IOWA STATE UNIVERSITY
University Extension

IBC Iowa Beef Center

feedlot forum 2010 proceedings

iowa beef center at iowa state university
2010 winter meeting series
dec. 8, 2009 - feb. 11, 2009

Iowa Beef Center's

Feedlot Forum 2010

table of contents

4 Winter Series Sponsor Information: Coalition to Support Iowa's Farmers

6-24 Proceedings Articles

6 Keeping Compromised Cattle out of the Livestock Market, Grant Dewell, Iowa State University Extension

7 BQA Feedyard Assessment Guide, Brian Waddingham, Iowa Beef Industry Council

8 Hoops and Mono-Slopes: What We Have Learned About Management and Performance, Beth Doran and Russ Euken, Iowa State University Extension; Mindy Spiehs, USDA Meat Animal Research Center

17 Cattle Market Situation and Outlook, 2010 and Beyond, John Lawrence, Iowa State University Extension

20 Feed Management – Bunker to Bunk, Dan Loy, Iowa State University Extension

25-33 Appendices

25 Appendix A: Bedded Hoop Barns for Beef Cattle, Iowa Beef Center

27 Appendix B: "Using the Crush Margin to Manage Profits Rather Than Price," Iowa State University Extension

29 Appendix C: "Feedlot Cost Management Assessment Worksheet," Iowa Beef Center

about the Iowa Beef Center

The Iowa Beef Center at Iowa State University in Ames, Iowa, serves as the university's extension program to cattle producers. Our center is comprised of a dedicated group of faculty and staff from the College of Agriculture and Life Sciences, the College of Veterinary Medicine and Iowa State University Extension. We work together to develop and deliver the latest in research-based information to improve the profitability and vitality of Iowa's beef industry.

At the Iowa Beef Center, we strive to be the No. 1 source "For all things beef."

Coalition to Support Iowa's Farmers

The Coalition to Support Iowa's Farmers (CSIF) was launched in May 2004 for the purpose of helping farm families raise livestock responsibly and successfully.

To date, the Coalition has assisted more than 1,300 farm families who raise livestock:

1. Follow all rules and regulations (there are nearly 180 type-written, single-spaced pages applicable to most families who raise livestock);
2. Find good locations for new livestock farms by conducting community assessment models that take into account the proximity of neighboring residences, towns, roads, parks, churches and other public use areas as well as topography and prevailing wind directions;
3. Enhance relationships with neighbors by fostering better and more timely communication about the construction of new livestock farms, participating in community discussions and networking with members of the news media to discuss intentions about moving forward on new livestock farms and;
4. Safeguarding air, soil and water quality by planting vegetative environmental buffers around new and existing farms and properly using manure as a nutrient resource to grow crops.

The Coalition to Support Iowa's Farmers is a non-partisan, not-for-profit organization that does not lobby, develop policy or maintain a membership base. CSIF is a collaborative, proactive initiative involving the Iowa Cattlemen's Association, Iowa Corn Growers Association, Iowa Farm Bureau, Iowa Pork Producers Association, Iowa Poultry Association, Iowa Soybean Association and Iowa Turkey Federation. Many individual farm families and Iowans also support the work of the Coalition.

All services provided by CSIF are offered to farm families at no cost.

For more information:

Aaron Putze, Executive Director
Coalition to Support Iowa's Farmers
Office: 1-800-932-2436
Cell: 515-975-4168
E-Mail: aputze@supportfarmers.com

Megan Ritter, Sr. Field Coordinator
Coalition to Support Iowa's Farmer
Office: 515-225-5481
Cell: 515-229-8275
E-Mail: mritter@supportfarmers.com

Look us up on the web at: www.supportfarmers.com

What people are saying about the Coalition to Support Iowa's Farmers

"The Coalition's work is critical given the complexity of today's regulations governing animal agriculture, the desire of farm families to do things right and the importance of sustaining a strong livestock industry to the betterment of our economy, including Iowa's booming renewable fuels sector. It's an important effort at a critical time for Iowa's livestock and poultry farmers."

Bill Northey, Iowa Secretary of Agriculture

"The fact that there's an organization helping address the needs and expectations of both livestock farmers and their neighbors is extremely beneficial and speaks to the need for a shared approach in helping grow one of Iowa's most important businesses."

Keith Sash, member of the Tama County Board of Supervisors

"There's a huge value to farmers in having an organization like the Coalition to use as a sounding board when making decisions. No one had the information that CSIF did in terms of knowing the issues, who the experts are and where to go for such things as financing, facility design and construction. But more than that, CSIF has helped farmers like me have the confidence we need to forge a future in raising hogs."

Stuart Swanson, Galt (Wright County). Swanson grows crops and markets 1,100 hogs annually through Lewright Meats, Eagle Grove

"We called on the coalition very early when we had questions about a regulatory issue. We wanted to do things right and the Coalition responded quickly with information we needed. We learned right away that the coalition is a dependable place to go and its assistance was extremely valuable for my family."

Jim McKnight, Union County grain and livestock farmer

"Work conducted by the Coalition on behalf of Iowa and Iowa farmers is priceless and it's helping keep families on the land and viable in their communities. With the increasingly complex and costly regulations covering animal agriculture, farmers can use some assistance and the Coalition's providing it directly to the families that need it most."

Rep. David Deyoe, a corn, soybean and hog farmer from Nevada (Story County) and Iowa legislator

"Thank you! Thank you! It means so much to think that we have a child and spouse wanting to carry on the work Ed and I have worked hard to keep for the next generation. It's heart-warming to know Kendra's dream may be coming true by moving ahead on her new hog farm. All that girl has ever talked about was to come back home and farm with her dad. Because of the Coalition's work, we're making that happen!"

Pam Elmore, Jefferson (Washington County)

"I've had the opportunity to work with a lot of great athletes and they all had one thing in common… a desire to work together as a team to achieve success. The Coalition is applying that same team approach to livestock farming."

Bill Fennelly, Head Coach
Iowa State University women's basketball

Keeping Compromised Cattle out of the Livestock Market

Dr. Grant Dewell, Extension Veterinarian
Iowa State University

INTRODUCTION

On January 30, 2008, the beef industry was reminded of the importance of animal care. The Humane Society of the United States (HSUS) released a video showing abuse of compromised dairy cattle at a California slaughterhouse. In addition to abuse of compromised dairy cattle, it was clear that these cattle had entered the food chain. In response to the down dairy cattle entering the food chain from this plant, the USDA initiated a recall of at least 143 million lbs of ground beef associated with the meat processor.

Though dairy cattle were depicted in the HSUS video, consumers often do not differentiate between beef and dairy cattle and the firestorm within the media left the beef industry with a black eye. This case has been a rallying point for new legislation, such as Proposition 2 in California, which set new standards for animal confinement. One of the take-home messages from this incident is that video cameras are as close as the next person with a cellular phone.

OUR RESPONSIBILITY TO THE INDUSTRY

In 2009, the Iowa Beef Industry Council (IBIC) released a manual entitled "Caring for Compromised Cattle." Although the main audience for this manual is dairy and cow-calf producers, there is some relevant information for feedlot producers.

Images of a helpless animal – whether puppy, kitten, or cow – being abused or neglected will always elicit a strong emotional response. It is therefore critical for beef producers to demonstrate to the public that we are trustworthy caretakers of our animals. This care should be standard for all animals on the operation, but it is crucial that animals sent to market be carefully evaluated for fitness before marketing.

Once the animal leaves your operation, you cannot assume that it will receive the same quality of care that you have given it. For example, an animal that is compromised but not down may not successfully handle the strain of marketing and become a downer during transit or after arrival. Animals entering the marketing chain are typically subjected to stressful events that include being transported to market, spending a day or more at an auction market, mixing with other cattle, and traversing a variety of surfaces that may provide less than ideal footing. Additionally, animal handlers in these facilities may not have the experience or caring attitude to manage compromised cattle. Regardless of who is at fault, when the poor handling of one of these animals is broadcast the entire beef industry suffers. Therefore, each individual beef operation needs to ensure that they do not market compromised cattle.

Most feedlot cattle that are marketed are in excellent health and physical condition. However, a small percentage of feedlot animals are marketed with health conditions that cause them to be compromised and unfit for normal marketing channels. Many of these compromised animals are condemned at slaughter and this ultimately produces a negative effect on prices. As demonstrated by the Hallmark incident, the financial return for marketing compromised cattle is not worth the potential scandal. It is more beneficial for the industry to humanely euthanize these animals on the premises and demonstrate good animal care and husbandry practices within the industry. There are some auction markets that are now chaining and locking their gates at night to prevent compromised cattle from being left at the auction barn.

CAUSES OF COMPROMISED CATTLE

Since feedlots primarily handle young cattle, compromised animals will primarily be diagnosed with chronic respiratory disease or acute trauma. The biggest risk for a young animal becoming compromised during marketing would be chronic pneumonia calves or "realizers." These animals not only have decreased respiratory function because of diseased lungs but, because of their chronic condition, many of these animals are in poor body condition and do not have the physical reserves to withstand shipping. Therefore these chronic animals need to be carefully evaluated prior to marketing. Additionally, since most of these animals have been treated for respiratory disease, drug withdrawal times must be followed. Chronic calves should be in good body condition (greater than 3 out of 9 scale) and no longer be febrile (temperature greater than 104°F). These calves need to be able to rise on their own and remain standing. Calves that cannot rise on their own or need to lie back down will not be able to endure the strenuous market system and should be euthanized on farm.

Occasionally, a feedlot animal will have severe pinkeye lesions that result in loss of vision in one or both eyes. Although they may be well adjusted in their feedlot pen, these animals need to be handled carefully as they will not be able to adapt as quickly

as their peer group when entering the market channel. Many of these animals will become frantic and injure themselves by running into gates, fences, etc. These animals should be humanely euthanized or slaughtered on the premise instead of moving through marketing channels.

Feedlot animals that have nervous disorders should also not be transported to slaughter or market. There are several potential causes such polio, nervous coccidiosis, listeriosis, and meningitis, as well as rabies. Not only are these animals highly likely to become downers during transport or marketing but they also can become frantic and injure themselves or others. In addition, cattle with apparent nervous conditions are required to be condemned at antemortem inspection.

Another major cause of compromised cattle is acute traumatic events. Animals can fracture a leg anytime during the feeding period, although they are more at risk when they are being handled. Animals with a leg fracture or spine injury should not be transported and should be humanly euthanized on the farm. To prevent acute injuries from happening, cattle should be handled calmly and facilities should be adequate to minimize chance of injury. It is important that load out facilities be well built and cattle handled calmly as well. The environment in the pen should provide firm footing and drop offs around concrete aprons minimized to prevent injury. Other causes of lameness, such as stifle injuries and foot rot, should be treated appropriately. Animals that do not respond to therapy should be marketed as soon as possible after drug withdrawals are followed and before the animal loses excessive weight or becomes severely lame, leaving them at risk of becoming downers during transport. Severely lame cattle should not be transported and should be humanely euthanized. Although these animals have minimal market value, the risk to the beef industry associated with attempting to market debilitated animals is high.

Although pregnant animals are not common in the feedlot, occasionally a pen of heifers will have some pregnant animals. Whenever possible, pregnant heifers should be identified on arrival and the fetus aborted. Heifers that deliver calves at the feedlot should be carefully monitored since they often have dystocia problems and are at greater risk of becoming down or compromised. Feedlot heifers that have become compromised or down due to calving should not be transported to market. It is illegal to load an animal for sale or processing if it is probable that the animal will give birth during transport. Finished cattle that may be pregnant should be evaluated for any indications of imminent parturition before loading for slaughter.

SUMMARY

Although feedlots are not a common source of compromised cattle in the marketing system, producers should evaluate all animals prior to leaving the operation. Animals that are being sold as chronics need to be carefully reviewed for the drug withdrawal clearance and their ability to be a viable candidate to enter marketing channels. Guidelines established by the Iowa Beef Industry Council are a vital resource when choosing to market chronic animals. Before marketing an animal, especially a compromised animal, ask yourself: "Is the meat from this animal something I would want my family to consume?"; "Is it humane to market this animal?"; "Would the public's perception of this animal be positive?" If you cannot answer "yes" to each of these questions, then you must reconsider marketing the animal. Consumer surveys have identified that one priority for consumers is knowing that producers care. Caring for compromised cattle properly on the farm and not allowing compromised cattle to enter marketing channels is an important component to demonstrate to consumers that we care about our livestock.

BQA Feedyard Assessment Guide

Brian Waddingham, Director of Industry Relations
Iowa Beef Industry Council

As producers face more pressure from animal rights groups, it becomes increasingly more important they are informed on the latest animal care and handling guidelines. The ultimate goal of the *BQA Feedyard Assessment* is to have producers better monitor their cattle and cattle facilities, which will benefit not only their cattle performance but their operations as well.

This guide is an innovative tool that facilitates the characterization and benchmarking of key feedyard indicators, including animal care and well-being. The *BQA Feedyard Assessment* focuses on three main areas – cattle management protocols, documentation of conformance to Best Management Practices through standardized recordkeeping, and facility design plus equipment operation.

The *BQA Feedyard Assessment* may be utilized as a self-assessment or conducted by a third-party assessor. The real key, regardless of who conducts the assessment, is that it be repeated on a periodic basis so that comparisons may be made, trends observed, and management actions taken to maximize animal care and well-being in addition to effective feedyard operations.

If at some time in the future you wish to have your feedyard assessed, please contact Brian Waddingham at the Iowa Beef Industry Council to set up a time. The *BQA Feedyard Assessment* is a valuable tool for feedlot operators to evaluate how they handle and manage their cattle.

The *BQA Feedyard Assessment* is another cutting-edge tool funded by The Beef Checkoff that empowers the industry to implement standards and to document performance in the quest for continuous improvement.

Hoops and Mono-Slopes: What We Have Learned About Management and Performance

Beth Doran and Russ Euken, Extension Beef Specialists
Iowa State University

Mindy Spiehs, USDA Meat Animal Research Center

INTRODUCTION

In the past ten years, Iowa beef feedlots have striven to improve environmental management. To reduce the potential for feedlot run-off, there has been increased interest in feeding animals in deep-bedded enclosed facilities. Two types of deep-bedded facilities – hoop barns and mono-slope barns – are now prevalent.

Likewise, in the past decade, there has been an increase in public scrutiny regarding how livestock are raised. Gestation crates for sows and veal crates and battery cages for laying hens have been banned in seven, five, and two states, respectively. The dairy industry is currently being challenged about tail docking. Although the beef industry has not been targeted as heavily, beef producers need to be proactive in environmental and animal stewardship.

