

Supply Chain Considerations in the
Formation of a Regional Cull Cow Cooperative

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EXECUTIVE SUMMARY

“This squall between the packers and the producers of this country ought to have blown over forty years ago, but we still have it on our hands...”

Senator John B. Kendrick of Wyoming, 1919

Cull cows represent fifteen to twenty percent of the average cow/calf operation's annual income. Many of these animals are sold when markets are at their seasonal lows, and their body condition is less than optimal. This represents a lost opportunity cost to producers of approximately \$100 per head sold. Forming a cull cow cooperative is one way of correcting these problems.

Local groups, including statewide organizations, have previously explored such an arrangement, but available numbers of animals require members be recruited from several states; this study examined cow numbers from members recruited from Colorado, Nebraska and Wyoming. This is a minimum; greater market power would exist if members, and increased cow numbers, came from an even wider area, including Montana and the Dakotas. While such a group has models to follow from the fat cattle and sheep industry, there are many unknowns. Because of this, and other unresolved questions, a strategic alliance with a packer(s) is the relationship of choice for this cooperative.

The cooperative would likely be more successful if their agreement is reached with one of the large packers; economies of scale, scope and utilization favor the largest packers. Two of these firms, Smithfield Company, and Swift & Company operate plants within the region that process cull cows. Purchasing an existing plant is a less desirable option; a greater level of involvement by the cooperative would be necessary, along with assistance of a partner, in order to gain access to market channels. Building a new plant would be the most expensive means of accomplishing the goals of this cooperative; the requirements for purchase of an existing plant are present, along with the extended time required to bring a new plant on-line and start-up costs.

Transportation analysis revealed five firms with the lowest live animal transportation costs. They were Smithfield Company, Swift & Company, Gibbon Packing Co., Inc., Lovett and Sons Packing Co. and Greater Omaha Packing. During negotiations, other firms may become more attractive, if they offer prices for carcasses greater than the transportation differential. Network analysis revealed the optimum location of a plant for the regional entity to be near Ogallala, Nebraska; such sites were determined for each state, but economies of scale gravitate away from that option.

The strategic alliance arrangement offers both parties economic rents to bind an alliance. Cooperative members would receive higher prices because of spreading flow over seasonal high prices, rather than spot marketing at seasonal lows; through feeding these cows, and awareness of cow condition and finish, they can also improve carcass quality. Packers would have lower procurement and transaction costs, and improve utilization, through smoother raw product flows.

Current technology offers the means to improve quality and account for individual animals, optimizing profitability through timely processing and improved feeding techniques. The cooperative should offer benchmarking information on this effort, and could benchmark other profitability metrics for member operations. This would lead to increase profitability for members in all aspects of their operations.

A successful effort in this area could lead to similar relationships regarding calves and fat cattle. While the monetary benefits drive this effort, as they should, the greatest gain may result from building trust between members of the beef supply chain. Mistrust within the beef industry has certainly harmed all participants; if not eliminate this mistrust now, WHEN?

INTRODUCTION

The Wyoming Stock Growers Association (WSGA), as a result of the value-added study completed in 2002 (Kennedy), would like to explore in greater depth the opportunities present in the formation of a cull cow cooperative. Many of the benefits, as well as pitfalls of forming such a group are associated with supply chain management. These animals represent fifteen to twenty percent of most cow/calf operators' annual income (Feuz). These animals are often marketed in a haphazard manner, often when dictated by operational convenience, rather than in a manner intended to maximize profit. It has often been the case that the low point of the cash market for these cows falls in November and December; the cows, when going directly to slaughter are yellow-fat, as opposed to white fat. This yellow fat, considered less desirable in the United States, and the lower than optimal body condition scores of these animals lead many to believe that producers are losing approximately \$100 per head in opportunity costs (Feuz, Robinson, Spreen).

Considering that no commercial size beef packing plants exist in Wyoming, and capacity for cow slaughter in Colorado and Nebraska is quite limited relative to cow numbers, one option that has been considered by cow/calf operators is the construction of a slaughter plant. However, much of the problem is one of flow, rather than lack of total capacity. If a cooperative can offer year round consistent supplies and higher quality cattle, the possibility of intense interest on the part of many packers in some type of arrangement is not nearly as remote as when looked at from the view of even the largest cow/calf operator.

