University of Nevada, Reno

Nevada Meat Processing Study, Phase 2: Potential for Commercial Slaughter/Processing Facilities

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Introduction

The COVID-19 pandemic brought renewed attention to a supply chain issue often expressed by producers – there is a lack of accessible meat processing facilities. Since the 1980s, the U.S. has seen a 50% decrease in the number of federally inspected slaughter facilities (USDA, 1980-2020).[1] A 2013 study by the Economic Research Service (Gwin et al) highlighted this issue of consolidation and further indicated that access to inspected processing facilities is uneven across the country. The authors provide an important note*: the presence of a livestock operation does not indicate demand for a processing facility* (Johnson, Marti, & Gwin 2012). This is something we need to consider for Nevada.

Nevada's livestock production structure is geared primarily to selling feeder cattle and lambs up the supply chain to finishing operations out of state, thus slaughter and processing capacity within the state is limited. In fact, there are no processing facilities of significant scale in areas where the largest inventories of animals exist (see Figures 3 and 1). This sparse processing capacity results in little incentive for local producers or other industry operators to finish animals in order to market meat and animal by-products to consumer markets within the state or otherwise. According to the USDA 2017 Census of Agriculture, of the approximately 200 thousand head of cattle marketed annually in Nevada, only one percent is slaughtered within the state, and half of those are slaughtered on-farm.

In addition to expanding slaughter and processing capacity within Nevada, several important factors must be considered in order to improve the ability of livestock producers to finish and market their animals in Nevada. To establish an environment conducive to finishing, processing, and marketing livestock and products, the ranching-centered economy of rural areas must be modified to include necessary components of the supply chain such as feed suppliers and/or facilities, transportation, processors, and wholesale-retail markets.

This analysis is the second part of a two-phase study focused on demand and feasibility of expanding the livestock supply chain in the Silver State. The first phase of the study investigated slaughter and processing needs in Northwestern Nevada and adequacy of Wolf Pack Meats (WPM) in meeting those needs of Nevada ranchers and neighboring California producers. The second phase of the study addressed in this document investigates the potential for expanding commercial slaughter and processing facilities within the state. This phase of analysis considers availability of livestock in the region (primarily cattle and sheep), estimates costs and revenues for a small facility, and gathers feedback from local producers about the demand and potential for expansion of regional processing capacity for the state's herds and flocks.

Location of regional livestock inventories and processing

It is important to first examine the structure of the existing ranching industry, beginning with an understanding of the "cattle shed" and "sheep shed" in Nevada and neighboring out-of-state counties. That is, what areas have the largest livestock inventories from which a processor could

[1] In 1982 there were 1,688 reported federally inspected slaughter facilities and 835 reported in 2019.

draw animals? Data on cattle and sheep numbers from counties in both Nevada and surrounding counties from neighboring states were collected from the 2017 USDA Census of Agriculture. This provides an estimate of potential animal inventories available for slaughter and processing in regional facilities. However, the structure of animal production in the area is geared primarily toward cow-calf operations and lacks many of the necessary supply chain components for bringing meat to market. Because of this, the vast majority of animals in the immediate area are not candidates for slaughter and processing due to their age and size, and are instead sold to finishing operations elsewhere. The structure of livestock production in Nevada must be altered to include supply chain components such as feedlots to accommodate the expansion of processing.

While Nevada and other nearby ranches finish relatively few cattle either in on-ranch finishing operations or feedlots, the animal inventory is sufficient to fully utilize a small processor that is strategically located within the region. Identifying the optimal location within the state is an important consideration. Figure 1 presents the inventories of cattle in Nevada counties and those surrounding the Silver State. Similarly, Figure 2 presents the inventories of sheep in Nevada and surrounding counties. The numbers on the maps are the inventories of the respective species within the corresponding counties as reported in the 2017 USDA Census of Agriculture. The highest regional concentration of both cattle and sheep herds are located in Elko County Nevada and the neighboring out-of-state counties.

Figure 3 reports locations of feedlots and processors of cattle and sheep (USDA 2020) located in the five states that share a border with Nevada. There are 68 feedlots and 60 USDA Food Safety and Inspection Service (FSIS) licensed processing facilities in the six states of interest that slaughter cattle, sheep, or lambs[2]. Feedlot locations are represented with a triangle[3]. Processing facilities are represented with a diamond scaled to reflect the total number of animals of all types slaughtered annually at the reported location. The facility scale is based on the USDA annual slaughter volume – note that no facility in the region of interest is classified at the largest scale reported by USDA, 10 million head or more slaughtered annually. Seven feedlots are located in Nevada, which represent 10.3% of all feedlots in the region. Three USDA FSIS licensed facilities are located in Nevada, representing 5.0% of all regional slaughter facilities. Fallon Livestock Processing and York Meats are both classified at scale 1 while Wolf Pack Meats is classified at scale 2.

As can be seen in Figure 3, the three existing processors in Nevada are not located near the state's counties with the largest concentrations of cattle. The larger processors in the region are located in southern Idaho and northern Utah, and are able to serve producers in a multi-state area where there are higher cattle inventories. As such, a slaughter/processing facility potentially located in Northeastern or North Central Nevada would compete with those in Idaho and Utah. Likewise, both sheep inventories and sheep processing are concentrated in counties surrounding Northeastern Nevada, though no regional sheep processing exists at a scale similar to that of cattle.

[2] Many of these facilities may process other animals such as hogs or goats. All of the largest facilities on this list process only cattle.
[3] Feedlot capacity was not reported in the dataset used for this study.

For a rancher to be able to profitably raise finished animals within the region, not only must there be processing capacity available within affordable distances, but there must be available and affordable feed to bring livestock to slaughter weights. There is not adequate grazing available to appreciably increase the potential for finishing animals, nor is it available throughout the year. Moreover, grass finished meat is not identical to grain finished meat and is marketed differently to consumers. Due to the climate and limited water supply, the ability for ranchers to grow their own feed is limited. Therefore, to finish an animal, feed will have to be purchased from out of state and transported to the ranch. Adequate weight-gain necessary to offset purchased feed prices is often difficult to achieve, especially for operations of a relatively smaller scale. Furthermore, transporting feeder cattle outside the area is often less expensive than shipping in the feed when considering conversion rates of approximately six pounds of feed to one pound of livestock weight gain.