WHAT AFFECTS ANIMAL COMFORT AND PERFORMANCE

Weather is a main contributor to cattle discomfort, including several aspects that result in animal heat loss, as well as wet conditions that increase the amount of mud on an animal.

A number of factors influence heat loss in a beef animal – ambient air temperature, wind speed, precipitation, relative humidity, type of surface the animal is in contact with (eg. bedding versus frozen ground), shelter, and solar radiation. Heat loss is also influenced by animal body condition, the amount of animal surface area per unit of weight, and condition of the hair coat.

Table 1. Estimated lower critical temperatures for cattle at maintenance with varying hair coats

Hair Coat	Lower Critical Temp. (°F)
Summer coat or wet	60
Fall coat	45
Winter coat	32
Heavy winter coat	19

The thermoneutral temperature for beef cattle is approximately 23°F to 77°F, which is where the rate and efficiency of animal performance is maximized (DeRouchey et al. 2005). However, the lower critical temperature varies with thickness and, most importantly, with dampness of the hair

Table 2. Impact of mud scores on dressing percent

Mud Score[1]	Tri-County[2] Dressing Percent	Armstrong[2] Dressing Percent
1	62.02[a]	62.00
2	62.19[a,b]	62.02
3	61.91[b]	61.96
4	61.19[a,b,c]	62.59
5	61.13[a,b,c]	59.50[a]

1: Mud Scores are defined as:
- 1 = no tag, clean hide
- 2 = small lumps of manure attached to the hide in limited areas of the legs and underbelly
- 3 = small and large lumps of manure attached to the hide covering larger areas of the legs, side and underbelly
- 4 = small and large lumps of manure attached to the hide in even larger areas along the hind quarter, stomach and front shoulder
- 5 = lumps of manure attached to the hide continuously on the underbelly and side of the animal from brisket to rear quarter

2: Column least square means with similar superscripts are significantly different (P<.01)

Table 3. Animal and lot mud condition scores in an unsheltered open feedlot[a]

	Low Pen Density (500 sq ft/hd)	High Pen Density (250 sq ft/hd)
Animal condition[b]		
Score 0	50.00	16.67
Score 1	26.67	43.33
Score 2	20.00	33.33
Score 3	3.33	13.67
Lot condition[c]		
Score 0	26.67	0.00
Score 1	73.33	96.67
Score 2	0.00	3.33

a: Percentage of pens observed at a given score

b: Animal condition: 0 = clean, no mud; 1 = small lumps of mud on the hide in limited areas of the leg and underbelly; 2 = Small and large lumps of mud covering larger areas of the legs, side and underbelly; 3 = small and large lumps of mud covering the hide in areas along the hind quarter, stomach and front shoulder

c: Lot condition: 0 = no mud or mud less than 3 inches deep; 1 = mild mud, 3 to 7 inches deep; 2 = severe mud, more than 7 inches deep

coat (Table 1).

When the temperature falls below the lower critical temperature or rises above the upper critical temperature, the animal must use more energy to keep warm or cool. A clean, dry hair coat is imperative to animal comfort and performance.

Excessive mud in the pen can decrease cattle average daily gain 25% to 37%, dry matter intake 15% to 30% and feed efficiency 20% to 33% (BQA Feedyard Assessment Working Group 2009). Busby and Strohbehn (2008, Table 2) noted that dressing percent was reduced as mud scores went from no tag, clean hide to lumps of manure attached to the hide continuously on the underbelly and side of the animal from brisket to rear quarter.

Table 4. Absorbency of bedding materials

Type	Form	Absorbency Factor
Wheat straw	Baled	2.1
Wheat straw	Chopped	2.1
Oat straw	Baled	2.5
Oat straw	Chopped	2.4
Hay	Baled	3.0
Hay	Chopped	3.0
Corn stover	----------	2.5
Corn cobs[a]	Ground	2.1
Sawdust	Hardwood	1.5
Sawdust	Softwood	2.5
Shavings	Hardwood	1.5
Shavings	Softwood	2.0
Chips[a]	Pine	3.0
Chips[a]	Hardwood	1.5

a Source: Wheeler et al. 2005

Aside from weather, several factors influence the surface condition of a pen – pen density, type of bedding and amount of bedding. Mader and Colgan (2007) concluded that increasing pen space per animal in an open feedlot (without bedding) lowered mud condition scores on the animal (P<.003) and in the feedlot (P<.002) (Table 3).

The recommended square footage per animal varies with size of the animal. Midwest Plan Service (1987) suggests 20-25 ft^2 for a 400-800 lb calf and 30-35 ft^2 for a 800-1200 lb finishing animal in a barn without a lot. Square footage should be adjusted upward as animal type and size increases.

Midwest producers have a variety of bedding materials. Type and form of bedding are important because they impact (Table 4) moisture holding capacity (Kains et al. 1997).

A North Dakota trial (Anderson et al. 2006) compared different crop residues as bedding materials for open feedlot cattle. The bedding treatments were (1) no bedding (pens scraped two times per month), (2) wheat straw bedding, (3) corn stover, (4) or soybean residue. Dry matter intake tended to be lower (P<.12) for the calves bedded with corn stover. Corn stover is highly palatable, and calves tend to eat the leaves and husks. Calves bedded with straw gained the fastest (P<.01), followed by soybean residue, stover, and calves in the scraped pens. Gains were greater (P<.05) in the straw treatment, followed by soybean residue, corn stover, and, last, no bedding. Feed efficiency was greater (P=.03 to .11) for bedded calves during the coldest part of the winter. Yield grade and fat thickness were affected (P<.02) by treatment. Increased fat deposition was noted on straw-bedded calves, followed by soybean residue, control, and corn stover.

Another North Dakota trial (Anderson et al. 2004) looked at the effect of the amount of wheat straw bedding on winter performance of open feedlot cattle. Bedding treatments were (1) no bedding, (2) modest bedding (385 lb per head), and (3) generous bedding (674 lb per head). A five-point scoring system was used to quantify the amount of tag on the hide with 1 = no tag and 5 = tag attached continuously on the underbelly and side of the animal from brisket to rear quarter.

Dry matter intake (Table 5) was not affected by bedding treatment. Average daily gain responded positively to bedding in two of the four twenty-eight-day feeding periods when weather was severe and during spring thaw. Feed efficiency tended to improve for bedded steers. Carcass quality traits were positively affected by bedding. Dressing percent in the no bedded group was greatly reduced, potentially due to increased manure tags on the hide. The percent of carcasses grading Choice improved with bedding. Yield grade was not affected by bedding.

Table 5. Effect of bedding level on winter performance of steers finished in North Dakota

	No Bedding	Modest Bedding	Generous Bedding	P-value
Dry matter intake, lb	21.99	21.96	22.16	.99
Average daily gain, lb[a]	2.83	3.69	3.53	.01
Gain/feed	.131	.172	.161	.09
Live weight, lb	1121	1182	1172	.02
Carcass weight, lb	674	715	721	.02
Dressing percent	61.95	62.33	63.43	.02
Percent Choice	23	45	63	----
Yield grade	2.98	3.03	3.09	.30
Tag score	3.75	2.64	1.58	----

a: Average daily gain may be lower than reported in the no bedding treatment due to more manure tags

IOWA STATE UNIVERSITY HOOP BARN RESEARCH

A bedded hoop barn potentially offers low facility investment, no feedlot runoff, solid manure handling, low odor and dust, easy management, and good animal performance (Honeyman 2004). However, limited research has been conducted looking at animal performance and management of hoop barns.

A three-year comparison of a bedded hoop barn and an open-front feedlot building was conducted in southwest Iowa (Honeyman et al. 2009). A 50 ft wide x 120 ft long hoop barn was oriented north and south and provided 50 ft^2 per animal. The hoop barn apron was scraped weekly and cornstalk bedding was added as whole large round bales. The open-front facility was a semi-confinement outside lot with a shelter that includes a drive-through feed alley. The open-front facility provided 125 ft^2 of earthen lot and 25 ft^2 under roof. The semi-confinement building was not cleaned or bedded during the summer/fall group. Bedding was provided when the winter/spring groups were started. During the winter, the area in front of the bunks was scraped every two to three weeks as needed.

Both ends of the hoop barn were open. During the winter, large round bales were stacked three high across the north and south end of the hoop barn for a partial windbreak. Slightly more than half of each end at ground level was blocked. Two groups of yearling steers were fed each year. Summer/fall groups were put on feed in August and marketed in November. Winter/spring groups were put on test in December and marketed in April/May.

There were no differences for average daily gain, average daily feed intake or feed:gain ratio (P>.05) (Table 6). However, final mud scores (1 = clean, 5 = dirty) were greater (P<.02) for the feedlot cattle compared with the hoop cattle and may have increased the final weight of the feedlot cattle. If the final weight is adjusted to a standard yield of 62% (equal to the hoop cattle), numerical performance differences by housing type disappear (calculated data not shown).

Carcass characteristics by housing type are shown in Table 7. Yield was lower in the feedlot cattle and may be partly due to differences in the amount of mud on the hide. There were no differences in fat cover, ribeye area, marbling, quality grades, or yield grades by housing type (P>.05).

The summer 2006 and winter 2007 groups were analyzed to determine seasonal effects for cattle fed in the two types of facilities. Within the summer 2006 groups, animal performance and carcass characteristics were similar between the two types of facilities (Baker et al. 2009a). Within the winter 2007 groups (Baker et al. 2009b), average daily gain, dry matter intake, and feed:gain ratio did not differ between housing treatments. Dressing percentage (P = .02) and hot

Table 6. Performance of yearling steers in a hoop confinement barn and semi-confinement lots

	Hoop	Feedlot	P-value
Days on test	103	103	.62
Initial weight, lb	904	905	.94
Final weight, lb	1311	1350	.32
Avg. daily gain, lb	4.0	4.1	.19
Avg. daily feed intake, lb	27.5	27.5	.98
Feed:gain	6.9	6.7	.17
Final mud score	1.9	2.2	.02

Table 7. Carcass characteristics of yearling steers in a hoop confinement barn and semi-confinement lots

	Hoop	Feedlot	P-value
Hot carcass weight, lb	813	818	.59
Dressing %	62.0	60.6	----
Fat thickness, in	.43	.43	.92
Ribeye area, in^2	13.2	13.1	.38
Marbling score[a]	1031	1027	.61
Choice or better, %	75.4	74.3	.78
Yield grade 1 & 2, %	63.4	62.9	.94

a Marbling score scale: slight = 900, small = 1000, and modest = 1100

carcass weight (P = .01) were higher for steers fed in the hoop barn. All other carcass characteristics did not differ.

Behavior of the cattle in the two facilities was studied (Baker et al. 2006c, and Baker et al. 2006d) summer 2006 and winter 2007. In the summer trial, hoop steers spent more time at the waterer (P=.02) and laying down (P=.004). Fewer hoop steers exhibited walking or standing behavior compared with the feedlot cattle. In the winter trial, cattle in the hoop barn spent more time at the feedbunk (P=.04), but there was no difference in time spent at the waterer (P=.66). Lying was higher for hoop steers (P=.008) and they spent less time walking or standing.

Table 8. Seasonal labor and bedding use in a hoop barn and semi-confinement lots

	Summer/Fall[a]		Winter/Spring[b]	
	Hoop	*Feedlot*	*Hoop*	*Feedlot*
Bedding, lb/hd/d	5.0	0.0	5.7	2.2
Labor clean/bed[c]	21.2	9.1	22.5	28.7

a: Summer/fall groups were placed in August and marketed in November

b: Winter/spring groups were placed in December and marketed in April/May

c: In 2005, due to sudden cold weather, the feedlot was not cleaned after the summer/fall group. The manure for the summer/fall group was removed after the winter/spring group. Thus, the winter/spring feedlot labor is the labor to remove the manure for three groups.

The deep-bedded hoop system used more bedding than the semi-confinement lots, requiring about 5 to 6 lb of cornstalk bedding per head per day. The winter/spring group used bedding at the higher end of this range (Table 8). The labor for cleaning and bedding averaged twenty-one to twenty-three hours per group of cattle regardless of housing system.

Environmental conditions of the facilities were monitored (Harmon et al. 2008). In the summer, the temperature was relatively consistent between the structures and ambient temperature, although the north end of the hoop barn had a slightly elevated dewpoint temperature. The hoop building and open-front structure were both open enough to exchange air freely and maintain conditions at least as good as an outside feedlot. The shelters, however, offer the advantage of shade, which can greatly impact heat stress.

A summer temperature humidity index (THI) showed that the hoop barn had fewer hours in the "alert" category (Table 9) than either open front or ambient conditions (Harmon et al. 2008). Temperature humidity index does not account for wind speed or solar radiation. Cattle that are not shaded average 16 breaths per minute more than shaded cattle in the same conditions. This indicates a much greater level of heat stress in the same environmental conditions.