Such a venture also serves as a learning tool, in that producers assume less risk to the total income of their operation where they are venturing relatively small amounts of capital on a small portion of total income, rather than involvement in retained ownership of calves. This may also serve as an entry point to further business relationships with feeders, packers or other new generation cooperatives.

STRATEGIC CONSIDERATIONS

Regardless of individual sentiment regarding packer concentration, the top five packers processed eighty-one percent of all cattle slaughtered in the US in 2001 (Kay). While many members of WSGA or affiliated groups may desire to change this trend, they also need to look to the profitability and long-term viability of their individual operations. The deciding factor should be which arrangement offers the highest long-term returns to the cooperative and its members. Consolidation in the beef packing industry has another effect, that of exerting pressure on smaller packers (Ward). While by disposition, many potential members might prefer to align with smaller packers, the question of their long-term viability should also be borne in mind. There are numerous facets of the economies of size, scope and utilization to be considered in the operation of packing facilities.

Several recent studies by Paul, Ward and McDonald have quantified the cost structure associated with economies of size in the beef packing industry (Appendix Table 2). This research indicates that the primary competitive advantage large packers enjoy over small packers is in the areas of process; the factor that tends to obviate this advantage is procurement of animals. The obverse is that one of the

primary benefits a proposed cooperative can offer to a packer is decreased procurement costs; this benefit would thus be of more value to large packers.

Economies of scope enter in two ways; the first being the number of plants operated by a given firm. The previously cited studies indicate that food safety problems affecting a given plant damage a packer owning multiple plants less than the effect the same problem would have on a firm operating a single plant. Another area where economies of scope enter in would be in the processing of multiple species. Although multi-species plants were the norm during the first half of the Twentieth Century, these plants have disappeared along with the terminal market. However, four of the top five beef packing firms are also large hog packers; this may be especially important to the cull cow discussion, as these firms already operate processing facilities that use large amounts of manufacturing beef, thus utilizing partially processed meat from their hog operations as well. This advantage may account for some of the recent closures of small cull cow packing plants.

Economies of utilization are another area where larger packers enjoy some advantage. Consider the right-hand column in Table 3 of the Appendix; it would appear that utilization is lower among smaller packers, even among the top 30 beef packers. This becomes more obvious if blocks of five packers' utilization rates are averaged; the top five firm's average utilization is 263 days per year, versus ranks twenty-one through twenty-five utilization of 221 days and ranks twenty-six through thirty of 226 days. This may be due, as stated by Paul, to higher total fixed costs among the largest firms driving these firms to utilize their plants more fully, in an effort to lower average unit fixed costs.

Considering the building of a plant in an industry that has overcapacity in many locations does not seem to be a viable option. Future Beef Operation is the most recent example of such a plant. Purchase of an existing plant is probably more reasonable, two such plants are included in the network analysis done as part of this study. However, one of these plants, Pierce Packing in Billings, Montana, has been closed intermittently for twenty years; the costs to remodel may be high. There are also questions about environmental permits, as well as difficulties with the economic viability of operating rendering facilities at small plants. Another plant that is on the market, Lovett and Sons, Hastings, Nebraska, ceased operations in December, 2002; there had been some effort by affiliates of the Rocky Mountain Cooperative Development Center to purchase this plant. The most recent information is that this effort has ceased (Mailander).

If the cooperative feels that owning a plant is their best option, the possibility of a joint venture with an existing packer is another possibility. This would bring experience relating to the operation of a packing plant, as well as business ties to a larger operation. However, in light of large packer's behavior in such ventures recently, such an option should be approached with caution; the experience of the Iowa Cattlemen's Association with Excel Corporation regarding the Tama, Iowa plant is a case in point. One of the plants evaluated in the transportation study, at Gibbon, Nebraska, was given to the local economic development group by IBP, rather than selling this plant on the open market. Given that IBP/Tyson is a for-profit firm, this should raise questions about the long-term profitability of this particular plant.

Assuming that building or buying a plant is not an option, at least in the near future, what type of affiliation with a selected packer(s) would function in the best interest of the coop. While a firm contract might be desirable, the coop will likely start with minimal experience in these matters. The possibility of a strategic alliance is therefore seems the most viable option. There are many unknowns with this project, first of which may be the ability of the group to offer a year-round supply of consistent quality cull cows. It may take some time for any packer to build outlets for substantial amounts of higher quality cow beef. A strategic alliance will offer packers the ability to decrease the acquisition costs of higher quality raw materials; transportation costs can likely be decreased because routes can be planned earlier. Truckers can be solicited to provide transportation for a given period, knowing in advance the routes up to one year prior to shipment. The previous discussion regarding economies of scale among large packers would lead one to believe that economic rents may exist in the relationship envisioned here, binding the allies to one another.

