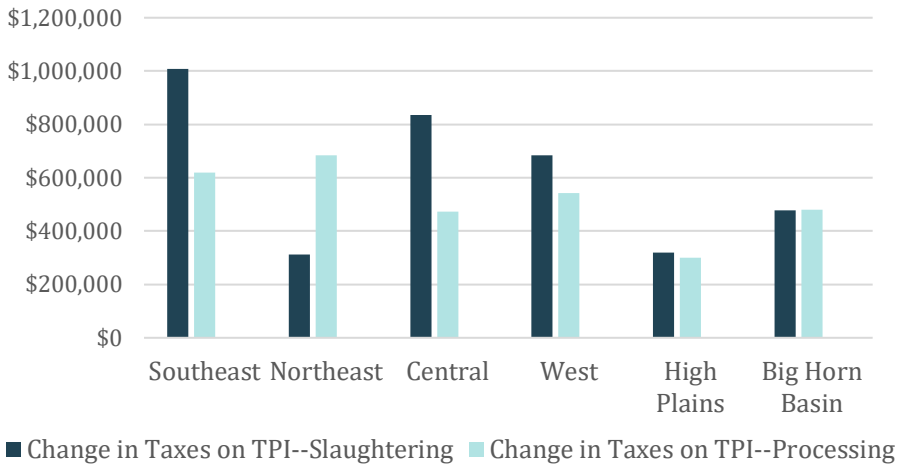


Figure 39. Expected Change in Tax Revenue, by Region, 2018

On average, adding a slaughtering or processing facility employing 60 workers in Wyoming would contribute an additional $500,000 to $600,000 in the form of taxes—primarily local and state—on production and imports. Figure # shows the expected change in taxes on production based on an additional 60 jobs in slaughtering or processing in various Wyoming regions.

Workforce Development Initiatives

Workforce availability is perceived as the greatest barrier to growth by the existing meat slaughtering and processing industry. We can use a general rule of thumb for the population needed to support a workforce of 100:1. This means that for every job to be created, it takes 100 people to draw from a healthy labor pool. In rural communities the ratio could be 75:1. Communities can use this frame of reference for considering labor availability for existing companies who need between 2-14 employees or a potential regional facility of 60 employees.

The economic development and education communities in Wyoming are supportive of the beef cluster and have already begun to address workforce needs through industry training and business support. The training and recruitment strategies suggested here will augment the efforts already underway. Some of the strategies described here have been implemented by the private sector in other parts of the United States or present an opportunity for the beef cluster to join forces to attract workers.

8. Training strategies

- **8.1.** Internship or apprenticeship program
- **8.2.** Certificates (community colleges)
- **8.3.** Human resource management. Help companies understand the motivation of various generations by exploring topics such as purpose-driven work, or using the nomenclature of team members, rather than employees.

9. Employee recruitment strategies

- **9.1.** Employee benefits.
  - **9.1.1.** Offer employee health insurance and benefits through a cooperative.
  - **9.1.2.** Employer-provided housing. This practice is common in agriculture.
  - **9.1.3.** Incentives – hiring bonus and/or production incentives.
  - **9.1.4.** Scholarship/training reimbursement – this could be offered by the public or private sector to students for working in Wyoming for period of time.
- **9.2.** Sources for recruiting workers.
  - **9.2.1.** Work-release program. Companies in Indiana and Ohio have found loyal, hard-working employees by offering training while people are incarcerated with the offer of full-time employment upon release. Explore this option with county jails or the state department of corrections.
  - **9.2.2.** Recruit skilled labor from plants in other regions. Wyoming wages, cost of living and quality of life would be attractive to workers in large meat processing plants.
  - **9.2.3.** Reach out to high school and post-secondary students in career and technical education programs like culinary arts and agriculture. An example of this type of interest is found in Jackson where chefs have their own butcher shop.
  - **9.2.4.** Use a temporary employment service to save money in hiring process on expenses such as pre-employment physical and drug screening.
  - **9.2.5.** Succession planning. Groom employees to purchase the business. This is a complex strategy that covers the issues of recruitment, training and human resource management.

Wyoming Beef Industry Study

APPENDIX

A. Industry Financial Report: Balance Sheet Comparison

B. Industry Financial Report: Profit & Loss Comparison

C. Regional Profiles

- Wyoming Big Horn Basin
- Northeast Wyoming
- Central Wyoming
- Western Wyoming
- Wyoming High Plains
- Southeast Wyoming

APPENDIX A

Industry Financial Report: Balance Sheet Comparison

Animal Slaughtering NAICS 311611
Meat Processed from Carcasses NAICS 311612
Companies with annual sales less than $5 million
Wyoming and U.S.
June 2019