Unlike the THI comparison for hot weather, there were large differences in winter weather. A cold stress index showed that the open-front barn provided the most shelter for the cattle. The percentage of hours classified as "no impact" was 92%, 77% and 51% for the open-front shed, hoop barn, and ambient temperature, respectively. The performance of cattle kept outside would have been impacted about half the time. Air speed was greater in the hoop barn because

Table 9. Weather safety index (THI) of the environmental conditions for a summer trial (August 18 to November 16, 2005)

Location	**THI Classification (percent of hours)**			
	Normal	*Alert*	*Danger*	*Emergency*
Hoop south	89.8	8.6	1.6	0
Hoop north	88.7	8.2	3.0	0
Open-front east	86.4	10.8	2.8	0
Open front west	86.8	10.5	2.7	0
Ambient	88.8	9.7	1.5	0

Table 10. Weather safety index of the environmental conditions for the winter trial (December 20, 2005 to April 4, 2006)

Location	**Cold Stress Index Classification (percent of hours)**			
	No Impact	*Mild*	*Moderate*	*Severe*
Hoop north	76.8	15.3	4.8	3.1
Open-front east	92.1	5.8	1.8	0.3
Ambient	51.5	29.8	11.8	6.9

Table 11. Cattle and pen characteristics for four mono-slope pens

Building A		**Pen 13**					**Pen 14**		
Group	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*
No. Head	196	103	112	151	154	142	92	181	70
Sex	Steers	Steers	Heifers	Steers	Steers	Steers	Steers	Steers	Steers
Breed	Beef	Beef	Beef	Beef	Dairy	Beef	Beef	Beef	Beef
In Wt., lb	754	1234	754	664	415	744	930	954	670
Out Wt, lb	1318	1683	1338	---------	1243	1406	---------	---------	---------
Days on Feed	162	158	179	106	371	199	16	5	5
Bedding, tons	72.56	50.63	74.36	40.00	174.83	85.00	5.40	2	2
Bedding, lb/hd/d	4.57	6.22	7.42	5.00	6.12	6.02	7.34	4.42	11.43
Density, sq ft/hd	34.66	65.96	60.66	44.99	51.44	55.78	86.10	43.76	113.16
Building B		**Pen 1**					**Pen 4**		
Group	*1*	*2*	*3*	*4*	*1*	*2*	*3*	*4*	*5*
No. Head	145	215	188	NA	195	200	205	210	NA
Sex	Heifers	NA	Steers	Steers	Heifers	Heifers	Heifers	Steers	Steers
Breed	Beef	Beef	Holstein	Beef	Beef	Beef	Beef	Beef	Holstein
In Wt., lb	1140	650	762	940	1140	980	960	920	900
Out Wt, lb	1205	750	1416	NA	1285	1295	1235	1040	NA
Days on Feed	34	42	230	NA	68	146	70	28	NA
Bedding, tons	26.25	12.5	109.03	NA	35.63	62.88	38.65	15.63	NA
Bedding, lb/hd/d	10.65	2.77	5.04	NA	5.37	4.31	5.39	5.31	NA
Density, sq ft/hd	52.17	35.19	40.24	NA	38.79	37.83	36.90	36.02	NA

the barn was more open. The open-front shed was closed on three sides in the winter. Also, the hoop barn was on a slightly higher, more open site, making it more accessible to wind.

MONO-SLOPE BARN RESEARCH

Mono-slope barns are a popular style of deep-bedded barn. Producers cite ease of labor and manure management and improved performance compared to open-lot feedlots. Most mono-slope barns are constructed with an east-west orientation and southern exposure to facilitate natural ventilation and solar radiation.

Because little is known about the environment in mono-slope barns or the effect of site-specific management on the barn environment, Iowa State University and the Environmental Management Unit at the USDA Meat Animal Research Center at Clay Center NE engaged in a research study to determine spatial and seasonal ammonia emission variability and the effect of environmental factors on ammonia emissions.

Data was collected from four pens housed in two 100-ft wide mono-slope barns every five to seven weeks from March 2008 through October 2009. Usually pens were scraped and bedded weekly with shredded cornstalks. Cattle and pen characteristics are listed in Table 11.

The amount of bedding ranged from 2.77 to 11.43 lb per head per day, but was affected by size of the animal, days on feed, and number of head in the pen. For cattle on feed at least 100 days, bedding ranged from 4.31 to 7.42 lb per head per head per day. Pen density for cattle on feed 100 or more days ranged from approximately 35 to 66 ft^2 per head, depending on number of head in the pen and size of the animal.

Manure samples were obtained each sampling from 56 points in each pen. The nutrient composition of the manure

Table 12. Nutrient composition of manure from deep-bedded cattle facilities (dry matter basis)

Location	**Total N(lb/ton)**	**P2O5(lb/ton)**	**K2O(lb/ton)**	**Total S(lb/ton)**	**Volatile Solids (%)**
Barn A (Pen 13)	47.2 ± 21.2	34.3 ± 23.4	47.9 ± 28.6	13.25 ± 10.1	84.4
Barn A (Pen 14)	46.9 ± 11.6	32.4 ± 12.6	36.7 ± 16.6	11.8 ± 6.0	84.2
Barn B (Pen 1)	42.9 ± 18.3	30.7 ± 19.3	39.2 ± 25.0	11.2 ± 10.5	79.9
Barn B (Pen 4)	42.4 ± 18.0	32.3 ± 24.3	37.4 ± 25.5	11.1 ± 9.8	80.0

Table 13. Concentration of ammonia after cattle were removed from pens.

Location	NH4 (µM) 0 hr	NH4 (µM) 4 hr - 7hr	NH4 (µM) 10 hr
Barn A Pen 613[1]	102.9 ± 128.9[a]	43.7 ± 53.7[b]	37.8 ± 23.3[b]
Barn B Pen 4[2]	88.2 ± 192.8[a]	54.1 ± 31.1[b]	51.4 ± 60.0[b]

1: Samples collected at 0, 4, and 10 hr after cattle were removed from pen in June 2008
2: Samples collected at 0, 7, and 10 hr after cattle were removed from pen in Sept 2008
a,b: Different superscripts within a row indicate a significant difference P < 0.01

was highly variable within pen (Table 12). Volatile solids at 80% are very high compared with levels of 20% for open feedlot manure. This manure would have value to plants that purchase manure to generate methane.

Ammonia was collected in acid traps at fifty-six locations per pen each sampling to measure relative differences in ammonia emissions from various areas of the barn and to attempt to understand the factors that influence ammonia emissions. ***Please note that this data does not represent absolute emissions from the barn and any attempt to calculate absolute emissions for the data would be an extrapolation and misuse of the data.***

There was no consistent spatial pattern of ammonia emissions. Areas of high ammonia emissions appeared to result from recent urination of cattle. Ammonia emissions decreased rapidly after cattle were removed from pens, reaching an apparent baseline after four hours (Table 13).

Table 14. Effect of season on pack characteristics

	Cold[1]	Mod[2]	Hot[3]
Pack moisture, %	69.8[a]	69.9[a]	63.4[b]
Pack temp, °F	59.7[a]	69.5[b]	84.4[c]
Pack height, ft	0.72[a]	0.57[b]	0.81[c]
pH	7.5[a]	7.8[b]	7.4[a]
Gen E. coli (log CFU/g)	5.99[a]	6.47[b]	NA

1: Average ambient temperature for both barns on the day of collection was at or below 32°F. Included data collected in March and December 2008, and January and March 2009

2: Average ambient temperature for both barns on the day of collection was between 33 and 69°F. Included the data collected in May, September, and October 2008, and April, 2009

3: Average ambient temperature for both barns on the day of collection was at or above 70°F. Included data collected in June and July 2008 and June and August 2009

a,b: Different superscripts within a row indicate a significant difference P < 0.01

Ammonia concentration of the manure pack increased as pack and air temperature increased (P<.01). Ammonia emissions were consistently lower in the winter compared to spring /fall and summer (P<.01).

The fluctuation in ammonia emissions is important. Currently, concentrated animal feeding operations are required to report ammonia emissions using a value based on a limited number of studies conducted during one season.

As expected, average pack temperature (Table 14) was affected by season and increased with increasing pack height. However, there was considerable variability of pack temperature within season. The lowest pack temperatures recorded were 23°F, 42°F, and 65°F for the cold, moderate, and hot seasons, respectively. What was surprising were the highest pack temperatures recorded. They were 118°F, 105.4°F, and 105°F for the cold, moderate and hot seasons, respectively. The 118°F temperature occurred in December 2008.

Table 15. Effect of bedding management on pack characteristics

	Deep[1]	Shallow[2]
Pack moisture, %	63.1[a]	67.2[b]
Pack temp, °F	70.2[a]	65.2[b]
pH	7.69[a]	6.90[b]
Gen E. coli, log CFU/g	6.02[a]	6.72[b]
Branch-chain VFA,	2.57	3.81
Aromatics	1.95[a]	4.42[b]
Surface temp, °F	63.5	61.4

1 Deep-bedded management: A bedded pack is allowed to accumulate in the center of the pen while cattle were in barn. Area around the pack was scraped and removed and fresh bedding added to the pack once weekly. Data are from one pen in April and June 2009

2 Shallow-bedded management: All bedding is completely removed every three weeks. No bedded pack is allowed to accumulate. Data are from one pen in April and June 2009

a,b: Different superscripts within a row indicate a significant difference P ≤ 0.01

Pack height increased as the seasonal temperatures increased. Although the pen averages are less than a foot, there was considerable variation within the pen. Pack height within pen varied from 0 in to 2.5 ft for the cold and moderate seasons. During the hot season, pack height ranged from 0 in to 3.63 ft.

While there were statistical differences in pH of the pack, these differences may not be biologically significant. As expected, E. coli levels increased with season and as temperature increased.

This study noted differences in animal behavior in the deep-bedded mono-slope barns in the summer. Animals were standing on the perimeter of the pack, presumably because of the higher pack temperatures, and consequently, were not lying down as much. This caused the perimeter area to be wetter and there appeared to be increased lameness.

To counteract this effect, management was changed in Pen 14 of Building A beginning March 2009. Instead of allowing the bedding pack to accumulate throughout the feeding period, all bedding was removed every three weeks. The effect of this change on bedding pack characteristics is noted in Table 15.

Shallow-bedded management significantly reduced pack temperature. Pack moisture, levels of generic E. coli, and aromatic compounds increased with the shallow-bedded management. Aromatics compounds are more pungent.

Management changes can affect pack characteristics and producers may be able to take advantage of this. It would appear that shallow bedding may be able to reduce pack temperature in the summer, whereas deep bedding may increase pack temperature in the winter. Both should improve animal comfort.

WHAT PRODUCERS HAVE LEARNED

An informal survey was conducted this fall by ISU Extension beef field specialists. Twenty-nine producers across Iowa who fed cattle in either a hoop or mono-slope barn were interviewed to determine their management practices and perceptions about cattle performance. Fifteen of the surveyed producers fed cattle in mono-slope barns; fourteen fed cattle in hoops. The results below are broken out by mono-slope or hoop barn. Because of the small sample size, the results reported may not be reflective of all Iowa deep-bedded barn producers.

Table 16. Type of building where cattle were fed

Building Type	Producers Using Type, %
Hoop east-west	71.4
Hoop north-south	28.6
Mono-slope wide (100 ft)	60.0
Mono-slope narrow (40-50 ft)	40.0

Table 17. Pen density averages and ranges for deep-bedded barns

	Mono-Slope Barn		Hoop Barn
Pen density avg, sq ft/hd	38.25	40.00	
Pen density range, sq ft/hd	20-55	33-50	

Table 18. Frequency of bedding in deep-bedded barns

Frequency	Mono-Slope Barn, %	Hoop Barn, %
4 times/week	6.7	------
3 times/week	6.7	21.4
2 times/week	13.3	50.0
1 time/week	46.7	21.4
Every two weeks	26.6	7.1

Table 19. Bedding averages and ranges for deep-bedded barns

	Mono-Slope Barn	Hoop Barn
Bedding average, lb/hd/day	4.25	4.89
Bedding range, lb/hd/day	2-10	1.71-8.0

A majority of the hoop producers oriented their barns east-west (Table 16). With mono-slope barns, there was a slight majority for wide barns over narrower barns.

Producers were asked about pen density (Table 17). The averages reported are greater than the Midwest Plan Service recommendation of 30-35 ft^2 for an 800- to 1200-lb animal. Average pen density was similar between the two types of facilities. However, there was a wide range in pen density, especially for producers who fed in mono-slope barns.

All producers indicated that they used cornstalk bedding. A few reported that they also bedded with bean stubble, wheat straw, corn cobs or sawdust. When asked how often they bed, it appeared that hoop barn producers bedded more frequently (Table 18).

Producers were asked how much bedding they provided. The average values were similar between barns, but there was a wide range for both types of facilities (Table 19). Among hoop barn producers, there was about an even split of whether more bedding was used in the summer versus winter. About 64% of the mono-slope producers indicated they used more bedding in the winter.

Producers were asked how long they maintained a pack and how often they cleaned the bunk apron (Table 20). In the hoop barns and mono-slopes, those who did not maintain a pack through a turn generally were removing all material from the pen every one to two weeks. Mono-slope producers who kept a pack more than one turn indicated that they

Table 20. Life of the pack and frequency of cleaning the bunk apron in deep-bedded barns

	Mono-Slope Barn, %	Hoop Barn, %
Maintain pack < 1 turn	28.8	13.6
Maintain pack 1 turn	50.0	45.6
Maintain pack > 1 turn	22.2	40.9
Clean bunk apron 1x/week	~100	50.0
Clean bunk apron 2x/week	-----	28.6
Clean bunk apron 3x/week	-----	21.4

were removing the pack one time per year, two times per year or never removing it.

Producers were asked how performance parameters for their deep-bedded barn compared to their open lot. The highest frequency of responses is listed in Table 21, with exception for increased feed intake in the mono-slope barn. Fifty percent of the mono-slope producers noted no change in feed intake. The majority of health problems were respiratory and lameness. However, some pulls for injury were noted. Some deep-bedded producers noted that it was harder to find sick cattle in a deep-bedded facility.

Producers were asked to evaluate the cleanliness of their cattle using a four-point scale (Table 22). A majority of producers felt that the cattle were reasonably clean. However, 26% of the mono-slope producers felt that the cattle had more manure on the belly. When asked if season affected cleanliness of cattle in a deep-bedded barn, a greater number of deep-bedded producers felt that cattle were cleaner in the fall, winter and spring compared with summer.

SUMMARY

Deep-bedded barns can affect cattle performance, cattle comfort and the environment. However, site-specific management of the barns can enhance or mitigate the magnitude of these effects.

References:

Anderson, V., E. Aberle and L. Swenson. 2004. Effects of bedding feedlot cattle on winter performance of feedlot cattle and nutrient conservation in composted manure. North Dakota Beef Report 2004. Carrington ND.

Anderson, V. L., R. J. Wiederholt and J. P. Schoonmaker. 2006. Effect of bedding feedlot cattle during winter on performance, carcass quality and nutrients in manure. North Dakota State University Annual Report 2006. Carrington ND.

Baker, R. G., A. K. Johnson, S. M. Lonergan, M. S. Honeyman and D. Busby. 2009a. Finishing steers in a deep-bedded hoop barn and a conventional feedlot: effects on performance and carcass characteristics during summer in Iowa. A.S. Leaflet R2406. Iowa State University Animal Industry Report 2009.