This is not to say that some type of option on an existing plant should not be considered during negotiations with packers. Changes can and will occur in the operation or ownership of these plants; holding an option to purchase some portion of ownership in selected plant(s) may serve to show packer management of serious intent.

Finally, during the solicitation phase of development of the cooperative, the importance of feeder members should be remembered. If sufficient feedlot capacity joins this effort, supplying high quality cows weekly will be relatively easy. Cows, as compared with fed cattle, require lower protein content in fattening rations; presently, ionophores and implants are not often used on cull cows, leading one to believe that the opportunity exists to improve feedlot efficiency of these animals.

TRANSPORTATION

Transportation issues are one of the two primary reasons for the completion of the network analysis contained in this study. Average transportation costs for regions of all three states were obtained from custom rate publications of the respective land-grant colleges. As the analysis was in its beginning stage, the inadequacy of some of this data came to light; the publication from the University of Wyoming was four years old, while data from Colorado State and University of Nebraska was collected as of January of 2002. The author of the Wyoming report was contacted, stating that a new report was due out in early April. The Wyoming Trucking Association was contacted, and a phone survey of prices from all firms hauling cattle was obtained; the mean price for two regions of Wyoming was then incorporated into the spreadsheet.

Latitude and longitude of each county seat within the region was obtained from the Delorme's 3-D TopoQuads. These points were then converted to miles relative to a nearly central point, latitude 40° north, longitude 102° west, to obtain the x and y coordinates for the transport cost and network analysis. Cow numbers in each county as of January 1, 2001, and 2002 were obtained from the National Agricultural Statistics Services' Internet Published Estimates Data Base. It was felt that normally, fifteen percent of a given cowherd would be culled, annually. This would equate to a productive life of 8.66 years for the average beef cow; this is probably conservative. After speaking with two of the principals involved in the formation of the Rocky Mountain Lamb Cooperative, twenty percent was felt to be an

accurate number for the proportion of producers who would commit to joining such a venture.

Persons familiar with the beef packing industry will find that not all packing plants in the region were included; those who process only fat cattle, according to Cattle-Fax, were omitted from the list. Geographic data regarding the location of plants outside of the three states were obtained from the Bureau of the Census' Zip Code data base website. Two of the plants listed, Pierce Packing in Billings, Montana and Lovett and Sons Packing, Hastings, Nebraska, are presently closed. Pierce Packing has been closed intermittently since 1983; Lovett and Sons ceased operations in late December, 2002. All other plants and firms evaluated rely in part on cull cows for a portion of their live cattle supply.

The results of this spreadsheet analysis are that Packerland Packing Company, a division of Smithfield Company, had the lowest freight cost, at \$13.47 per head. Swift and Company was ranked second at \$14.77 per head, Gibbon (Nebraska) Packing Company at third with costs of \$14.89 per head, Lovett and Sons Packing fourth at \$16.06 and Greater Omaha Packing finishing the top five ranked by transportation costs at \$21.72. All other packers had a transportation cost greater than \$26.00 per head; the maximum for firms evaluated was \$53.93 per head. The top ten firms are presented in chart number one of the Appendix, while all firms are presented in table two, at the same location.

All of the firms evaluated here, with the exception of Smithfield, and Swift, only operate one plant that harvests cull cows, within this region or adjacent states. Smithfield operates two plants, with the model showing lower transportation costs to

the Gering, Nebraska plant in all counties except three in the extreme southwest corner of Colorado, which were less expensively shipped to their plant at Tolleson, Arizona. Four plants that Swift operates in the region process cows, the analysis revealed that none would be shipped to the Nampa, Idaho plant if shipping costs were the only consideration. Their Omaha, Nebraska plant received fifty-two percent, Hyrum, Utah slightly under thirty percent, and Dumas, Texas over eighteen percent of delivered animals.