	Animal Slaughtering				Meat Processing			
	Wyoming		U.S.		Wyoming		U.S.	
Cash	$117,662	14.20%	$127,203	14.42%	$65,252	10.52%	$87,396	11.02%
Receivables	$133,983	16.17%	$132,284	14.99%	$115,504	18.62%	$142,493	17.97%
Inventory	$138,843	16.51%	$134,781	15.28%	$38,411	6.19%	$47,429	5.98%
Other Current Assets	$20,717	3.59%	$31,282	3.55%	$18,569	2.99%	$23,872	3.01%
Total Current Assets	$419,205	50.47%	$425,550	48.23%	$237,736	38.32%	$301,190	37.98%
Gross Fixed Assets	$312,195	37.67%	$1,892,366	214.49%	$226,372	36.48%	$1,605,761	202.50%
Accum. Depreciation, Amortization, Depletion	$25,467	3.07%	$1,567,432	177.66%	$20,471	3.30%	$1,330,040	167.73%
Net Fixed Assets	$286,728	34.60%	$324,917	36.83%	$205,901	33.18%	$275,708	34.77%
Other Non-Current Assets	$123,768	14.93%	$131,786	14.94%	$176,828	28.50%	$216,089	27.25%
Total Assets	$828,701	100.00%	$882,253	100%	$620,465	100%	$792,987	100%
Accounts Payable	$88,352	10.66%	$85,469	9.69%	$40,553	6.54%	$48,539	6.12%
Loans/Notes Payable	$29,468	3.56%	$27,634	3.13%	$22,389	3.61%	$26,762	3.37%
Other Current Liabilities	$37,531	4.53%	$37,615	4.26%	$21,070	3.40%	$25,280	3.19%
Total Current Liabilities	$155,351	18.75%	$150,718	17.08%	$84,012	13.55%	$100,581	12.68%
Total Long Term Liabilities	$212,649	25.66%	$214,369	24.30%	$150,651	24.28%	$180,114	22.71%
Total Liabilities	$368,000	44.41%	$356,087	41.38%	$234,663	37.82%	$280,695	35.40%
Net Worth	$460,701	55.59%	$517,166	58.62%	$385,802	62.18%	$512,292	64.60%
Total Liabilities & Net Worth	$828,701	100.00%	$882,253	100%	$620,465	100%	$792,987	100%

Source: Bizminer Industry Financial Report
compliments of University of Wyoming, Market Research Center

APPENDIX B

Industry Financial Report: Profit & Loss Comparison

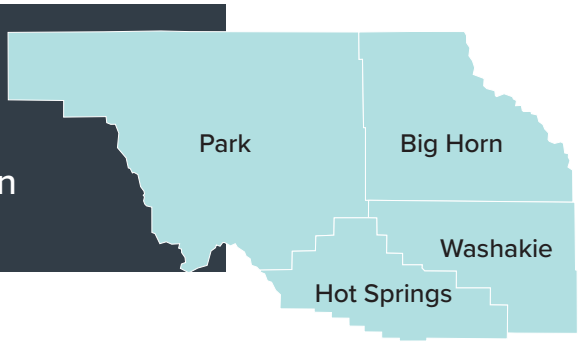
Animal Slaughtering NAICS 311611
Meat Processed from Carcasses NAICS 311612
Companies with annual sales less than $5 million
Wyoming and U.S.
June 2019

	Animal Slaughtering				Meat Processing			
Income & Expense	**Wyoming**		**U.S.**		**Wyoming**		**U.S.**	
Business Revenue	$2,848,660	100%	$2,988,452	100%	$2,271,316	100%	$2,800,670	100%
Cost of Sales	$1,792,270	62.92%	$1,952,500	65.33%	$1,639,472	72.18%	$2,106,744	75.22%
Cost of Sales - Labor Portion	$128,246	4.50%	$134,539	4.50%	$130,085	5.73%	$160,402	5.73%
Gross Margin	$1,056,390	37.08%	$1,035,952	34.67%	$631,844	27.82%	$369,926	24.78%
Officers Compensation	$101,137	3.55%	$101,453	3.39%	$76,586	3.37%	$90,767	3.24%
Salary-Wages	$2,115,178	7.55%	$226,677	7.59%	$113,924	5.02%	$134,962	4.82%
Rent	$52,844	1.86%	$53,061	1.78%	$50,612	2.23%	$55,658	1.99%
Taxes Paid	$53,932	1.89%	$55,684	1.86%	$28,787	1.27%	$52,314	1.87%
Advertising	$28,215	0.99%	$29,077	0.97%	$33,804	1.49%	$37,125	1.33%
Benefits-Pensions	$32,609	1.14%	$29,631	0.99%	$39,985	1.76%	$47,330	1.69%
Repairs	$37,365	1.31%	$35,222	1.18%	$29,400	1.29%	$32,221	1.15%
Bad Debt	$2,779	0.10%	$2,747	0.09%	$1,722	0.08%	$1,888	0.07
Sales, General, Admin & Misc	$300,093	10.53%	$297,648	9.96%	$132,095	5.82%	$159,724	5.70%
EBITDA	$232,238	8.16%	$204,752	6.86	$124,929	5.49%	$81,937	2.92%
Amortization Depreciation Depletion	$47,732	1.68%	$45,531	1.52%	$38,058	1.72%	$42,801	1.53%
Operating Expenses	$871,884	30.60%	$876,731	29.33%	$545,973	24.05%	$654,790	23.39%
Operating Income	$184,506	6.48%	$159,221	5.34%	$85,871	3.77%	$39,136	1.39%
Interest Income	$846	0.03%	$801	0.03%	$797	0.04%	$896	0.03%
Interest Expense	$24,886	0.87%	$22,255	0.74%	$17,980	0.79%	$19,798	0.71%
Other Income	$23,524	0.83%	$21,620	0.72%	$7,896	0.35%	$9,779	0.35%
Pre-Tax Net Profit	$183,990	6.46%	$159,387	5.33%	$76,584	3.37%	$30,013	1.07%
Income Tax	$38,638	1.36%	$45,412	1.52%	$16,082	0.71%	$45,021	0.16%
After Tax Net Profits	$145,352	5.11%	$113,975	3.83%	$60,502	2,66%	$25,511	0.90%
Discretionary Owner Earnings	$294,221	10.33%	$306,371	10.25%	$176,146	7.76%	$163,581	5.84%