Table 21. How performance parameters of the deep-beeded barn compared to open lot

Parameter of Deep-Bedded Barn	Mono-Slope Barn, %	Hoop Barn, %
Increased labor	80.0	92.9
Increased feed intake	42.9[a]	57.1
Increased average daily gain	86.7	57.1
Improved feed efficiency	86.7	64.3
Increase in time cattle lay	66.7	64.3
Decreased pulls for health	42.9	54.5

a: 50% of the mono-slope producers indicated no change in feed intake

Table 22. Producer perception of cattle cleanliness

Cleanliness Score[a]	Mono-Slope Barns, %	Hoop Barns, %
1	23.5	37.5
2	47.1	37.5
3	26.7	12.5
4	5.9	12.5

a:
1 = Clean animals with some manure on feet and pasterns (ankles)
2 = Manure on legs above the knees. Sides and belly clean
3 = Belly of the animal has manure tags on them. Sides are clean
4 = Belly and side of body have manure tags on them

Baker, R. G., A. K. Johnson, S. M. Lonergan, M. S. Honeyman and D. Busby. 2009b. Finishing steers in a deep-bedded hoop barn and a conventional feedlot: effects on performance and carcass characteristics during winter in Iowa. A.S. Leaflet R2405. Iowa State University Animal Industry Report 2009.

Baker, R.G., A. K. Johnson, K. J. Stalder, M. S. Honeyman and D. Busby. 2009c. Finishing steers in a deep-bedded hoop barn and a conventional feedlot: effects on behavior and temperament during summer in Iowa. A.S. Leaflet R2404. Iowa State University Animal Industry Report 2009.

Baker, R.G., A. K. Johnson, K. J. Stalder, M. S. Honeyman and D. Busby. 2009d. Finishing steers in a deep-bedded hoop barn and a conventional feedlot: effects on behavior and temperament during winter in Iowa. A.S. Leaflet R2407. Iowa State University Animal Industry Report 2009.

BQA Feedyard Assessment Working Group. 2009. Feedyard Assessment. Assessor's Guide.

Busby, W. D. and D. R. Stohbehn. 2008. Evaluation of mud scores on finished beef steers dressing percent. A.S. Leaflet R2292. Iowa State University Animal Industry Report 2008.

DeRouchey, J., T. Marston, and J. P. Harner. 2005. How feeding-site mud and temperature affect animal performance. MF-2673. Kansas State University Experimental Station and Cooperative Extension Service.

Harmon, J.D., S. C. Shouse, M. S. Honeyman. 2008. Environmental conditions in a bedded hoop barn with market cattle. A.S. Leaflet R2326. Iowa State University Animal Industry Report 2008.

Honeyman, M. 2004. Beef cattle feeding in deep-bedded hoop barns. Competitive Grant Report SPO1-2004. Leopold Center for Sustainable Agriculture. Iowa State University. Ames IA.

Honeyman, M., J. Harmon, A. Johnson, D. Maxwell, D. Busby and S. Shouse. 2009. Beef cattle feeding in a bedded hoop barn: three year summary. A.S. Leaflet R2403. Iowa State University Animal Industry Report 2009.

Kains, F., B. Lovell, M. Payne, and R. Trembley. 1997. Livestock bedding alternatives. Fact Sheet 97-029. Ontario Ministry of Agriculture Food and Rural Affairs.

Mader, T. L. and S. L. Colgan. 2007. Pen density and straw bedding during feedlot finishing. Nebraska Beef Cattle Reports. University of Nebraska. Lincoln NE.

Midwest Plan Service. 1986. Beef Housing and Equipment Handbook. Fourth edition. MWPS-6. Iowa State University. Ames IA.

Wheeler, E., B. Koenig, J. Harmon, P. Murphy, and D. Freeman. 2005. Horse Facilities Handbook. Midwest Plan Service. Iowa State University. Ames IA.

Cattle Market Situation and Outlook, 2010 and Beyond

Dr. John Lawrence, Extension Livestock Economist Iowa State University

INTRODUCTION

The U.S. beef sector is adjusting to higher prices for land, harvested feed, energy, and other costs during a global economic recession that is limiting demand for the product. Prices at all levels, retail meat, wholesale boxed beef, hide and offal, fed cattle, and feeder cattle are all lower in 2009 than 2008 in spite of 3% lower cattle slaughter. This economic pressure is expected to encourage further liquidation of the beef cowherd leading to a smaller calf crop, feedlot inventories and cattle slaughter through the first half of the next decade. While the adjustment will be economically painful, the smaller supplies should support higher cattle prices as the economy recovers.

This situation and outlook article will briefly describe the supply and demand conditions entering 2010 and discuss some simple tools for cattle price forecasting and risk management. It will also highlight two publically available longer-term forecasts of beef supplies and prices for the coming years. We will finish with a discussion of the management implications and management strategies for the years ahead.

CURRENT SITUATION

The beef sector is on track to harvest 33.2 million cattle in 2009, producing nearly 26 billion lb of carcass weight beef. These values are 3.3% and 2.2% lower than 2008, respectively, and the lowest levels since 2005. In spite of the lower supplies, fed cattle prices averaged 10% below the year before. Yearlings and calves were 8% and 5% lower, respectively. A decrease in supply and price at the same time points to a fall in beef demand, which is heavily influenced by the recession.

Beef supplies are forecast to decrease in each of the next two years and likely beyond. Compared to 2008, January to mid-October total cow slaughter was down 0.5% on 12% higher milk cow and 9% lower beef cow slaughter. For the same period, heifer slaughter was 3.6% lower while steer slaughter was down 4.6%. As a result, it is expected that January cow inventory will be modestly lower than the year before and the calf crop will continue to decline. Furthermore, the economic pressures on beef cowherds should encourage further liquidation. Beef supplies are forecast to decrease 1.5% in 2010 and an additional 1.1% in 2011, each compared to the previous year. If correct, total cattle slaughter in 2011 would be 31.8 million head, 7.4% lower than 2008.

Economic pressures on beef cowherds do not favor expansion. The USDA reported that the U.S. average pasture and land prices had doubled between 2003 and 2008. Iowa pasture land prices had a similar increase. While producers that own land may not recognize or feel the effect of rising land prices, those renting or looking to buy do. Competition from alterative land uses (recreation, crop production, timber, etc.) are contributing to higher prices. Non-feed costs continue to rise as well. The 2008 Kansas Farm Management Association summary reports the cost of producing a calf (580 lb) at $720 and non-feed cost at $380 per head. It will take higher calf prices for multiple years to bring about growth of the herd. Thus, expect smaller calf crops and higher calf prices, all else equal, until 2012 or beyond.

Beef and cattle imports also add to the U.S. supply. Beef imports in 2009 are approximately 11% larger than 2008 and are forecast to increase an additional 7% in 2010 before leveling off. Cattle imports are down sharply since the implementation of mandatory Country of Origin Labeling (MCOOL). During the first year of MCOOL (October 2008-September 2009) feeder and fed cattle imports from Canada decreased approximately 342,000 and 207,000 head, respectively. Feeder cattle from Mexico increased 68,000 head. This 481,000 head decrease in cattle imports is approximately three-fourths of one week's average slaughter.

As mentioned, beef demand is the challenge. The recession is global and exports have not grown at the same pace of earlier years. It is anticipated that the weaker U.S. dollar will be supportive of beef exports going forward. The domestic market is the largest user of U.S. beef. Nearly 94% of the beef coming out of U.S. plants is consumed domestically. Domestic demand is tied to consumer spending, which has decreased during the recession. The economy and consumer confidence will have to improve to show much improvement in beef demand. The somewhat good news is that poultry and pork are also struggling due to weak demand and supplies of the two competing means have declined, and when the economy does improve it will be at a time of relatively tight meat supply.

SOURCES OF OUTLOOK

There are several sources of production and price outlook for

cattle producers and they differ primarily by time horizon and source. In the short term, the futures market offers a consensus forecast of prices for a year or more in advance. Research has repeatedly shown that basis-adjusted futures are as good of forecast available for the short-term. However, the basis-adjusted futures forecast can still have a wide forecast error. Recent research shows that the average futures forecast error for one quarter out is 4% and it grows to 7% when two quarters out. Thus, in a $90 market a 7% error says that the price will be as predicted, plus or minus $6.30/cwt about two-thirds of the time. About one time out of six, prices will be less than the average ($90 in this example) minus $6.30 and there is an equal chance that they will be that much above what the futures are forecasting.

The point is that basis-adjusted futures prices are our best forecast and they aren't very good. Managers should beware of the forecast, have their own forecast in mind and, more importantly, have a strategy on how best to market their cattle based on the information they have. For estimates of basis see http://www.extension.iastate.edu/agdm/livestock/pdf/b2-42.pdf.

For more information about the futures as a price forecast see: http://www.extension.iastate.edu/agdm/livestock/html/b2-61.html and http://www.extension.iastate.edu/agdm/livestock/html/b2-66.html.

A relatively new tool that uses the futures market to forecast prices is BeefBasis.com. It is a free Web site that automatically pulls in the previous day's futures prices to forecast feeder cattle prices for a specific market on a chosen marketing date. It has auction specific data from twenty-three states and several locations in the states. For example, there are five auction markets in Iowa, fourteen in Missouri and six in South Dakota.

This tool is very good for a seller evaluating marketing dates, (i.e., "Should I sell at weaning or background for sixty to ninety days?") because he or she can forecast the selling price of the heavier animal at a later date. It is also helpful for a feeder cattle buyer choosing where to buy cattle because you can compare the historic price relationships of different locations for a particular type of cattle at a given time.

There are also fundamental outlook analyses based on economic models that try to capture the factors that impact beef supply and demand. These models typically have longer time horizons than the futures market. Two such models are highlighted here.

The Livestock Market Information Center (LMIC) is a cooperative of land grant universities and industry organizations. There is a staff that do the day-to-day work of managing data and updating models, but they also rely on input from economists at universities and the USDA, who are members. The LMIC forecast of beef supplies and cattle prices is in Table 1. Iowa Choice steers are approximately $1/cwt below the 5-Market and Iowa feeder cattle and calves, on average, are similar in price to Southern Plains which are forecast in the table.

Table 1. Forecast of Change in Cattle Slaughter and Beef Supply and Cattle Prices

	Commercial Cattle Slaughter	Beef Production	Live Sltr. Steer Price 5-Mkt Avg	7-800#	Feeder Steer Price Southern Plains 5-600#
	% Chg from year ago		*$/Cwt.)*		*($/Cwt.)*
2009					
I	-3.6	-1.9	82.18	93.86	109.42
II	-5.0	-4.3	84.47	99.63	115.56
III	-3.9	-3.2	83.05	101.21	109.37
IV	-0.4	0.7	84-85	94-96	103-106
Year	-3.3	-2.2	83-84	96-98	109-110
2010					
I	0.0	0.3	84-87	94-98	106-110
II	-4.5	-3.6	87-91	98-103	110-117
III	-1.3	0.1	83-88	102-108	115-121
IV	-3.9	-2.7	87-93	101-110	109-119
Year	-2.4	-1.5	86-89	99-105	110-117
2011					
I	-1.3	-0.4	88-95	97-106	111-122
II	-1.6	-1.1	92-100	103-113	115-126
III	-1.2	-0.3	86-95	106-117	117-130
IV	-3.4	-2.6	90-100	104-114	113-126
Year	-1.9	-1.1	90-96	103-113	114-126

Sources: Livestock Slaughter - USDA/NASS; Steer Prices - USDA/AMS Livestock Market News; Projections and Forecasts by LMIC. Forecast date October 23, 2009

The LMIC updates its quarterly forecast for up to two years in advance on a regular basis. The forecast is not published directly by LMIC, but is available from its members as they use it in their presentations and own forecasting analyses. The LMIC Web site also has a public section with links to analysts from around the country at http://www.lmic.info/.

A longer term forecast that is updated each year is available from the Food and Agricultural Policy Research Institute (FAPRI), a joint effort by Iowa State University and the University of Missouri. FAPRI is funded by Congress to do agricultural policy analysis including changes in regulations, Farm Bill provisions, and trade agreements. Each year, a ten-year baseline forecast is published for several commodities and countries.

Obviously, if short-term forecasts are difficult as we saw with the futures forecast error, precise long-term forecast are nearly impossible. However, the FAPRI model has two advantages that make it work considering. First, it is internally consistent. While there may be a shock to markets initially, commodity prices will respond to one another and will return to a long-run equilibrium. Knowing that path of adjustment is helpful. Second, the forecast, however flawed, is better than nothing and better than assuming that current conditions will persist each year forever. The model does incorporate the real world of biology, policy and prices to forecast supplies and price. Figure 1 shows the forecast prices estimated in the spring of 2009.

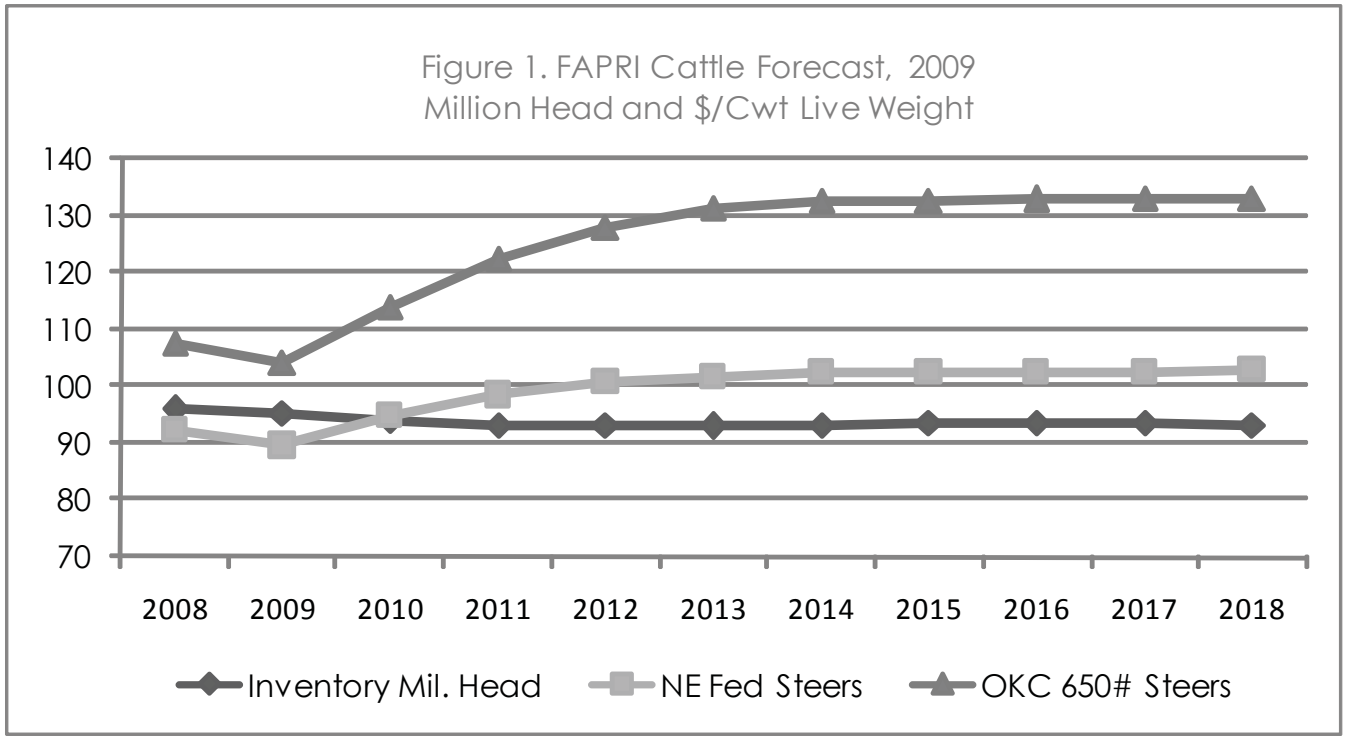
First, notice that the forecast for 2009 fed cattle was too optimistic, but it was consistent with most short-term forecasts at that time. Second, the model doesn't capture the year-to-year variation that is likely to occur. These issues aside, the model predicts a continued slow reduction in cattle inventories and generally higher calf and fed prices until 2014 before leveling off. Watch for a new forecast each spring at: http://www.fapri.iastate.edu/outlook/.