This analysis does not mean to imply that members from other states within the region should not be recruited; data from such members can be readily entered into the model, as can actual numbers of cows committed. This analysis could change substantially if the number of cattle committed were different from the initial assumptions made in this model. Prospective members should also remember that this is a tool for negotiation; prices paid for individual carcasses could negate gains from savings on transportation. This may also be used to set allowances for transportation, in addition to recruiting feedlots near packing plant(s), which would create a situation where delivery delays, primarily due to weather, could be dealt with rapidly and efficiently.

FACILITY DECISIONS

During completion of the above analysis, a network analysis was also completed. The optimal site for a plant, given the assumptions regarding transportation costs and numbers of animal committed, would be approximately thirty-five miles north of Ogallala, Nebraska. When states were evaluated individually using this method, the Nebraska site moved thirty miles east, approximately thirty-five miles north northwest of North Platte, Nebraska. The optimal Colorado location was located immediately west of the United States Air Force Academy; the Wyoming site was located thirty-five miles northwest of Casper, Wyoming. When economies of scale, scope and utilization are considered, only the Nebraska site looks viable, and that not without considerable additional volume, whether that be fed or non-fed beef.

Although individual state analyses were completed, the probable number of cows that would be committed to such a statewide venture make this less than practical on a commercial basis. Colorado and Wyoming individually will likely commit approximately 24,000 head annually, which would equate to less than one day's supply for a small plant such as the Packerland facility at Gering. Nebraska's probable commitment represents 1.2 days supply of weekly slaughter for Swift's Omaha plant.

The decision to open and operate such a plant would require considerable time; permitting for environmental consideration could easily take three years, which would delay payout on any investment in the cooperative. Consideration of economies of scale with regard to rendering make establishing a plant far from

rendering facilities impractical, as some estimate that optimum economies exist only when a plant reaches 5,000 head per day of capacity. Outside expertise would be necessary, and entry into marketing channels obtained. One need only look to the difficulties encountered by Future Beef Operations, or the time spent by the Iowa Quality Beef network beginning operations at their Tama, Iowa plant to see the possibilities. Some type of alliance with existing packers obviates the need to consider these items.

INVENTORY MANAGEMENT

The primary benefit this cooperative can offer to a packer is that of raw material inventory management and procurement. Along with the highly seasonal nature of prices for cull cows, supplies are often low during other times of the year (Robinson). Supplying a dependable daily quantity of cows for processing will lower the plant's cost of maintaining a network of order buyers, and transportation in the spot market. While there will be greater accounting costs where individual animal data is recorded, this will be offset to some degree by only dealing with one entity, rather than numerous auction yards and brokers. The use of electronic identification can also serve to automate much of this process, in addition to aiding quality evaluation during sorting and fattening.

Dealing with allotments to members during the creation of this organization is problematic. One would anticipate that many cow/calf members would wish to take 'slots' during the times that they now normally cull. Extensive price data will help convince members to choose delivery slots for times where cows are traditionally in

short supply. This highlights the importance of feeder membership. Feeders will need to function as the funnel through which carcass quality is improved, in addition to regulating flow. Cows that are able to winter on after-feed or pasture can be carried forward to late winter and spring months by ranchers or feeders, when they can then be fattened in lots. The cooperative could also negotiate with feedlots to perform this function. Feeder member could also purchase cows on the open market to fulfill their delivery obligations; if members fail to fill slots, the cooperative may also need to procure cows in this manner, until the problem is resolved.

The use of a relatively new risk management tool would also be considerable easier under the umbrella of this cooperative; that being the use of lean beef futures contracts to cross hedge these cull cows. This was specifically mentioned by Graff in 1997, when she said "... these producers would need to group cull-cow sales with other producers." This would be another area where the expertise of a large packer could be used to the benefit of cooperative members, such hedging could be easily be done by their risk management personnel. Under a strategic alliance, such hedging efforts could be designed so as not to be duplicative, thus adding to the economic rents of each partner.

QUALITY

This is the second primary benefit this cooperative can offer a packer. This can be accomplished by two means; first, incorporation of feeders into the cooperative. This, aside from smoothing the flow of cows, serves to use existing technology to increase the grade and yield of the cows harvested. The seasonal

nature of cull market price is well documented. Prices for energy feeds are the primary determinant of cow-feeding profitability, aside from beef prices; the seasonal high price is usually during March, when cows placed on feed during November and December will be ready for processing.

Further implementation of the Beef Quality Assurance program will also offer increased returns to members; long-time participants in BQA will likely see fewer discounts on cows as they will be sold based on carcass quality. Due to the time span from BQA implementation until cull cows are harvested, producers just beginning BQA will not see results for several years. The same is true of genetic improvement in the cow herd.

Initially, BQA membership should not be required; however, a time definite for this quality program to become mandatory for members would be desirable. Education will need to be an integral part of this program; timing of culling is important to maximize the value of cows sold through this program. Improving this salvage value must be offset against the possible profits of the cow raising an additional calf. Cows that have structural or medical problems need to be immediately harvested; some means to accommodate this within the structure of the cooperative can be devised. Care should be taken that this does not become a dumping ground for animals that cannot be sold through auction channels.

ACCOUNTING

Individual identification of animals is vital if this enterprise is to succeed. At member feed yards, cows from multiple producers may be fattened together; a

system that fully accounts for cost and performance of the individual animal will be necessary for success. Cows could be electronically tagged when they are assembled at central points. Ultrasound and visual scoring to decide what animals should go directly to harvest could take place at this time; cows going to feed could also be vaccinated and implanted, at this stage.

There is presently no means to accurately identify cows that will not improve their Body Condition Score efficiently once they are in the feedlot. One feeder the author spoke with indicated that in northern cows, this number is usually around five percent; their experience is that this percentage rises as the proportion of cows originating from the southern plains increases (Hasbrouck). Two to three years of data might allow the group to learn some means of identifying these animals prior to their being placed on feed.

BENCHMARKING

This venture offers a means for producers to benchmark performance regarding carcass, quality, and price information with other members; depending on the packer selected, benchmarks from several plants may also be available. Obtaining access to this information should be one of the goals of the group during negotiations with packers.

Finding and utilizing these benchmarks does not imply creating a new middleman; firms such as AgSpan and identiGen presently offer these services. Several members of WSGA participate in these programs; it is likely that several members of sister groups in Colorado and Nebraska are participants. This firm can

also aggregate data from within the group such that individual operations retain anonymity, while still providing access to information that may be used by members to improve their operations.

This cooperative could function as a clearinghouse for benchmarks regarding other aspects of cow/calf operations, such as cost per pound of beef weaned, cost of gain for retained ownership and quality benchmarks for carcass fat cattle. The value of this should be obvious; if such data is collected, it should be closely held for the benefit of members of the cooperative. The internet offers a means for this information to be readily available, yet closed to the public, through the use of password protection.

CONCLUSION

The concept of forming a regional cull cow cooperative serves several important functions when thought of from a supply chain management perspective. Perhaps the most important area of improvement will be in the area of improving trust between cow/calf producers and packers, resulting from a successful relationship. The current relationship is strained at best; knowledge obtained from this venture might begin to build awareness of the mutual dependency of these parties. Another benefit would be in cooperation between producers; they do have benefits to offer other members of the beef supply chain, especially if they actively participate in alliances such as this.

Strategic considerations should lead this group to look at a Strategic Alliance as the best option for a cull cow cooperative, at least in the short and intermediate

term. The group would more easily be able to adjust to obstacles encountered during the initial period of operations, under a strategic alliance. Wise initial choices regarding selection of an ally may make or break this venture. The necessary commitment of cows to this venture will be at a point where a packer can discontinue other procurement efforts for their cull cow slaughter, necessitating regional participation; this is one of the primary rents such a coop can offer their partner.

Quality of the raw product would be another rent offered by the coop. Producers are presently surrendering on average an additional \$100 per cull cow sold, by not improving Body Condition Scores, and feeding cows to eliminate yellow-fat. Quality improvements in beef are primarily available to beef producers where information about the performance and worth of individual animals can be recognized; more producers realize this in calf and fat cattle than presently appreciate this fact in the marketing of culls. Benchmarking information, especially in the cow/calf portion of the supply chain had tended to be generic, most often oriented to production standards, rather than profitability standards.

Orienting independent-minded cow/calf producers toward cooperating with each other will not be an easy task; this lesson may be easier learned at this point rather than at the point of desperation, which has driven the domestic sheep industry to this realization during the past several years. To accomplish this, champions of the concept will need to come to the fore during the subscription phase, and be active throughout the region, at the local level. While drought is in the forefront of producer's minds, along with the changes drought has caused to the US cattle cycle, now is the time to plan for greater profitability throughout the beef supply chain.

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APPENDIX

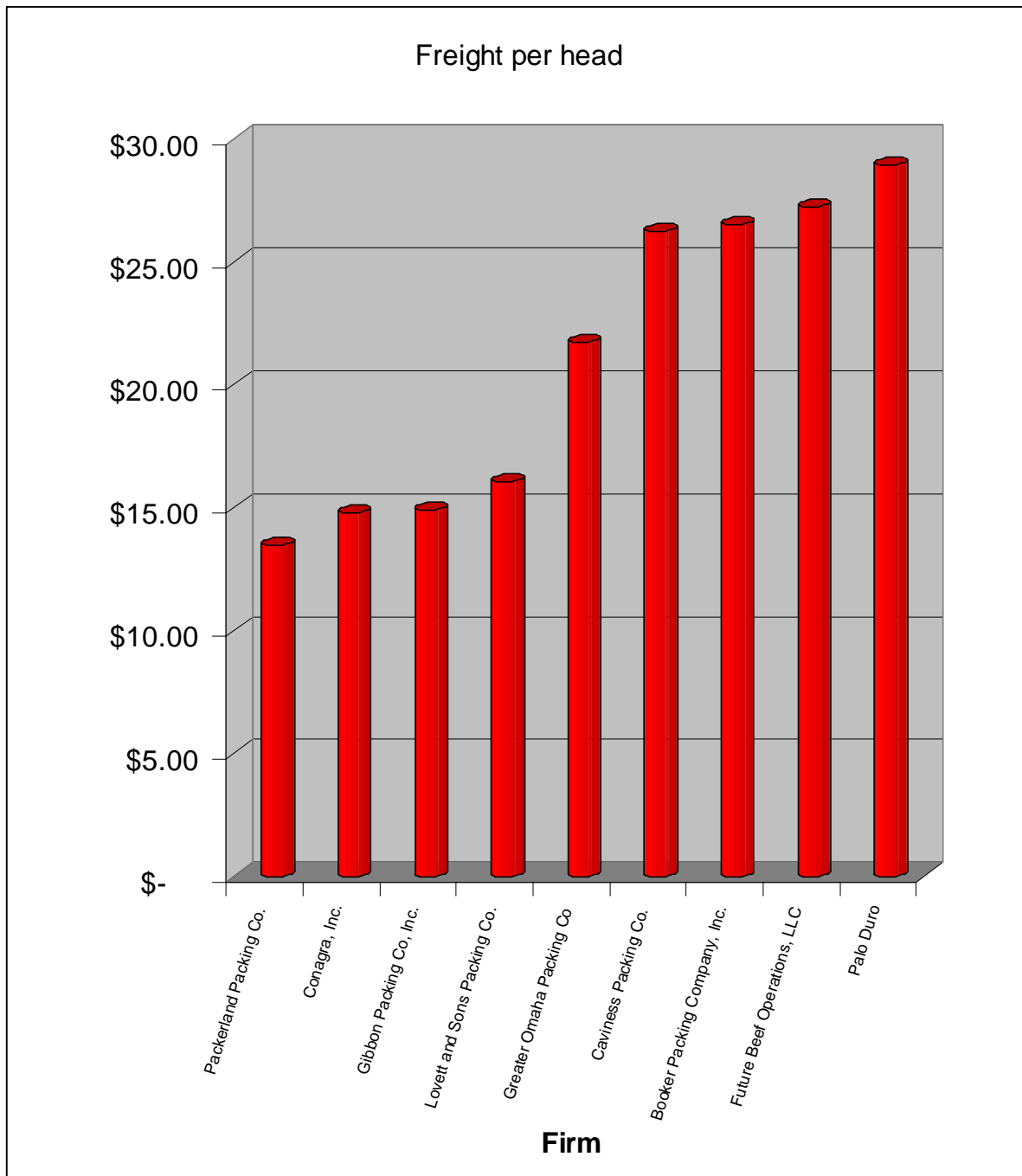
Table 1 – Ranking of regional cow packers by transportation costs

<i>Plant Name</i>	<i>City</i>	<i>State</i>	<i>Freight per head</i>	<i>Rank on \$ for Transport</i>
Packerland Packing Co.			\$ 13.47	1
Conagra, Inc.			\$ 14.77	2
Gibbon Packing Co, Inc.	Gibbon	NE	\$ 14.89	3
Lovett and Sons Packing Co.	Hastings	NE	\$ 16.06	4
Greater Omaha Packing Co	Omaha	NE	\$ 21.72	5
Caviness Packing Co.	Hereford	TX	\$ 26.24	6
Booker Packing Company, Inc.	Booker	TX	\$ 26.51	7
Future Beef Operations, LLC	Arkansas City	KS	\$ 27.19	8
Palo Duro	Amarillo	TX	\$ 28.92	9
Yellowstone Packing	Billings	MT	\$ 29.26	10
Tama Beef Packing	Tama	IA	\$ 32.27	11
Dale Smith & Sons	Draper	UT	\$ 32.47	12
Agriprocessors	Postville	IA	\$ 36.22	13
San Angelo Packing Co., Inc.	San Angelo	TX	\$ 44.10	14
San Angelo Meat	San Angelo	TX	\$ 44.12	15
IBP, Inc.	Boise	ID	\$ 46.76	16
L & H Packing Company, Braun D	San Antonio	TX	\$ 53.93	17

- from Excel transportation model

The Excel workbook used for the transportation cost and network to web models is available on CD, in the rear cover of this report.

Chart 1 – Freight costs, nine lowest transportation cost firms



- from Excel transportation model

Table 2 – Relative packing plant costs

Head/year (in 1,000)	Cost/head, including acquisition			Cost/head, slaughter & fabrication only		
	W & S	D & N	Census	W & S	D & N	Census
				Index		
175	102.3	101.4	104.3		116.9	111.2
300	101.2	100.6	101.5		109.3	104.3
425	100.0	100.0	100.0		100.0	100.0
850	98.7	98.4	97.9		90.4	87.1
1,100	97.7	98.0	97.3		82.6	84.4
1,350	97.5	98.0	97.0		81.3	84.4

- courtesy C.E. Ward, 'A Review of Causes for and Consequences of Economic Concentration in the U.S. Meatpacking Industry', 2002

Table 3 – Top 30 U.S. Beef Packing Firms, 2002

Rank	Company Name	Head office	Capacity per day	Number of US Plants	2001 Kill (thousand head)	Utilization 2001 (days at capacity)
1	Tyson Foods (IBP only)	Arkansas	36,000	10	9,800	272
2	Excel Corporation	Kansas	28,100	7	7,100	253
3	Swift & Company	Colorado	20,600	6	5,400	262
4	Farmland National Beef Packing	Missouri	10,000	2	2,800	280
5	Smithfield Foods (Packerland and Moyer)	Virginia	7,900	5	1,957	248
6	Rosen Meat Group	Minnesota	4,000	4	Confidential	
7	Greater Omaha Packing	Nebraska	2,650	1	660	249
8	Nebraska Beef Ltd.	Nebraska	2,500	1	670	268
9	Beef Packers Inc.	California	2,100	1	400	190
10	American Foods Group	Wisconsin	1,900	1	538	283
11	Brawley Beef	California	1,600	1	None	
12	Shapiro Packing Company	Georgia	1,500	1	Confidential	
13	Sam Kane Beef Processors	Texas	1,400	1	380	271
14	L & H Packing Companies	Texas	1,150	1	225	196
15	Washington Beef, Inc.	Washington	1,100	1	247	225
16	Harris Ranch Beef Company	California	1,000	1	181	181
17	PM Beef Holdings, LLC	Virginia	800	1	160	200
18	Lone Star Beef Processors	Texas	775	1	169	218
19	Caviness Packing Company	Texas	730	1	203	278
20	Central Valley Meat Company	California	700	1	180	257
20	Martin's Wholesale Meats	North Carolina	700	1	123	176
22	San Angelo Packing Company	Texas	650	1	150	231
23	Aurora Packing Company	Illinois	600	1	130	217
23	Booker Packing Company	Texas	600	1	120	200
25	Brown Packing Company	South Carolina	550	1	154	280
26	Agriprocessors	New York	500	1	125	250
26	Simplot Meat Products	Idaho	500	1	103	206
26	Valley Pride Pack, Inc.	Wisconsin	500	1	120	240
29	Hallmark Meat Packing	California	450	1	100	222
30	Minnesota Beef Industries	Minnesota	400	1	84	210

-data courtesy of Cattle Buyer's Weekly, December 2, 2002; utilization from this data by K.A. Kennedy. Firms in green were included in this study.