Source: Bizminer Industry Financial Report, compliments of University of Wyoming, Market Research Center

Beef Cluster

REGIONAL PROFILE: Wyoming Big Horn Basin



Cattle & Calves
136,000

Annual Calf Crop
75,683

Slaughter Capacity
2,340

500# Animals
34,057

Cattle on Feed
6,328

Beef Value Chain

Total demand met in-region vs by imports for beef cluster, Wyoming Big Horn Basin (2018)					
NAICS Industry	2018 Demand met In-Region	2018 % Demand met In-Region	2018 Demand met by Imports	2018 % Demand met by Imports	2018 Total Demand
112000 Animal Production	$17,191,398	55%	$14,255,624	45%	$31,447,021
311611 Animal (except Poultry) Slaughtering	$2,358,907	27%	$6,347,915	73%	$8,706,822
311612 Meat Processed from Carcasses	$41,162	1%	$8,188,142	99%	$8,229,304
311613 Rendering and Meat Byproduct Processing	$0	0%	$620,845	100%	$620,845
Total, Beef Cluster	**$19,591,467**	**40%**	**$29,412,525**	**60%**	**$49,003,992**

Strengths

- International value-added meat business
- Largest USDA capacity by region (as of publication date)
- Variety of existing business in beef cluster

Opportunities

- Grow the number of cattle on feed
- Sell high margin cuts to area tourists
- Market Wyoming beef through local restaurants and further processing

Orbis

Wyoming BUSINESS COUNCIL

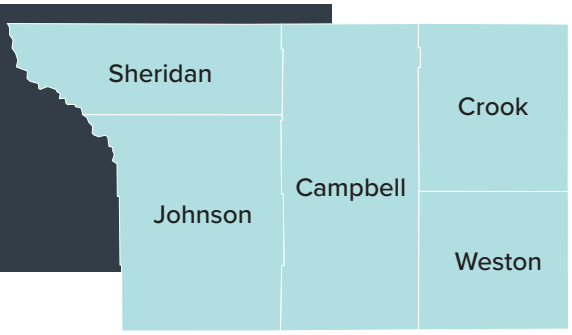
2019

Beef Cluster: Detailed Supply Chain for Top Supply Industries, WYOMING BIG HORN BASIN (2018)					
Purchases from NAICS	**In-region Purchases**		**Imported Purchases**		**Total Purchases**
Animal Production (1120)	$14,806,389	55%	$12,276,680	45%	$27,083,069
Animal Food Manufacturing (3111)	$65,102	0%	$25,838,354	100%	$25,903,456
Crop Production (1110)	$5,220,452	71%	$2,144,049	29%	$7,364,500
Misc. Nondurable Goods Merchant Wholesalers (4249	$2,496,500	49%	$2,615,089	51%	$5,111,590
General Freight Trucking (4841)	$1,876,898	47%	$2,130,392	53%	$4,007,290
Beer, Wine, and Distilled Alcoholic Beverage Merchant Wholesalers (4248)	$1,291,469	38%	$2,102,741	62%	$3,394,210
Lessors of Real Estate (5311)	$2,505,911	79%	$677,100	21%	$3,183,011
Chemical & Allied Products Merchant Wholesalers (4246)	$1,507,880	48%	$1,613,588	52%	$3,121,467
Apparel, Piece Goods, and Notions Merchant Wholesalers (4243)	$12,709	0%	$2,802,592	100%	$2,815,301
Petroleum and Coal Products Manufacturing (3241)	$2,033	0%	$2,364,847	100%	$2,366,881
Paper and Paper Product Merchant Wholesalers (4241)	$469,498	22%	$1,635,694	78%	$2,105,191
Activities Related to Real Estate (5313)	$819,494	47%	$918,392	53%	$1,737,886
Support Activities for Crop Production (1151)	$1,112,950	75%	$368,125	25%	$1,481,074
Specialized Freight Trucking (4842)	$796,848	63%	$477,246	37%	$1,274,094
Wholesale Electronic Markets and Agents and Brokers (4251)	$66,084	5%	$1,178,630	95%	$1,244,713
Offices of Real Estate Agents and Brokers (5312)	$515,926	45%	$625,336	55%	$1,141,261
Animal Slaughtering and Processing (3116)	$235,636	34%	$461,184	66%	$696,820
Grain and Oilseed Milling (3112)	$220	0%	$989,727	100%	$989,946
Farm Product Raw Material Merchant Wholesalers (4245)	$260,334	27%	$702,630	73%	$962,965
Petroleum and Petroleum Products Merchant Wholesalers (4247)	$492,122	53%	$443,738	47%	$935,860
Rail Transportation (4821)	$668,159	75%	$218,781	25%	$886,941
Spring and Wire Product Manufacturing (3326)	$0	0%	$862,060	100%	$862,060
Grocery and Related Product Merchant Wholesalers (4244)	$203,469	26%	$573,503	74%	$776,972
Electric Power Generation, Transmission and Distribution (2211)	$415,399	52%	$376,435	48%	$791,834
Coal Mining (2121)	$31,360	5%	$623,091	95%	$654,451
Commercial and Industrial Machinery and Equipment Rental and Leasing (5324)	$280,261	53%	$252,364	47%	$532,625
Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing (3253)	$0	0%	$514,766	100%	$514,766
Agriculture, Construction, and Mining Machinery Manufacturing (3331)	$585	0%	$494,749	100%	$495,333
Other Professional, Scientific, and Technical Services (5419)	$394,884	89%	$49,174	11%	$444,058
Machinery, Equipment, and Supplies Merchant Wholesalers (4238)	$106,932	29%	$267,956	71%	$374,888