MANAGEMENT IMPLICATIONS

The forecast, regardless of the time horizon, is for higher prices in 2010 and 2011 than we had in 2009. As discussed, there are also risks associated with the forecast as variables change and there are errors in the forecasts even if the variable are predicted correctly as consumer preferences and weather conditions come into play. The management challenge is to stay current on the best available forecasts for each time horizon and then determine the appropriate production or marketing action. The following are two simple tools to help evaluate marketing opportunities.

First, is a simple matrix to determine the breakeven purchase price for feeder cattle given a set of assumptions and varying fed cattle and corn prices. Producers must use their own numbers for input quantities and price, but this provides a ballpark forecast of feeder cattle prices for a given fed cattle market. For example, if the finished steer is expected to sell at $91 and the corn price is $4/bu then the breakeven purchase price for a 650-lb steer calf is $112/cwt. The assumptions for an individual feedlot and class of cattle will be relatively stable with the exception of the price of hay and distillers grains. A generic spreadsheet where producers can enter their own input assumptions is available at http://www.iowabeefcenter.org/content/breakevenworksheet.xls.

Another tool to help identify cattle feeding opportunities and therefore potential changes in feeder cattle prices is the "Crush Margin." The Crush Margin uses basis-adjusted futures prices to calculate the margin or difference between the value of a 1250-lb Choice steer or a 750-lb steer and 50 bu of corn. This margin is the money left to pay all the other costs and earn a profit. Depending on the individual farm's cost, the crush



margin needs to be about $150-160 to breakeven. The Crush Margin (Figure 1) is updated each Wednesday and is reported along with the trend in margins at http://www.econ.iastate.edu/faculty/lawrence/Excel/cattle%20crush%20web.htm, along with an explanation of the margin and how it has performed in the past by selling month.

This crush margin graph was calculated based on October 28 futures closing prices and covers cattle placed as distant as September 2010 to be sold in February 2011. It indicates that there is an opportunity to hedge a crush margin over $150 for cattle placed in November through January by buying feeder cattle futures and corn futures and selling live cattle futures. When the actual feeder cattle and corn are bought those futures positions are offset. There are also $150 opportunities for cattle placed in July and August. Even if you do not use futures to capture the margins, this variable is informative. One might expect that feeder cattle prices may be bid up in the months that offer profits and may be bid lower in the months not offering a positive return.

SUMMARY

Marketing and management decisions are increasingly complex and the stakes are large given the volatility in the market place. Price forecasts are readily available from a variety of sources and differ by the time horizon considered. It is important to stay current on market information, but recognize that forecasting is not an exact science. The challenge is to act upon the information to capture opportunities when they are presented.

Feed Management —Bunker to Bunk

Dr. Dan Loy, Extension Beef Specialist
Iowa State University

INTRODUCTION

Feed efficiency is one of the primary factors driving cost of production of beef cattle. Much of the research effort in the United States in the area of nutrition and management is focused on methods and technologies to improve feed efficiency. Numerous articles and factsheets cover the recommendations and ideas that have been developed that impact feed conversion efficiency. Many producers and consultants work very hard to fine tune programs that optimize technologies such as implants, ionophores and beta agonists; nutritional factors such as energy levels, grain processing, protein type and level, minerals and vitamin supplementation; and receiving programs, market timing and co-product feeding. Certainly feed conversion efficiency, defined as dry matter intake per unit of weight gain, is important. However, losses in efficiency before the feed reaches the mouth is often neglected, or at least overlooked. This review will emphasize the opportunities to reduce feed losses through delivery, storage, feed management and feed delivery—bunker (or bin, commodity shed, etc.) to bunk. Some of the information referenced in this paper comes from the dairy industry. With more expensive feeds and more reliance on purchased commodities this area has been a management concern for some time in that industry. As feed costs increase in the beef industry, feed management is increasingly important.

FEED STORAGE AND SHRINK MANAGEMENT

Feed losses can be significantly greater than the typical improvements resulting from the technologies mentioned above. These losses come in several forms including losses during storage, losses during mixing and transportation within the feedyard, losses due to wind and weathering, and losses due to pests including birds and rodents. Table 1 shows typical feeding losses for common feedstuffs that have been observed. For many feedstuffs, the range in storage losses

Table 1. Typical Storage Losses

Feed	Shrink/Loss	Reference
Commercial feed mill–dry feeds	.3-.7%	(1)
Dry commodities–semi loads weighed in, mixing trucks weighed out	2-4%	(1)
Wet and modified distillers grains–weighed at ethanol plant, unloaded and weighed into storage	2-3%	(2)
Wet brewers grains– truck loads weighed in, mixing trucks weighed out	15-20%	(1)
Alfalfa–chopped and delivered or ground at feedlot	4-10%	(1)
Corn silage–stored in bunker	6-18% 10-50% 5-30%	(1) (3) (4)
High moisture corn	2-9%	(5)
Soybean meal–pushed into commodity shed, potentially windy conditions	8-9%	(4)
Wet and modified distillers grains–stored in bags or bunker (anaerobic), weighed at ethanol plant in and mixing wagons weighed out	7-17%	(2)

References: (1) Kuhl, 2003, (2) Loy et al, 2010a, 2010b, (3) Barmore, 2002, (4) Brouk, 2009, (5) Soderland , 1997

Table 2. Corn Silage Dry Matter Losses in Bunker Silos

Silage Density (lbs. DM/ft3)	DM Loss at 180 days (%)
10	20.2
14	16.8
15	15.9
16	15.1
18	13.4
22	10.0

Ruppel et al. (1992)

can be quite wide. This is due to several management factors that will be discussed. However, for most operations the first step is to identify the shrink of each commodity/feedstuff. This involves measuring shrink by weighing feeds into storage, and into mixing trucks or wagons destined to the feed bunk. Storage losses should be continually monitored, which may include periodic moisture tests. For high moisture feeds in particular, storage losses may partially be due to surface moisture evaporation, which would not contribute to storage losses. Once losses are known, management changes can be implemented that improve storage and feedout losses. These steps are the three M's of feed shrink management—Measure, Monitor, and Manage.

Some of the areas for improvement of storage losses and shrink include the management of silage and silage bunkers, management of wind losses, control of birds and rodents, and tires and tracking (Bourk, 2009).

Silo management: Storage losses in bunker silos are influenced by three main factors—proper moisture, packing density, and feedout procedures. The preferred moisture range is 60%-70% for corn silage, 60%-65% for hay crop silage (Bolsen 2002) and 26%-32% for high-moisture corn (Soderland 1997). If silages are stored wetter than these values some losses due to seeping may occur. At drier levels, packing may be compromised, which could decrease the anaerobic conditions. The feeding value of the silage may be normal outside of these ranges, but with some additional storage losses. Packing density can be improved by using a large, single track packing tractor and packing in layers no more than 6-10 in. Table 2 shows the effect of packing density on corn silage storage losses. Feedout rate should be at least 6-12 in to minimize storage losses. During periods of warm weather, this should be increased to 18 in, especially with high-moisture corn (Bolsen 2002).

Wind loss and weathering: Wind loss can be a significant source of storage and shrink loss in feedlots. Losses during hay grinding and storage are the most obvious, but can be sizable with any fine particle-size dry feedstuff. High-moisture feedstuffs can also benefit from covered storage by reducing weather losses and evaporation through reduced surface area exposed to the air and exposure to precipitation. Shown in Table 3 is the expected storage losses from common commodity feeds stored in open, uncovered piles; commodity sheds; or bulk bins (where appropriate). These numbers can be useful in budgeting potential payback to the construction of feed storage alternatives.

Control of birds and rodents: Starlings can have a significant negative effect on feeding and storage losses. Studies in Kansas have indicated that starlings can consume about 2 lb of feed per month, about 1 lb each from feed and feces. Flock sizes can be several hundred to several thousand. A flock of three hundred thousand birds would consume as

Table 3. Expected Shrink Losses from Common Feeds

Ingredient	Open uncovered piles	Commodity shed	Bulk bin
Alfalfa meal	7-15	5-10	2-5
Alfalfa, chopped	10-20	5-10	--
Bakery waste	8-16	4-7	--
Barley, whole	5-8	4-7	2-3
Beet pulp, dry	12-20	5-10	3-5
Brewers grain, dry	12-20	5-8	2-5
Brewers grain, wet	15-30	15-30	--
Concentrates, typical	4-5	4-5	--
Cottonseed, whole	10-20	5-15	--
Distillers grains, dry	15-22	7-10	3-6
Distillers grains, wet	15-40	15-40	--
Dry meal feeds, typical	5-10	3-8	2-4
Dry grains, typical	5-8	4-7	2-4
Wheat bran	15-28	6-12	2-5
Wheat middlings	14-22	4-9	3-5
Soybean hulls	12-20	5-10	2-5

Kertz (1998)

Table 4. South Dakota 4-point Bunk Scoring System

Score	Description
0 =	No feed remaining in bunk
1/2 =	Scattered feed present. Most of bottom of bunk is exposed
1 =	Thin uniform layer of feed across bottom of bunk. Typically about 1 kernel deep.
2 =	25 to 50% of previous feed remaining.
3 =	Crown of feed is thoroughly disturbed. >50% of feed remaining.
4 =	Feed is virtually untouched. Crown of feed still noticeable

Pritchard (1993)

much as 150 T of feed per month. Control methods that have been tested include habitat management, physical form of feed and bunk management, frightening devices, and toxins. Rodents can be reduced by limiting spilled feed; maintaining clean feed storage areas; reducing weeds, tall grass, and other cover in the feedlot grounds; or through the use of rodenticides.

Tires and tracking: Brouk (2009) lists feed losses associated with handling commodity feeds as another significant item in feeding operations. These losses include feed spilled during handling with a loader tractor or feeder truck/wagon and feed tracked by the tires of this equipment during loading and delivery. Reducing travel distances, premixing certain ingredients or more deliberate equipment operation can improve these losses.

FEED QUALITY CONTROL

Feed quality control begins with the management of storage, handling, and shrink losses mentioned above. Other factors include quality control of incoming ingredients and continual monitoring of potentially variable ingredients.

Quality control of ingredients: The first step in quality control of incoming ingredients is to purchase from a reliable source. This is particularly true for feeds that have increased risk of problems due to variability or short shelf life. Included in this category are liquid feeds, fats, and byproduct feeds. Routine testing at the supplier level and guarantees given by the suppliers have value. A protocol of inspection, testing, and rejection of incoming feeds should be developed.

Continual monitoring of potentially variable feeds: A silo or grain bin may contain feeds from different varieties that were harvested over different periods of time. All feed can change in storage due to evaporation, seepage, wind loss, fermentation, and spoilage. Change in moisture is the biggest risk, so frequent moisture determination allows for ration adjustments that can account for feed variation. Periodic nutrient analysis of other nutrients is also advisable; however, with the right equipment, moisture can be evaluated as frequently as daily. One approach is daily testing using a Koster tester or by the microwave method of the final mixed ration. Any deviation from outside a range of expectations would then trigger testing of individual feedstuffs. A ration that is off specifications in moisture level could be because of a change in ingredient moisture level or a problem in mixing, which will be discussed later in this paper.

Bunk scoring and intake management: Another factor that can affect feed waste is bunk management. Systematic bunk management was popularized in the early 1990s by Pritchard (1993) and his development of the South Dakota bunk scoring system (Table 4). The majority of feedlots in the upper Midwest today utilize some version of this system to make feed delivery calls each day. The well known benefits of utilizing a bunk scoring system include acidosis control and improvements in feed efficiency through reduced cycling in feed intake and slight feed restrictions that can occur when bunk scoring is coupled with a slick bunk protocol. Basically a slick bunk protocol involves managing the feed calls in a way that maintains bunk scores in the 0 to ½ category.

An example of one approach to guidelines based from Krehbiel and Holland (2009) is shown in Tables 5 and 6. This shows suggested adjustments to feed deliveries based on an

Table 5. Daily adjustments to feed delivery

Previous day's PM feed call	Today's AM feed call	Adjustment (lb/head)
Feed remaining	Feed remaining	See table 6
Feed remaining	Slick	+
Feed remaining	Slick (but increased delivery yesterday)	No change
Feed remaining	Slick (but decreased delivery yesterday)	+1/2 of yesterday's decrease
Slick (first consecutive day of slick bunk)	Slick	+1
Slick (subsequent consecutive day of slick bunk)	Slick	+ lb per head regardless of any previous increases

Krehbiel and Holland (2009)

Table 6. Adjustment to feed delivery based on amount of feed remaining

Amount remaining (lb/head)	Adjustment (lb/head)
<1	No change
1	-0.5
2	-1
3	-2
4	-3
5	-4

Krehbiel and Holland (2009)

assessment of bunk scores. Each producer will have slightly different philosophies on how much and how rapidly to make feed changes. Ultimately there will be a tradeoff between feed waste and feed intake.

A contrast to a slick bunk management program would be a maximum intake management program where cattle are fed well above their expected intake to ensure the greatest intake possible. Many dairies are managed this way. Research cattle are also often fed this way to measure differences in treatment effects for feed intake. The excess feed, called orts, are weighed back and discarded. The cost of maximum intake feedbunk management system is additional feed waste.