Most of the feedlots in the region are located within relatively close proximity to slaughter/processing facilities. Processors need available supplies of livestock to maintain operations and feedlots act as aggregators of livestock to supply processing facilities. However, there are only a few feedlots located within the region (Figure 3) that have the ability to finish cattle and sheep to slaughter weights. The regional ability to feed enough animals to slaughter weight is currently insufficient to supply a processor of even a moderate size.

Figure 1. Cattle Inventory in Nevada and Surrounding Counties

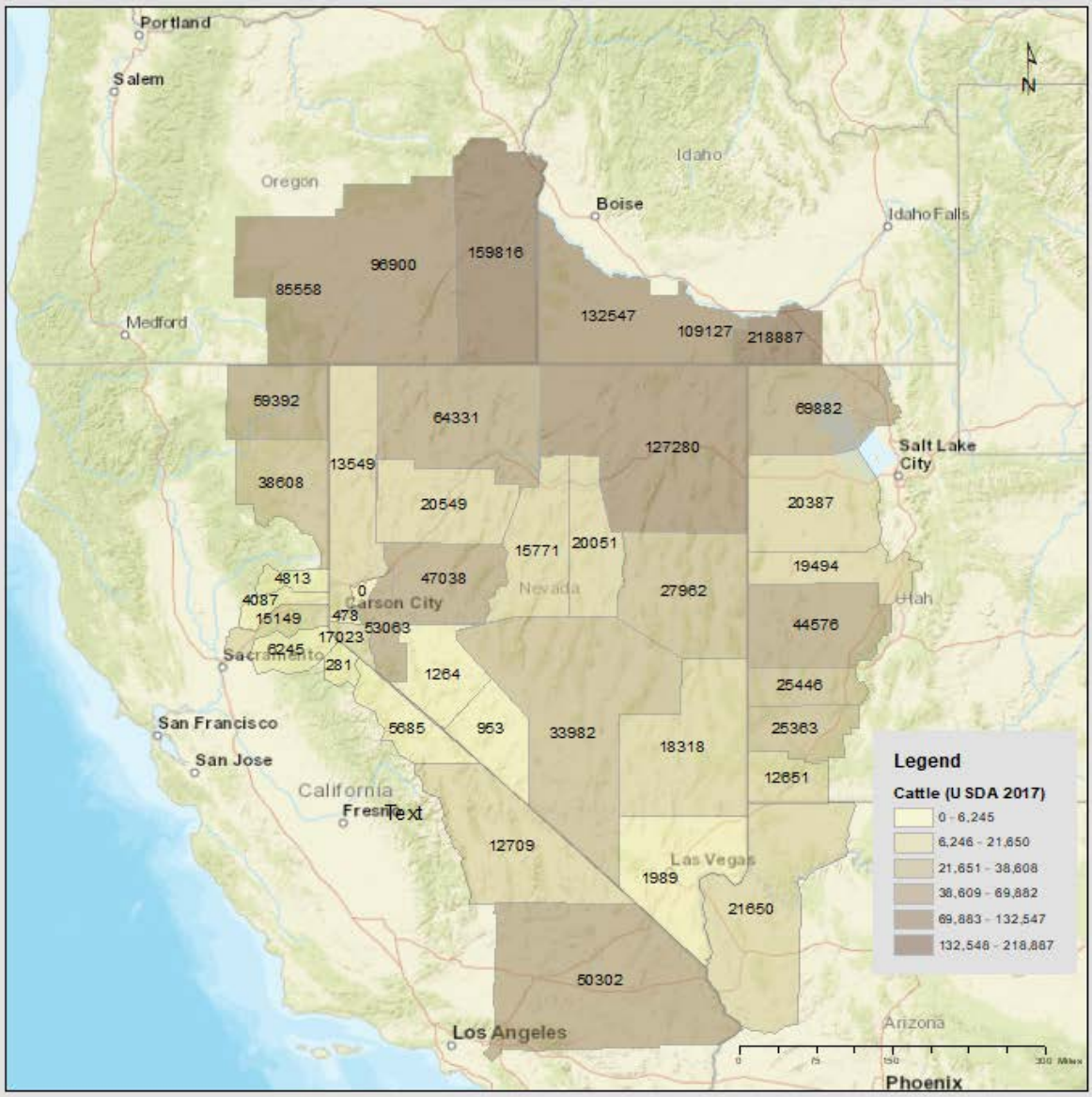
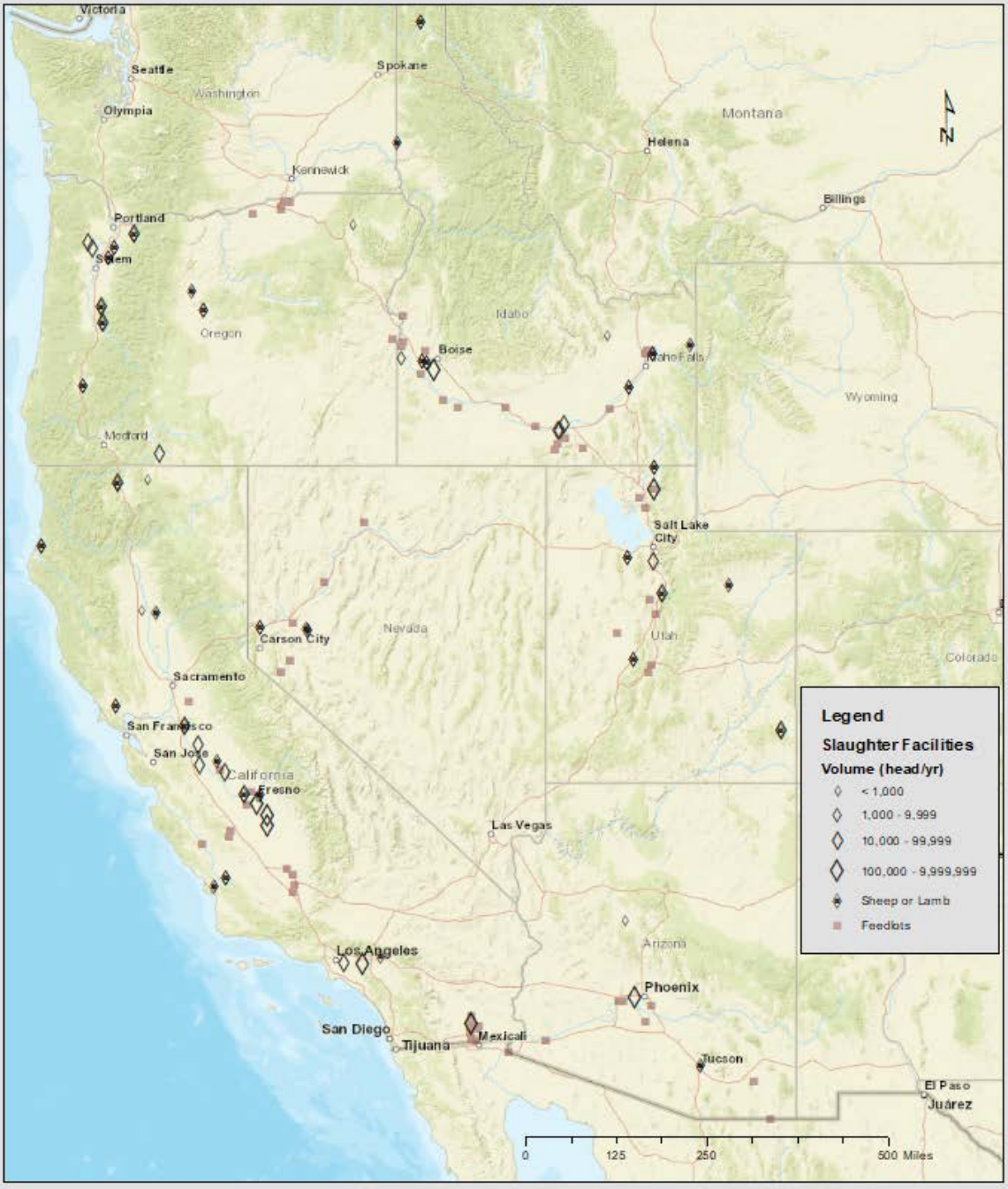