Source: Emsi

Beef Cluster

REGIONAL PROFILE: Northeast Wyoming



Cattle & Calves
336,000

Annual Calf Crop
186,981

Slaughter Capacity
2,600

500# Animals
84,142

Cattle on Feed
5,731

Beef Value Chain

Total demand met in-region vs by imports for beef cluster, Northeast Wyoming (2018)

NAICS Industry	Demand met In-Region	% Demand met In-Region	Demand met by Imports	% Demand met by Imports	Total Demand
112000 Animal Production	$38,767,917	58%	$27,765,573	42%	$66,533,490
311611 Animal (except Poultry) Slaughtering	$3,208,033	18%	$14,441,093	82%	$17,649,126
311612 Meat Processed from Carcasses	$569,916	3%	$16,111,136	97%	$16,681,052
311613 Rendering and Meat Byproduct Processing	$0	0%	$1,272,835	100%	$1,272,835
Total, Beef Cluster	**$42,545,866**	**42%**	**$59,590,636**	**58%**	**$102,136,502**

Strengths

- Largest cattle producing region
- State-of-the-art beef processing facility
- Plentiful native pastureland

Opportunities

- Grow grass-fed beef market
- Add more value to culled cows
- Direct marketing to Rapid City, SD, and Billings, MT

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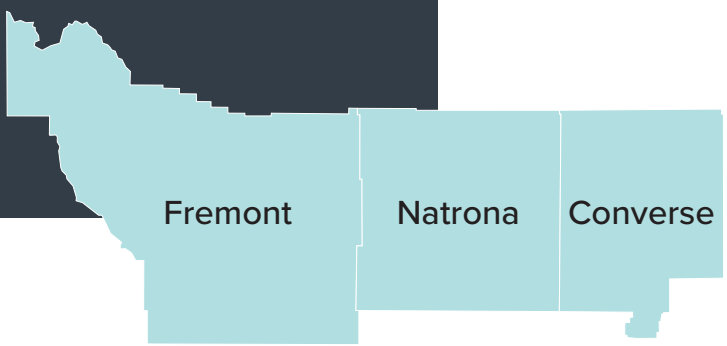
Beef Cluster: Detailed Supply Chain for Top Supply Industries, NORTHEAST WYOMING (2018)					
Purchases from NAICS	In-region Purchases		Imported Purchases		Total Purchases
Animal Production (1120)	$34,398,467	58%	$24,551,855	42%	$58,950,322
Animal Food Manufacturing (3111)	$0	0%	$56,165,835	100%	$56,165,835
Crop Production (1110)	$3,370,903	21%	$12,596,659	79%	$15,967,562
Misc. Nondurable Goods Merchant Wholesalers (4249	$2,474,692	22%	$8,613,520	78%	$11,088,212
General Freight Trucking (4841)	$4,197,489	48%	$4,514,962	52%	$8,712,451
Beer, Wine, and Distilled Alcoholic Beverage Merchant Wholesalers (4248)	$1,511,887	21%	$5,850,917	79%	$7,362,804
Lessors of Real Estate (5311)	$6,403,828	93%	$497,917	7%	$6,901,745
Chemical and Allied Products Merchant Wholesalers (4246)	$4,139,065	61%	$2,632,110	39%	$6,771,175
Apparel, Piece Goods, and Notions Merchant Wholesalers (4243)	$95,570	2%	$6,011,469	98%	$6,107,039
Petroleum and Coal Products Manufacturing (3241)	$723,723	14%	$4,408,474	86%	$5,132,197
Paper and Paper Product Merchant Wholesalers (4241)	$253,748	6%	$4,312,901	94%	$4,566,649
Activities Related to Real Estate (5313)	$2,008,183	53%	$1,760,089	47%	$3,768,272
Support Activities for Crop Production (1151)	$2,201,725	69%	$1,009,511	31%	$3,211,236
Specialized Freight Trucking (4842)	$1,958,771	71%	$811,297	29%	$2,770,067
Wholesale Electronic Markets and Agents and Brokers (4251)	$361,914	13%	$2,338,511	87%	$2,700,425
Offices of Real Estate Agents and Brokers (5312)	$1,262,031	51%	$1,212,574	49%	$2,474,605
Animal Slaughtering and Processing (3116)	$312,099	20%	$1,286,750	80%	$1,598,850
Grain and Oilseed Milling (3112)	$22,717	1%	$2,123,852	99%	$2,146,569
Farm Product Raw Material Merchant Wholesalers (4245)	$596,086	29%	$1,492,817	71%	$2,088,903
Petroleum and Petroleum Products Merchant Wholesalers (4247)	$1,768,763	87%	$260,515	13%	$2,029,278
Rail Transportation (4821)	$1,892,561	98%	$30,893	2%	$1,923,454
Spring and Wire Product Manufacturing (3326)	$75,913	4%	$1,793,187	96%	$1,869,100
Grocery and Related Product Merchant Wholesalers (4244)	$315,615	19%	$1,379,035	81%	$1,694,651
Electric Power Generation, Transmission and Distribution (2211)	$1,101,380	64%	$617,116	36%	$1,718,496
Coal Mining (2121)	$559,255	39%	$858,978	61%	$1,419,233
Commercial and Industrial Machinery and Equipment Rental and Leasing (5324)	$510,348	44%	$644,580	56%	$1,154,928
Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing (3253)	$208,353	19%	$907,782	81%	$1,116,135
Agriculture, Construction, and Mining Machinery Manufacturing (3331)	$4,936	0%	$1,069,037	100%	$1,073,972
Other Professional, Scientific, and Technical Services (5419)	$735,422	76%	$228,675	24%	$964,097
Machinery, Equipment, and Supplies Merchant Wholesalers (4238)	$370,320	46%	$442,692	54%	$813,012

Source: Emsi

Beef Cluster

REGIONAL PROFILE: Central Wyoming



Cattle & Calves
185,000

Annual Calf Crop
102,951

500# Animals
43,328

Cattle on Feed
850

Slaughter Capacity
2,600

Beef Value Chain

Total demand met in-region vs by imports for beef cluster, Wyoming High Plains (2018)

NAICS Industry	Demand met In-Region		Demand met by Imports		Total Demand
112000 Animal Production	$15,305,527	43%	$20,480,120	57%	$35,785,647
311611 Animal (except Poultry) Slaughtering	$4,750,775	30%	$11,074,999	70%	$15,825,774
311612 Meat Processed from Carcasses	$114,892	1%	$14,843,005	99%	$14,957,897
311613 Rendering and Meat Byproduct Processing	$0	0%	$1,141,041	100%	$1,141,041
Total, Beef Cluster	**$20,171,193**	**30%**	**$47,539,166**	**70%**	**$67,710,359**

Strengths

- Available workforce
- High demand for beef, local food
- Large anchor institutions
- Slaughtering capacity
- Large population center

Opportunities

- Workforce training
- Local food movement
- Regional food hub
- Growing presence of independent restaurants
- Aggregation of cold storage, offal products, regional hub

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Beef Cluster: Detailed Supply Chain for Top Supply Industries, CENTRAL WYOMING (2018)					
Purchases from NAICS	**In-region Purchases**		**Imported Purchases**		**Total Purchases**
Animal Production (1120)	$19,249,851	46%	$22,912,939	54%	$42,162,790
Animal Food Manufacturing (3111)	$650,825	2%	$33,976,753	98%	$34,627,578
Crop Production (1110)	$3,401,721	35%	$6,424,157	65%	$9,825,878
Misc. Nondurable Goods Merchant Wholesalers (4249	$1,944,851	28%	$5,017,088	72%	$6,961,939
General Freight Trucking (4841)	$2,708,811	45%	$3,275,202	55%	$5,984,013
Beer, Wine, and Distilled Alcoholic Beverage Merchant Wholesalers (4248)	$1,317,723	29%	$3,305,113	71%	$4,622,836
Lessors of Real Estate (5311)	$4,195,449	99%	$62,205	1%	$4,257,654
Chemical and Allied Products Merchant Wholesalers (4246)	$2,038,112	48%	$2,213,230	52%	$4,251,343
Apparel, Piece Goods, & Notions Merchant Wholesalers (4243)	$41,186	1%	$3,793,249	99%	$3,834,435
Petroleum and Coal Products Manufacturing (3241)	$2,222,178	70%	$945,182	30%	$3,167,360
Paper and Paper Product Merchant Wholesalers (4241)	$143,426	5%	$2,723,771	95%	$2,867,197
Activities Related to Real Estate (5313)	$1,323,183	57%	$1,001,448	43%	$2,324,632
Support Activities for Crop Production (1151)	$940,966	48%	$1,035,116	52%	$1,976,082
Specialized Freight Trucking (4842)	$1,429,044	75%	$473,570	25%	$1,902,613
Wholesale Electronic Markets & Agents and Brokers (4251)	$128,624	8%	$1,576,459	92%	$1,705,082
Offices of Real Estate Agents and Brokers (5312)	$765,452	50%	$761,111	50%	$1,526,563
Animal Slaughtering and Processing (3116)	$1,049,161	32%	$2,194,862	68%	$3,244,023
Grain and Oilseed Milling (3112)	$0	0%	$1,326,664	100%	$1,326,664
Farm Product Raw Material Merchant Wholesalers (4245)	$140,974	11%	$1,170,871	89%	$1,311,845
Petroleum & Petroleum Products Merchant Wholesalers (4247)	$773,133	62%	$479,801	38%	$1,252,933
Rail Transportation (4821)	$1,130,458	95%	$63,553	5%	$1,194,011
Spring and Wire Product Manufacturing (3326)	$130,750	11%	$1,019,429	89%	$1,150,179
Grocery and Related Product Merchant Wholesalers (4244)	$231,497	18%	$1,071,579	82%	$1,303,076
Electric Power Generation, Transmission & Distribution (2211)	$737,405	67%	$362,504	33%	$1,099,909
Coal Mining (2121)	$227,654	26%	$652,026	74%	$879,679
Commercial and Industrial Machinery and Equipment Rental and Leasing (5324)	$550,573	77%	$162,736	23%	$713,309
Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing (3253)	$0	0%	$687,433	100%	$687,433
Agriculture, Construction, and Mining Machinery Manufacturing (3331)	$18,152	3%	$642,733	97%	$660,885
Other Professional, Scientific, and Technical Services (5419)	$597,154	95%	$30,078	5%	$627,231
Machinery, Equipment, and Supplies Merchant Wholesalers (4238)	$265,059	52%	$240,001	48%	$505,060

Source: Emsi

Beef Cluster

REGIONAL PROFILE: Western Wyoming

Cattle & Calves
146,000

Annual Calf Crop
81,248

Slaughter Capacity
520

500# Animals
36,562

Cattle on Feed
3,168

Beef Value Chain

Total demand met in-region vs by imports for beef cluster, Western Wyoming (2018)

NAICS Industry	Demand met In-Region		Demand met by Imports		Total Demand
112000 Animal Production	$17,127,470	47%	$19,012,168	53%	$36,139,638
311611 Animal (except Poultry) Slaughtering	$1,989,152	12%	$14,708,361	88%	$16,697,514
311612 Meat Processed from Carcasses	$556,558	4%	$15,220,895	96%	$15,777,453
311613 Rendering and Meat Byproduct Processing	$0	0%	$1,203,237	100%	$1,203,237
Total, Beef Cluster	**$19,673,180**	**28%**	**$50,144,661**	**72%**	**$69,817,841**

Strengths

- Established grass-fed beef operations
- Influence of national parks
- National, international visitors
- Demand for Wyoming products
- Variety of restaurants

Opportunities

- Promote Wyoming beef to national and international visitors
- Largest market for high margin retail cuts
- Likely the highest demand for Wyoming branded products in the state comes from tourists visiting this region

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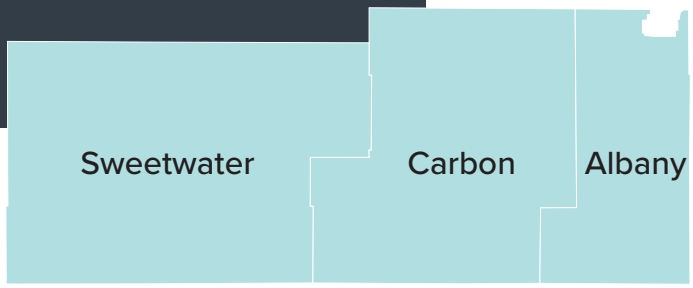
Beef Cluster: Detailed Supply Chain for Top Supply Industries, WESTERN WYOMING (2018)					
Purchases from NAICS	**In-region Purchases**		**Imported Purchases**		**Total Purchases**
Animal Production (1120)	$14,231,563	49%	$14,816,593	51%	$29,048,155
Animal Food Manufacturing (3111)	$0	0%	$26,572,892	100%	$26,572,892
Crop Production (1110)	$1,681,539	22%	$5,869,279	78%	$7,550,818
Misc. Nondurable Goods Merchant Wholesalers (4249	$1,478,588	28%	$3,792,427	72%	$5,271,015
General Freight Trucking (4841)	$1,821,558	43%	$2,422,143	57%	$4,243,701
Beer, Wine, and Distilled Alcoholic Beverage Merchant Wholesalers (4248)	$310,593	9%	$3,189,455	91%	$3,500,048
Lessors of Real Estate (5311)	$2,490,225	76%	$775,603	24%	$3,265,829
Chemical and Allied Products Merchant Wholesalers (4246)	$969,714	30%	$2,249,093	70%	$3,218,807
Apparel, Piece Goods, and Notions Merchant Wholesalers (4243)	$69,261	2%	$2,833,855	98%	$2,903,116
Petroleum and Coal Products Manufacturing (3241)	$16,212	1%	$2,412,564	99%	$2,428,775
Paper and Paper Product Merchant Wholesalers (4241)	$35,659	2%	$2,135,187	98%	$2,170,846
Activities Related to Real Estate (5313)	$1,216,160	68%	$566,945	32%	$1,783,105
Support Activities for Crop Production (1151)	$898,895	59%	$619,650	41%	$1,518,545
Specialized Freight Trucking (4842)	$922,765	68%	$426,495	32%	$1,349,261
Wholesale Electronic Markets and Agents and Brokers (4251)	$37,445	3%	$1,248,154	97%	$1,285,599
Offices of Real Estate Agents and Brokers (5312)	$988,478	84%	$182,476	16%	$1,170,954
Animal Slaughtering and Processing (3116)	$105,459	9%	$1,100,346	91%	$1,205,805
Grain and Oilseed Milling (3112)	$6	0%	$1,016,194	100%	$1,016,201
Farm Product Raw Material Merchant Wholesalers (4245)	$139,870	14%	$853,192	86%	$993,062
Petroleum and Petroleum Products Merchant Wholesalers (4247)	$637,519	66%	$322,930	34%	$960,449
Rail Transportation (4821)	$370,488	41%	$541,152	59%	$911,640
Spring and Wire Product Manufacturing (3326)	$0	0%	$883,869	100%	$883,869
Grocery and Related Product Merchant Wholesalers (4244)	$85,276	10%	$767,825	90%	$853,102
Electric Power Generation, Transmission and Distribution (2211)	$496,130	60%	$324,962	40%	$821,092
Coal Mining (2121)	$152,965	23%	$519,440	77%	$672,404
Commercial and Industrial Machinery and Equipment Rental and Leasing (5324)	$349,487	64%	$197,180	36%	$546,667
Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing (3253)	$0	0%	$527,927	100%	$527,927
Agriculture, Construction, and Mining Machinery Manufacturing (3331)	$3,478	1%	$504,387	99%	$507,865
Other Professional, Scientific, and Technical Services (5419)	$401,415	87%	$61,236	13%	$462,651
Machinery, Equipment, and Supplies Merchant Wholesalers (4238)	$52,142	14%	$333,268	86%	$385,410

Source: Emsi

Beef Cluster

REGIONAL PROFILE: Wyoming High Plains



Cattle & Calves
185,000

Annual Calf Crop
102,951

500# Animals
43,328

Cattle on Feed
850

Slaughter Capacity
2,600

Beef Value Chain

Total demand met in-region vs by imports for beef cluster, Wyoming High Plains (2018)

NAICS Industry	Demand met In-Region		Demand met by Imports		Total Demand
112000 Animal Production	$15,305,527	43%	$20,480,120	57%	$35,785,647
311611 Animal (except Poultry) Slaughtering	$4,750,775	30%	$11,074,999	70%	$15,825,774
311612 Meat Processed from Carcasses	$114,892	1%	$14,843,005	99%	$14,957,897
311613 Rendering and Meat Byproduct Processing	$0	0%	$1,141,041	100%	$1,141,041
Total, Beef Cluster	**$20,171,193**	**30%**	**$47,539,166**	**70%**	**$67,710,359**

Strengths

- Anchor institution (UW)
- UW meat lab
- Trendy consumers
- USDA plant opening in the year 2020
- Training capacity for workforce

Opportunities

- Add value to the large supply of culled cows in the region
- Direct marketing to the CO Front Range
- Many locally owned restaurants and retailers that may carry Wyoming branded beef
- Cold storage along the I-80 corridor, which would leverage low cost of development, proximity, and cooler climate to support business case

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Wyoming BUSINESS COUNCIL

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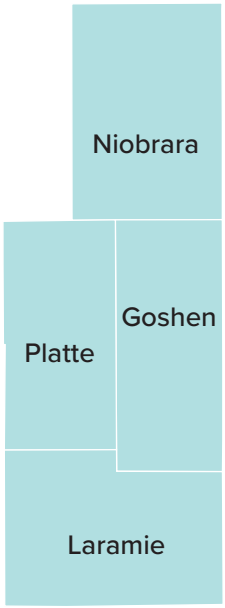
Beef Cluster: Detailed Supply Chain for Top Supply Industries, WYOMING HIGH PLAINS (2018)					
Purchases from NAICS	**In-region Purchases**		**Imported Purchases**		**Total Purchases**
Animal Production (1120)	$12,740,042	44%	$16,467,172	56%	$29,207,214
Animal Food Manufacturing (3111)	$0	0%	$26,716,889	100%	$26,716,889
Crop Production (1110)	$2,092,903	28%	$5,498,815	72%	$7,591,718
Misc. Nondurable Goods Merchant Wholesalers (4249	$579,477	11%	$4,720,158	89%	$5,299,635
General Freight Trucking (4841)	$1,178,542	28%	$3,088,588	72%	$4,267,131
Beer, Wine, and Distilled Alcoholic Beverage Merchant Wholesalers (4248)	$741,451	21%	$2,777,612	79%	$3,519,064
Lessors of Real Estate (5311)	$3,061,299	93%	$222,228	7%	$3,283,526
Chemical and Allied Products Merchant Wholesalers (4246)	$1,585,837	49%	$1,650,448	51%	$3,236,285
Apparel, Piece Goods, and Notions Merchant Wholesalers (4243)	$22,561	1%	$2,896,315	99%	$2,918,875
Petroleum and Coal Products Manufacturing (3241)	$1,739,261	71%	$702,660	29%	$2,441,921
Paper and Paper Product Merchant Wholesalers (4241)	$59,969	3%	$2,122,658	97%	$2,182,627
Activities Related to Real Estate (5313)	$847,084	47%	$945,683	53%	$1,792,767
Support Activities for Crop Production (1151)	$832,601	55%	$694,169	45%	$1,526,770
Specialized Freight Trucking (4842)	$770,620	57%	$586,095	43%	$1,356,715
Wholesale Electronic Markets and Agents and Brokers (4251)	$39,427	3%	$1,253,168	97%	$1,292,595
Offices of Real Estate Agents and Brokers (5312)	$549,443	47%	$627,856	53%	$1,177,299
Animal Slaughtering and Processing (3116)	$194,753	16%	$1,018,272	84%	$1,213,025
Grain and Oilseed Milling (3112)	$0	0%	$1,021,736	100%	$1,021,736
Farm Product Raw Material Merchant Wholesalers (4245)	$89,061	9%	$909,393	91%	$998,454
Petroleum and Petroleum Products Merchant Wholesalers (4247)	$463,881	48%	$501,770	52%	$965,651
Rail Transportation (4821)	$870,635	95%	$45,944	5%	$916,579
Spring and Wire Product Manufacturing (3326)	$0	0%	$888,657	100%	$888,657
Grocery and Related Product Merchant Wholesalers (4244)	$172,911	20%	$684,969	80%	$857,880
Electric Power Generation, Transmission and Distribution (2211)	$411,118	50%	$414,430	50%	$825,548
Coal Mining (2121)	$203,175	30%	$472,859	70%	$676,034
Commercial and Industrial Machinery and Equipment Rental and Leasing (5324)	$228,466	42%	$321,163	58%	$549,628
Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing (3253)	$18,337	3%	$512,445	97%	$530,782
Agriculture, Construction, and Mining Machinery Manufacturing (3331)	$3,337	1%	$507,279	99%	$510,616
Other Professional, Scientific, and Technical Services (5419)	$438,532	94%	$26,653	6%	$465,185
Machinery, Equipment, and Supplies Merchant Wholesalers (4238)	$59,821	15%	$327,676	85%	$387,497

Source: Emsi



Beef Cluster

REGIONAL PROFILE: Southeast Wyoming

Cattle & Calves
325,000

Annual Calf Crop
180,000

Slaughter Capacity
780

500# Animals
81,387

Cattle on Feed
57,651

Beef Value Chain

Total demand met in-region vs by imports for beef cluster, Southeast Wyoming (2018)					
Industry (NAICS)	Demand met In-Region		Demand met by Imports		Total Demand
Animal Production (112000)	$36,119,072	54%	$30,627,079	46%	$66,746,151
Animal (except Poultry) Slaughtering (311611)	$2,018,905	8%	$22,875,018	92%	$24,893,923
Meat Processed from Carcasses (311612)	$0	0%	$23,530,370	100%	$23,530,370
Rendering and Meat Byproduct Processing (311613)	$0	0%	$1,788,131	100%	$1,788,131
Total, Beef Cluster	**$38,137,977**	**33%**	**$78,820,598**	**67%**	**$116,958,575**

Strengths

- Largest number of grain-fed cattle
- Availability of grain, feed
- Largest livestock auction in region
- Proximity to large beef processors and support industry in Northern CO

Opportunities

- Proximity to rendering plants in Denver and Western Nebraska
- Grow slaughter capacity; this area has the highest amount of cattle on feed, and the lowest slaughter capacity in the state
- Rendering and offal aggregation may be feasible in this area as well

Orbis

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Beef Cluster: Detailed Supply Chain for Top Supply Industries, SOUTHEAST WYOMING (2018)					
Purchases from NAICS	**In-region Purchases**		**Imported Purchases**		**Total Purchases**
Animal Production (1120)	$30,993,326	54%	$26,513,808	46%	$57,507,135
Animal Food Manufacturing (3111)	$1,962,729	4%	$52,696,398	96%	$54,659,127
Crop Production (1110)	$9,681,813	62%	$5,856,946	38%	$15,538,758
Misc. Nondurable Goods Merchant Wholesalers (4249	$5,008,403	46%	$5,785,373	54%	$10,793,776
General Freight Trucking (4841)	$5,597,800	66%	$2,895,848	34%	$8,493,648
Beer, Wine, and Distilled Alcoholic Beverage Merchant Wholesalers (4248)	$1,952,865	27%	$5,214,443	73%	$7,167,309
Lessors of Real Estate (5311)	$4,967,897	74%	$1,748,762	26%	$6,716,659
Chemical and Allied Products Merchant Wholesalers (4246)	$2,791,840	42%	$3,799,534	58%	$6,591,374
Apparel, Piece Goods, and Notions Merchant Wholesalers (4243)	$90,892	2%	$5,853,977	98%	$5,944,868
Petroleum and Coal Products Manufacturing (3241)	$2,590,704	52%	$2,403,870	48%	$4,994,575
Paper and Paper Product Merchant Wholesalers (4241)	$259,476	6%	$4,185,901	94%	$4,445,376
Activities Related to Real Estate (5313)	$2,119,224	58%	$1,547,993	42%	$3,667,217
Support Activities for Crop Production (1151)	$1,890,647	61%	$1,234,352	39%	$3,124,999
Specialized Freight Trucking (4842)	$1,804,756	67%	$895,752	33%	$2,700,508
Wholesale Electronic Markets and Agents and Brokers (4251)	$272,852	10%	$2,356,112	90%	$2,628,964
Offices of Real Estate Agents and Brokers (5312)	$1,183,121	49%	$1,225,121	51%	$2,408,243
Animal Slaughtering and Processing (3116)	$606,644	38%	$1,003,025	62%	$1,609,670
Grain and Oilseed Milling (3112)	$14,770	1%	$2,074,330	99%	$2,089,100
Farm Product Raw Material Merchant Wholesalers (4245)	$1,300,383	64%	$733,058	36%	$2,033,441
Petroleum and Petroleum Products Merchant Wholesalers (4247)	$974,450	49%	$1,000,429	51%	$1,974,879
Rail Transportation (4821)	$1,852,104	99%	$19,940	1%	$1,872,044
Spring and Wire Product Manufacturing (3326)	$0	0%	$1,818,906	100%	$1,818,906
Grocery and Related Product Merchant Wholesalers (4244)	$405,152	24%	$1,250,289	76%	$1,655,441
Electric Power Generation, Transmission and Distribution (2211)	$1,180,451	71%	$492,897	29%	$1,673,348
Coal Mining (2121)	$209,354	15%	$1,171,896	85%	$1,381,250
Commercial and Industrial Machinery and Equipment Rental and Leasing (5324)	$549,088	49%	$574,887	51%	$1,123,974
Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing (3253)	$69,563	6%	$1,016,606	94%	$1,086,169
Agriculture, Construction, and Mining Machinery Manufacturing (3331)	$71,111	7%	$974,020	93%	$1,045,131
Other Professional, Scientific, and Technical Services (5419)	$783,409	83%	$155,630	17%	$939,039
Machinery, Equipment, and Supplies Merchant Wholesalers (4238)	$206,405	26%	$584,885	74%	$791,290

Source: Emsi

Wyoming Beef Industry Study | 2019

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