FEED MIXING ASSESSMENT

In a paper given to the High Plains Dairy Conference, Turgeon (2006), a feedlot nutritional consultant, explained what he called the five R's of feed bunk management. Those five R's are as follows:

Right Feed: Proper formulation of the ration and constant adjustments for moisture variations (Turgeon advocates daily, on-site monitoring for moisture)

Right Pen: Proper pen and bunk space, surface management and water cleaning

Right Amount: Feedbunk management

Right Time: Timely and consistent feeding

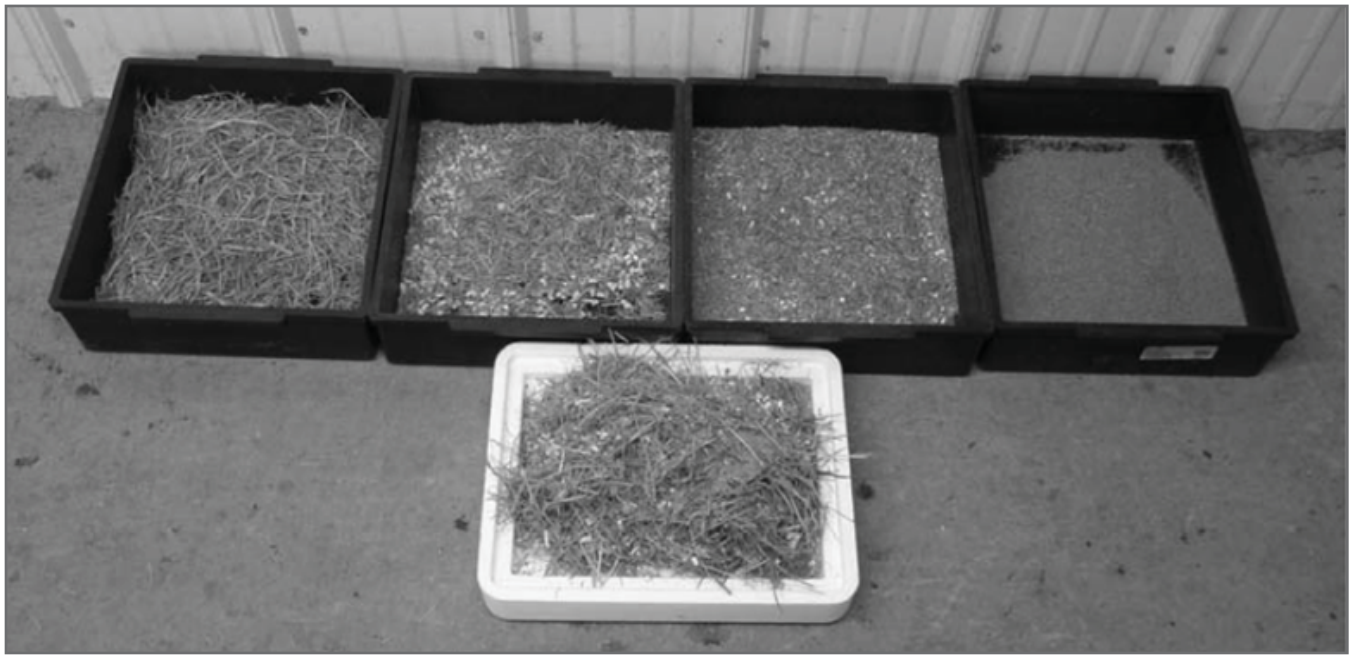
Right Way: Reducing variability in feed delivery

He also mentions three C's of feed milling and mixing. Those are consistency, consistency, and consistency. One of the areas where adjustments can be made to improve consistency is through feed mixing. Each mixer is different and may be more effective with alternative ingredient sequences and mixing times.

Also, a periodic test of feed mixing can indicate changes due to wear and needed maintenance. A mixing test is usually done by sampling approximately ten bunk samples as the mixer unloads in the feed bunk. Then each sample is sent for analysis. Compounds analyzed would represent the components of the ration of interest. Typically, samples are analyzed for dry matter, protein, fiber, at least one major mineral, and perhaps a feed additive.

The results of the ten analyses are then used to calculate a coefficient of variation (CV) for each nutrient. If the calculated CV is less than 10%, the general rule of thumb is that mixing is adequate. A good goal would be a CV of less than 5%. A high variation in a specific nutrient or ration component would represent a mixing problem with the feedstuffs that vary most in those nutrients.

Figure 1. Ration in white tray and components in four trays from Penn State Particle separator. (Dahlke and Strohbehn, 2009)



One problem with this method of mixing analyses is the large number of feed analyses required and the potential cost of those analyses. This cost may limit the frequency in which some producers may conduct this analysis. Often mixing issues relate to problems with uniform distribution of feeds that differ in particle size.

One lower cost alternative to evaluation mixing efficiency more frequently is using the Penn State Particle separator, which separates the feed sample into four trays by particle size. Then a CV can be calculated on the percent of the ration in each tray. Often the large particles (top tray) will be unloaded later if there is a problem. An example of this was outlined in a recent Iowa State University study (Dahlke and Strohbehn 2009).

TAKE THE FEEDLOT COST ASSESSMENT

In this paper you have learned about the three M's, the five R's and the three C's, as well as some of the factors affecting feed management prior to consumption by the animal. A logical next step is to do an honest assessment of how your operation stacks up in managing and controlling feed and feed losses. In the appendices you'll find the Feedlot Cost Management Worksheet developed by the Iowa Beef Center (Appendix C). Page 2 outlines fourteen items that relate to feed storage, feed delivery and feed bunk management. An honest self assessment will get you on the road to improvement. Then, take a look at the other items on the assessment tool, including nutrition and rations, implant systems, feed additives, records and tracking, budgeting and purchase costs, cattle marketing, and cattle comfort and facilities.

References

Barmore, James. 2002. Fine-tuning the ration mixing and feeding high producing herds. Tri-State Dairy Nutrition Conference.

Bolsen. 2002. Bunker silo management: four important practices. Tri-State Dairy Nutrition Conference.

Brouk, Micheal. 2009. Don't let shrink kill you with high feed prices. Western Dairy Management Conference.

Dahlke, Garland and Daryl Strohbehn. 2009. Feed separation due to feed delivery and time in feed bunk and effects on cattle performance. Iowa State Univ. Anim. Industry Rep. ASL-R2422.

Kertz, A. 1998. Variability in delivery of nutrients to lactating dairy cows. J. Dairy Sci. 81:3075.

Krehbiel, C. R. and B. P. Holland. 2009. Methods to improve feed efficiency in feedlot cattle. Western Nutrition Conference.

Kuhl, Gary. 2003. Typical Feed Shrinkage. Presented at the 2003 Southwest Iowa Feedlot Shortcourse.

Loy, Dan, Daryl Strohbehn, Joe Sellers and Dan Morrical. 2010a. Extended storage of wet distillers grains with ground hay. Midwest ASAS (in press).

Loy, Dan, Daryl Strohbehn, Joe Sellers and Dan Morrical. 2010b. Extended storage of modified distillers grains. Midwest ASAS (in press).

Pritchard, Robbi. 1993. Bunk Management. Proceedings Land 'O Lakes Delivering the Difference Conference.

Ruppel, K. A. , R. E. Pitt, L. E. Chase and D. M. Galton. 1995. Bunker silo management and its relationship to forage preservation on dairy farms. J. Dairy Sci. 78:141.

Soderland, Steve. 1997. Managing and feeding high-moisture corn. NRAES Field to Feedbunk Proceedings.

Turgeon, Abe. 2006. A feedlot consultant's perspective on feeding and milling. High Plains Nutrition Conference.

Bedded Hoop Barns
for beef cattle

APPENDIX A

MARK HONEYMAN, SHAWN SHOUSE, DARRELL BUSBY, AND JAY HARMON
IOWA STATE UNIVERSITY

FEBRUARY 2009

An alternative to open feedlots where runoff and manure management are a growing concern, hoop barns are considered a more environmentally friendly option to traditional open feedlot arrangements. Recent research has compared the hoop barn to open feedlots, as well as other housing options, in an attempt to determine its advantages. Hoop barn cattle feeding often confines the cattle inside the hoop barn and relies on bedding to maintain the animal environment.

layout and construction

Although a hoop barn's specific layout and construction differs with each building, there are four basic common features: a floor, walls, hoop frame, and cover.

Floor: A hoop barn's floor is generally made of compacted soil, crushed limestone, or concrete, with a concrete floor allowing for the easiest cleanout. From 40-50 sq. per animal is suggested.

Walls: Wood and concrete sidewalls are common for the structure. Concrete sidewalls will hold up better, but are more expensive, and make the hoop building a more permanent structure. The north and south ends are usually open to increase airflow, although winter windbreaks of bales or end panels can be used.

Hoop frame: Hoop frames are constructed primarily from 2- to 3-inch round tubular steel to form a roof truss system. This frame supports the tarp roof, which is attached to the sidewall of the building. A variety of frame widths are available depending on particular needs. Wider hoop barns will have arched steel bridgework for the arches or hoops.

Cover: The tarp covers are generally made of woven polyethylene fabric and come in a variety of weights and colors. The nature of the fabric cover makes the tarp resistant to runs when a puncture occurs.

budget

Beef cattle feedlots can be built for a wide range of prices. Depending on the type of feedlot, a bedded hoop barn would cost slightly more per head of capacity than an open-front shelter with earthen lot. According to a 2007 study on the feasibility of hoop barns (Honeyman, et al. [A]) construction of these structures in Iowa costs about 10% more than a conventional feedlot with shelter. Of course, the cost of an individual hoop barn varies depending on the quality of materials used. Cattle performance is similar in the two systems, thus the slightly higher building cost and bedding costs of a hoop barn system must be offset by other factors, such as minimal nutrient runoff, personal preference, or an improved cattle environment.

bedding use

When considering the budget needed for hoop barn construction, it's also important to understand the costs associated with utilizing the structure. These buildings require enough bedding to keep the floor under the bedding pack relatively dry if it is not completely concrete. Average corn stover bedding was 5.18 lbs/head/day. Producers have used corn stalks, soybean stubble, straw, prairie hay and wood shavings. A 2007 study on the feasibility of hoop barns for beef cattle (Honeyman, et al.) showed that the bedded hoop system used three times more bedding than open-front feedlots. In a hoop barn, bedding

IOWA STATE UNIVERSITY
University Extension

IBC Iowa Beef Center

is used all year-round, although use increases during winter and wet periods.

cattle environment

The environment in a livestock building is determined by numerous factors, including ambient temperature, air speed, temperature of surfaces, and relative humidity. Because a stressful environment can have a negative impact on the cattle performance, it's important to understand the environment in a hoop barn compared to traditional feedlot housing. A 2006 study (Harmon, et al.) was conducted in southwest Iowa comparing the environment in a bedded hoop barn to that in an open-front feedlot building during both winter and summer.

In the summer trial, the summer temperature-humidity index (THI) showed that the hoop barn had fewer hours in the "alert" category than either the open-front building or ambient conditions (Table 1). In winter, a cold stress index showed that the open-front barn provided the most shelter for the cattle with the highest percentage of hours with "no impact" to the cattle. This study suggests hoop barns offer a viable environment for feeding cattle in confinement.

Table 1: THI of the environmental conditions (summer trial)

Location	Weather THI (percent of hours)[1]			
	Normal	*Alert*	*Danger*	*Emergency*
Hoop south	89.0	8.6	1.6	0
Hoop north	88.7	8.2	3.0	0
Open-front east	86.4	10.8	2.8	0
Open-front west	86.8	10.5	2.7	0
Ambient/outdoor	88.8	9.7	1.5	0

[1] Based on 2,160 hours; THI = Temperature-Humidity Index

cattle behavior

Cattle behavior and temperament in hoop barns has been compared with that of cattle in an open-shelter facility to determine if any negative alterations developed in hoop barn confinement (Baker, et al. 2007a and 2007b). Summer (2006) and winter (2007) trials were conducted with behaviors, postures, and temperaments monitored.

In the summer trial, steers in the hoop barn spent more time at the waterer than the open shelter steers and were more likely to be less active (greater incidences of lying down as well as fewer incidences of walking recorded). In the winter trial, cattle in the hoop barn spent more time at the feedbunk, but an equal amount of time at the waterer. As with the summer trial, the steers in the hoop barn were less active, spending more time lying down and less time walking. Neither trial indicated an adverse behavioral or temperament shift among the cattle.

cattle performance

The performance of beef cattle has also been evaluated in an attempt to understand any effects of this new housing option. A three-year Iowa study (Honeyman, et al. 2009) evaluating the performance of yearling steers fed and confined in a bedded hoop barn versus an open feedlot showed no difference in cattle performance, with the exception of higher mud scores for the steers in the open-shelter lot. Carcass characteristics were also similar for the cattle in both types of housing.

manure management

Hoop barns, thought to be a better housing option for nutrient runoff, still need proper equipment and, if necessary, storage available for manure management. Management of the manure in a hoop barn is either done by selectively cleaning portions of the barn periodically or waiting until the cattle are sold and hauling out the built up manure pack. If not spreading the manure immediately, there must be an appropriate storage area available. State and federal regulations may also require control of rainfall runoff from the storage area or cover of the storage area. Manure may compost during stockpiling which can reduce mass and volume.

nutrient losses

With partial concrete floor hoop barns being increasingly adopted by beef producers, in part for runoff concerns with traditional feedlots, initial studies have attempted to determine the nutrient loss in the soil beneath hoop barns. In a 2008 study at the ISU Armstrong Research and Demonstration Farm (Shouse, et al.), soil tests were taken before a hoop barn was built (in 2005) and three years later in 2008. Shallow and deep soil samples underneath the packed limestone floor indicated that phosphorus, calcium and magnesium levels did not show consistent or major changes with time (Table 2). Soil organic matter content increased in both shallow and deep samples. These results show measurable, but very slow migration of moisture and nutrients into the soil profile.

Table 2: Impact of hoop barn on soil nutrient levels

		December 2005		April 2008	
Parameter	**Units**	**Shallow[1]**	**Deep[2]**	**Shallow[1]**	**Deep[3]**
pH		6.3	6.5	6.0	6.4
Phosphorus	ppm	4	10	11	6
Potassium	ppm	143	114	267	147
Calcium	ppm	2127	1951	2252	2164
Magnesium	ppm	507	648	437	658
Organic Matter	%	2.5	1.4	3.6	2.8
Nitrate Nitrogen	ppm	1.51	2.26	11.47	1.70

[1] Samples from 1 foot depth; [2] Samples from 4 to 5 foot depth; [3] Samples from 3 foot depth

Cited:

Baker, R.G., A.K. Johnson, K.J. Stalder, and M.S. Honeyman. 2007a. Finishing steers in a deep-bedded hoop barn and a conventional feedlot: Effects on behavior and temperament during summer in Iowa. Animal Science Leaflet. Ames, IA: Department of Animal Science, Iowa State University.