Figure 2. Sheep Inventory in Nevada and Surrounding Counties

Figure 3. Feedlots and USDA FSIS Meat Processing Facilities



Small Nevada Slaughter/Processor Costs and Revenues

The Budget

The small Nevada slaughter and processing facility budget presented in Curtis, et al. (2008) was used as the basis to estimate costs and revenues, which used 2006 costs and prices. Using the producer price index from the Bureau of Labor Statistics and the prices paid series from the USDA, the 2006 costs were inflation adjusted to 2019. Current livestock and meat prices were collected from USDA Livestock Meat & Domestic Data (2021). The prices used in this study are available in Appendix Table 1. The description of the price index data used for inflating the cost categories after 2006 is in Appendix Table 2 and the data for the 2006 base and years 2015-2019 are in Appendix Table 3.

Utilizing the original 2006 budget in this study as the basis for estimating revenues and costs for recent years requires several assumptions. Tight margins and relatively low volumes for small and medium processors result in lowered ability to adopt new technologies that may help improve efficiency and capacity. Therefore, the first is that the structure of a modest-sized processing plant will be relatively unchanged between 2006 and 2019. Likewise, a second assumption is that the number and mix of cattle, sheep, and hogs processed at the facility are constant over time, as are the slaughter weights of the animals.

The combination of revenues received for various species meats must at least cover the costs of procuring the animals, plant operation costs, plus return a reasonable margin. Figure 4 and Table 1 present overall revenues and expenses. As can be seen, inflating the 2006 budget to 2019 values results in a reasonable set of costs and a reasonable relationship between costs and revenues.

Figure 4. Small Facility Revenues and Expenses by Year, $ths

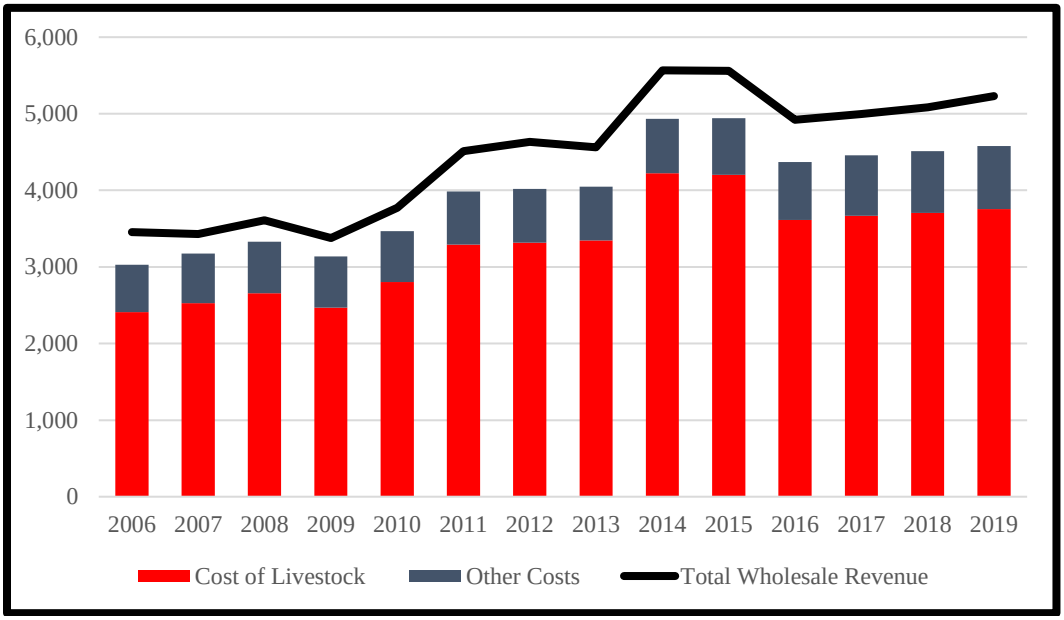


Table 1. Small Facility Revenues and Expenses by Year, $ths

Year	Total Wholesale Revenue	Cost of Livestock	Other Costs	Net Revenue
2006	$3,455.4	$2,409.1	$618.0	$428.3
2007	$3,429.1	$2,526.3	$648.3	$254.6
2008	$3,610.6	$2,656.0	$675.0	$279.6
2009	$3,377.4	$2,469.3	$668.2	$239.9
2010	$3,771.5	$2,802.3	$667.0	$302.2
2011	$4,511.1	$3,290.6	$694.9	$525.5
2012	$4,634.7	$3,316.0	$703.7	$615.0
2013	$4,563.0	$3,347.9	$699.8	$515.4
2014	$5,566.8	$4,224.0	$711.3	$631.5
2015	$5,558.5	$4,202.9	$740.0	$615.6
2016	$4,922.4	$3,614.8	$755.8	$551.9
2017	$4,995.5	$3,668.5	$787.4	$539.7
2018	$5,084.1	$3,704.1	$807.4	$572.7
2019	$5,228.8	$3,756.3	$822.0	$650.5

The estimates presented clearly show that, as expected, the most variable cost is that of procuring livestock. Livestock prices, and therefore costs to processors, are highly influenced by a number of factors, including available inventories, feed costs, transportation costs, and eventually final meat demand and accompanying prices (Brown 2016). Especially for cattle, there were several cycles in the first two decades of the twenty-first century resulting in fluctuations in prices. This also results in fluctuations in net revenue in some years. Domestic and global feed production and demand also influence the costs of producing finished animals and therefore, the producer prices necessary to meet costs. Other costs for processors include labor, industrial supplies, and services required to operate the plant. These cost categories are much more tied to general inflation and as such are much less volatile than either livestock or meat prices.

The budget described above is available in Appendix Table 4, which illustrates specific data for prices and cost categories for the years 2015 through 2019, as well as averages for those years. This budget was used to perform sensitivity analysis surrounding changes in both livestock and meat prices, and the impacts on the estimated bottom line. In order to obtain a reasonable comparison, or baseline, the five-year average of prices and costs from 2015 through 2019 was used to create an “average” budget. These years reflect a movement through livestock cycles, especially cattle cycles, including high- and low-price periods. This average budget is also included in Appendix Table 5.

Sensitivity Analysis

The sensitivity analysis evaluates a breakeven point for net revenue at wholesale prices. The closest breakeven point found in this analysis yields $2 in net revenue. This incorporates the cost to the processor to finish livestock, the price of finished meat products, and how these two interact to find an equilibrium.

The breakeven point is sensitive to the cost of processing. The analysis is based on fluctuations in the 5-year average costs from 2015-2019. Table 2 below provides the average cost for each type of animal in the top three rows. The average cost per pound of cattle is $2.07, per pound of hog is $0.48 and per pound of sheep is $1.82.

The breakeven point is also subject to price adjustments in meat products. Table 2 provides the average price per pound of meat type in the bottom three rows. The average price per pound of beef is $3.34, per pound of pork is $1.47 and per pound of sheep is $3.38.

The equilibrium is contingent on fluctuations in both the cost to the processor and the price of products. We find that at the current 5-year average costs (2015-2019) for both categories, the processing plant yields a Net Revenue of $565,083, as shown in each “Net Revenue” row of Table 2. The table demonstrates three scenarios of evaluation: 1) No change in current average prices, 2) The cost to process livestock increases while the price of finished meat products remains constant, and 3) The cost to process livestock remains constant while the price of finished meat products decreases.

If the price of meat products remains constant, the average cost of processing livestock can increase by up to 15.01% of current prices before the firm reaches a breakeven point. If the cost of livestock increases by 15.01%, the plant will yield a Net Revenue of $1.52. Table 2 provides the new prices after these adjustments. The price of meat products has an even smaller margin of sensitivity. If the cost of processing livestock remains constant, the price of meat products cannot drop more than 11.05% of current prices before the firm is unable to break even. If the price of meat products drops by 11.05%, the plant will yield a negative Net Revenue of ($30.65).

Table 2. Breakeven Analysis of Processing Costs and Meat Prices

Item	5-Yr Average (2015-2019)	% Change	New Amount
Scenario 1: No Change in Current Average Prices			
Cost to Processor			
Avg. Cattle Price, $/lb	$2.07	0.00%	$2.07
Avg. Hog Price, $/lb	$0.48	0.00%	$0.48
Avg. Sheep/Lamb Price, $/cwt	$181.65	0.00%	$181.65
Price of Finished Products			
Beef Avg. Wholesale Price/lb of Meat	$3.34	0.00%	$3.34
Pork Avg. Wholesale Price/lb	$1.47	0.00%	$1.47
Sheep/Lamb Avg. Wholesale Price/lb	$3.38	0.00%	$3.38
Net Revenue	**$565,083**		**$565,083**
Scenario 2: Cost to Process Livestock Increases			
Cost to Processor			
Avg. Cattle Price, $/lb	$2.07	15.01%	$2.38
Avg. Hog Price, $/lb	$0.48	15.01%	$0.55
Avg. Sheep/Lamb Price, $/cwt	$181.65	15.01%	$208.92
Price of Finished Products			
Beef Avg. Wholesale Price/lb of Meat	$3.34	0.00%	$3.34
Pork Avg. Wholesale Price/lb	$1.47	0.00%	$1.47
Sheep/Lamb Avg. Wholesale Price/lb	$3.38	0.00%	$3.38
Net Revenue	**$565,083**		**$1.52**
Scenario 3: Price of Finished Meat Products Decreases			
Cost to Processor			
Avg. Cattle Price, $/lb	$2.07	0.00%	$2.07
Avg. Hog Price, $/lb	$0.48	0.00%	$0.48
Avg. Sheep/Lamb Price, $/cwt	$181.65	0.00%	$181.65
Price of Finished Products			
Beef Avg. Wholesale Price/lb of Meat	$3.34	-11.05%	$2.97
Pork Avg. Wholesale Price/lb	$1.47	-11.05%	$1.31
Sheep/Lamb Avg. Wholesale Price/lb	$3.38	-11.05%	$3.01
Net Revenue	**$565,083**		**($30.65)**

Producer Interviews

Livestock producers ranching cattle, sheep, and bison from various parts of Northern Nevada were interviewed to better understand production practices and the demand for increased local processing capacity. They provided a better understanding of the production factors unique to Nevada as well as a broad array of opinions on the desire to operate outside livestock production most common in Nevada – livestock grazed on private and public lands then sold as feeders.

Cattle and sheep production in Nevada is similar in a few important aspects that are relevant when considering the feasibility of expanding slaughter and processing capacity in the state. The factors that influence the current structure of the livestock industry are driven in large part by climate and include feed availability and animal genetics. The Silver State is an extremely arid four-season climate that produces high quality grass and range lands, primarily in spring through fall and primarily in the northern part of the state. Ranching in this climate cycle means animals held over the winter require either stored feed or transportation to winter rangelands out of state. Stored feed can either be efficiently grown in-state, such as alfalfa and other hay, or imported, such as corn and or other grains which cannot be grown cost-effectively at scale in Nevada. Regardless of winter feed source, the cost per animal to feed over winter in Nevada is more expensive than other times of the year. Feed storage requires additional capital investment and importing grain feed or the use of out of state grazing lands incur significant transportation costs.

Most cattle and lambs are finished on grain, which results in a meat product with white fat marbling that consumers expect. However, the arid Nevada climate does not favor corn or other grain production that is commonly used to fatten livestock. Of course, grain can be, and is, imported to finish livestock in Nevada, but the feed conversion ratio requires that approximately five to seven pounds of grain are required to add one pound of live weight to a beef cow. Lambs require about half the quantity of feed of cattle to gain a pound of live weight. These conversion ratios heavily influence existing U.S. feedlot locations near areas that are highly efficient at producing animal feed as transportation expense is driven by the weight of the freight.

Grass-fed and grass-finished animals tend to result in a leaner product with less marbling and yellow fat that consumers are not used to. The differences in grain and grass finished meat can be minimized through genetic selection and grass selection. However, genetics that favor grass fattening – smaller frame, earlier maturing – are not optimal for the Nevada climate. Similarly, grasses productive for animal weight gain are available for only a short window in Nevada in late spring and provide only about 25% of the days required to grass fatten a cow.

Regardless the type of animal slaughtered and processed, meat production results in byproducts such as offal, tallow, hides and other animal parts not typically processed for consumption in the U.S. Large scale livestock processors have established resale streams that provide additional revenue on top of the cuts of meat destined for U.S. consumers. However, these same byproducts often result in additional disposal costs, in time or money, to smaller processors and individual ranchers who are unable to capitalize on resale streams dependent upon large quantities of byproducts generated at a single location.

Despite challenges related to regional climate regimes and cost-competitiveness of smaller operations with the scale of larger supply chain operators, all of the Nevada ranchers we spoke with were supportive of establishing an additional processing somewhere within the state. Many of the smaller ranchers that were interviewed currently market a few fed or slaughtered animals and indicated a desire to increase these aspects of their operation if additional processing was available in Nevada. Most of these ranchers must truck their animals a great distance for processing, sometimes as far as 800 miles one-way. A closer processing facility would decrease their transportation cost. But a few questions remain unanswered:

1. What distance is considered sufficiently "local" or "close"?
2. What location minimizes transportation costs for a majority of ranchers?
3. Are the transportation cost savings to a 'local' facility sufficient to offset the cost of transporting feed?
4. Is a multi-species processing facility an optimal? Nevada has cattle, bison, sheep, and hogs. Would a single species (e.g. cattle) facility be more efficient/lower cost?
    a. What are the different types of regulations involved?

Many of the ranchers interviewed commented on Nevada's limited slaughter licensing which currently includes two options – full USDA FSIS certified inspection or custom inspection. Most slaughter facilities within the state act as 'custom' processors, which restricts consumption or use of meat to essentially personal use only. USDA certification is required to market meat commercially within and outside of Nevada and the number of slaughter facilities with the necessary USDA certification number three in total. Several interviewees specifically mentioned the lack of a state inspection program like many of the neighboring states have, which would allow for commercial sales within state boundaries. Could a state inspection program reduce the cost of meat processing? And could this program increase the availability of local meat for Nevada consumers interested in buying direct from the ranch?

In order to thoroughly address questions about the optimal state licensing structure, it is necessary to understand consumer demand for Nevada produced meat. Many of the interviewed ranchers interested in expanding Nevada slaughter capacity believe they could increase the number of fed animals to be processed, but are unsure about the extent of demand for the product. The current supply chain in Nevada is not sufficient to process enough animals necessary to sell meat individually by pound of highly-demanded cuts (e.g. steak, roast, ground). Currently, most of the interviewees who sell finished meat do so direct-to-consumer from the ranch. Consumers essentially purchase a portion of the cow, then receive processed beef in 'slab' quantities such as quarters, halves, or whole processed animals. Each quarter includes familiar cuts (e.g. steak, ground) as well as less familiar cuts that customers may also find less desirable (e.g. oxtail). Producers bundle cuts in this manner so they don't end up with freezers full of beef cuts that are less in demand. Interviewees reported that consumers seeking to purchase meat directly from the ranch often don't understand this type of meat product purchasing. They reported consumers, especially those new to direct ranch purchasing, are often surprised to learn that the 100-plus pounds of meat included in a quarter beef is not comprised of only, or primarily, familiar cuts.

Another challenge to marketing direct-to-consumer is the wait time related to processing. Many ranchers indicated they receive numerous calls from consumers interested in purchasing meat at the ranch. However, these orders often go unfulfilled due to the delay from order to processing, the quantity requested for purchase (less than ¼ carcass), or the type of cuts requested. Ranchers who market their beef in this manner process only animals that have been 'purchased' for processing because they lack the storage infrastructure to hold inventory and lack the marketing stream to guarantee that all beef products are sold, not just those in high demand.

In our study, the desire to increase production of fed or slaughtered animals is a stated preference of a hypothetical as opposed to a preference revealed through observed actions. Running a cow-calf operation is a full-time job in itself and it may not be desirable or feasible for ranches to take on other 'jobs' in the beef supply chain such as feeding out animals[4]. This would require accessing a feedlot or purchasing feed. Some ranchers are close to existing feedlots or have their own small feedlots. As seen in Figure 3, the feedlots in Nevada are all located in the northwestern part of the state. The northeast, where a majority of cattle are located currently does not have a feedlot. This is likely due to feedlot proximity to the concentration of processing plants in southern Idaho and northcentral Utah. The proximity to a feedlot could decrease transportation-related feed costs, but the very rural ranches may not have this option. Most ranches in Nevada may not have the ability or desire to add a feedlot to the property. Therefore, additional processing capacity in Nevada would also require expansion of commercial feedlots.

Some of our interviewees stated that marketing processed meat was challenging and time intensive. Establishing wholesale and retail relationships often requires production volume that small and mid-sized ranchers are unable to provide. In interviews, producers stated that advertising is a challenge, and most customers contact them based on word-of-mouth or social media. It's not cost effective or profit maximizing for small producers to hold inventory to sell direct-to-consumer. As discussed previously, ranchers cannot provide meat immediately which frequently results interest gone cold and loss of a sale. With most of the Nevada ranches located in very rural parts of the state, many do not have access to a lot of consumers looking to pay a premium for locally raised meat. So, if we expand processing, how can we expand the local market? How can we make sure our ranchers are able to connect with consumers?

Conclusions

Livestock production is an important and long-running industry in the state of Nevada. The existing structure of the industry is such that animals are sold as feeders primarily to out-of-state interests with connections to components of the meat supply chain that can finish and process animals more cost effectively than can be accomplished within the state. There are some producers that market a small number or animals direct-to-consumer, but the feasibility of expanding this niche market is limited by two key factors – consumer demand and the existing Nevada meat supply chain.

Consumer demand is dependent upon access to consumers given limited wholesale and retail options for small scale production. It is also dependent upon consumer education about the

[4] In fact, this sentiment was stated explicitly in several producer interviews.

timing of product delivery as well as type and quantity of products available for sale. Producers who finish their animals on grass as opposed to grain may also find that customers are not familiar with how the final meat products differ depending on the type of finishing feed.

Perhaps most importantly, the existing meat supply chain infrastructure within Nevada is highly influenced by the state's arid, four-season climate. Nevada lacks processing of any significant scale because there are no feedlots. There are no feedlots because large scale production of finishing grains such as corn requires a significantly wetter climate to produce cost-effectively at scale. Nevada lacks backgrounding operations because our climate is not temperate enough to provide year-round grazing on highly productive grazing lands. However, our climate and grazing lands are well suited for raising high-quality feeder cattle.

Recommendations

A recent commentary gathered information on 13 previous feasibility studies on local processing facilities in the U.S (Richards & Vassalos, 2020). The states included in this study were California, Connecticut, Georgia, Maryland, Massachusetts, Michigan, Montana, New York, North Carolina, Vermont, Virginia, and Wisconsin. As the authors indicated, most studies found the local facilities to not be feasible and if they were considered feasible, there was no resulting facility. This was also the case for the Nevada feasibility study in 2008 (Curtis et al. 2008). These results could be due to the very high investment costs or an incomplete study that failed to properly analyze the seven components of the local meat supply chain (Richards & Vassalos, 2020). These seven components are:

1. Producer Supply – In order to completely understand the types of products Nevada producers currently supply or would like to supply, a comprehensive survey of Nevada producers is recommended.
2. Logistics – based on the survey results, locations with the highest concentration of animals to be slaughtered should be further analyzed. It is also important to include existing processing facilities within Nevada and surrounding states to understand the competition and potential crowding-out effects.
3. Aggregation – Richards and Vassalos (2020) and Gwin, Thiboumery, and Stillman (2013) emphasize the importance of long-term commitments and business relationships to ensure the steady supply of animals for a processing facility. So, is there a way for producers or processors to aggregate animals? Would this require a feedlot associated with the processing facility?
4. Addressing Inspection Systems – As indicated in this report, Nevada does not have a state inspection program. Is there interest by the Nevada Department of Agriculture to create and manage a state inspection program? However, it is important to remember that state inspected meat cannot be shipped across state lines.
5. Slaughter and Processing Capacities – Both phases of this project have addressed the current capacity in the state. However, what is the capacity of processing facilities close to the border in neighboring states? As seen in Figure 3, there are a few processing facilities located in Idaho and Utah and close to the northeastern corner of Nevada.
6. Storage and Distribution – the processing facility or wholesaler will have to have the ability to market processed meat products and store the products before distribution.

7. Consumer Demand - While demand for additional slaughter and processing capacity within the state exists, it appears to be primarily focused on niche production for direct-to-consumer sales. In a stated preference survey, researchers found Nevada consumers are willing to pay a premium for Nevada raised ground beef (Lacy et al. 2021). However, further analysis into consumer demand for specific meat products and demand for Nevada grown meats is the first step in determining feasibility of expanding meat processing at any significant scale. Understanding demand will help determine if the costs associated with expanding state licensing, capital investment of processing facilities, and expanding associated parts of the supply chain such as feedlots is feasible and cost effective for Nevada ranchers.

At the time of report delivery, there are active USDA grant opportunities related to meat processing. In particular, the Meat and Poultry Inspection Readiness Grant (MPIRG) program focuses on covering costs to improve existing processing facilities to achieve FSIS certified inspection or operate under inter-state shipment programs (USDA 2021b).

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Appendices

Appendix Table 1. Livestock and Meat Price Data

	2006	2015	2016	2017	2018	2019	2015-2019 Avg
Live cattle price, $/lb	$1.33	$2.30	$1.96	$1.98	$2.03	$2.07	$2.07
Live hog price, $/lb	$0.47	$0.50	$0.46	$0.50	$0.46	$0.48	$0.48
Live sheep price, $/cwt	$105.10	$193.17	$180.38	$189.11	$170.82	$174.77	$181.65
Beef wholesale price, $/lb	$2.28	$3.63	$3.17	$3.22	$3.29	$3.42	$3.34
Pork wholesale price, $/lb	$1.21	$1.46	$1.50	$1.55	$1.40	$1.45	$1.47
Sheep meat wholesale price, $/lb	$1.99	$3.47	$3.33	$3.39	$3.32	$3.40	$3.38

Appendix Table 2a. Budget Cost Categories and Description of Inflators Used for Updating – Salaries and Wages

Budget Category	Update index used	Description	Source
Processing Facility Salaries and Wages			
Plant Manager	CIU20200001100001	Wages and salaries, Private Management, business, and financial	BLS
Product/Brand Marketing Manager	CIU20200001100001	Wages and salaries, Private Management, business, and financial	BLS
Butcher	CIU20200005100001	Wages and salaries, Private Production	BLS
Seasonal Employees	CIU20200005100001	Wages and salaries, Private Production	BLS
Office Staff	CIU20200002200001	Wages and salaries, Private Office and administrative support	BLS
Taxes/Benefits	CIU20330000000001	Total benefits for Private industry workers in Manufacturing	BLS

Appendix Table 2b. Budget Cost Categories and Description of Inflators Used for Updating – Processing Facility Expenses

Budget Category	Update index used	Description	Source
Processing Facility Expenses			
Accounting & Legal	PCU541219541219P	PPI, Other accounting services-Primary services	BLS
Legal Services	PCU5411--5411--	PPI, Legal services	BLS
Bank Charges	PCU522110522110	PPI, Commercial banking	BLS
Business License		Nevada Department of Agriculture Facility Licensing Fee	NV Dept. of Agriculture
Depreciation - Building	WPU80110401	PPI, Construction (partial)-New industrial building construction	BLS
Depreciation - Furniture & Fixtures	WPU122	PPI, Furniture and household durables-Commercial furniture	BLS
Depreciation - Equipment	WPU116104	PPI, Commercial food products machinery	BLS
Equipment Replacement & Repairs	WPU116105	PPI, Industrial food products machinery for processing foods	BLS
Insurance: Builders Risk	PCU9241269241267	PPI, Premiums for other property and casualty insurance	BLS
Insurance: Workers Compensation	PCU9241269241266	PPI, Premiums for worker's compensation insurance	BLS
Insurance: General Liability	PCU9241269241264	PPI, Premiums for non-auto liability insurance	BLS
Insurance: Business Personal Property	PCU924126924126	PPI, Premiums for property and casualty insurance	BLS
Janitorial	PCU56172-56172-	PPI, Janitorial services	BLS
Loan P & I Payment	PPPI9INT	Prices Paid Index - Interest	Ag Prices, Annual Summary
Office Supplies	PCU33994-33994-	PPI, Office supplies (excl. paper) mfg.	BLS
Packaging Supplies	WPU09150336	PPI, Folding paperboard boxes, packaging, and packaging components	BLS
Postage	PCU491110491110	PPI, U.S. Postal Service	BLS
Property Taxes	PPPI9TAX	Prices Paid Index - Taxes	Ag Prices, Annual Summary
Utilities	WPU0543	PPI, Industrial electric power	BLS
Total Processing Facility Expenses	PPPI9WRT	Prices Paid Index - Labor	Ag Prices, Annual Summary

Appendix Table 3. Indices Used for Updating, 2006=100

Cost Category	Index	2006 Base	2015	2016	2017	2018	2019
Plant Manager	CIU20200001100001	100	122	125	128	132	135
Product/Brand Marketing Manager	CIU20200001100001	100	122	125	128	132	135
Butcher	CIU20200005100001	100	119	122	126	130	134
Seasonal Employees	CIU20200005100001	100	119	122	126	130	134
Office Staff	CIU20200002200001	100	122	126	129	133	138
Taxes/Benefits	CIU20330000000001	100	122	124	127	129	131
Processing Facility Expenses							
Accounting & Legal	PCU541219541219P	100	109	110	116	123	128
	PCU5411--5411--	100	137	140	145	149	154
Bank Charges	PCU522110522110	100	90	89	91	96	99
Business License							
Depreciation - Building	WPU80110401	100	121	121	125	130	138
Depreciation - Furniture & Fixtures	WPU122	100	120	121	123	127	132
Depreciation - Equipment	WPU116104	100	122	124	124	129	132
Equipment Replacement & Repairs	WPU116105	100	138	141	144	148	152
Insurance: Builders Risk	PCU9241269241267	100	110	112	112	113	114
Insurance: Workers Compensation	PCU9241269241266	100	96	97	96	93	92
Insurance: General Liability	PCU9241269241264	100	103	103	104	105	106
Insurance: Business Personal Property	PCU924126924126	100	117	120	123	126	128
Janitorial	PCU56172-56172-	100	115	116	117	118	118
Loan P & I Payment	PPPI9INT	100	108	114	123	126	126
Office Supplies	PCU33994-33994-	100	112	115	116	119	122
Packaging Supplies	WPU09150336	100	112	113	112	110	114
Postage	PCU491110491110	100	131	131	132	135	140
Property Taxes	PPPI9TAX	100	166	157	164	166	168
Utilities	WPU0543	100	129	124	139	143	141
Labor	PPPI9WRT	100	125	130	134	142	149

Appendix Table 4a. Processing Facility Budget: Revenues Summary

	2006 Base	2015	2016	2017	2018	2019	2015-2019 Avg
Avg. Cattle Price, $/lb	$1.33	$2.30	$1.96	$1.98	$2.03	$2.07	$2.07
Carcass Weight, lbs	800	800	800	800	800	800	800
Total Carcass Price	$1,060.48	$1,841.92	$1,569.20	$1,585.76	$1,621.20	$1,653.36	$1,654.29
Number of Animals	2016	2016	2016	2016	2016	2016	2016
Cost of Goods	$2,137,928	$3,713,311	$3,163,507	$3,196,892	$3,268,339	$3,333,174	$3,335,045
Avg. Hog Price, $/lb	$0.47	$0.50	$0.46	$0.50	$0.46	$0.48	$0.48
Carcass Weight, lbs	200	200	200	200	200	200	200
Total Carcass Price	$94.52	$100.46	$92.30	$100.92	$91.84	$95.90	$96.28
Number of Animals	120	120	120	120	120	120	120
Cost of Goods	$11,342	$12,055	$11,076	$12,110	$11,021	$11,508	$11,554
Avg. Sheep/Lamb Price, $/cwt	$105.10	$193.17	$180.38	$189.11	$170.82	$174.77	$181.65
Carcass Weight, lbs	69.6	69.6	68.7	68.4	70	66.3	64.8
Total Carcass Price	$73.15	$134.45	$123.92	$129.35	$119.57	$115.87	$117.71
Number of Animals	3552	3552	3552	3552	3552	3552	3552
Cost of Goods	$259,827	$477,553	$440,168	$459,456	$424,727	$411,579	$418,103

Appendix Table 4b. Processing Facility Budget: Revenues Detail

	2006 Base	2015	2016	2017	2018	2019	2015-2019 Avg
Beef							
Carcass Weight, lbs							
Meat	585	585	585	585	585	585	585
Trim	175	175	175	175	175	175	175
Avg Wholesale Price/lb of Meat	$2.28	$3.63	$3.17	$3.22	$3.29	$3.42	$3.34
Wholesale Value per Cow of Meat	$1,334.97	$2,122.38	$1,853.28	$1,880.78	$1,922.31	$1,997.78	$1,955.30
Avg Price/lb of Trim	$1.22	$1.93	$1.83	$1.82	$1.82	$1.86	$1.85
Wholesale Value per Cow of Trim	$122.72	$195.11	$170.37	$172.90	$176.72	$183.65	$179.75
Total Carcass Wholesale Revenue	$1,457.69	$2,317.49	$2,023.65	$2,053.67	$2,099.03	$2,181.43	$2,135.05
Pork							
Total Pork Weight	200	200	200	200	200	200	200
Assume 16% Waste	168	168	168	168	168	168	168
Avg Wholesale Price/lb	$1.21	$1.46	$1.50	$1.55	$1.40	$1.45	$1.47
Total Carcass Wholesale Revenue	$203.95	$244.78	$252.17	$261.07	$235.37	$244.27	$247.53
Sheep/Lamb							
Avg Price per Sheep/Lamb	$206.84	$264.42	$261.78	$259.33	$257.90	$260.53	$260.79
Total Sheep/Lamb Weight	69.6	69.6	68.7	68.4	70.0	66.3	64.8
Avg Wholesale Price/lb	$1.99	$3.47	$3.33	$3.39	$3.32	$3.40	$3.38
Total Carcass Wholesale Revenue	$138.57	$241.30	$228.74	$231.99	$232.06	$225.72	$219.13
Wholesale Total Revenue Summary							
Beef	$2,938,707	$4,672,055	$4,079,678	$4,140,203	$4,231,636	$4,397,759	$4,304,266
Pork	$24,474.24	$29,373	$30,260	$31,329	$28,244	$29,313	$29,704
Sheep/Lamb	$492,213.43	$857,109	$812,497	$824,012	$824,263	$801,755	$778,332
Total Wholesale Revenue	$3,455,395	$5,558,538	$4,922,435	$4,995,544	$5,084,143	$5,228,826	$5,112,302

Appendix Table 5. Processing Facility Budget: Expenses and Net Revenues

	2006 Base	2015	2016	2017	2018	2019	2015-2019 Avg
Processing Facility Wholesale Revenue							
Beef	$2,938,707	$4,672,055	$4,079,678	$4,140,203	$4,231,636	$4,397,759	$4,304,266
Pork	$24,474	$29,373	$30,260	$31,329	$28,244	$29,313	$29,704
Sheep/Lamb	$492,213	$857,109	$812,497	$824,012	$824,263	$801,755	$778,332
Total Wholesale Revenue	$3,455,395	$5,558,538	$4,922,435	$4,995,544	$5,084,143	$5,228,826	$5,112,302
Less Cost of Goods	$2,409,097	$4,202,919	$3,614,751	$3,668,458	$3,704,087	$3,756,261	$3,764,702
Gross Revenue	$1,046,298	$1,355,618	$1,307,684	$1,327,086	$1,380,056	$1,472,565	$1,347,601
Salaries - Processing Facility							
Plant Manager (1)	$72,100	$87,968	$90,169	$92,458	$94,924	$97,354	$92,575
Product/Brand Marketing Manager (1)	$83,441	$101,805	$104,352	$107,002	$109,855	$112,668	$107,136
Butcher (1)	$42,000	$50,052	$51,449	$52,971	$54,554	$56,241	$53,054
Seasonal Employees (1)	$21,440	$25,550	$26,264	$27,040	$27,849	$28,710	$27,083
Office Staff (1)	$24,788	$30,198	$31,132	$31,975	$33,043	$34,128	$32,095
Taxes/Benefits	$36,565	$44,473	$45,268	$46,283	$47,252	$48,010	$46,257
Total Processing Facility Salaries	$280,334	$340,046	$348,634	$357,729	$367,477	$377,112	$358,200
Processing Facility Expenses							
Accounting & Legal	$3,600	$4,441	$4,503	$4,706	$4,902	$5,075	$4,725
Bank Charges	$300	$269	$266	$272	$288	$297	$278
Business License	$145	$145	$145	$145	$145	$145	$145
Depreciation - Building	$38,611	$46,631	$46,907	$48,086	$50,367	$53,355	$49,069
Depreciation - Furniture & Fixtures	$3,636	$4,378	$4,398	$4,464	$4,612	$4,799	$4,530
Depreciation - Equipment	$6,921	$8,414	$8,590	$8,608	$8,957	$9,151	$8,744
Equipment Replacement & Repairs	$1,200	$1,655	$1,694	$1,732	$1,773	$1,826	$1,736
Insurance: Builders Risk	$10,000	$11,041	$11,179	$11,228	$11,267	$11,415	$11,226
Insurance: Workers Compensation	$15,000	$14,439	$14,517	$14,335	$13,943	$13,735	$14,194
Insurance: General Liability	$2,500	$2,586	$2,577	$2,597	$2,632	$2,654	$2,609
Insurance: Business Personal Property	$1,000	$1,167	$1,198	$1,233	$1,259	$1,278	$1,227
Janitorial	$4,800	$5,522	$5,592	$5,619	$5,642	$5,670	$5,609
Loan P & I Payment	$183,276	$197,529	$208,569	$224,629	$230,651	$231,454	$218,566
Office Supplies	$1,800	$2,007	$2,070	$2,084	$2,133	$2,202	$2,099
Packaging Supplies	$6,000	$6,699	$6,765	$6,705	$6,584	$6,819	$6,714
Postage	$1,200	$1,577	$1,567	$1,582	$1,615	$1,677	$1,604
Property Taxes (3.0316)	$45,652	$75,956	$71,776	$74,911	$75,956	$76,479	$75,016
Utilities	$12,000	$15,535	$14,833	$16,708	$17,153	$16,896	$16,225
Total Processing Facility Expenses	$337,641	$399,992	$407,146	$429,644	$439,880	$444,926	$424,318
Net Revenue at Wholesale Prices	$428,322	$615,581	$551,903	$539,713	$572,699	$650,527	$565,083