Baker, R.G., A.K. Johnson, K.J. Stalder, and M.S. Honeyman. 2007b. Finishing steers in a deep-bedded hoop barn and a conventional feedlot: Effects on behavior and temperament during winter in Iowa. Animal Science Leaflet. Ames, IA: Department of Animal Science, Iowa State University.

Harmon, J.D., S.C. Shouse, and M.S. Honeyman. 2008. Environmental conditions in a bedded hoop barn with market beef cattle. A.S. Leaflet R2326. Ames, IA: Iowa State University.

Honeyman, M.S., J.D. Harmon, S. C. Shouse, W.D. Busby, and D.L. Maxwell. 2008. Feasibility of bedded hoop barns for market beef cattle in Iowa: Cattle performance, bedding use, and environment. ASABE Paper No. 08838542. St. Joseph, Mich.: ASABE.

Honeyman, M.S., J.D. Harmon, A.K. Johnson, D.L Maxwell, W.D. Busby, and S.C. Shouse. 2009. Beef cattle feeding in a bedded hoop barn: Three year summary. A.S. Leaflet R2403. Ames, IA: Iowa State University.

Shouse, S.C., M.S. Honeyman, D.L. Maxwell, and W.D. Busby. 2008. Nutrient retention performance of a crushed limestone floor surface in a bedded hoop barn with confined beef cattle. Ames, IA: Iowa State University.

Estimated "Crush" Margins for Feedlot Operators, 1999-2008

Zeb Gray and John D. Lawrence
Iowa Beef Center at Iowa State University

Buying feeder steers and selling fed cattle at discrete times throughout the year exposes producers to both input and output price risk. Feeder steers and corn prices account for a significant share of total cost and are volatile, adding to the operators' risk. This new level of risk shifts the focus from just the fed steer selling price to managing the "crush" margin between fed steer revenue and the major input costs (feeder steers and corn) that change with market conditions. The term crush originated in the soybean sector where futures on oil, meal, and soybeans are used to manage the margin derived from crushing the soybeans into components. Similarly, futures prices for fed steers, feeder steers, and corn can be managed to protect a margin for feedlot operators.

Procedure

A basic model was created to estimate the margin made on the sale of a fed steer in each month over a ten-year period from January 1999 through December 2008. This historical perspective provides a benchmark with which to compare current conditions as producers evaluate their marketing alternatives. It is assumed that feeder cattle are placed, corn is purchased, and fed cattle are sold on the first Wednesday of each month. In this analysis the crush margin (CM) is defined as the value of the fed steer less the cost of the feeder calf and the corn. Specifically,

1. $CM_T = 12.5 \times LCF_{BT} - 7.5 \times FCF_{BT-5} - 50 \times CF_{BT-5}$

LCF_{BT} is the live cattle futures that expire in month T (or one month after T in the case of off-contract months) adjusted for the basis (B) for month T. This price is multiplied by 12.5 for a 1250-lb. steer. FCF_{T-5} is the feeder cattle futures price adjusted for basis at placement, five months prior to slaughter. CF_{BT-5} is the corn futures price at placement adjusted by the North Central Iowa Basis multiplied by fifty bushels per steer. For example, for a steer sold in January of 1999, the CM was calculated daily based on the price for February 1999 live cattle futures, August 1998 feeder cattle futures, and September 1998 corn futures from February 23, 1998, to Wednesday, January 6, 1999. This process was followed for fed cattle sales in each month from 1999-2008.

At placement, the first Wednesday of the month, it is assumed that the feeder steer and corn are purchased in the spot market (S) at the weekly average price. The CM then becomes:

2. $CM_T = 12.5 \times LCF_{BT} - 7.5 \times FC_S - 50 \times C_S$

When the feeder steers are bought in the spot market at time T the price is the weekly average price of the St. Joseph, MO auction market price for a 750-lb. steer. The corn purchased in the spot market is based off of the North Central Iowa corn prices for that day.

The last day, or the day of slaughter, CM for each month is:

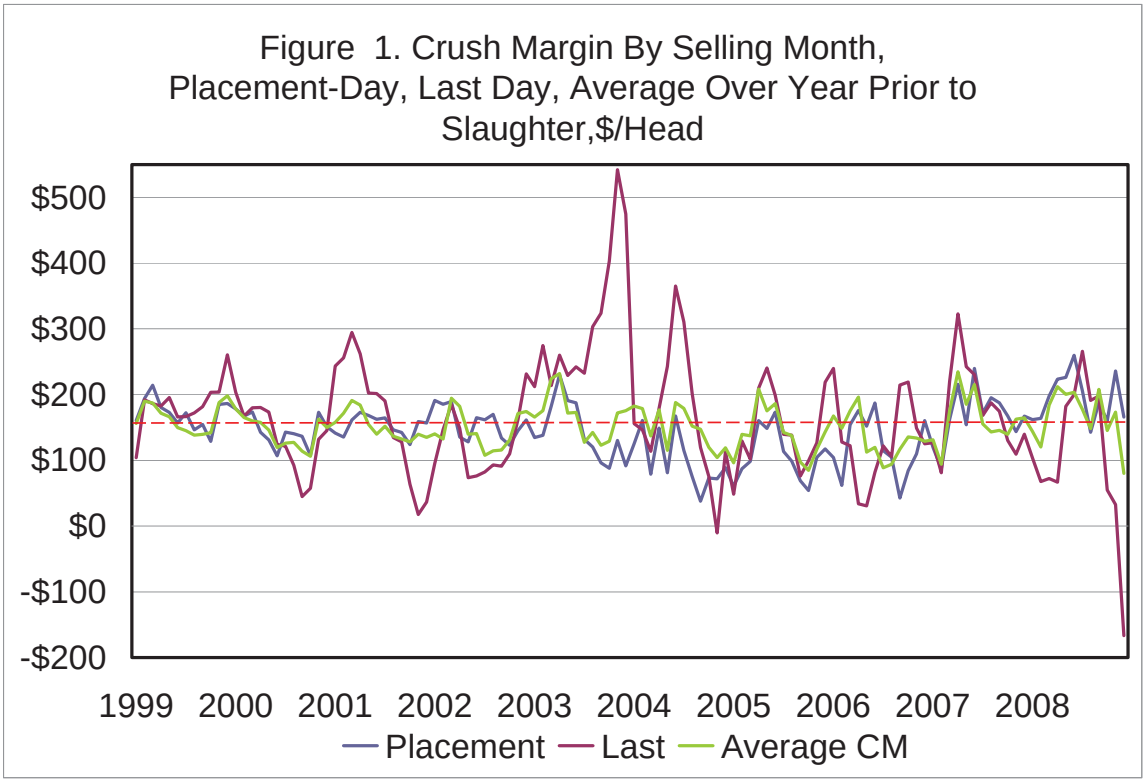
3. $CM_T = 12.5 \times LC_S - 7.5 \times FC_S - 50 \times C_S$

The price for fed cattle is the Iowa-Minnesota weekly average fed cattle cash price. The feeder steer price and the corn price remains the same as in Equation 2.

Results

A crush margin of approximately $150/head is needed to breakeven (See "Using the Crush Margin to Manage Profits Rather than Price") when feeding yearling steers. Figure 1 shows the crush margin by selling month over the ten-year period and the $150 breakeven line. The "average" is the average of each trading day crush margin for up to one year prior to slaughter. The "placement" and "last" is the crush margin calculated on placement day and the day of slaughter, respectively. From placement-day to last-day margin uses basis adjusted live cattle futures and spot market prices for feeder cattle and corn. The last-day margin is based on spot market for all three variables and would be similar to a spot-market strategy.

The last-day strategy has higher average margins, but they are also more volatile than the placement-day strategy. The last-day margin was higher than the placement-day in six months, but was only higher than the average in four months. Margins reached very high levels in late 2003 as the fed cattle prices trended much higher as feeder cattle and corn prices remained steady. Margins reached very low levels in late 2008 as corn prices were based on higher feeder and corn price and declining live cattle futures. Last-day margins were largely negative meaning that feed costs were not covered when the cattle were sold.



Averaging across selling months indicates that April has the highest crush margins on average, as well as before and after placement. However, June has the highest margin at placement and May the highest on the last day. October marketings provide the lowest margin on average and across most categories. The "high" is the average of the highest daily margin for that selling month averaged across the ten years. The "low" is similarly the average of the lowest daily margin for each selling month. Table 1 shows the ten-year average for each month's average crush margin, high margin, low margin, last-day margin, placement-day margin, the average margin before placement, and the average margin after placement.

Table 1. Steer Crush Margin, $/head, 1999-2008 Averages by Selling Month

	Overall	Highs	Lows	At Placement	Last Day	Before Placement	After Placement
Jan	152	222	101	138	157	148	157
Feb	152	219	86	138	159	152	151
Mar	*177*	*241*	*103*	161	169	*180*	*174*
Apr	**195**	**255**	**107**	*179*	185	**203**	**187**
May	157	217	90	155	**193**	162	152
Jun	164	238	101	**181**	*189*	156	172
Jul	140	220	83	149	180	128	153
Aug	137	206	91	134	162	129	139
Sep	134	224	70	119	155	126	142
Oct	126	225	57	111	142	125	128
Nov	153	244	71	146	146	150	155
Dec	147	235	57	145	158	149	145

Table 2 reports the percent of days that the crush margin was higher than the last-day margin, by selling month and year. Note that the last-day is a spot market result using cash prices for fed cattle, feeder cattle and corn. If the basis is different that was expected in the crush margin calculation prior to the last-day, a basis estimation error, it is included in this comparison. On average 46% of days prior the last-day have a higher crush margin. Over 50% of days leading to January to March and October to December marketing are above last-day and only 28% in May. Notice that some years provide better opportunities that others, e.g., 2002 and 2008 compared to 1999 and 2003. Also, note that there is somewhat of a chronological pattern. For example, from April 1999 through May 2000 marketings, few days exceeded the last-day, but from June 2000-December 2000 marketings, most days were higher. This simply means that the markets go through bull periods and bear periods. The challenge is recognizing when the change occurs and adjusting marketing accordingly.

Table 2. Average Percent of Days Crush Margin Higher than Last-Day by Selling Month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1999	94	36	37	19	9	10	10	0	0	0	16	0	19
2000	16	41	21	0	0	54	82	100	99	90	100	68	56
2001	0	3	0	0	0	0	6	54	60	96	100	97	35
2002	92	29	74	84	91	88	71	75	90	89	44	5	69
2003	17	1	46	20	0	0	0	0	0	0	0	0	7
2004	40	88	63	56	0	0	10	24	87	89	100	100	55
2005	80	61	67	65	0	27	66	64	69	54	59	1	51
2006	9	86	100	100	86	79	11	39	1	8	24	54	50
2007	70	59	11	4	13	47	46	8	18	49	100	82	42
2008	99	92	100	100	79	41	8	13	50	100	96	95	73
Average	52	50	52	45	28	35	31	38	47	58	64	50	46

Table 3 indicates the percent of trading days up to a year prior to slaughter that the crush margin was in one of five margin categories. As noted earlier, it is estimated that approximately $150 is needed to breakeven. March and April had the highest percentage of days over $150 with more than 80%. May and June had over 60% of the days above $150. July to October marketings had the lowest percentage of days over $150. Margins over $250 are rare in any month, but do occur and should be viewed as a hedging opportunity.

Table 3. Distribution of Crush Margins, Average Percent of Days by Margin Category and Selling Month

	<$100	$100-150	$150-200	$200-250	>$250
Jan	6.8	48.1	34.1	8.5	2.6
Feb	9.5	33.0	47.6	7.3	2.6
March	5.8	12.4	50.4	25.4	6.0
April	3.2	8.0	36.1	46.1	6.6
May	8.4	25.4	56.7	8.5	1.0
June	6.2	33.5	45.3	9.0	5.9
July	10.7	62.3	18.4	5.1	3.5
Aug	6.4	64.3	12.9	3.5	12.9
Sept	15.3	61.2	16.9	2.4	4.1
Oct	17.6	64.8	13.0	3.2	1.3
Nov	11.2	35.1	42.1	8.4	3.1
Dec	11.2	39.2	38.5	8.5	2.6

Summary

The purpose of this analysis is to provide information to feedlot operators to help them manage profitability and risk. The crush margin is the value of fed cattle less the cost of the feeder animal and corn. Basis adjusted futures are used until the position is taken in the cash market. The analysis calculated daily crush margins for up to a year prior to marketing by month for the ten years of 1999-2008. Across all months and years 46% of the days offered a larger crush margin than was available on the last-day. Often the most profitable pricing opportunity is prior to slaughter and may be prior to placement.

The value of the analysis is that it provides a benchmark for producers to compare margins currently offered by the market. Live cattle, feeder cattle, and corn futures trade far enough into the future that is possible to calculate and protect a crush margin twelve to fifteen months in advance if it appears attractive compared to his/her cost structure and the historic levels presented in this analysis.

Feedlot Cost Management Assessment Worksheet

Name: **Address:** **Telephone:** **Email:**

	Score	None or Needs to Develop (1)	Improving (2)	Good (3)	Excellent (4)
Nutrition and Rations					
Rations developed to optimize performance		Utilize general recommendations	Rations developed for the operation using several feedstuffs	Rations developed for each pen of cattle using several feedstuffs	Rations developed for each pen of cattle evaluating all available feedstuffs
Rations reviewed		Look at performance at marketing	Monitor consumption weekly	Monitor consumption and performance daily	Monitor consumption and performance daily and analyze bunk samples
System to analyze feedstuffs for moisture and nutrient analysis		Use book values	Some feeds tested every six months or yearly	Most feeds tested quarterly. Wet feeds and more variable feeds tested monthly. All analyses used to adjust rations	All feeds tested quarterly .Wet feeds and more variable feeds tested monthly. All analyses used to adjust rations
System to evaluate alternative feeds in ration		Use general recommendations	Evaluate one or two alternative feeds for cost	Evaluate 3-4 alternative feeds for cost and ration effects	Evaluated all alternative feeds for cost (including transportation and storage) and ration effects
Rations developed to meet nutrient requirement specs (phase feeding)		Nutrient levels especially protein level changed once or twice during a feeding period	Nutrient levels changed 2-3 times during feeding period	Nutrient levels monitored and changed monthly if needed	Nutrient levels monitored and changed weekly if needed
Defined step- up program		No program	Use a program based on cattle type and consumption	Have a defined program for each cattle type and adjust for cattle intake	Have a defined program for each cattle type and adjust for cattle intake, projected performance and targeted marketing date.
Rations adjusted for weather		No adjustment in ration	Try to catch up to weather	Make changes with oncoming weather	Monitor cattle and weather to make changes as needed
Water delivery amount available and consumed		Water available	Clean water available		Clean cold water available with at least 1 water space for 25 head. Water intake may be monitored
Water quality reviewed		No water sampling	Water evaluated yearly for mineral content	Water evaluated quarterly for mineral content	Water evaluated quarterly for mineral content and bacteria

Feed Delivery and Feedbunk Management					
	Score	**None or Needs to Develop (1)**	**Improving (2)**	**Good (3)**	**Excellent (4)**
Bunk scoring system		No system	Bunks evaluated but no scoring system	A scoring system in place but not routinely used to make feed calls or adjustments	Scoring system in place. Scores recorded and used by all to make feed calls and adjustments
Receiving program for calves		No clear program	Defined step- up rations	Specific program for high risk cattle	Defined receiving and step-up program. Includes guidelines for ration changes by intake, cattle type, and targeted marketing date.
Mixing assessment		Feed is mixed but no monitoring occurs	Feed is mixed according to mixing equipment manufacturer directions	Feed is mixed and ration consistency is evaluated	Bunk sample analyzed and mixing Coefficient of Variation calculated periodically
Feed processing and delivery efficiency		Feed is processed and delivered	Feed is processed and delivered. Cost is monitored	Feed is processed and delivered. Cost and performance is monitored	Feed is processed and delivered. Cost and performance is monitored. Time to feed and process feed per pen or head is tracked and monitored
Management and employee communication adequacy (if applicable)		Employee handles and makes own decisions	Employee is trained and makes decisions based on management input provided quarterly	Employee is trained and makes decisions based on management input provided monthly	Employee and management review weekly and jointly make decisions
Feed waste at bunk monitored		Observed but not tracked	Feed waste is observed and tracked by pen	Feed waste is evaluated and changes made to reduce waste if needed	Feed waste measured against a standard and adjustments made based on target goals
Feed Storage					
Inventory control		Inventory not monitored	Inventory periodically measured	Routine inventory checks	Inventory analysis program with daily or weekly reports
Feed waste		Not monitored	Periodic checks	Routine inspections for feed waste	Feed waste estimated and accounted for.
Processing cost and waste		Not considered	Periodic estimates of feed waste and costs	Feed waste and processing costs measured	Waste and actual costs of processing built into feed costs. Goals established for waste
Shrink		Not considered	Periodic checks of some feed shrink	Routinely monitored	Tracked at each opportunity
Cost of storage		Not considered	Use standard percentage of feed value	Storage costs calculated from published numbers	Feed costs include storage charges based on fixed and variable costs
Wet feed storage – quality control		Not considered	Moisture levels checked periodically	Discard spoiled feed. Monitor nutrient values from supplier	Written quality control targets. Visual inspection & routine analysis
Ground hay management, quality and loss control		Not considered	Try to consider feed quality/hay price tradeoffs	Try to minimize hay grinding losses. Have considered covered ground hay storage	Hay storage and grinding loses known and accounted for. Have established benchmarks
Grounds clean and rodents controlled		Not considered	Normal issues with cleanliness and pest control	Program in place for routine housekeeping and pest control	Grounds immaculate. Pests controlled

Feed Additives					
	Score	**None or Needs to Develop (1)**	**Improving (2)**	**Good (3)**	**Excellent (4)**
Performance increase versus cost of additive monitored		Not considered	Use most available and cheapest feed additive	Periodically evaluate cost/return of available feed additives	Established program based on cattle type, history and market goals
Level of additive fed monitored		No monitoring	Assume what's in the supplement is OK	Levels recalculated for each ration	Concentration and amount per day evaluated daily for each pen
Timing of addititive		Not considered	Same for each pen	Periodic adjustments made for different cattle types or sources	Systematic plan for each pen based on expected outcomes/response
Meets market targets		Not considered	Check withdrawal times	Market considered with feed additive decisions	Plan developed for optimal response to terminal feed additives
Implant System					
Defined implant system for each cattle type		Use same implant program for all cattle	Different program for calves and yearlings	Grid premiums/discounts considered	Systematic implant protocol based on days on feed adjusted routinely for market signals
Employees trained on implanting (Quality Control)		Implanter evaluated on speed	Proper implanting discussed, but no formal training	Employees asked to review company literature	Training program in place
Evaluated against market target		Reimplant after X days on feed or not reimplanted	Different first implant for varying days on feed	Terminal implant evaluated first	Implant timing based on market date. Program based on market target
Records and tracking					
Pen closeouts		Not considered	Occasionally do a complete closeout	Have closeouts on file	Closeout on every pen, maintain database and review regularly
Daily tracking and monitoring of performance		Do not weigh or record feed delivered	Estimate feed delivery	Weigh and record daily feed delivery, but do not estimate cattle gain	Weigh and record daily feed delivery and use software to estimate cattle gain and performance
Feed inventory -cost and waste control purchase decisions		Do not record or monitor feed inventory	Spot check purchases for shrinkage	Reconcile feed purchases and inventories annually	Monitor feed purchases and waste monthly to adjust billing or cost of feed.
Health management and drug Inventories		Do not record or monitor drug inventory	Monitor drug inventory according to BQA guidelines	Have animal health plan but do not monitor product use and inventory	Follow health plan developed by vet. Monitor product inventory. Evaluate effectiveness annually.
Non-feed cost monitored		Do not calculate	Use suggested values	Calculated using own feedlot figures & suggested values	Calculate and adjust annually using feedlot figures
Benchmarking of records to evaluate competitiveness		Do not have records	Have records and compare my records to others in the media	Have standardized calculations but do not compare to others.	Belong to benchmarking program and use standardized calculations
Records readily available and used to make decisions		Do not have records	Have some records, but not used.	Have records on file, but do not routinely use in decision process	Maintain database and review regularly

Budgeting and Purchase Costs

	Score	None or Needs to Develop (1)	Improving (2)	Good (3)	Excellent (4)
Evaluate purchase decisions		Only look at cash outlay	Focus on annual costs and return to farm.	Only consider impact on cash cost	Consider in terms of variable and fixed costs potential profit
Risk management		Do not consider	Have knowledge of tools, but don't believe they payoff often enough	Have used risk tools on cattle	Have skills and experience with using risk tools for cattle and feed
Cattle availability		Do not have a buying plan	Work with trusted order buyer on the type and price of cattle you want	Have select suppliers that you will consider	Have contacts in several markets across US. Know performance and freight to estimate bid price by region or type
Health assessment and program		Do not consider	Try to buy vaccinated cattle	Buy mostly pre-conditioned calves or vaccinated yearlings	Follow prescribed preconditioning program for cattle before they arrive at the yard
Different weights and types of cattle evaluated		Do not consider	Only feed one type of cattle.	Can run projections for different types of cattle.	Have database of how cattle of different weight and sex perform in yard and bid accordingly.

Cattle Marketing

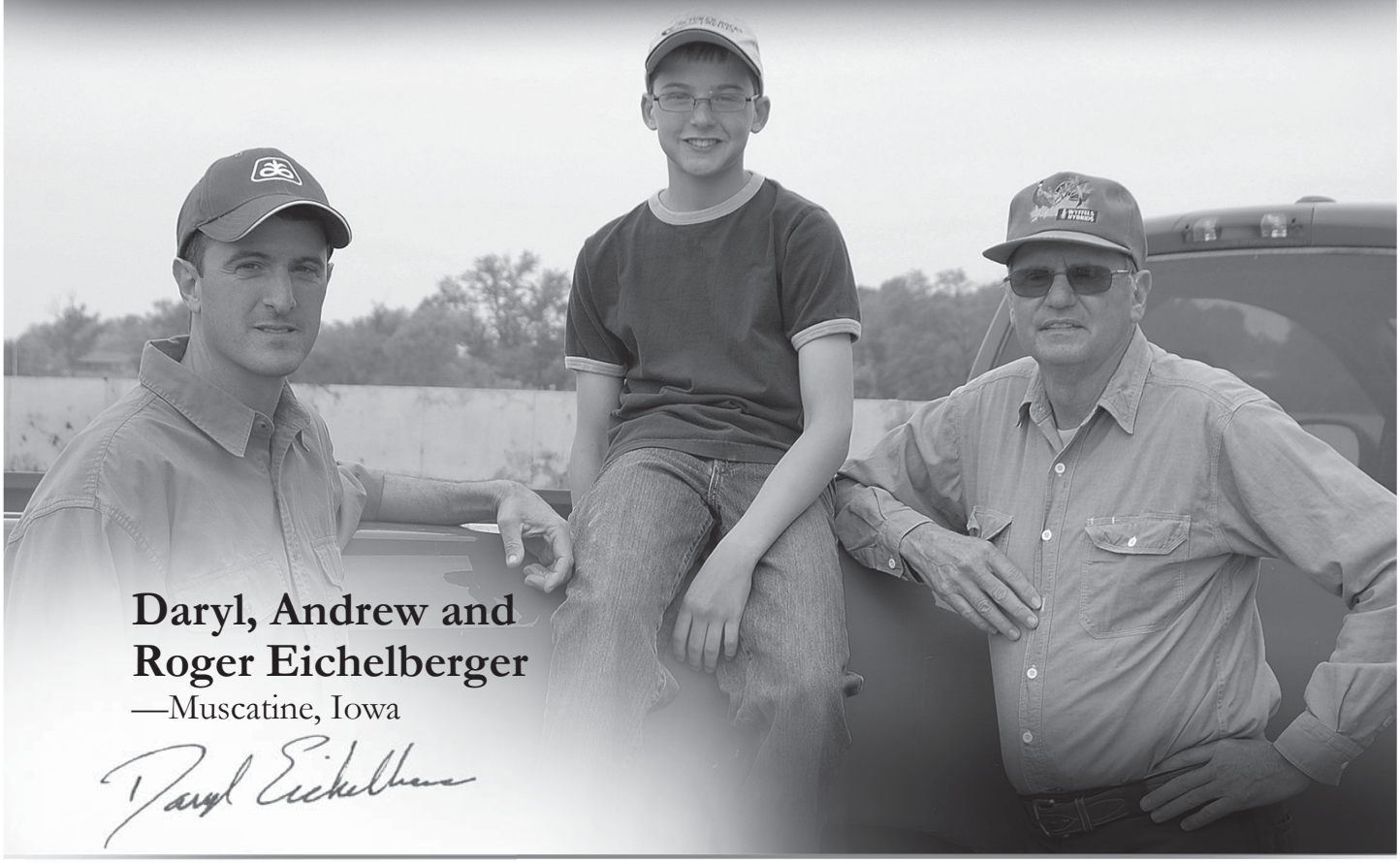
	Score	None or Needs to Develop (1)	Improving (2)	Good (3)	Excellent (4)
Cost of gain and breakeven continually monitored		Not considered	Sell when the cattle are ready and calculate returns later	Have projected marketing date and breakeven	Have projected breakeven and marketing date/weight. Monitor cattle, intakes, and COG closely as date approaches
Grid marketing		Do not sell on grid	Some grid data from cattle	Experienced with sorting cattle and understand grid marketing	Have database of grid premiums by type of cattle and feeding program
Number of bids available		Always sell the same way	Have sold to more than one buyer in last year	Four or more buyers a year buy from the yard	Four or more buyers a month buy from the yard.
Feeding and sorting skills		Do not evaluate	More than 15% out cattle	60% Choice or better, 60% Y1&2 and less than 10% out cattle	70% Choice or better, 70% Y1&2 and less than 10% out cattle

Improve cattle comfort- facilities

	Score	None or Needs to Develop (1)	Improving (2)	Good (3)	Excellent (4)
Provide windbreaks or shelter		None	Some, but likely inadequate	Effect of wind significantly reduced	Wind effect eliminated
Provide shade or sprinklers		None	Access to sprinkler	Shade provided, <20 ft2	Shade or shelter, >20 ft2
High and dry traffic patterns		Problem areas exist in most pens	One or more areas (feeding, resting, water) have access issues during wet conditions in many pens	Good traffic patterns, but some improvements could be made	Cattle stay clean and dry in all pens
% of time during year with mud greater than 2 in		More than one month	2-4 weeks	Less than 2 weeks	Never
Pen maintenance		Once per year or less	Once after pen is marketed	At least 2-3 times for each pen	Weekly scraping of apron and dirt lots if weather allows
Pen density		Not known	Pen density is the minimum book value	Pen density is the maximum book value	Pen density is calculated and adjusted for animal type and size
Bedding provided		None	Only when weather is to become severe	Bedding occasionally provided	Bedding is supplied regularly to keep cattle clean and dry. Cattle are scored for mud and manure.
Management of the solids settling system		No management	The picket fence is checked and released when the system is full. Solids are removed seasonally.	The picket fence is opened within several days. Solids are removed as soon as possible.	The picket fence is opened within 24 hours after a rainfall event.. Solids are removed as soon as possible.

Doing Things Right

Starts with me



Daryl, Andrew and Roger Eichelberger
—Muscatine, Iowa

Daryl Eichelberger has a passion for raising cattle and knows it comes with a responsibility to care for the animals and the environment. So when he decided to replace an old, outdoor lot with a modern cattle barn, he called on the Coalition to Support Iowa's Farmers.

"The Coalition helped me choose the best location for my new barn and to meet all rules and regulations. I wouldn't have it any other way. I love what I do, and I want to be sure I do things right so my children have the opportunity to stay on the farm and raise livestock. My son is already my right-hand man, and I want to set a good example for him."

COALITION TO SUPPORT IOWA'S FARMERS

At no cost, the Coalition can help you do things right when it comes to raising livestock responsibly and successfully. Call 800-932-2436 or visit supportfarmers.com today!

Growing communities one farmer — and one neighbor — at a time

800-932-2436 | www.supportfarmers.com

Iowa Cattlemen's Association, Iowa Corn Growers Association, Iowa Farm Bureau Federation, Iowa Pork Producers Association, Iowa Poultry Association, Iowa Soybean Association, Iowa Turkey Federation

. . . and justice for all

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Many materials can be made available in alternative formats for ADA clients. To file a complaint of discrimination, write USDA, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Jack M. Payne, director, Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa.