Welcome to the Mississippi Master Cattle Producer Program Self-Study Program Beef End Product training module. This program is administered by the Mississippi State University Extension Service. For answers to questions about this training program, contact Dr. Jane Parish, MSU-ES Extension Beef Cattle Specialist.

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Mississippi Master Cattle Producer Program

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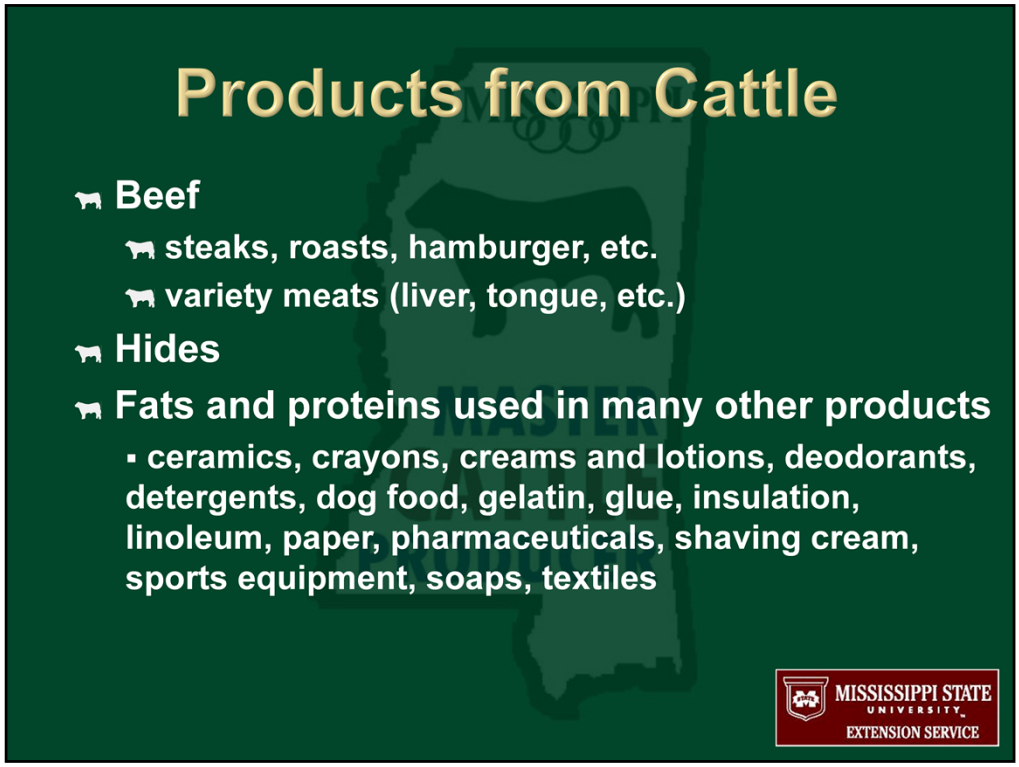
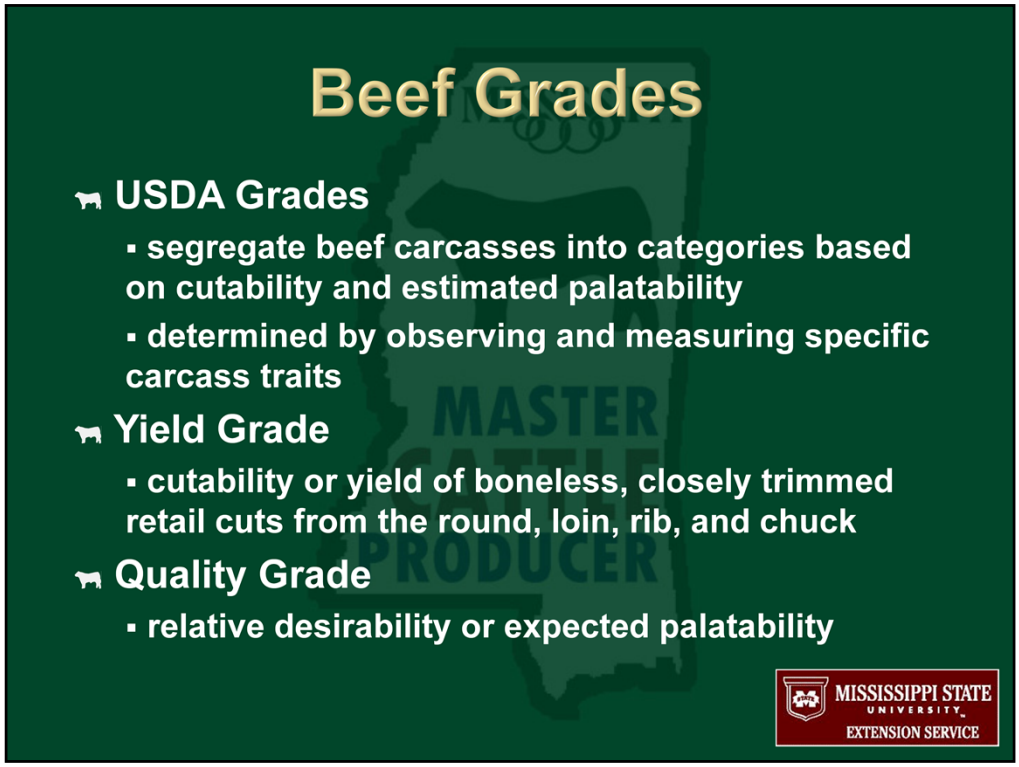
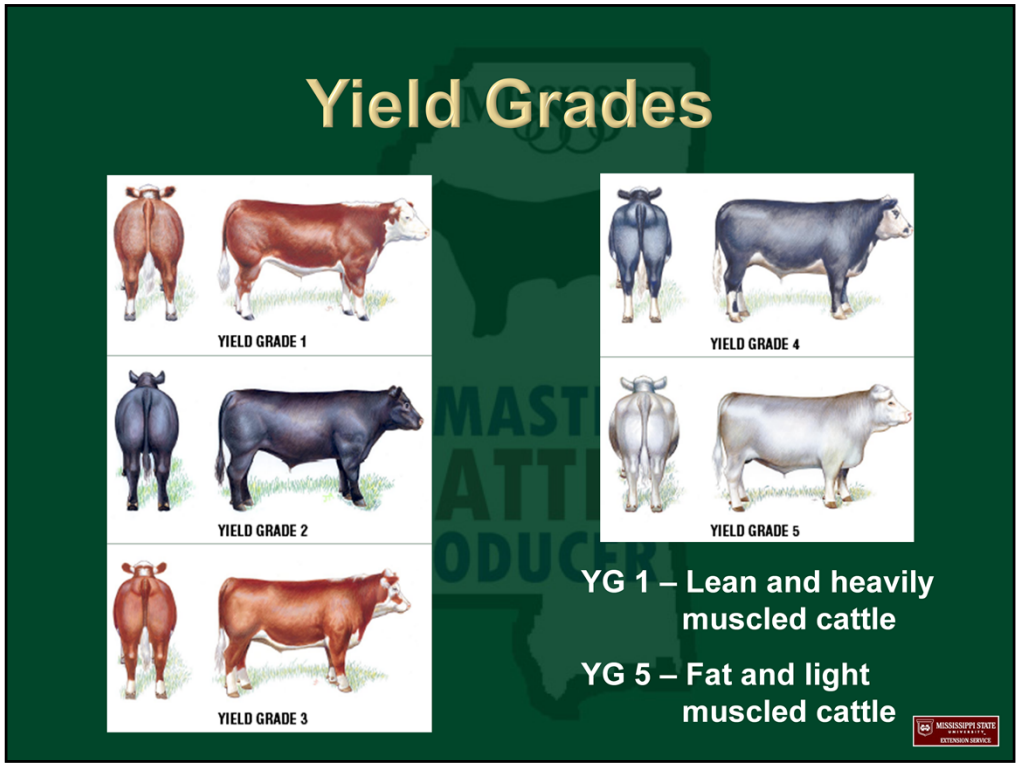


End products from cattle include many different items beyond beef. Cattle hides are a major source of leather. Fats and proteins from beef carcasses are inputs into many manufactured products including ceramics, crayons, creams and lotions, deodorants, detergents, dog food, gelatin, glue, insulation, linoleum, paper, pharmaceuticals, shaving cream, sports equipment, soaps, and textiles.

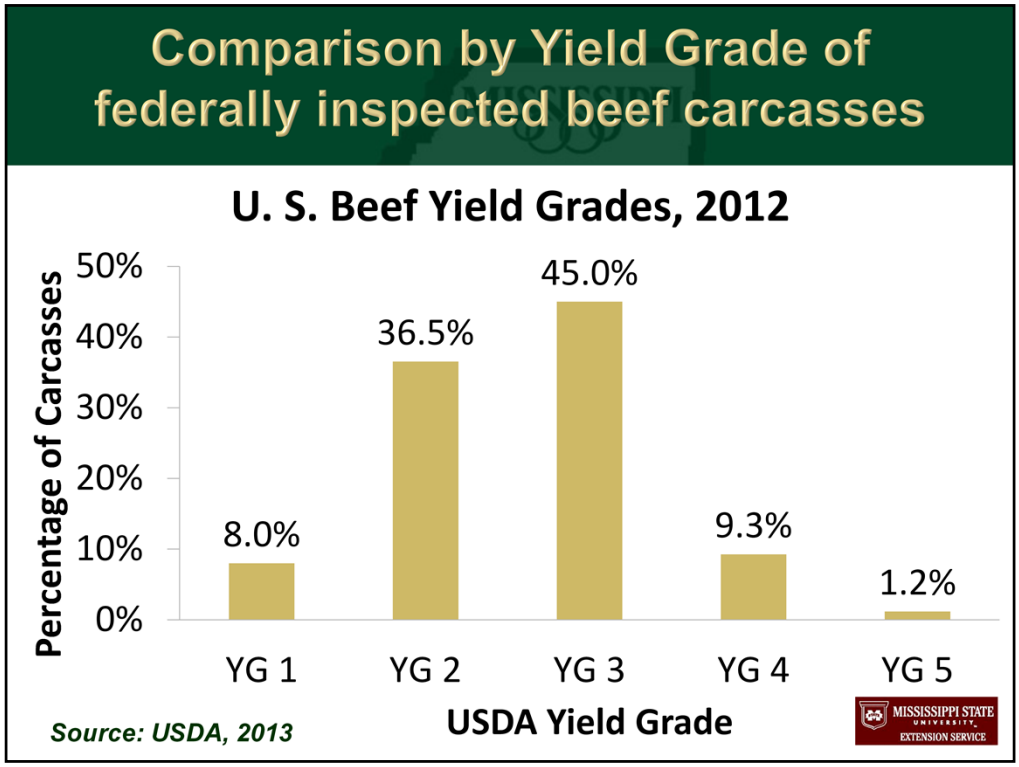


The U. S. Department of Agriculture (USDA) uses a dual grading system for beef carcasses: a Yield Grade for estimating cutability and a Quality Grade as a comprehensive evaluation of factors that affect beef palatability. The USDA grades segregate carcasses into similar categories based upon cutability and estimated palatability. Yield Grade identifies differences in cutability or yield of boneless, closely trimmed retail cuts from the round, loin, rib, and chuck. Quality Grade indicates the relative desirability or expected palatability of the meat in a carcass or cut. Yield Grades and Quality Grades are determined by observing and measuring specific carcass traits.

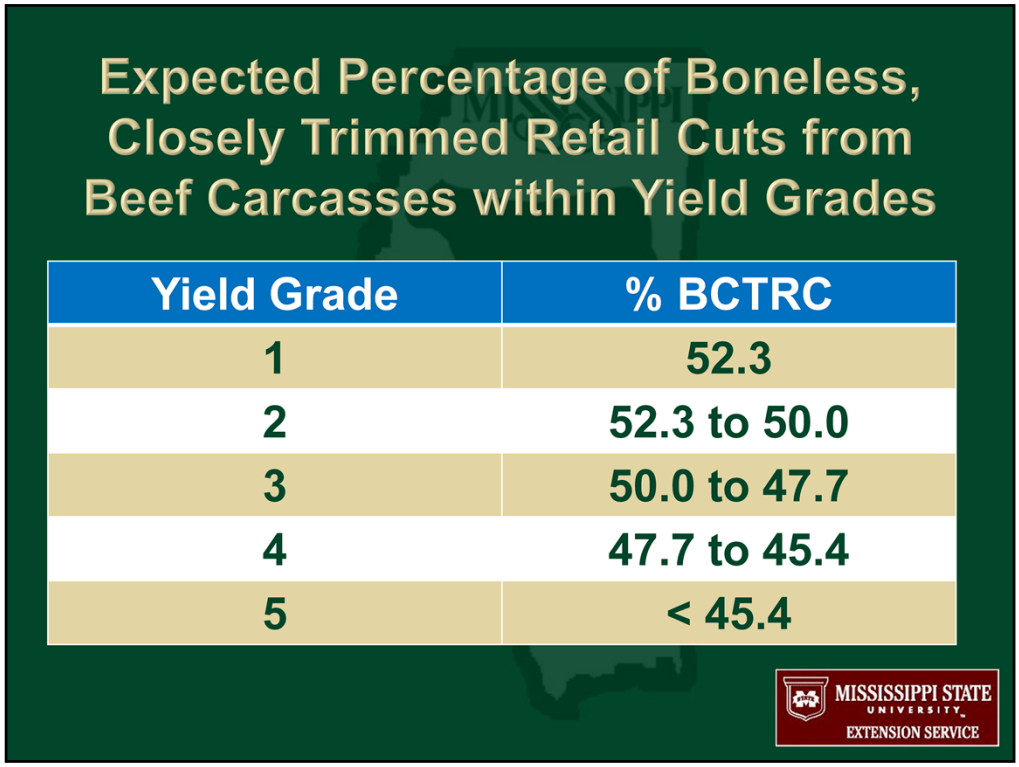
Mississippi State University Extension Service Publication 2522, “Beef Grades and Carcass Information” provides detailed information on the factors influencing Yield Grades and Quality Grades along with other carcass traits.



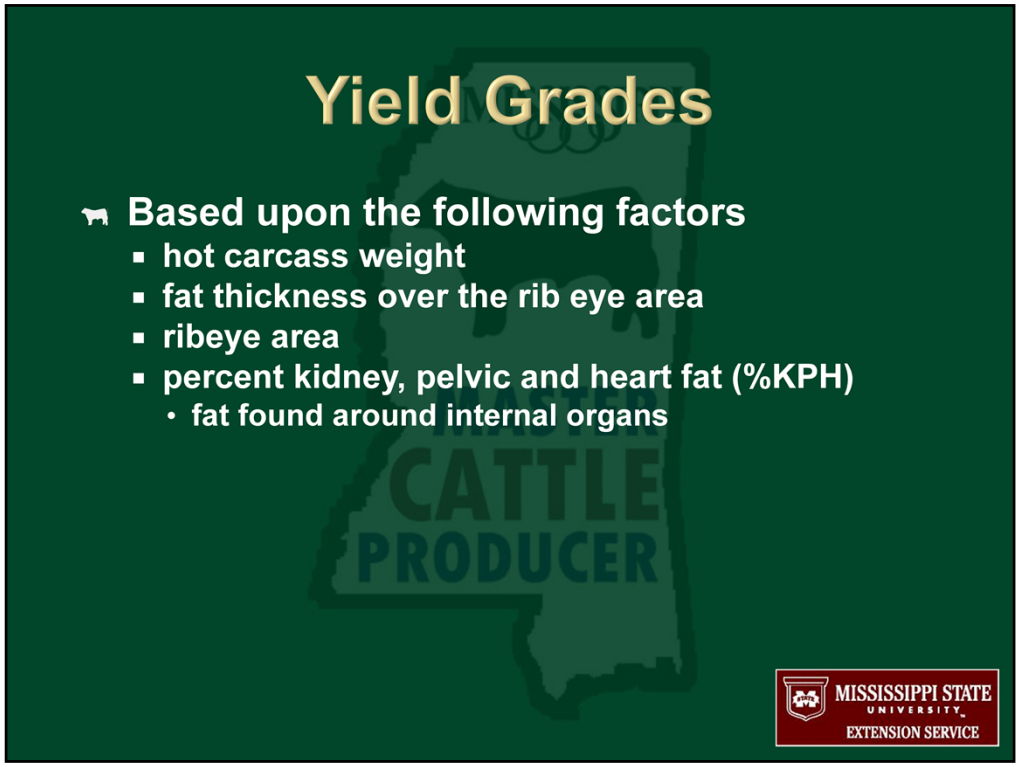
The USDA Yield Grades classify carcasses for differences in cutability or yield of boneless, closely trimmed retail cuts from the round, loin, rib and chuck. The five Yield Grades are numbered 1 through 5. Carcasses in Yield Grade 1 have the highest cutability or percentage of retail product, while carcasses in Yield Grade 5 have the lowest cutability or percentage of retail product. Mississippi Farm to Feedlot program cattle averaged Yield Grade 3 over a 15-year period.



The percentages of federally inspected beef carcasses in each Yield Grade appear for 2012 in this figure. The majority of beef carcasses were Yield Grades 2 or 3.



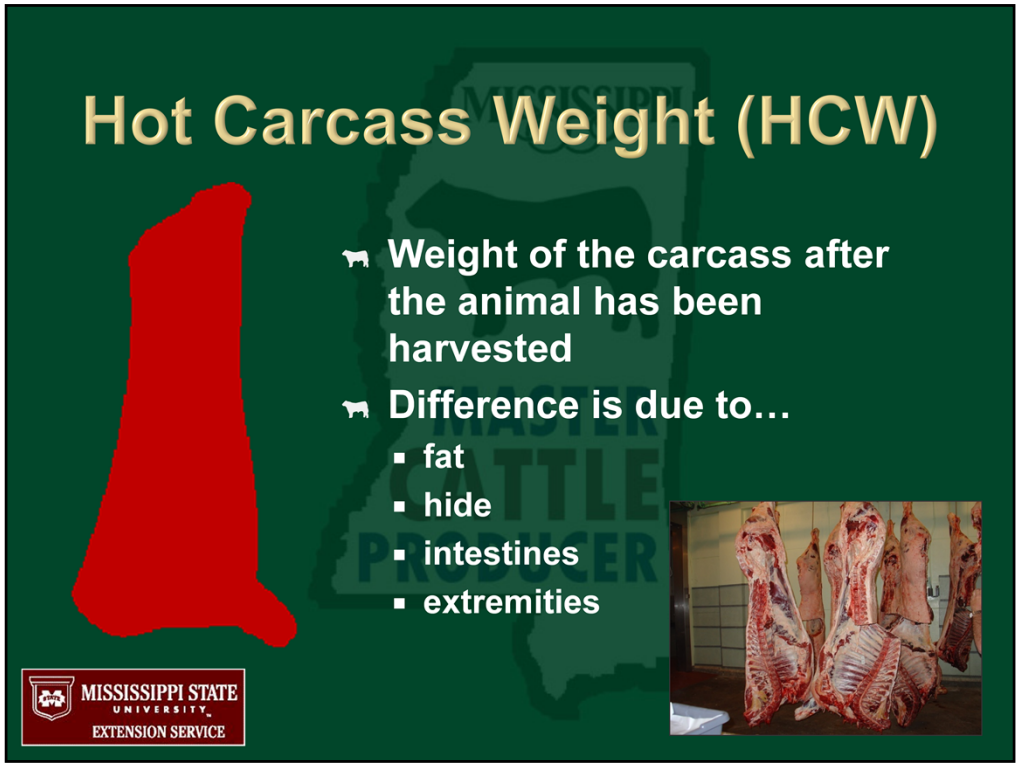
This table shows the expected percentage of boneless, closely trimmed retail cuts from beef carcasses within Yield Grades. Note that leaner carcasses with lower numerical Yield Grades have higher percentages of boneless, closely trimmed retail cuts.



The Yield Grade of a beef carcass is determined by considering four characteristics: (1) the amount of external fat (back fat), (2) the amount of KPH fat, (3) the area of the ribeye muscle, and (4) the hot carcass weight. Yield Grades are based on the following equation:

Yield Grade = 2.50 + (2.5 x adjusted fat thickness, inches) + (0.2 x percentage kidney, pelvic and heart fat) + (0.0038 x hot carcass weight, pounds) – (0.32 x area of ribeye, square inches)

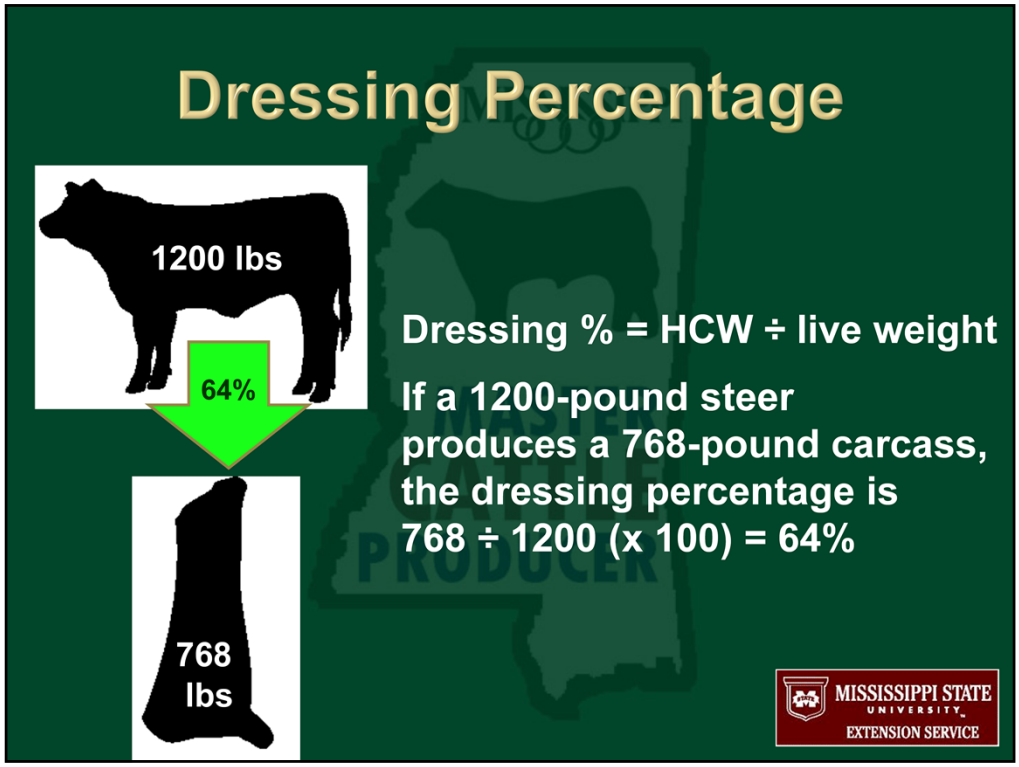
Numerical Yield Grades calculated using this equation are rounded down to the nearest whole number for assignment of a distinct Yield Grade from 1 to 5. For example, a beef carcass with a calculated Yield Grade of 2.98 would be classified as Yield Grade 2, not Yield Grade 3. Therefore, it is possible for a change in a characteristic influencing Yield Grade to change the calculated Yield Grade in terms of decimals.



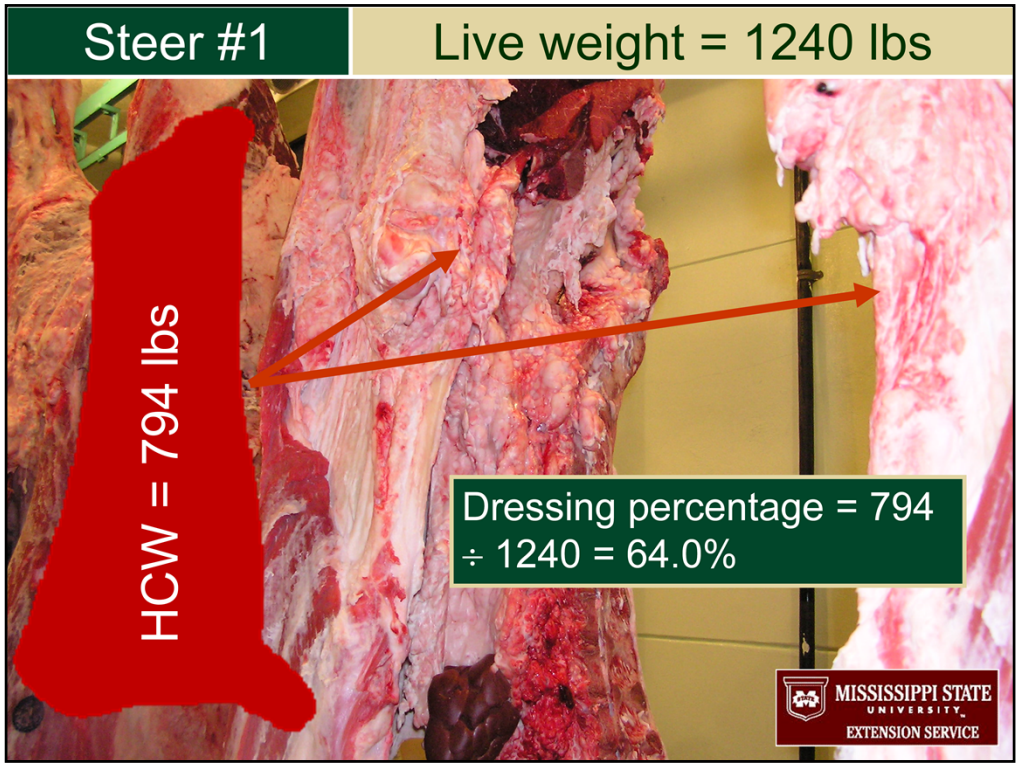
Hot carcass weight (HCW) is the weight of the carcass after the animal has been harvested and prior to carcass chilling. The difference between live weight and hot carcass weight is due to the removal of fat, hide, intestines, and extremities (head, legs, tail) during harvest.

Packers monetarily discount heavyweight and lightweight carcasses that do not fit their specifications. Generally, as carcass weights move further away from baseline specifications, discount levels increase. Large fluctuations in carcass weights create challenges during harvesting and processing. Heavy carcasses can break or damage overhead rail systems in packing plants, and light carcasses may be too short for stationary equipment used in carcass fabrication. Additionally, wholesale beef cuts that are outside desired size ranges are difficult to manage and market in a boxed beef system.

The National Beef Quality Audit outlined a range of 650 to 850 pounds as an industry target for carcass weight. Carcass size is genetically influenced and can be changed with an emphasis on frame size and growth rate in breeding decisions. Management of days on feed, implant regimes, and feeding programs can also be changed to affect carcass weights. Mississippi Farm to Feedlot program data show that the 15-year average for hot carcass weight was 750 pounds.

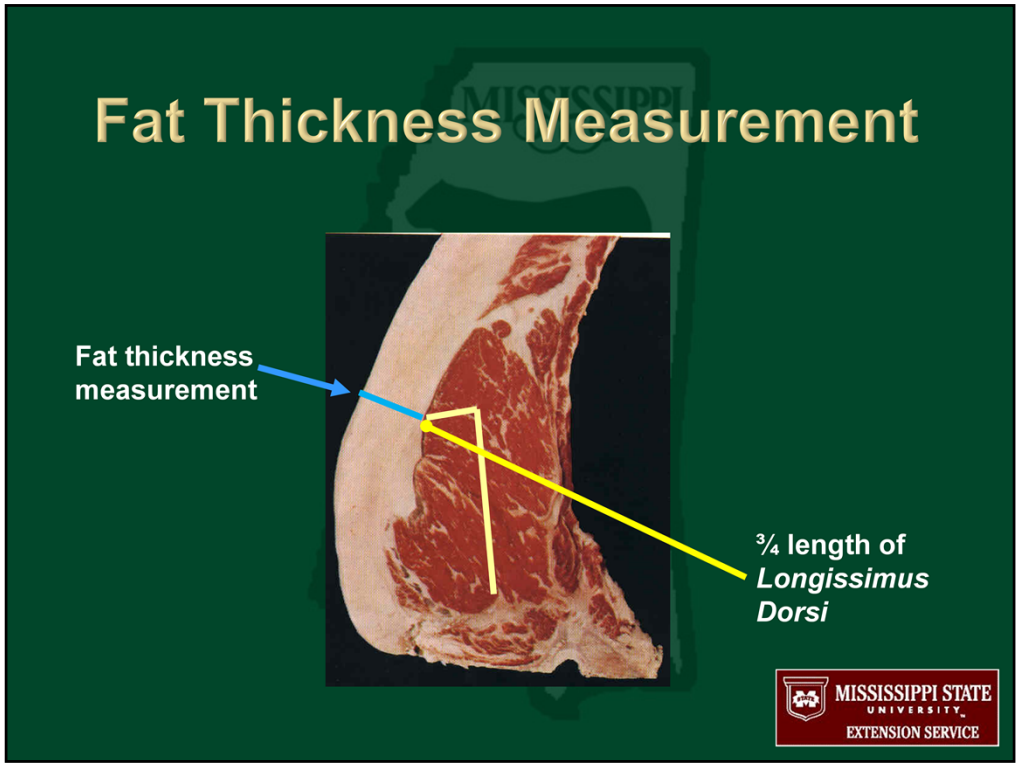


Dressing percentage is hot carcass weight as a percentage of the live weight of the animal at harvest. To calculate dressing percentage, divide hot carcass weight by animal live weight. The result is expressed as a percentage. For example, if a 1200-pound steer produces a 768-pound carcass, then the dressing percentage is 64 percent (*768 ÷ 1200 x 100% = 64%).* Similarly, animal live weight times the dressing percentage yields the carcass weight.



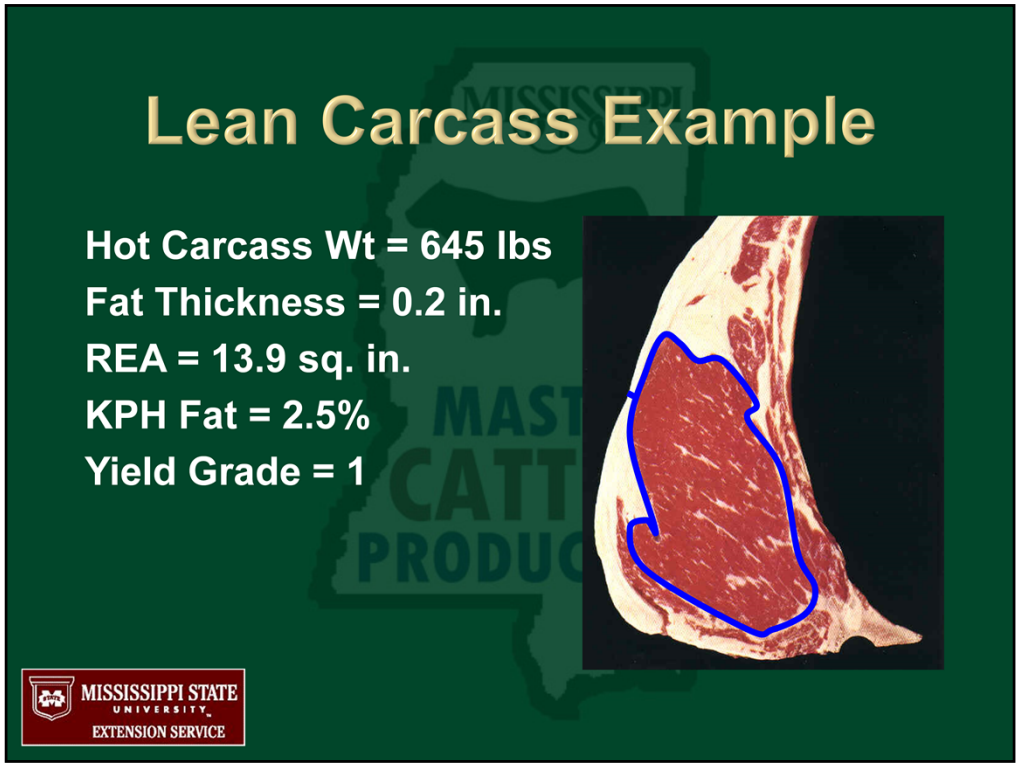
Dressing percentage calculation example: A 1240-pound steer produces a 731-pound carcass. The dressing percentage is 64 percent (*794 ÷ 1240 x 100% = 64%).*

Although beef dressing percentage can vary from 55 to 68 percent, it typically ranges from 60 to 64 percent for the majority of fed cattle. Dressing percentage averaged 64 percent for the Mississippi Farm to Feedlot program cattle from 1993 through 2007.

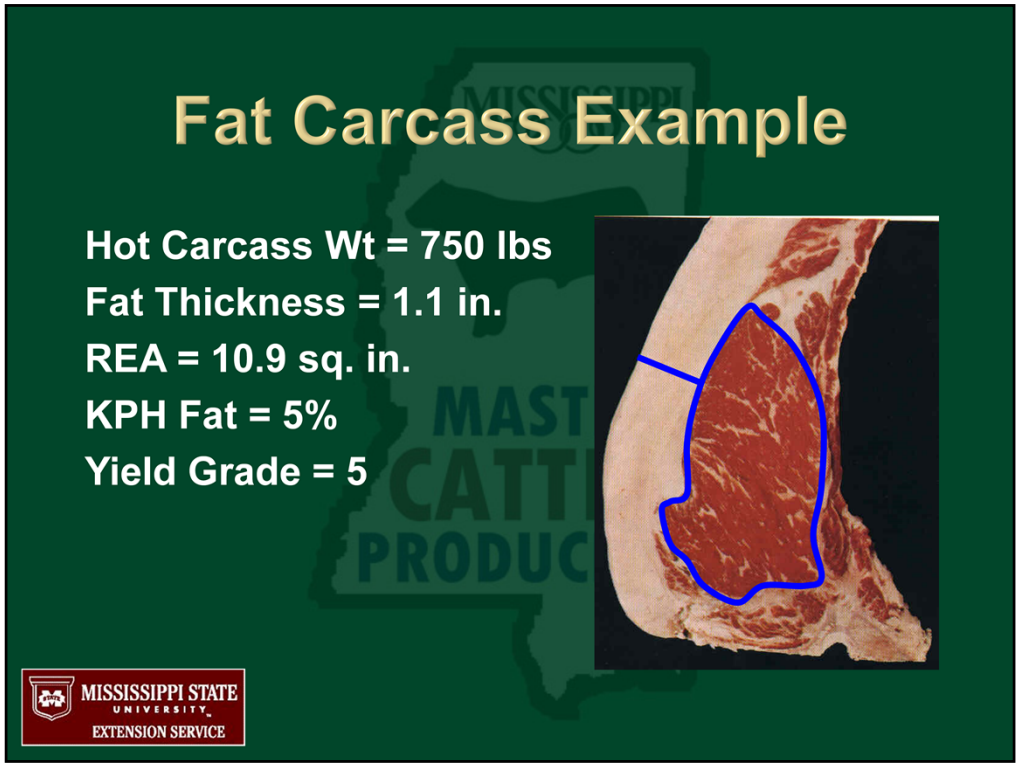


Fat thickness (rib fat or back fat) is a measure of external fat thickness on a carcass. External fat is the most important determinant of retail yield. Fat thickness is measured at a point ¾ of the length of the *longissimus dorsi* muscle from the split chine bone. An optimum range for fat thickness is 0.2 to 0.5 inches. Mississippi Farm to Feedlot program carcass back fat thickness averaged 0.48 inches over 15 years of the program.

Illustration of fat thickness measurement



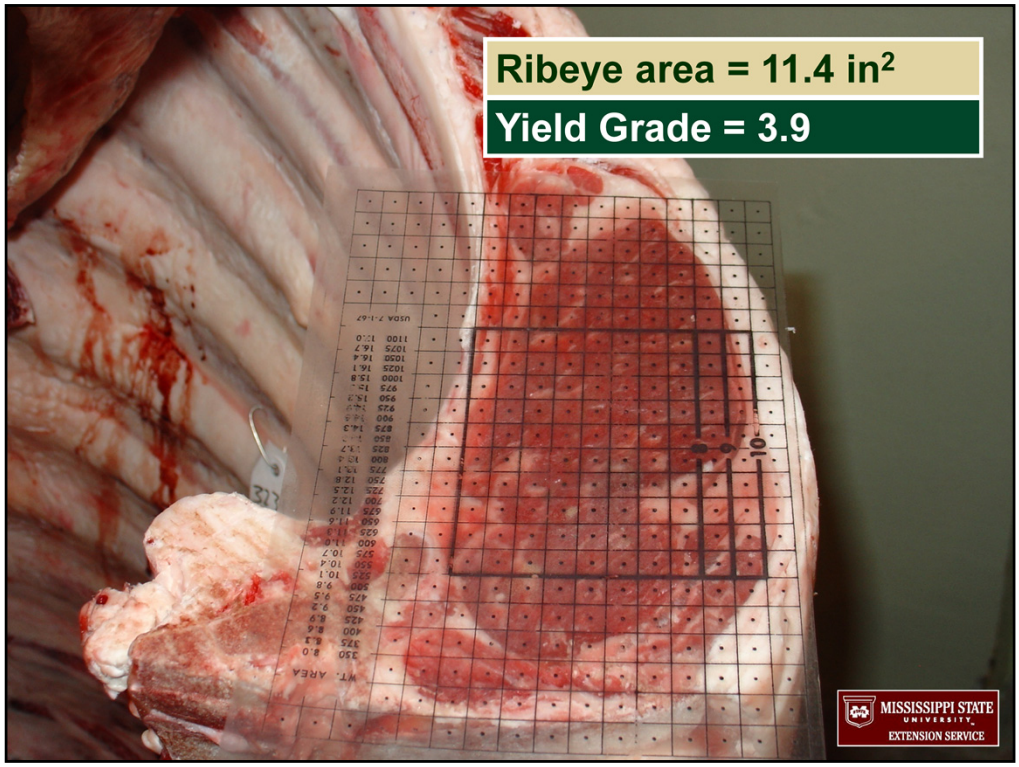
Excessively low amounts of external fat on a beef carcass are undesirable. This can increase the risk of cold shortening (chilling of the carcass too rapidly leading to increased toughness).



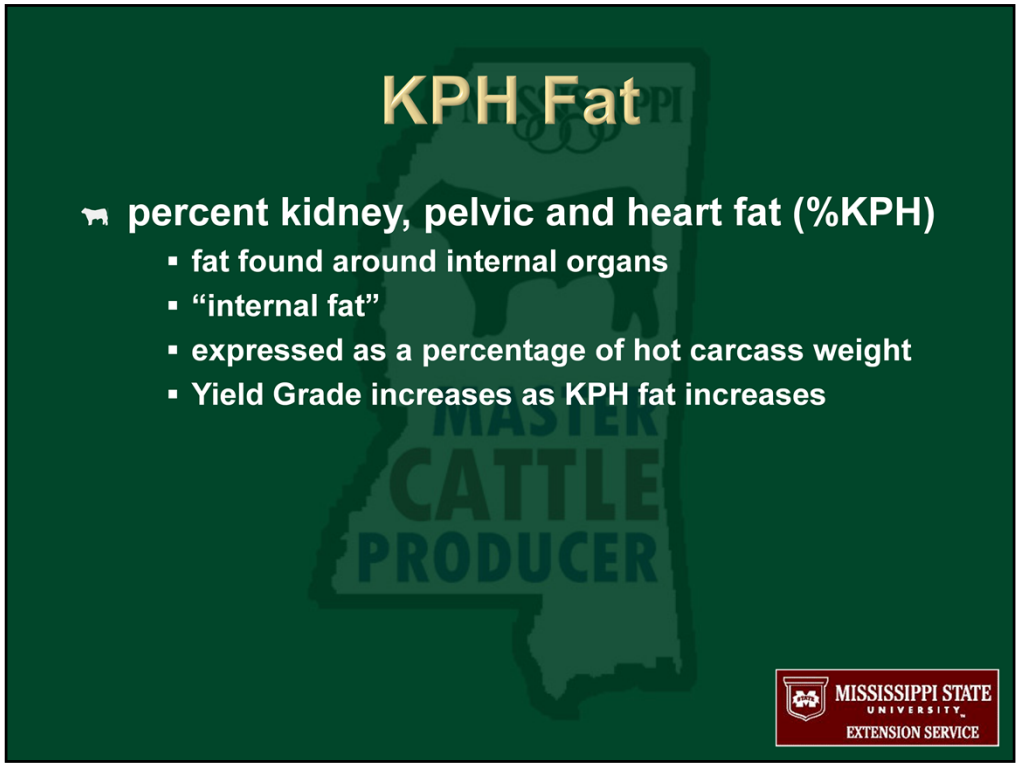
As fat thickness increases, cutability and percentage of retail product decrease resulting in less desirable Yield Grades. Cutability is the percentage yield of closely trimmed, boneless retail cuts.

Illustration of fat thickness differences

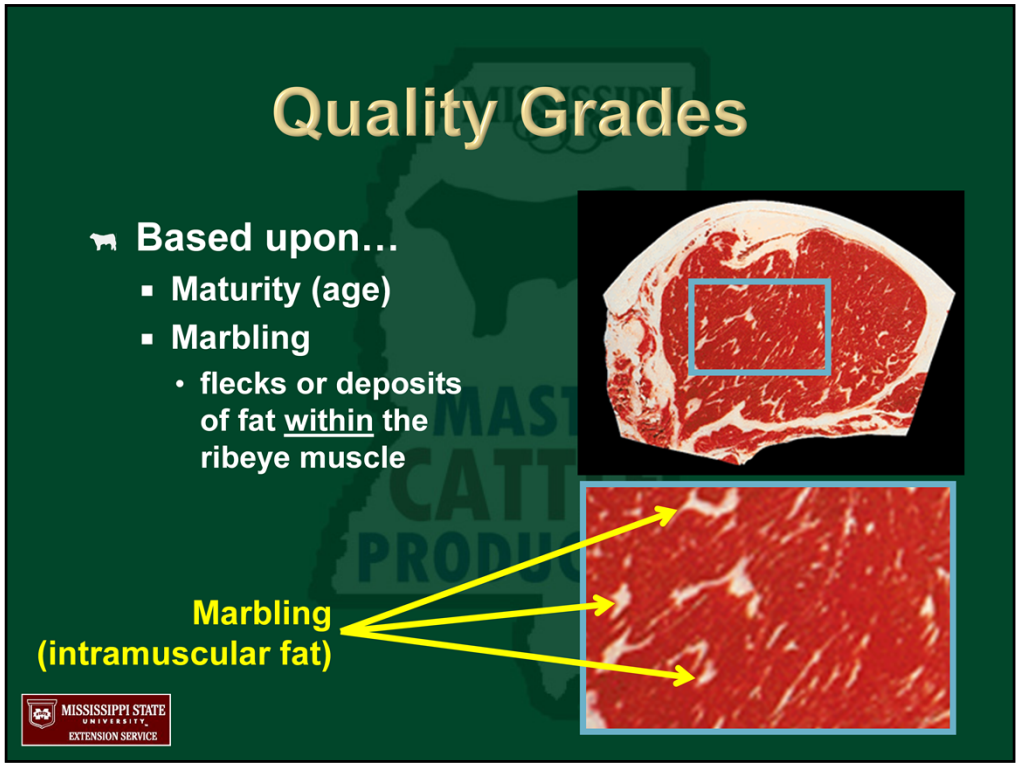
Ribeye area (REA) is an indicator of the amount of lean muscle associated with a carcass. As the REA increases, the amount of muscle in a carcass increases. It is an important factor in determination of Yield Grade. As ribeye area increases, Yield Grade tends to improve. Ribeye area is determined by measuring the area of the l*ongissimus dorsi* (ribeye) muscle exposed by cutting or "ribbing" the carcass between the 12th and 13th ribs.



Ribeye area is expressed in square inches and is often determined using a grid device, analysis of ribeye tracings or most recently, the use of electronic vision instruments which are basically computerized cameras.



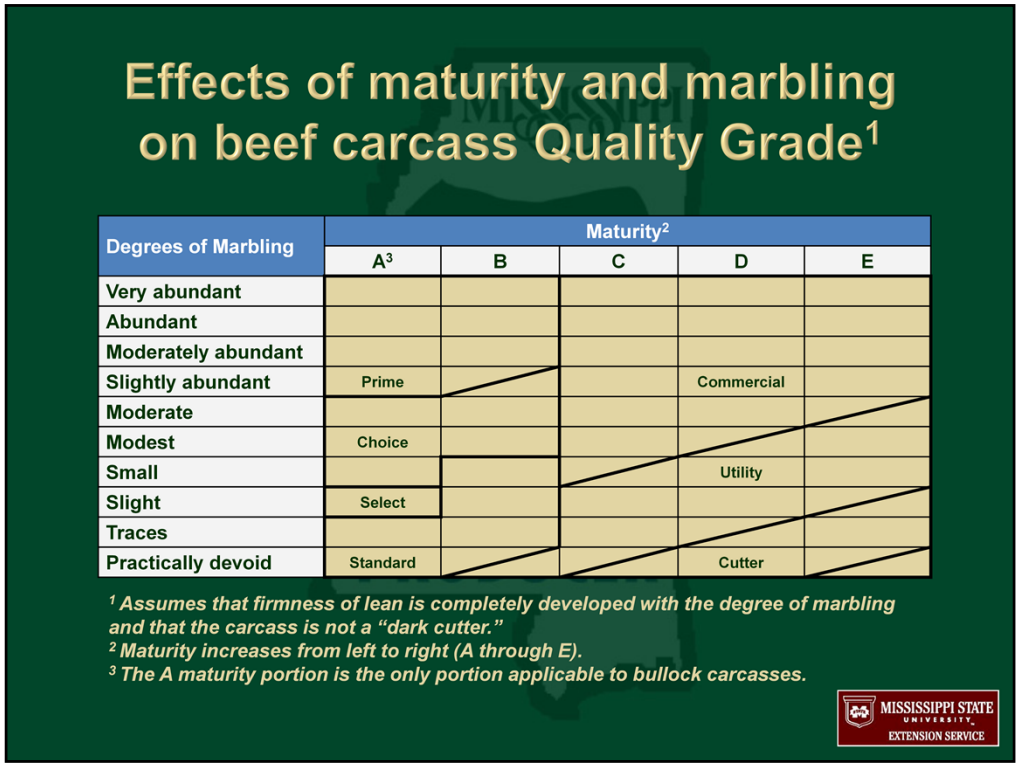
Kidney, pelvic, and heart (KPH) fat is also called internal fat. Internal or KPH fat is expressed as a percentage of hot carcass weight and is used in Yield Grade determination. The percentage of retail product yield decreases as KPH fat increases.



Quality Grades evaluate factors that affect beef palatability (eating quality and desirability). Marbling (intramuscular fat or IMF within the ribeye muscle) and carcass maturity (including bone characteristics and the color, firmness, and texture of the exposed lean on the cut surface between the 12th and 13th rib) determine Quality Grade.

Beef Quality Grades are typically divided into thirds or halves for improved segregation of beef carcasses. Meat judging, carcass evaluation, and value-based marketing programs utilize these subdivisions. The Prime grade is divided into thirds (High, Average, and Low), and the Choice grade is also divided into thirds (High, Average, and Low). The Select grade is divided into halves (High and Low), and the Standard grade is also separated into halves (High and Low).

Symbols used to designate these Quality Grade divisions are: + (high), o (average) and – (low). For example, Choice– indicates the lower one-third of the Choice grade. A “No Roll” category refers to all carcasses that do not meet the requirements for the USDA Select grade and would likely grade USDA Standard if graded. A grade stamp is not rolled on these carcasses. Bull beef is not Quality Graded, and cow beef is not eligible for the Prime grade. In addition, Commercial, Cutter and Canner grades are not applicable to bullock beef. Mississippi Farm to Feedlot program cattle averaged Select + over 15 years with a trend towards increasing Quality Grade. The percentage of these cattle grading Choice – or better was 43 percent and also displayed an increasing trend.



A better Quality Grade is achieved with higher degrees of marbling and lower degrees of carcass maturity.

Maturity affects carcass Quality Grade and is subjectively evaluated because chronological age (age in months) of a beef animal is not always known at harvest. Therefore, physiological estimators of age are used to evaluate carcass maturity. Physiological age may not be the same as the actual animal age. The physiological maturity of a carcass is determined by evaluating the size, shape and ossification of bone and cartilage (especially the split chine bone) and the color, texture, and firmness of the lean tissue exposed at cut between the 12th and 13th rib. Lean color becomes darker and texture becomes courser with increasing age. Factors other than age can alter lean color and texture, so most of the emphasis on maturity evaluation is placed on observation of bone characteristics and cartilage ossification.

To estimate maturity, a USDA grader evaluates the cartilage associated with the backbone (spinal column) and the color and shape of the ribs. When a beef animal is harvested, the carcass is split down the spinal column. When the carcass is split in half, the grader can evaluate cartilage associated with the spinal column and the shape and color of the ribs. At the dorsal (backside) end of each vertebra is a section of cartilage, which is referred to as the cartilaginous tips or buttons. As cattle age, these tips ossify or change from soft, pearly white cartilage to hard, porous bone. Maturity is then estimated based upon the status of these buttons and the degree to which they are ossified. The rib bones are quasi round with a red, youthful appearance in young cattle. As cattle age, the ribs flatten out and develop a white appearance.

Carcass maturity is scored using letters A through E, with A being the least mature and E being the most mature (A = 9 to 30 months, B = 30 to 42 months, C = 43 to 72, D = 73 to 96, E = 97 months or more). Carcasses displaying advanced skeletal maturity are referred to as "hard bones", and associated price discounts normally apply.

Intramuscular fat (IMF) is often called marbling. Marbling refers to the flecks of fat within the muscle tissue. Sufficient marbling is important for beef tenderness, juiciness and flavor. Degree of marbling is the primary factor determining Quality Grade. For official grading purposes, marbling is assessed in the *longissimus dorsi* muscle exposed between the 12th and 13th ribs. Nine degrees of marbling are recognized by the USDA Grade Standards. These nine marbling scores and their common abbreviations are listed below.

Abundant $^{00-99}$ (AB)

Moderately abundant $^{00-99}$ (MAB)

Slightly abundant $^{00-99}$ (SLAB)

Moderate $^{00-99}$ (MD)

Modest $^{00-99}$ (MT)

Small $^{00-99}$ (SM)

Slight $^{00-99}$ (SL)

Traces $^{00-99}$ (TR)

Practically devoid $^{00-99}$ (PD)

Each marbling score is divided into 100 subunits. Superscripts ranging from 00 (least amount of marbling) to 99 (greatest amount of marbling) are assigned within each marbling score. Average marbling score over 15 years of the Mississippi Farm to Feedlot program was Small with the trend being towards increasing marbling score.

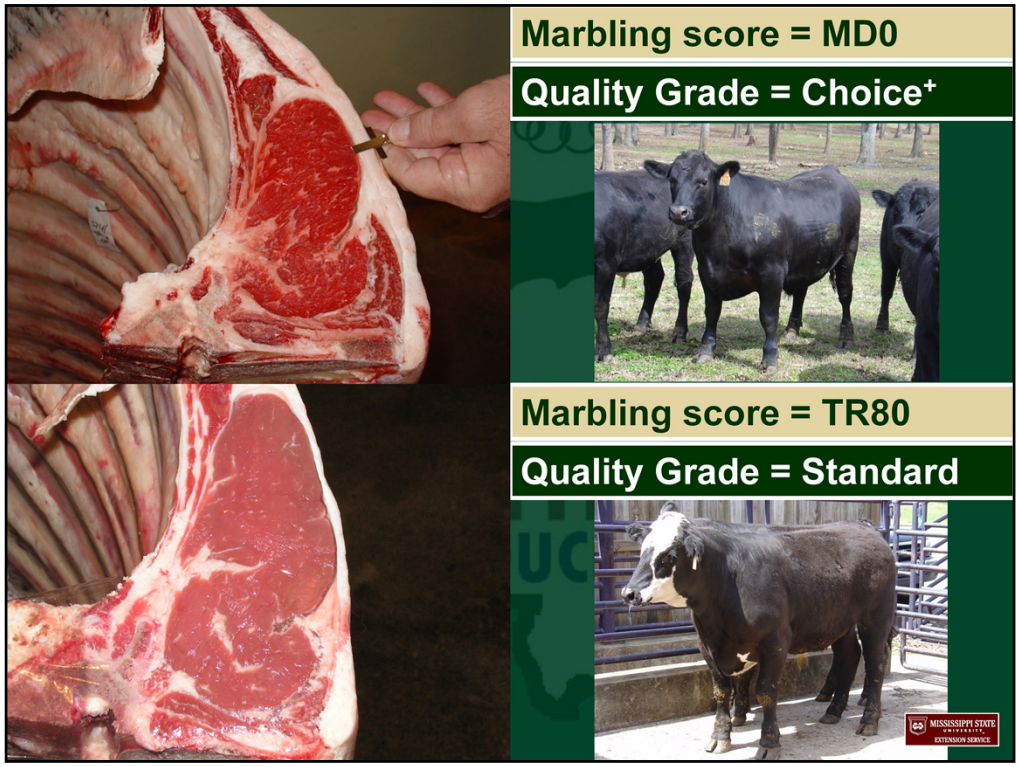
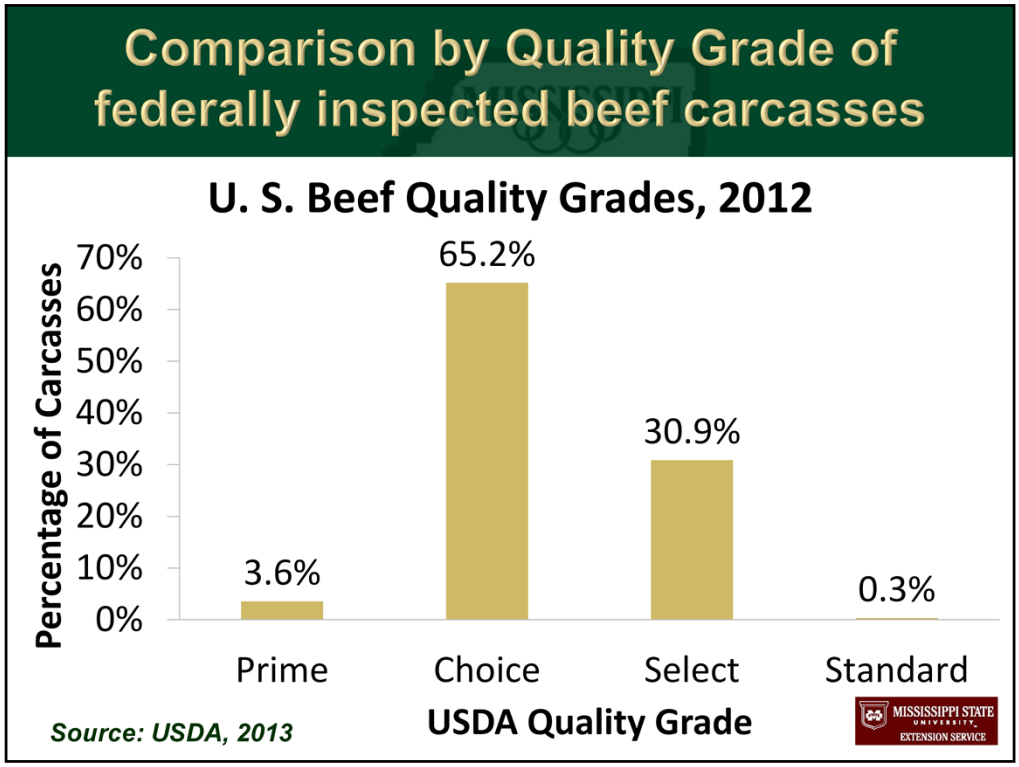
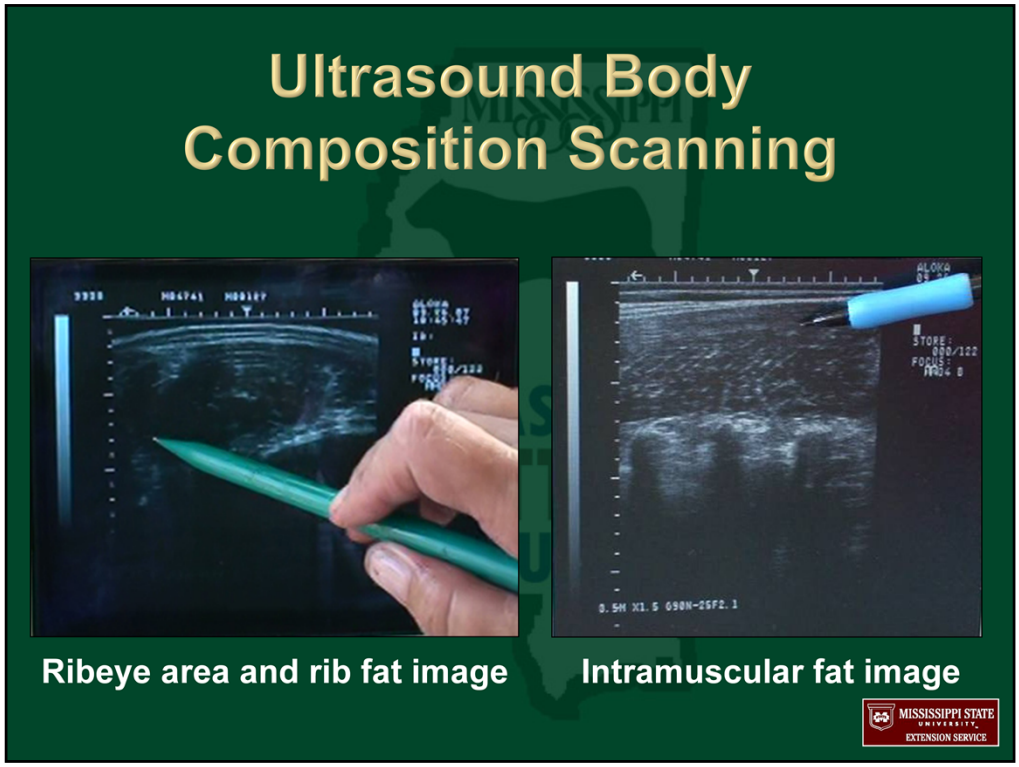


Illustration of differences in marbling score and Quality Grade



The percentages of federally inspected beef carcasses in each Quality Grade appear for 2012 in this figure. The majority of beef carcasses were Choice or Select Quality Grades.



Ultrasound scanning for carcass traits is a useful tool for obtaining valuable carcass information from a live animal. Ultrasound technology uses sound waves to develop images of body composition. Body composition traits that can be measured include 12th to 13th rib fat thickness, rump fat thickness, ribeye area, and intramuscular fat percentage (marbling). Each of these traits is at least moderately heritable and is significant in the determination of red meat quality and yield for individual animals.

Mississippi State University Extension Service Publication 2509, “Ultrasound Scanning Beef Cattle for Body Composition” discusses ultrasound scanning in detail.

The Mississippi Farm to Feedlot Program assists producers in the collection and interpretation of cattle finishing and carcass data. Educational opportunities offered include:

- Year-round marketing opportunities
- Feeder calf tagging and marketing program coordination within Mississippi
- Cash advance options
- Risk management strategy education and implementation
- Feeding performance and carcass data summaries and recommendations
- Sire evaluation information

More information on the Mississippi Farm to Feedlot Program is available online at http://msucares.com/livestock/beef/ftf

The 2011 National Beef Quality Audit identified the greatest quality challenges facing the beef industry. Many of these quality challenges can be addressed by using beef carcass information for improved genetic selection practices. They can also be affected by making cattle management decisions with the quality and value of the beef end product in mind.

Using this information, beef cattle producers can take the following actions to improve carcass value:

Improve cattle genetics

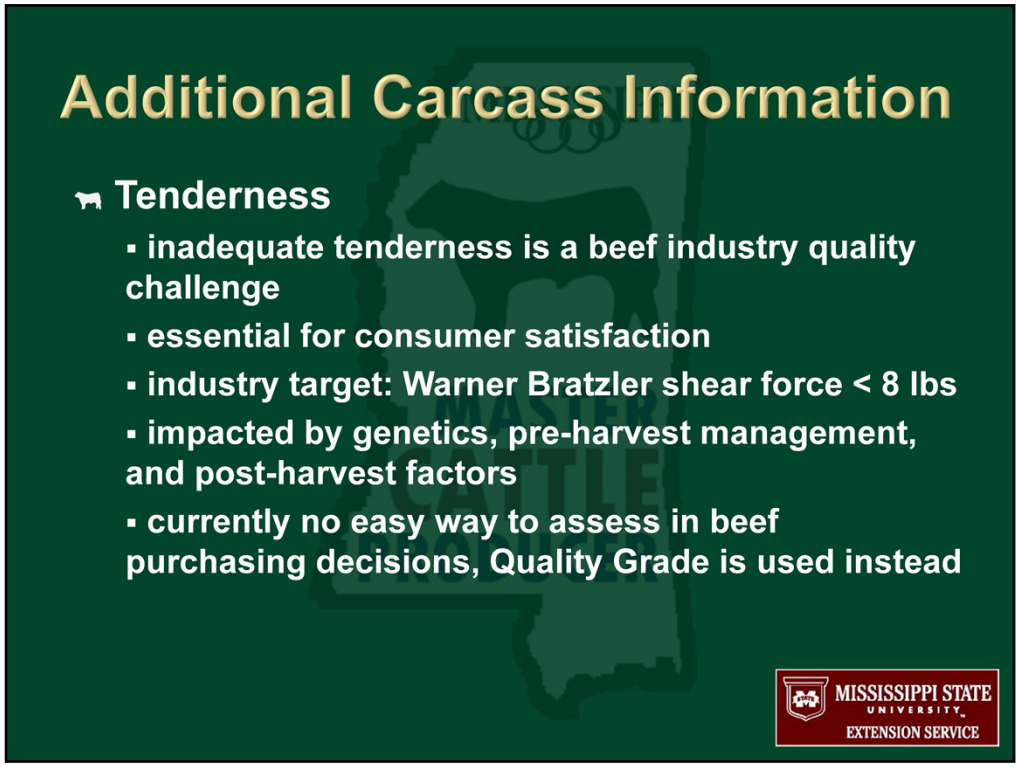
Increase record keeping

Increase individual animal identification

Improve animal handling and transportation practices

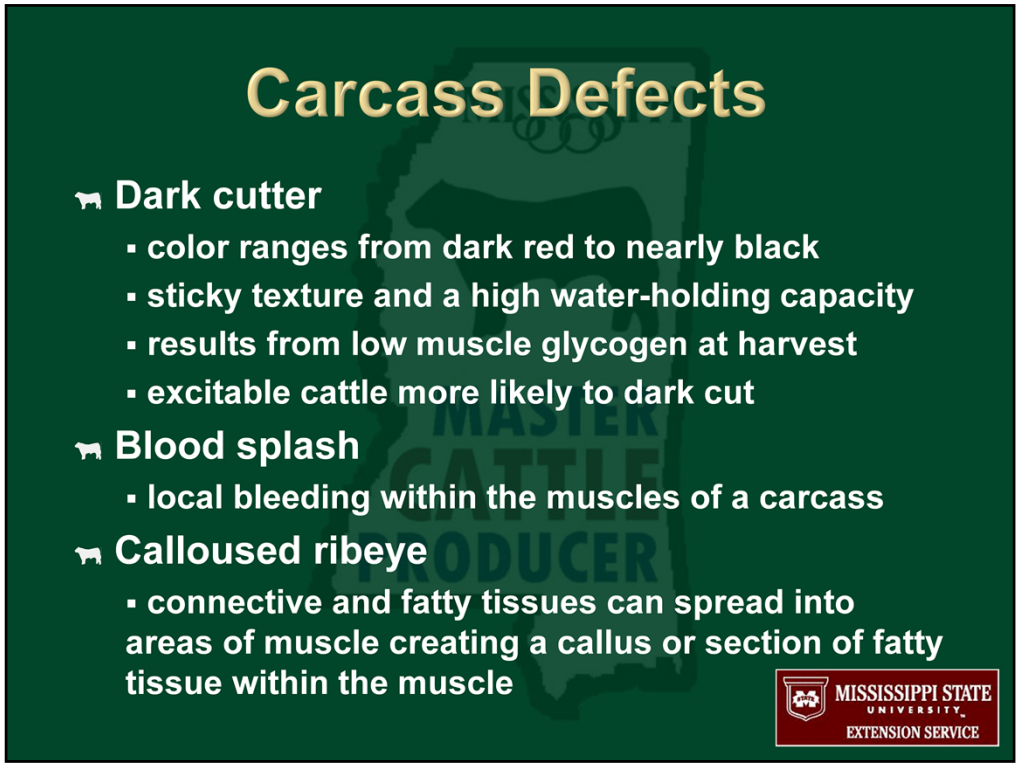
Collect and utilize carcass data

Follow Beef Quality Assurance guidelines



Inadequate tenderness of beef was cited in the 2005 National Beef Quality Audit as one of the top quality challenges facing the beef industry. Although tenderness is not used in Quality Grade or Yield Grade calculations, it plays an essential role in consumer satisfaction. Tenderness is objectively measured with a Warner-Bratzler shear force device. A good industry target for tenderness is a Warner-Bratzler shear force value below eight pounds.

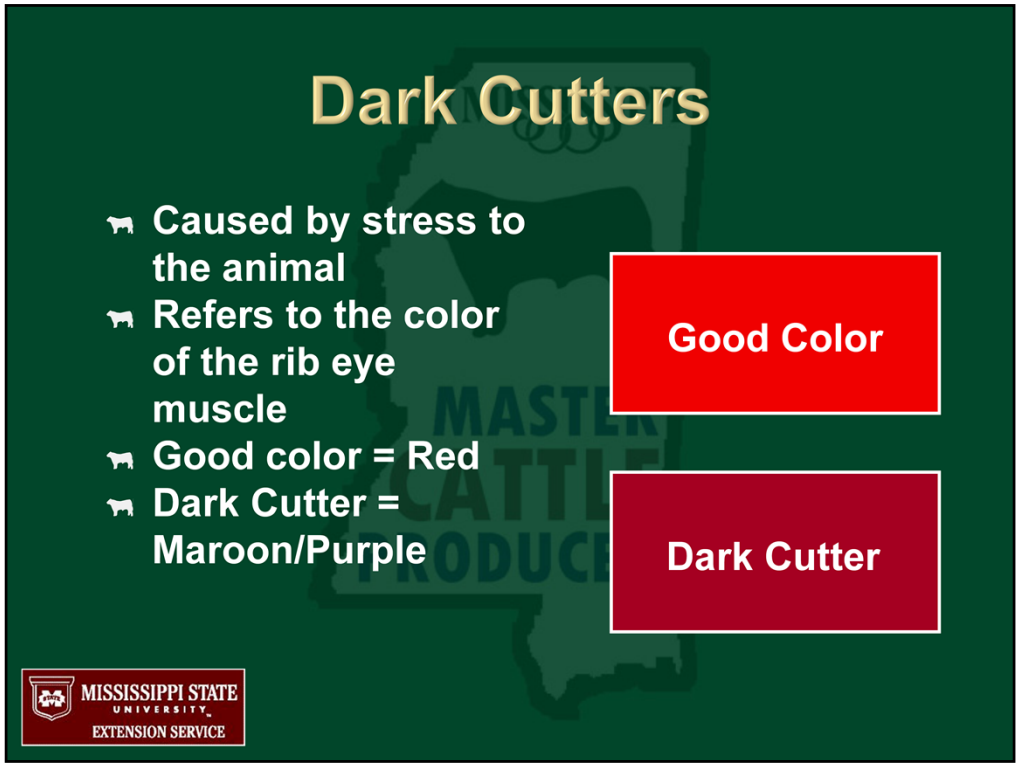
Acceptable tenderness levels depend in part on where and how the product will be marketed. Currently there is no easy way to assess tenderness in making beef purchasing decisions, so restaurants often base their purchasing decisions upon Quality Grade instead. Many food service establishments, particularly fine-dining establishments, seeking a good eating experience for their customers recognize that tenderness is an important component of this eating experience.



Dark-cutting meat is characterized by a color that ranges from dark red to nearly black and has both a sticky texture and a high water-holding capacity. Dark-cutting beef results from low muscle glycogen at the time cattle are harvested. Glycogen depletion in muscles of cattle can be caused by strenuous muscular activity, stress-induced adrenalin secretion, and severe energy restriction for several days prior to slaughter. Highly excitable cattle are more likely to produce dark cutter carcasses than calmer cattle.

"Blood splash" describes localized hemorrhaging (bleeding) within the muscles of a beef carcass. This condition results when the capillaries in the muscles rupture due to abnormally high blood pressure before exsanguination (blood draining). Lengthy delays between stunning and sticking during harvest may cause this condition. The incidence of blood splash reported in the 2011 National Beef Quality Audit was 0.3 percent.

"Calloused" ribeyes are the result of steatosis of *longissimus* muscle. Connective and fatty tissues can spread into areas of muscle creating a callus or section of fatty tissue within the muscle. The causes of muscular steatosis are unknown, but strenuous muscle exertion may be involved. The 2011 National Beef Quality Audit reported a calloused ribeye incidence of 0.05 percent.



The greatest problem with dark-cutting beef is consumer rejection because of its color. The quality of dark-cutting beef is lower than normal. It has significantly shorter shelf-life than normal beef and greater water-holding capacity, which are more conducive to bacterial growth. For these reasons, dark-cutting beef is severely discounted. The 2011 National Beef Quality Audit reported that 3.2 percent of beef carcasses were dark cutters.

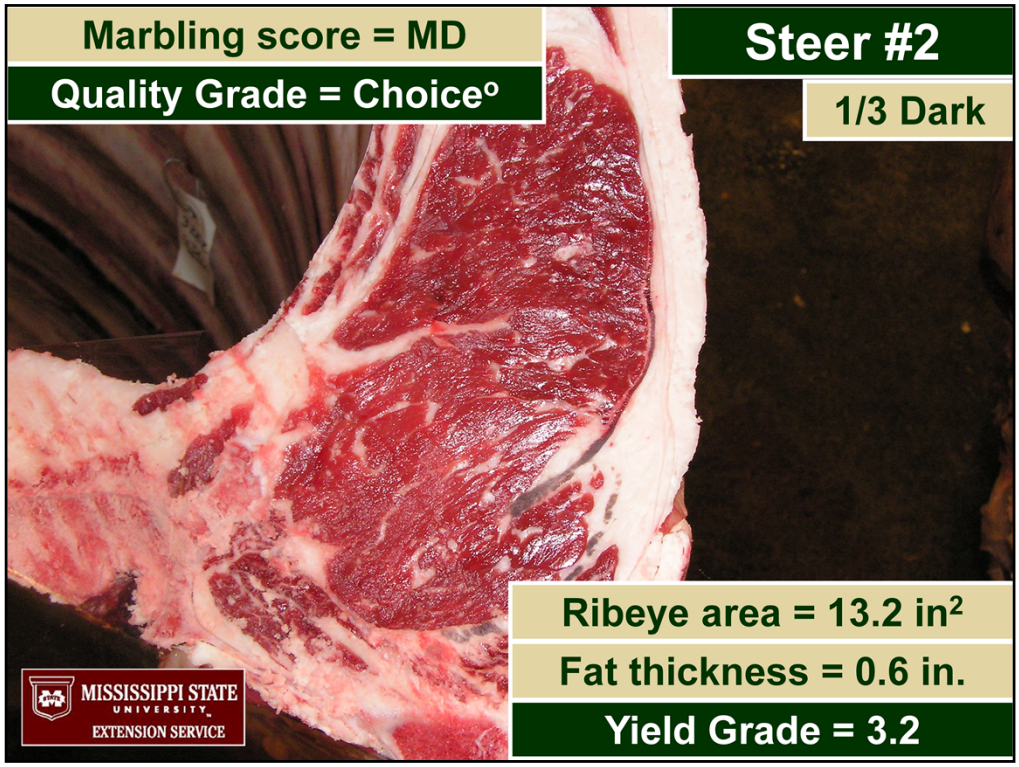
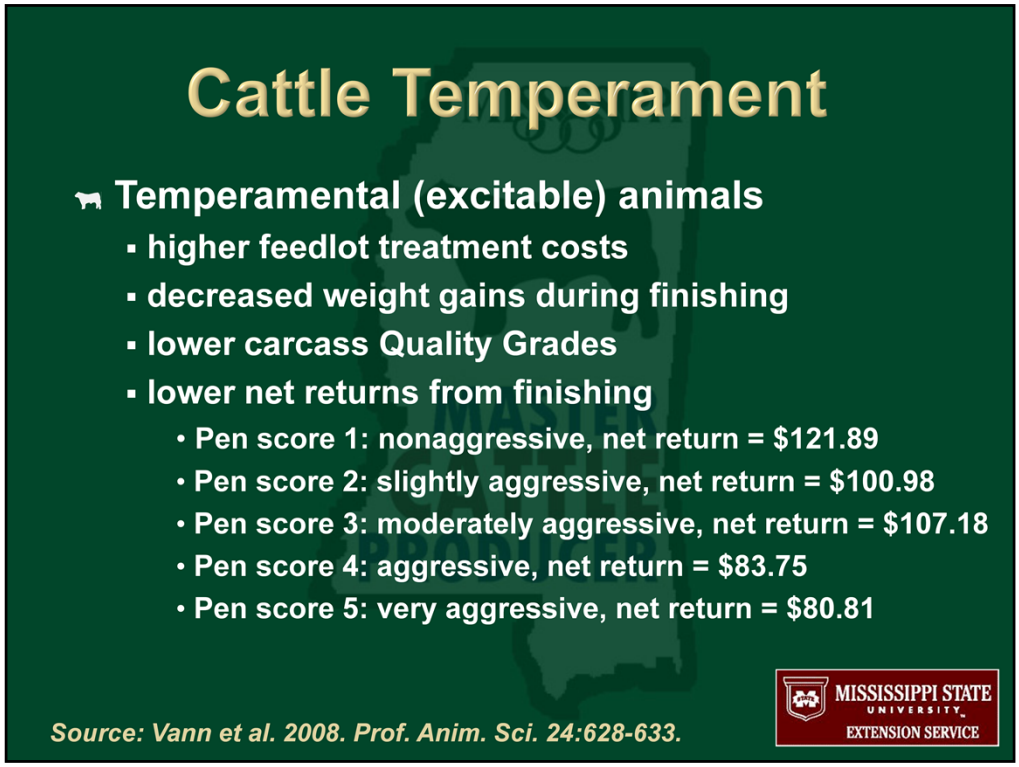
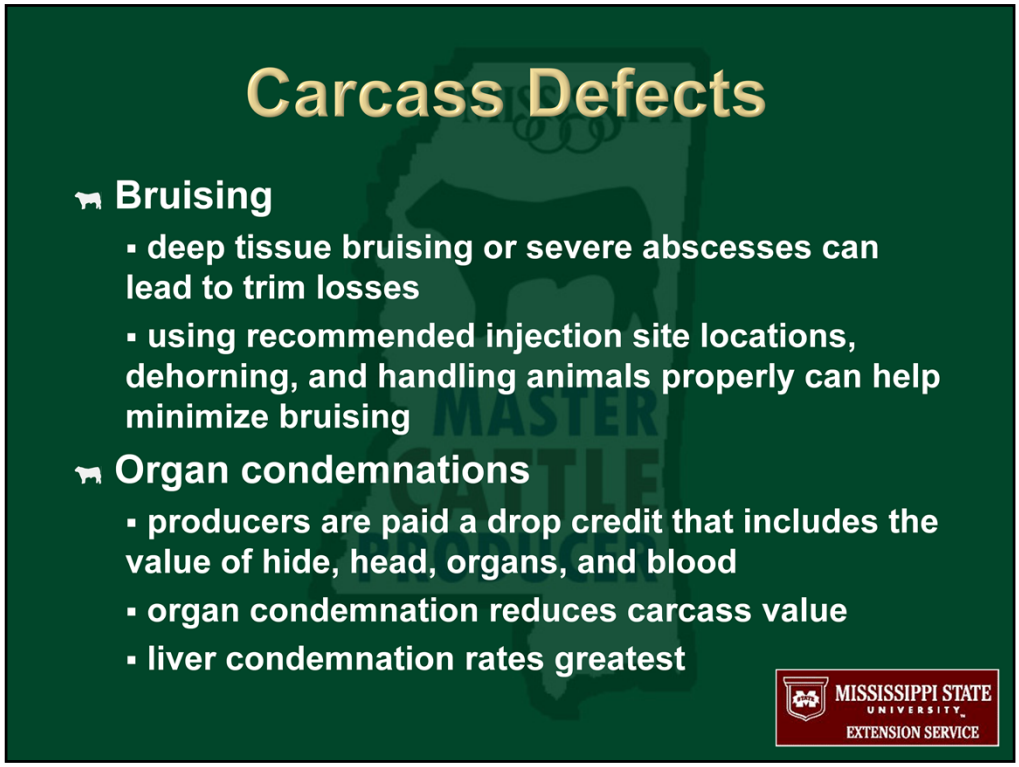


Image of dark cutting beef



Data from research conducted by MAFES animal scientist, Dr. Rhonda Vann, on Mississippi Farm to Feedlot cattle demonstrate the effects of temperament (degree of excitability or aggressiveness) on cattle finishing performance and carcass merit. Subjective pen temperament score and objective chute exit velocity measurements have the best correlations with overall cattle temperament scores. Temperamental ("high-headed") animals have increased feedlot treatment costs, decreased animal growth performance, reduced Quality Grades, and lower net returns compared with calmer animals. Beef cattle producers can have an impact on their overall profitability by assessing the temperament of their cow herds and calf crops and culling those animals that are temperamental. These temperamental animals pose an economic risk attributable to their reduced growth performance, higher medicine costs, and lower profitability in a feedlot production system.



Trim loss is most often due to fecal contamination but can occur due to deep tissue bruising or severe abscesses. Trim loss due to bruising can impact carcass value, particularly when high-value sections of the carcass are involved. Trimming that damages the major muscle groups of the wholesale round, loin, rib, or chuck is a “major” defect.

The 2011 National Beef Quality Audit revealed that 23.0 percent of beef carcasses exhibited bruises. This was down from 46.7, 48.4, and 35.2 percent in the 1995, 2000, and 2005 audits, respectively. Over half of bruises in 2011 appeared on the loin. Following Beef Quality Assurance guidelines, such as adhering to recommended injection site locations, dehorning, and handling animals properly can help minimize bruising and resulting trim loss.

In addition to being paid for the value of a beef carcass, producers are paid a drop credit that includes the value of hide, head, organs, and blood. Variety meats are produced from carcass offal such as livers, hearts, and tongues. Condemnations of these products reduce the value of a harvested beef animal.

The 2011 National Beef Quality Audit showed that 20.9 percent of livers were condemned, an improvement from the 24.7 percent of livers condemned according to the 2005 Audit. Liver condemnations were primarily due to abscesses and contamination. Lung condemnation incidence in 2011 was 17.3 percent. Pneumonia was the leading cause of lung condemnations. In addition, 10.0 percent of tongues were condemned. Whole carcass condemnations were not found.

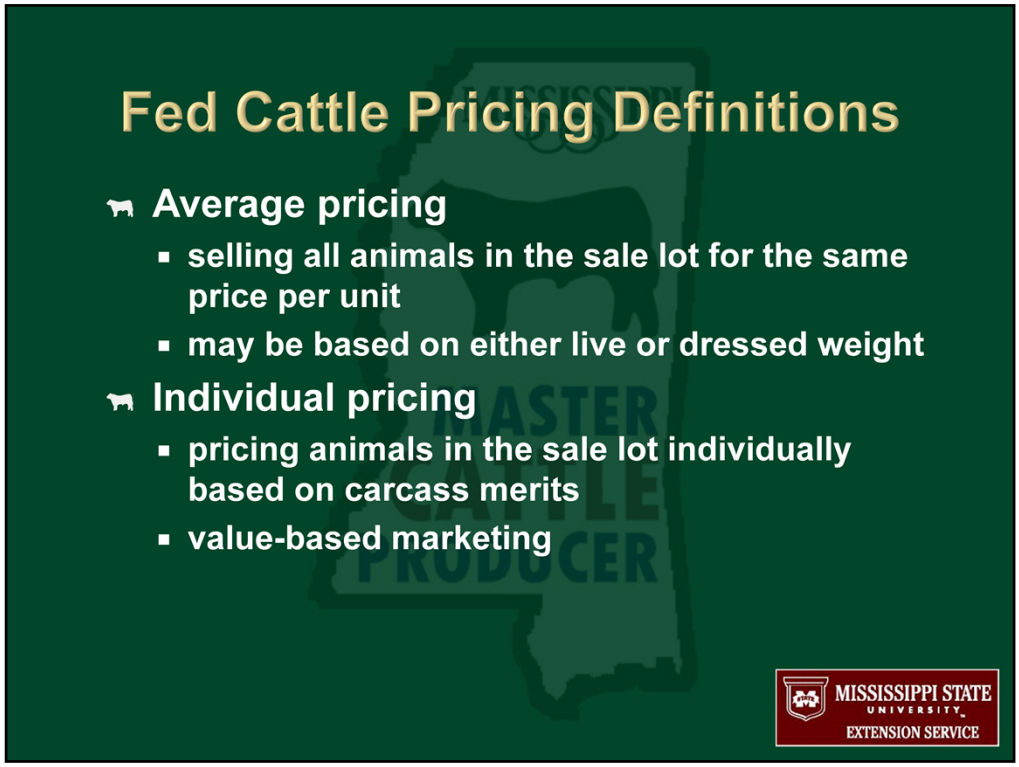
This animal was severely bruised across the back and loin area. Beef cattle producers can prevent many common quality defects in market cows and bulls. Bruising necessitates carcass trimming and results in less saleable product. Horn removal can reduce bruising incidence. The beef cattle industry has virtually eliminated carcasses with buckshot or grubs. In addition, 94 percent of carcasses in the 2007 audit showed no signs of injection site lesions suggesting that many producers follow recommended Beef Quality Assurance practices. Fewer cattle had brands than in 1999. Brands lower hide values, particularly when located over the ribs.

When loading cattle, separate animals by gender to reduce the occurrence of injury or bruising. The 2007 National Beef Quality Audit found that 44 percent of market cow and bull loads arriving at harvest plants were multi-gender. Of these mixed-gender loads, 73 percent were not divided on the trailer by gender. Even though the 2007 audit found fewer carcasses with bruises than the earlier audits, only 47 percent of bulls and 37 percent of cows exhibited no bruises at harvest. The round was the most frequent site of bruising in market cow and bull carcasses. This corresponds to the hindquarters on the live animal and suggests that improvements in cattle handling could decrease bruising rates in this location. Reducing bruising starts with management changes on the ranch and extends through transportation and at the harvest facility.

While unloading, give attention to methods that reduce cattle slipping and improving footing. Twenty-seven percent of beef cattle loads had more than three percent of the cattle slip during unloading. Learn and implement low-stress cattle handling methods to improve handling on the ranch and to reduce the incidence of slipping and bruising during and after transport.

For more information on market cow and bull marketing and management, refer to Mississippi State University Extension Service Publication 2520, “Market Cow and Bull Management and Marketing”. The Mississippi Beef Quality Assurance manual also discusses management of both fed cattle and market cows and bulls for a quality beef product.

Trim loss can significantly impact carcass weight. The trim loss for this infected joint was over 14 pounds.

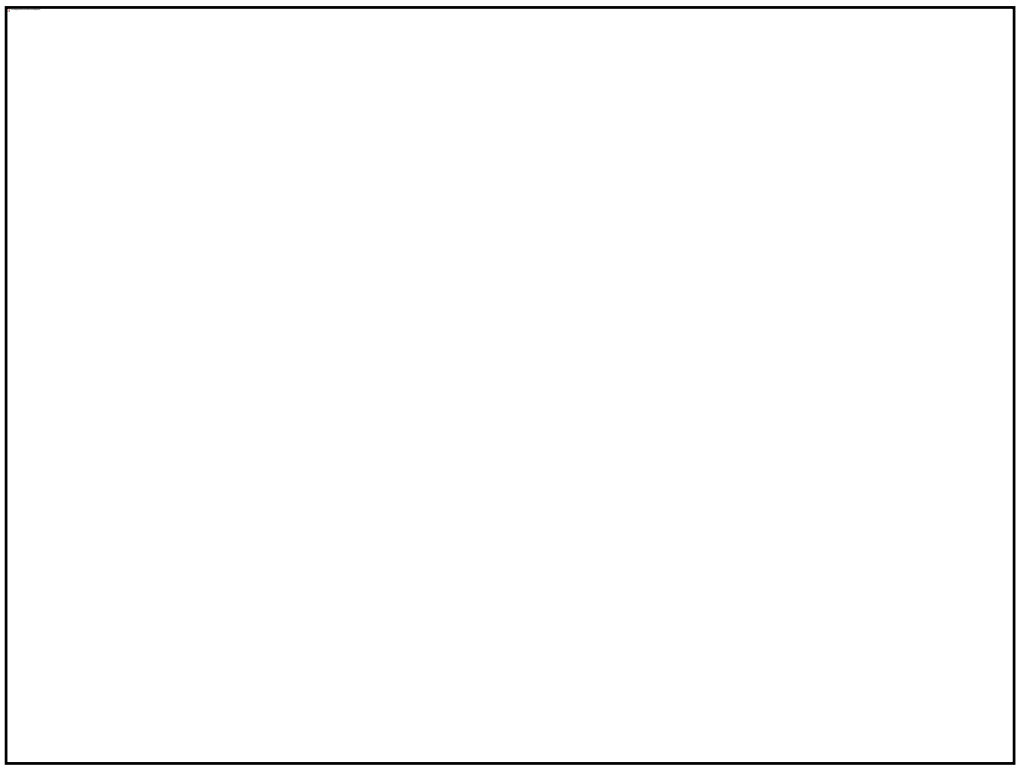


Marketing fed cattle on a live weight basis involves negotiating a price between the packer and feedlot. In this method, the packer usually starts with a base Choice carcass value and adds or subtracts premiums or discounts from the expected carcass quality when processed. Then, the adjusted carcass price is multiplied by the expected dressing percentage to obtain a live animal price. Live cattle pricing is done at the pen level. The price is established on the average weight and perceived quality rather than applying a value to each animal. Live cattle pricing requires skill and years of experience by both the feedlot operator and packer or buyer because the actual value of the end product is unknown at the time of the transaction. Even the most experienced buyers and feeders will lose potential revenue because the projected carcass quality is not always reflected at harvest. High carcass quality cattle are often discounted and low carcass quality cattle often receive premiums.

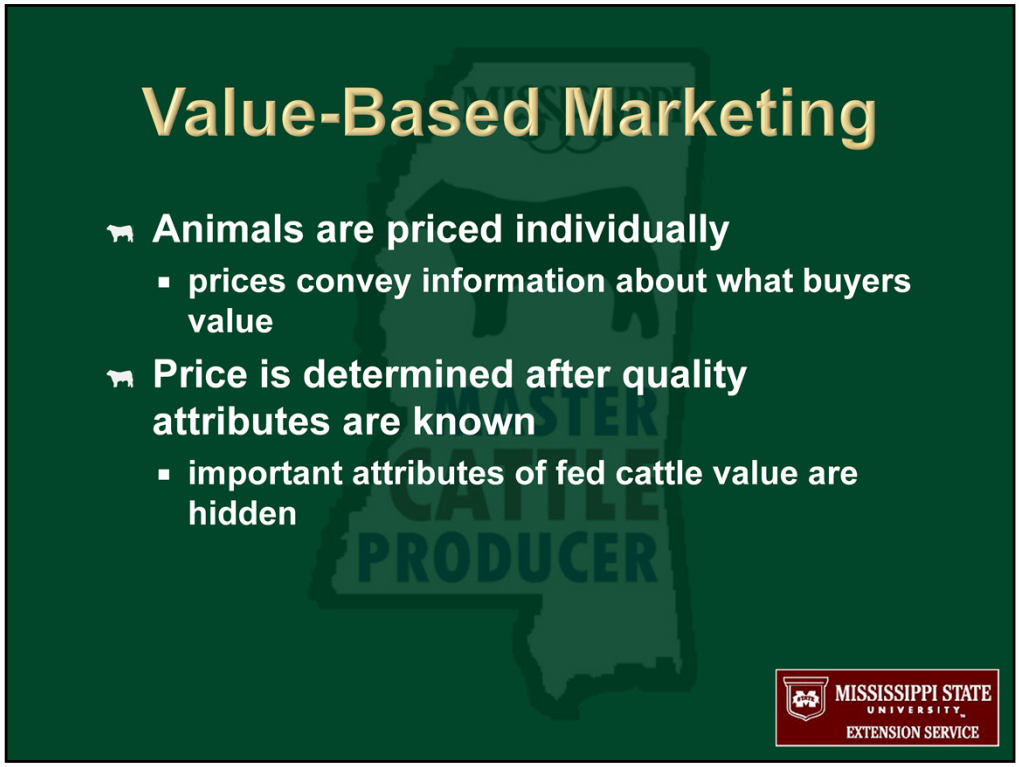
For dressed weight pricing (often referred to as “in the beef”), the value of the animal is based on the hot carcass weight at harvest. Therefore, the buyer does not have to estimate the dressing percentage. The other aspects of dressed weight pricing are similar to live pricing. The buyer’s estimate begins with a base Choice carcass price and is adjusted for expected quality and yield grades, weight premiums and discounts, slaughter costs and by-product value.

Neither of these methods of pricing reward improved carcass quality and do not give incentive to improve real carcass quality by management or genetic selection. More and more fed cattle are now sold by cattle feeders, to packers, in transactions such as “grade-and-yield” or “on a grid” that require that all carcasses in such groups be officially Yield Graded and Quality Graded. Some packers may also have their own in house grades and premium/discount programs independent of USDA grades.

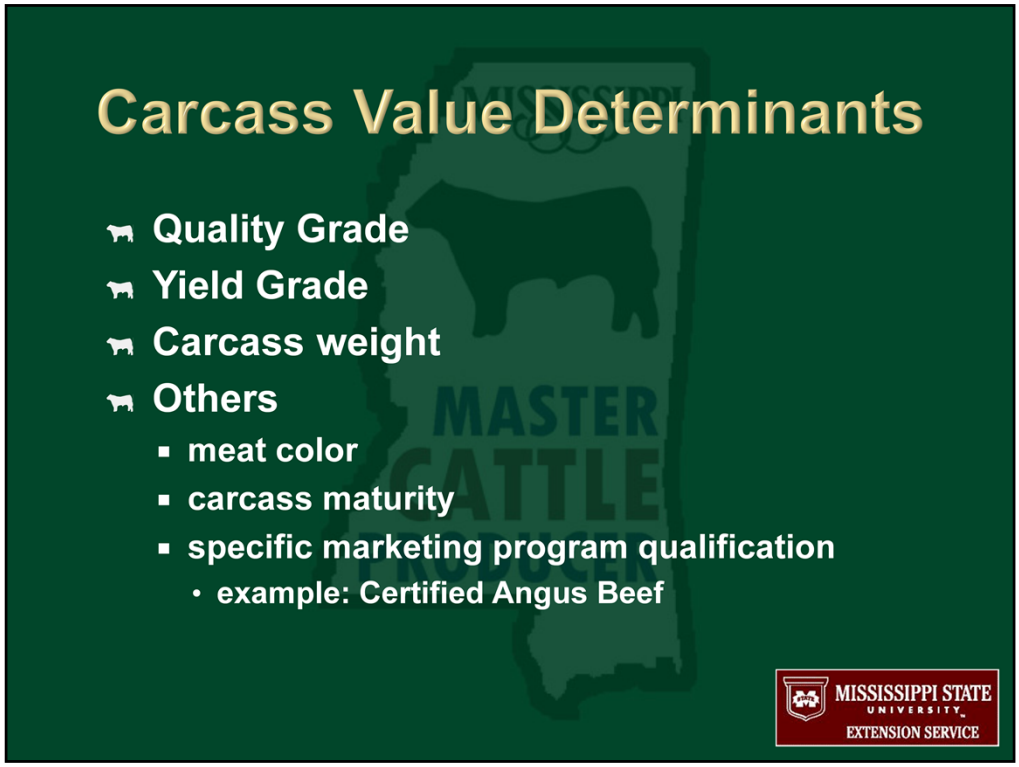
Example live cattle pricing: 1,240 pounds x $86.79 / 100 pounds = $1,076.20



Example dressed weight pricing: 794 pounds x $140.88 / 100 pounds = $1,118.59

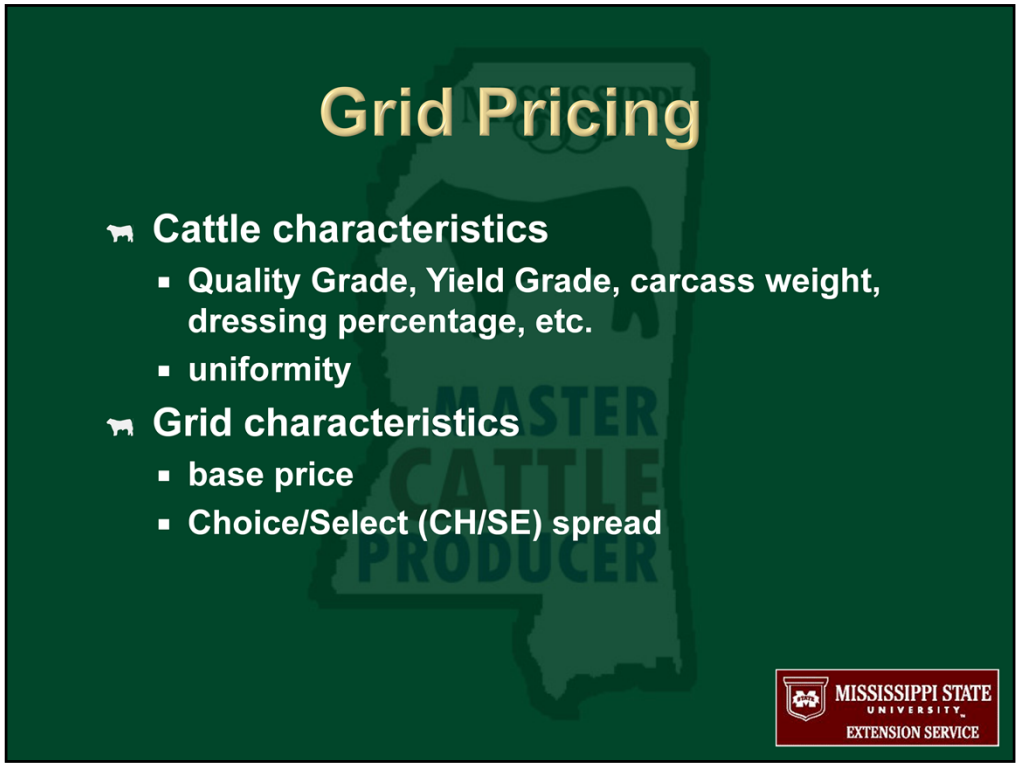


In value-based marketing, animals are priced individually are carcass attributes are known. Grid pricing is a form of value-based marketing. The only major pricing method that truly rewards improving carcass quality is grid pricing. The components of this method are fundamentally the same as live cattle pricing and dressed weight pricing. The difference is that the price is adjusted to Quality and Yield grade at harvest.

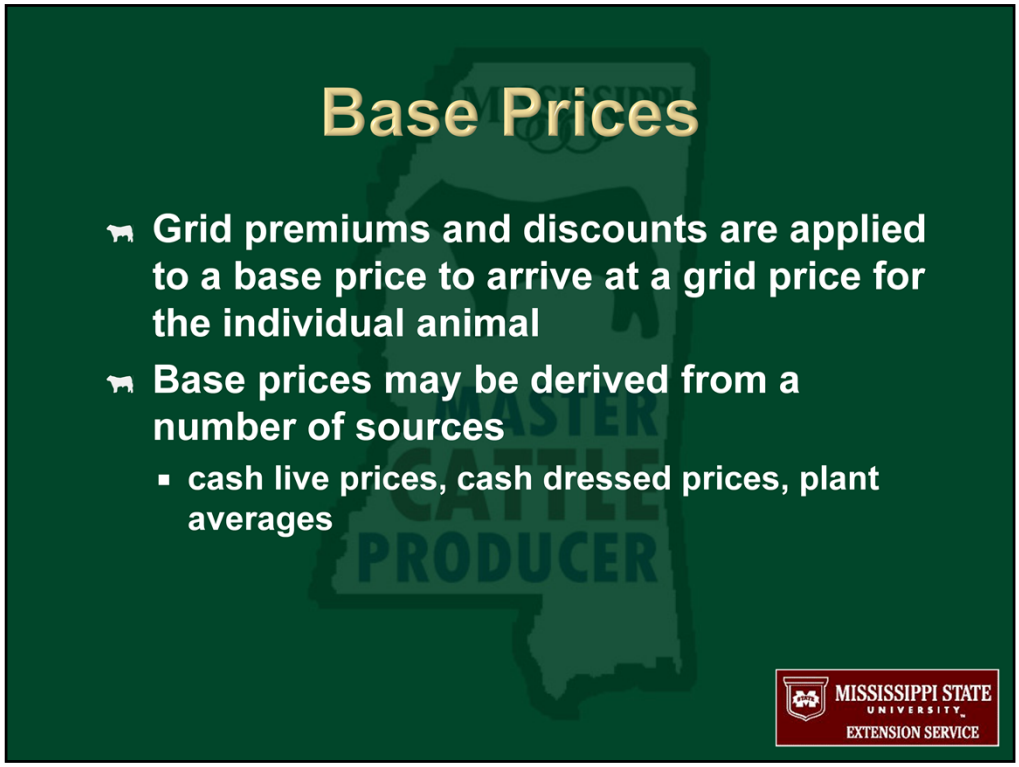


Many factors determine beef carcass value in value-based marketing systems. These factors include Quality Grade, Yield Grade, hot carcass weight, meat color (discounts for dark cutters), carcass maturity, and eligibility for specific marketing programs such as Certified Angus Beef.

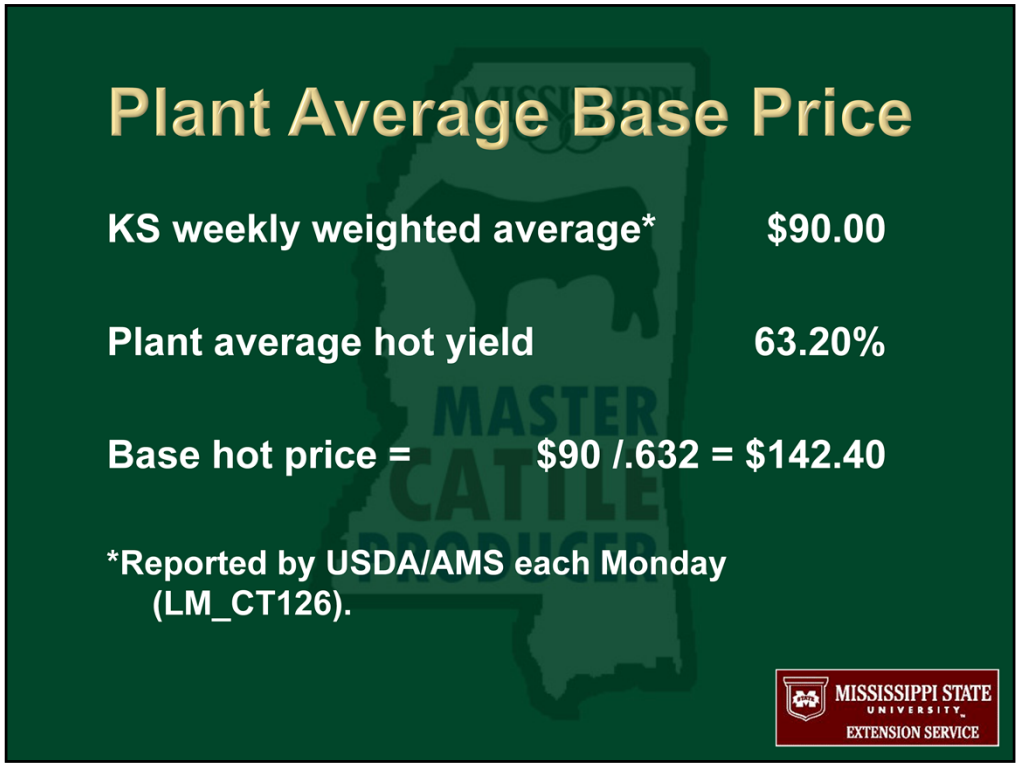
Once the true base price is determined, premiums and discounts are established for carcasses that fall outside the base grid block. These adjustments are based on marbling and the amount of product in the carcass as determined by Quality Grade and Yield Grade, respectively. The grid is structured so that the most valuable carcass would be a Prime Yield Grade 1 and the least valuable carcass would be a Standard Yield Grade 5. Many plants also offer a premium for carcasses that meet the specifications of a branded program.



Grid pricing is profitable when cattle characteristics are appropriate for the grid used. Some grids favor high Quality Grades, while others favor high yielding cattle. Cattle uniformity makes it easier to decide to use grid marketing. Wide fluctuations in cattle uniformity often lead to wide fluctuations in grid prices for the set of cattle. Grid characteristics including base price and Choice/Select spread further determine the desirability of grid marketing for a particular set of cattle. Revenue per head from grid pricing is generally more variable than revenue from live pricing, emphasizing the importance of cattle uniformity to reduce grid pricing variability. This variability increases seller price risk.



Base prices provide a starting point for pricing a beef carcass on a value-based grid. Grid premiums and discounts are applied to the base price to arrive at the grid price for the animal. The base price for grids can be set in several different ways with many plants using the USDA's weighted regional carcass price and others using the previous week's plant average. Base prices can also come from cash dressed prices.



Plant average base prices are sometimes used for base prices in value-based grids. They are based on a ratio of a fed cattle price and the plant average hot yield (dressing percent). The USDA Agricultural Marketing Service reports weighted average fed cattle prices on a weekly basis.

This slide illustrates an example carcass premium and discount grid. It includes a base price and hot carcass weight range for the base price. Carcass weight discounts are applied to carcasses outside of the specified range. The base price is for carcasses grading Choice and Yield Grade 3. Premiums are given to carcasses grading Prime and Yield Grade 1 or 2. Discounts are applied for Select, Standard, Yield Grade 4, and Yield Grade 5 carcasses.

Carcass Premium and Discount Grid Example

	Yield Grade				
	1	2	3	4	5
Quality Grade	($/cwt. carcass)				
Prime	7.80	6.75	5.00	-7.00	-13.00
Choice o/+	7.30	6.25	4.50	-7.50	-13.50
Choice -	2.80	1.75	Base	-12.00	-18.00
Select	-4.20	-5.25	-7.00	-14.00	-20.00
Standard	-11.20	-12.25	-14.00	-21.00	-27.00
Base price = $142.40/cwt.					

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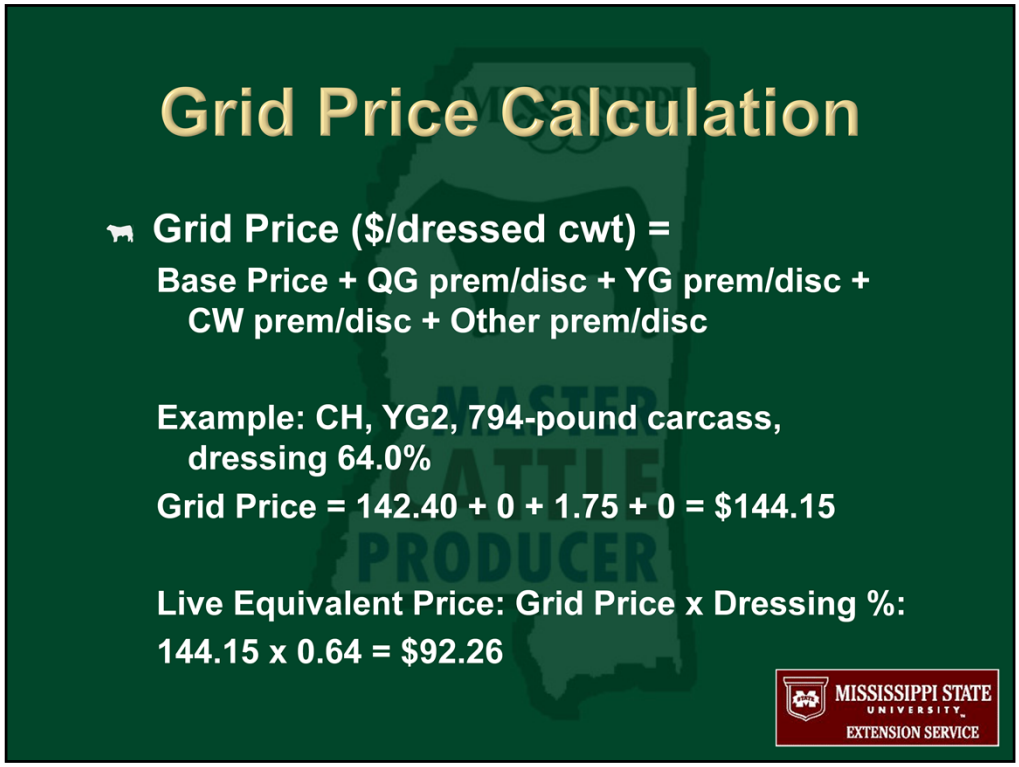
This slide illustrates the example carcass premium and discount grid in a different format. It also specifies a premium for average and high Choice.

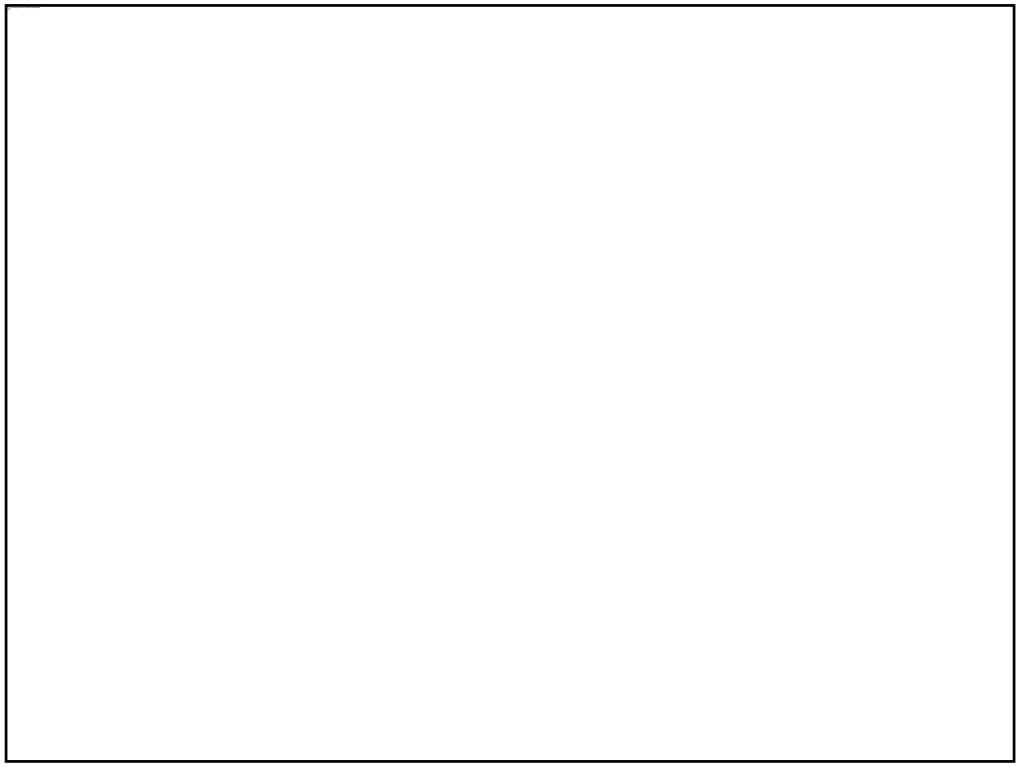


Grid price calculation is outlined here.

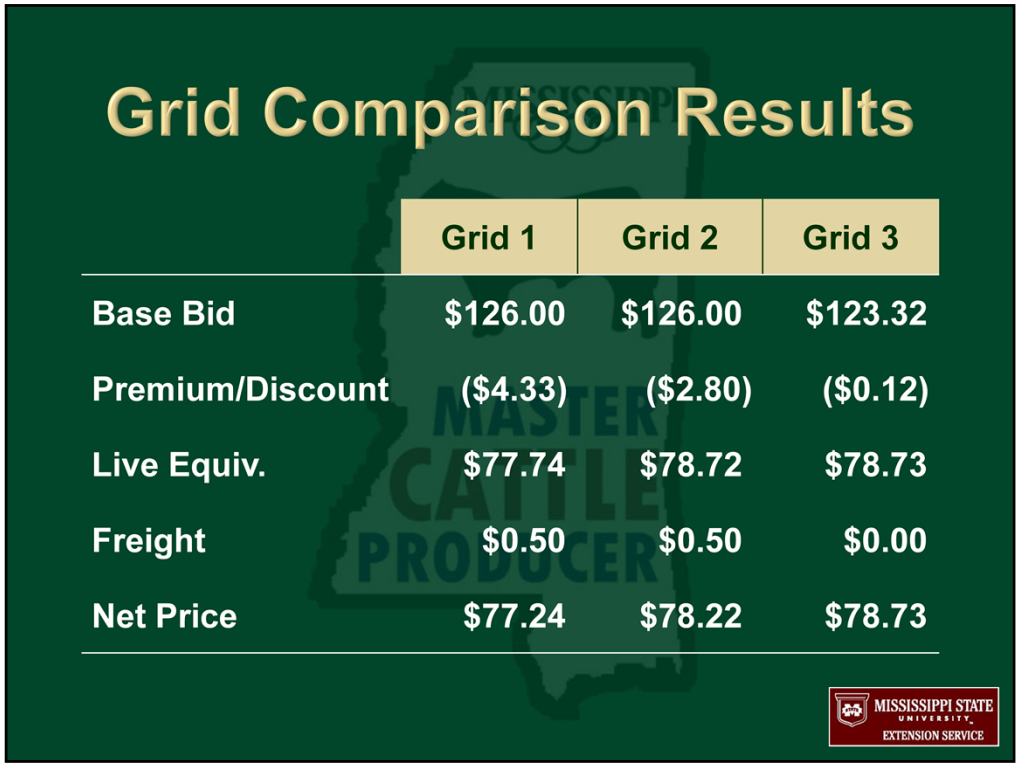
Grid price ($/dressed cwt) = base price + QG premium/discount + YG premium/discount + carcass weight premium/discount + other premium/discount

In the example (Choice, Yield Grade 2, 794-pound carcass, dressing 64%), grid price = $142.40 + $0 + $1.75 + $0 = $144.15/cwt.

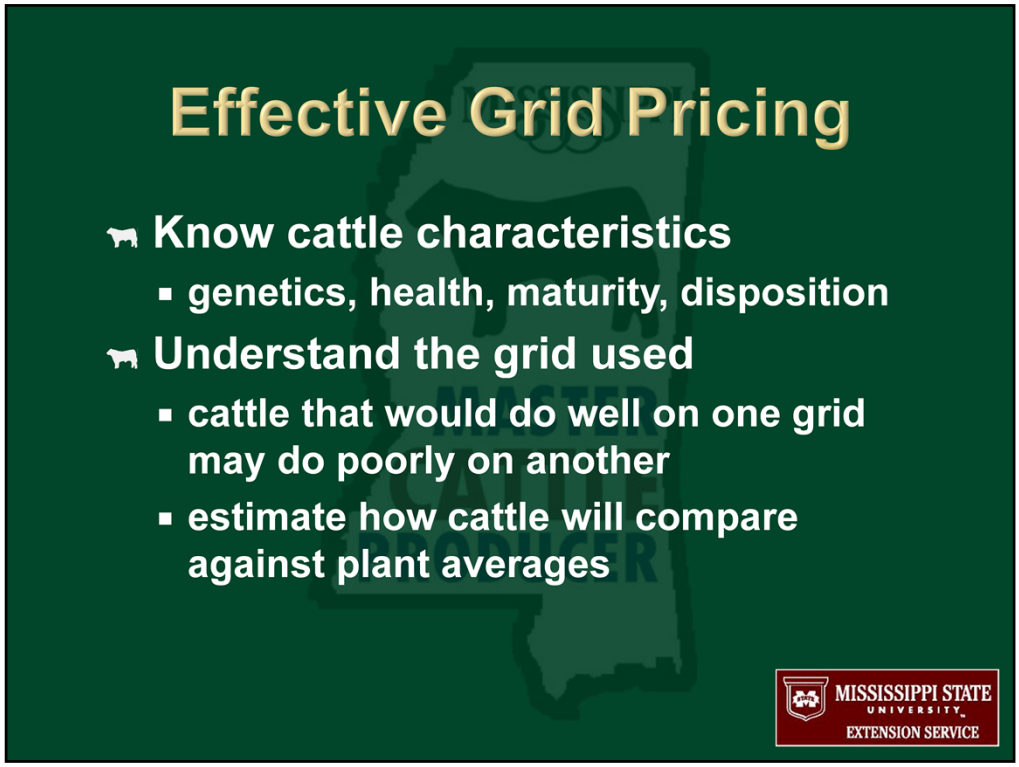
The live equivalent price is then, grid price x dressing %: $144.15 x 0.64 = $92.26/cwt.



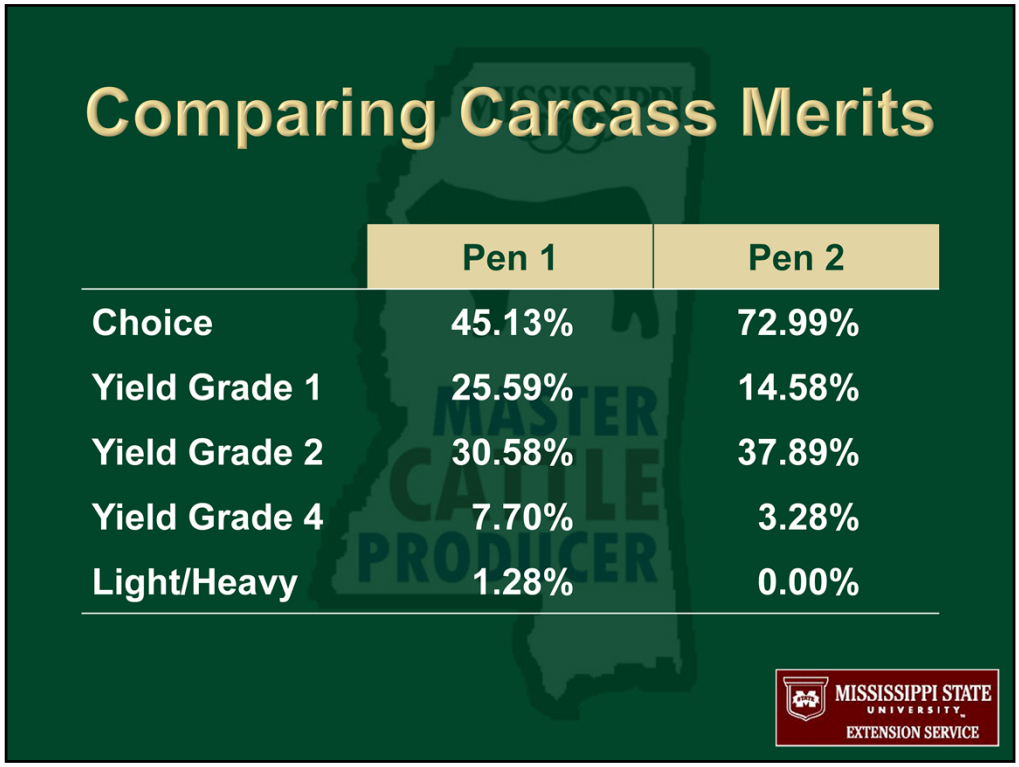
Carcass attributes are listed for the same steer in the previous live weight and dressed weight pricing examples. This information along with the carcass weight and any defect information are applied to a grid of carcass premiums and discounts to arrive at a grid price (value-based marketing). In this example using the grid previously shown, there is no premium or discount for Quality Grade, because low Choice is the base Quality Grade for the grid. There is a Yield Grade premium of $1.75/cwt for a Yield Grade 2 carcass. The hot carcass weight falls within the 600- to 900-lb acceptable range specified by the grid, so there is no heavyweight or lightweight discount. This carcass is also not a dark cutter, bullock, or other defected carcass requiring a discount. Therefore, the carcass value is ($142.40/cwt +$1.75/cwt) x 7.94 cwt = $1,144.55.



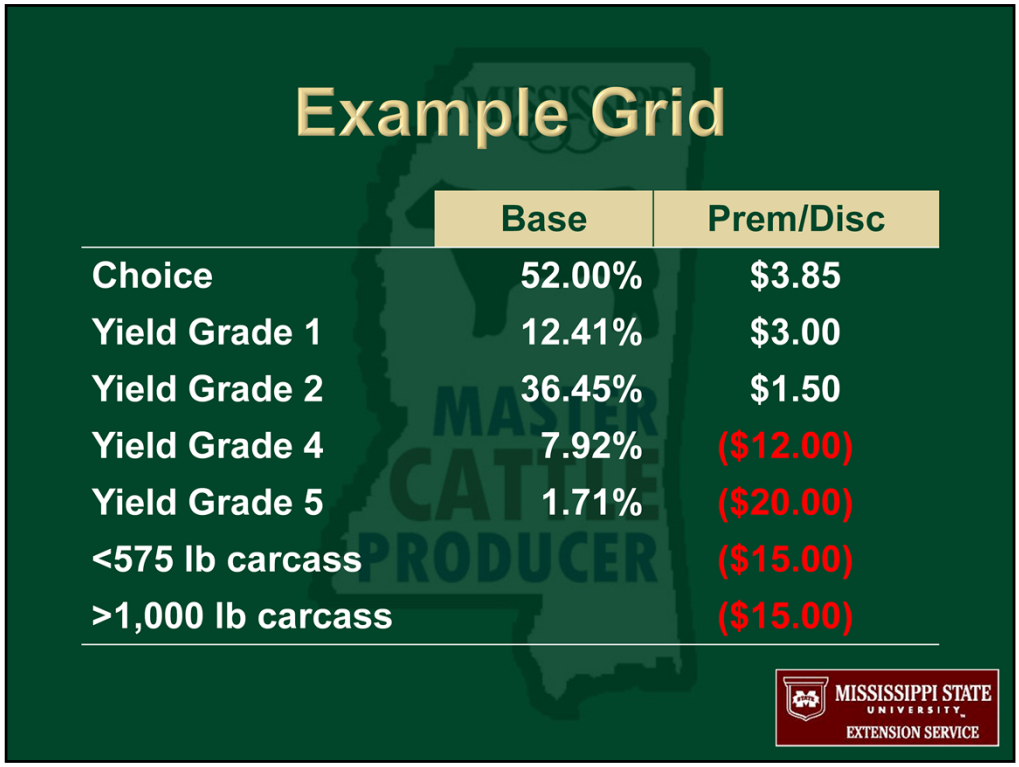
In this example comparison, details on three grids are shown. The grids differ in base prices, premiums and discounts, and freight charge. Grid 3 results in gross revenue that is $17.73/head higher [1190 pounds x ($78.73/cwt - $77.24/cwt) /100 pounds =$17.73/head] than Grid 1 and $6.07/head higher [1190 pounds x ($78.73/cwt - $77.24/cwt) /100 pounds =$17.73/head] than Grid 2 based on 1190-pound live weight. Freight differences also contribute to differences in the net price received.



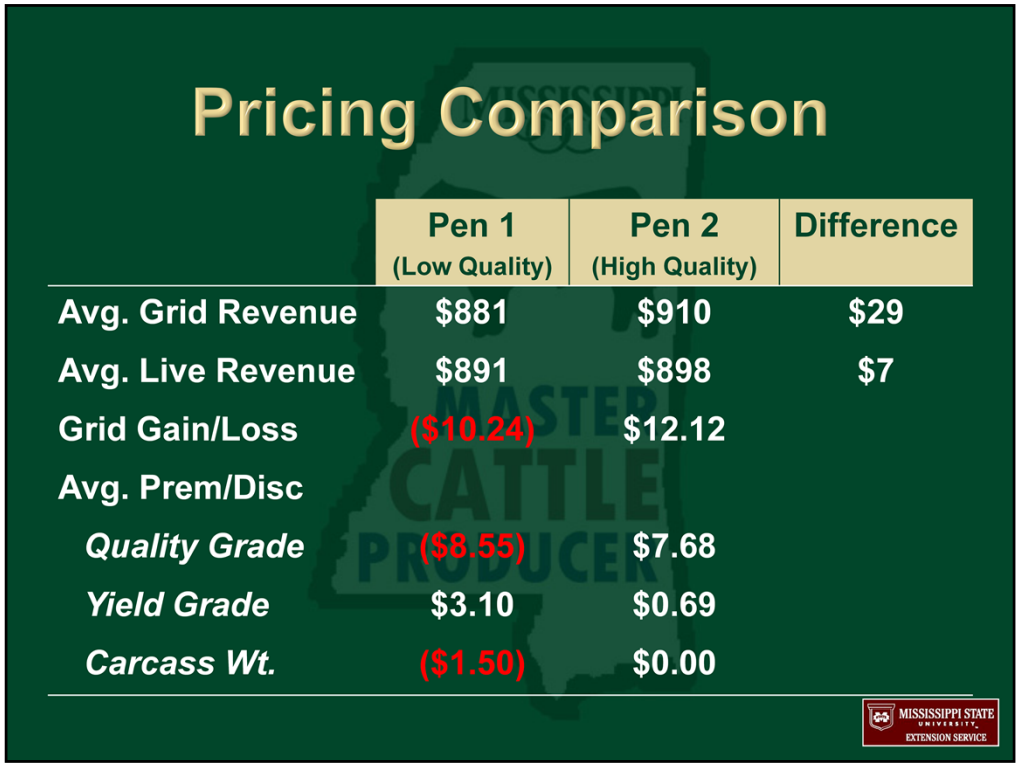
To effectively use grid pricing for fed cattle marketing, it is critical to know cattle carcass characteristics. Known genetics, health programs, cattle age, disposition, feeding management, etc. prepare the producer to take advantage of grid marketing. Cattle should be produced to target a specific grid. Grid specifications vary widely, so cattle that would do well on one grid may perform poorly on another grid. A good estimation of how cattle will compare against plant average dressing percentages is also very useful in making grid marketing decisions.



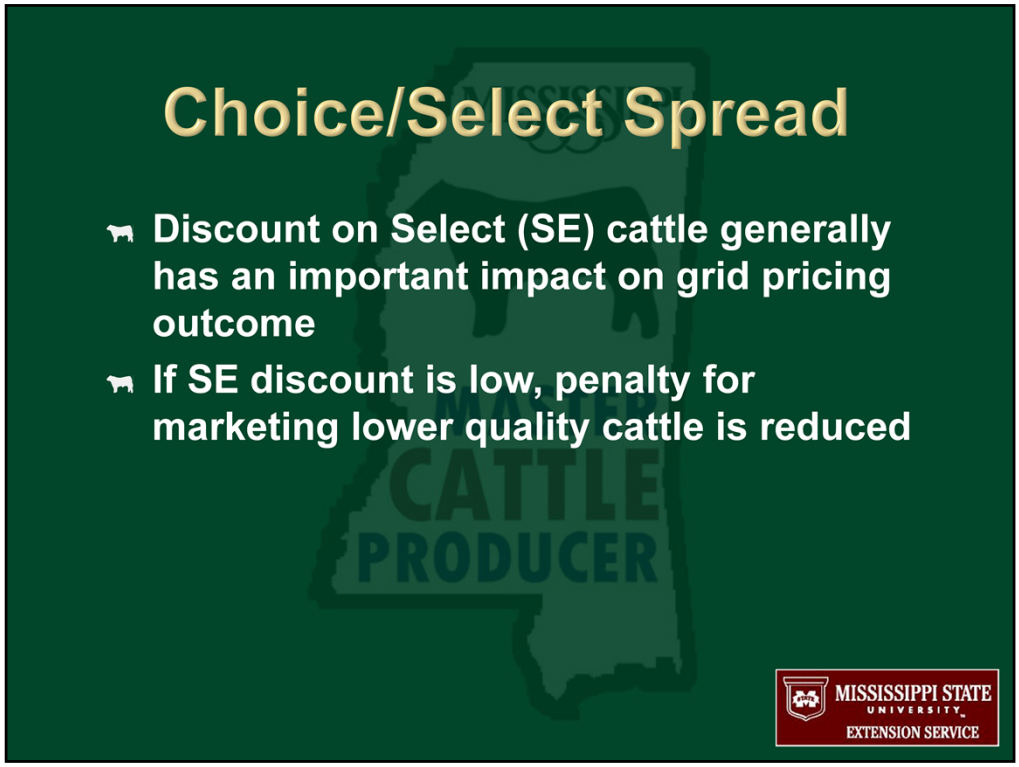
Carcass merits differ for each pen of cattle. In this example, pen 1 consists of lower performing cattle for both Quality and Yield Grades than pen 2. Pen 1 also contains some outweight cattle, unlike pen 2.



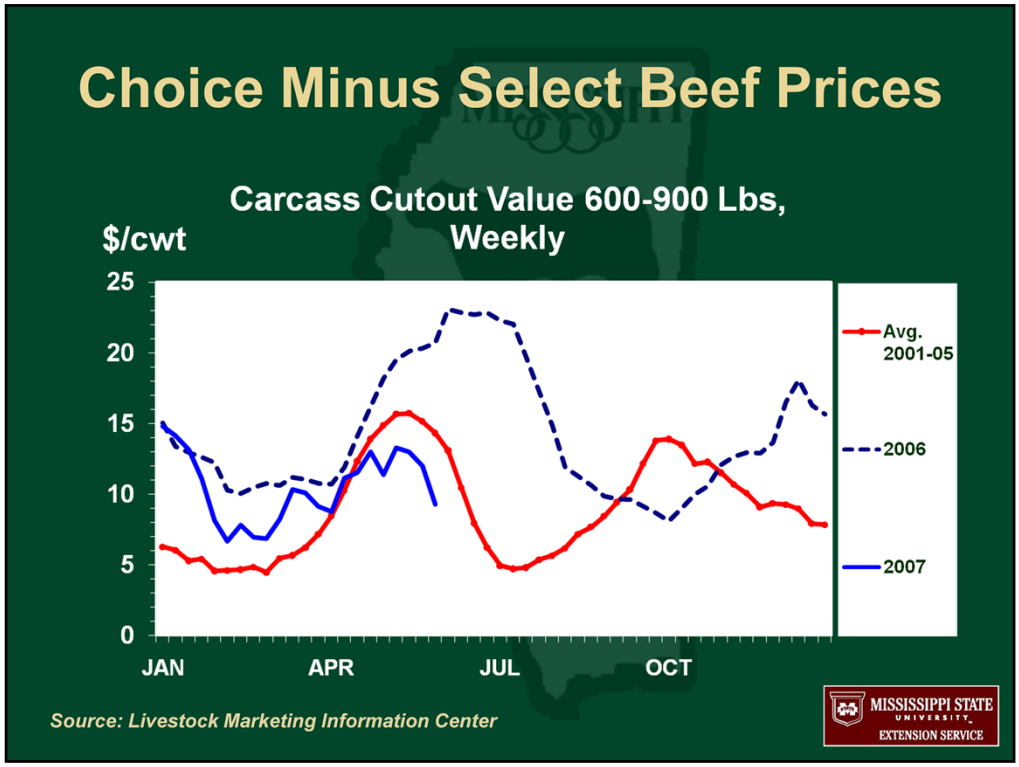
An example grid is outlined here to be used in a grid marketing scenario with example pens 1 and 2.



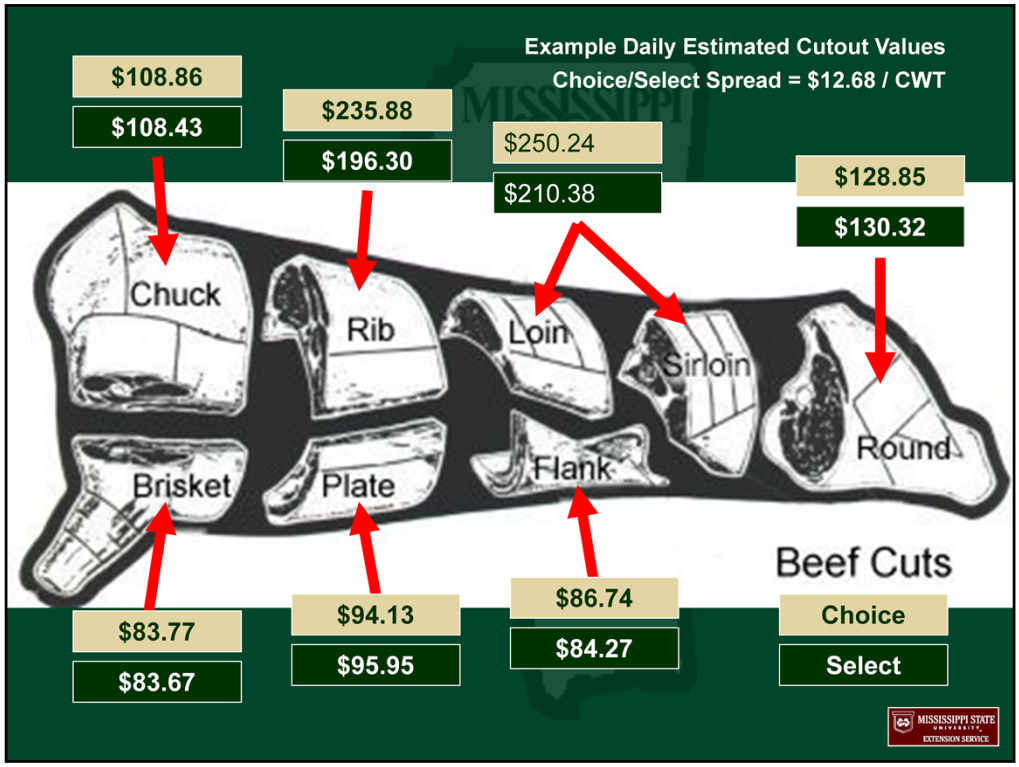
Average grid revenue, average live revenue, grid gain or loss, and average premiums and discounts are listed for the pen comparison example. Note the grid loss and discounts associated with pen 1.



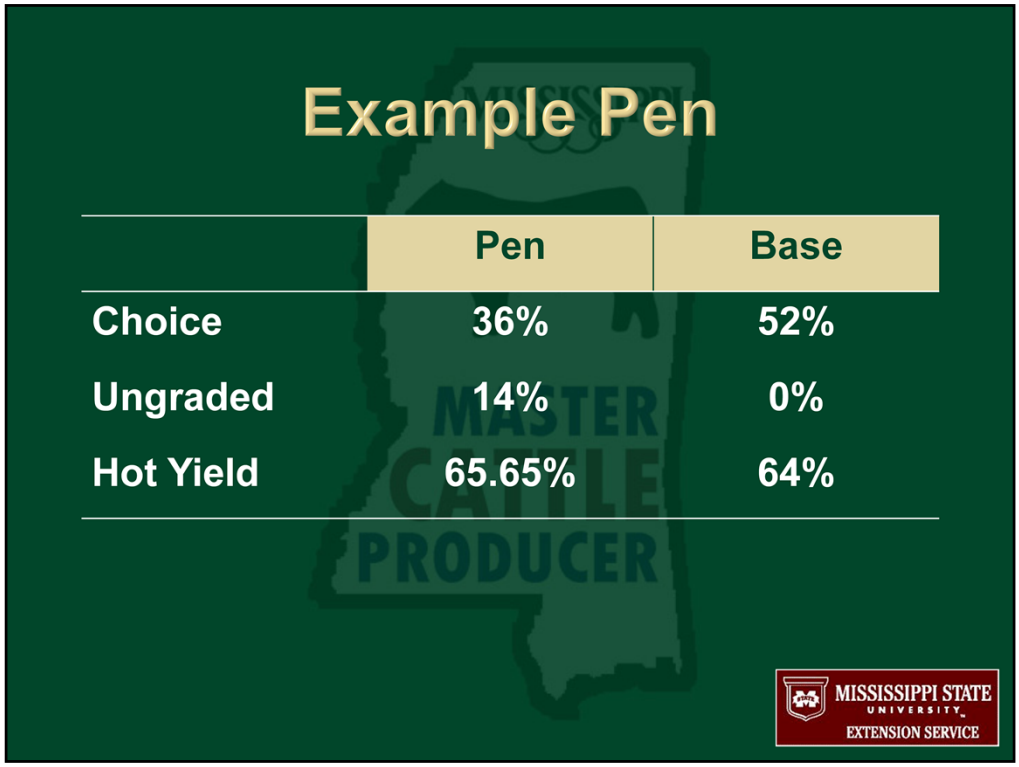
The Choice/Select (CH/SE) spread usually has a large influence on grid pricing profitability. When the Select discount is low (CH/SE spread is small), marketing lower quality cattle incurs less of a price penalty. This spread changes over time, so it is important to be aware of market conditions and current and expected CH/SE spreads.



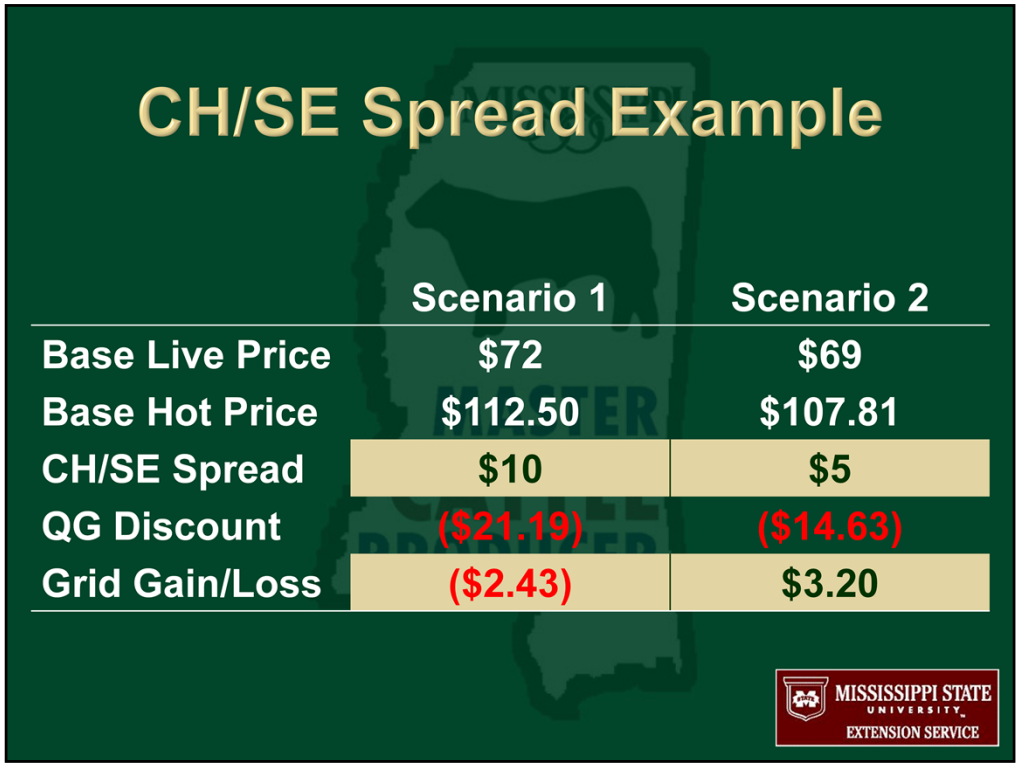
This graph illustrates the Choice/Select spread (Choice minus Select beef prices) over time showing the variability of the spread.



This figure illustrates daily estimated cutout values for various beef cuts at one point in time when the Choice/Select spread was $12.68/CWT.

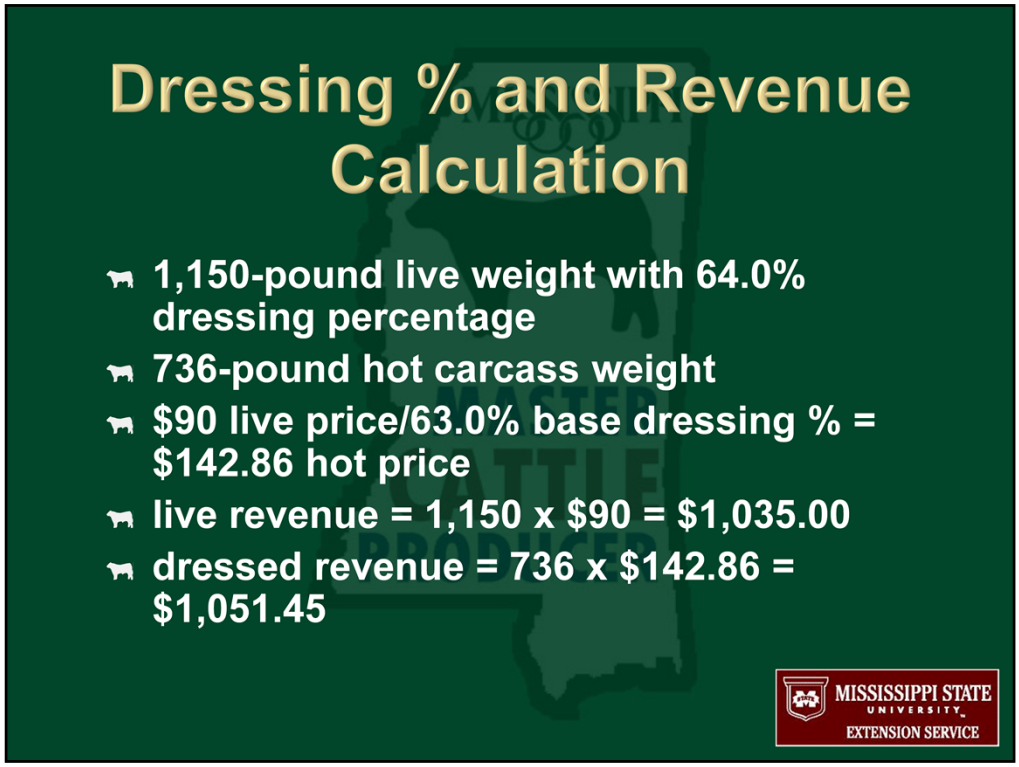


Percentages for Choice, Ungraded, and hot yield are listed for an example pen to show the impact of the Choice/Select spread on grid marketing.

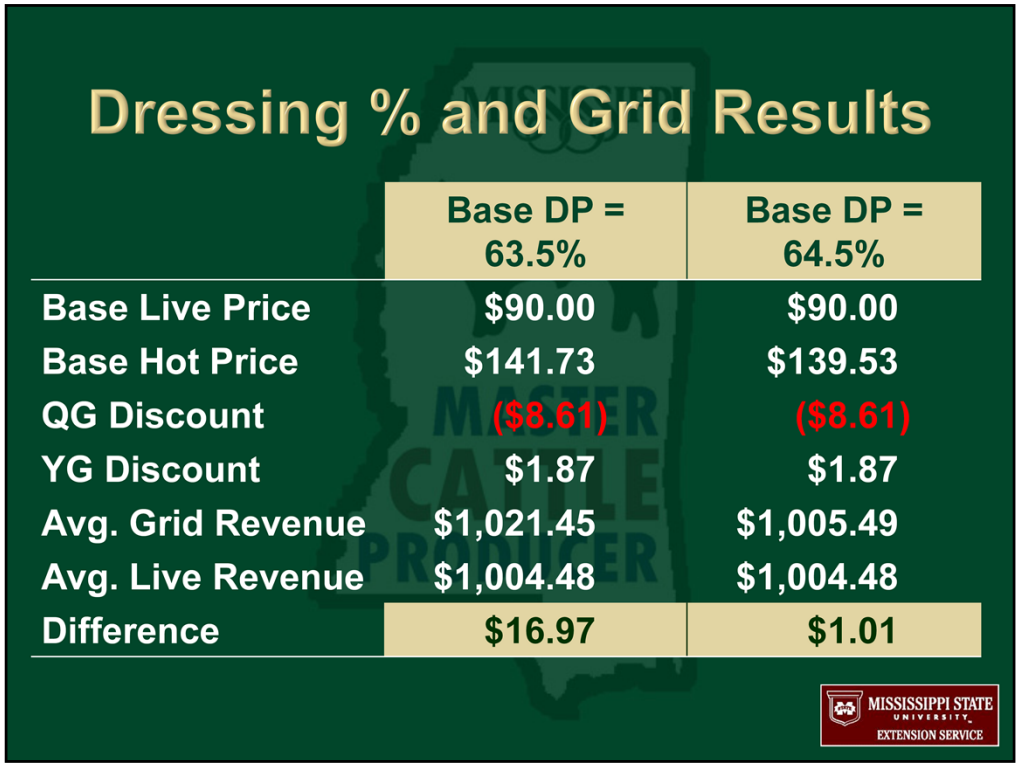


This example shows two difference Choice/Select spreads and their impact on grid gain or loss for the example pen of cattle. Note that a $5 shift in the CH/SE spread shifts the grid pricing scenario from profitable to unprofitable in this example. A larger Quality Grade discount is incurred when the spread is wider.

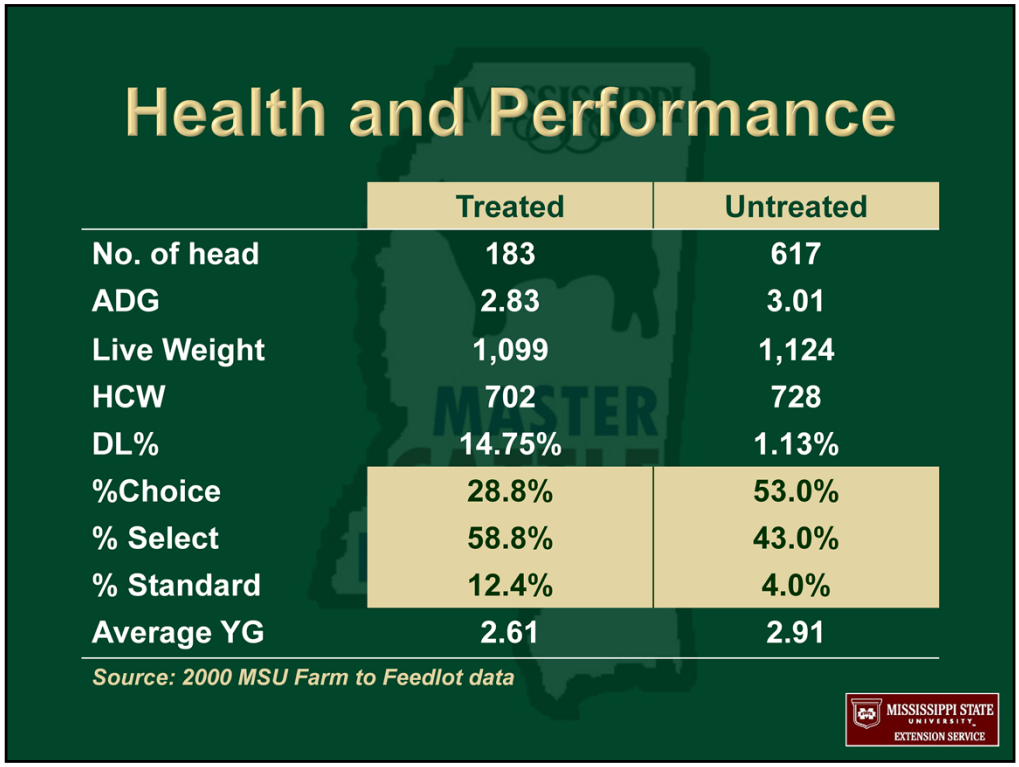
Dressing percentage can also have a large impact on grid pricing outcome. In general, when dressing percentage is below average, a poor grid outcome is expected. When dressing percentage is above average, a good grid outcome is expected.



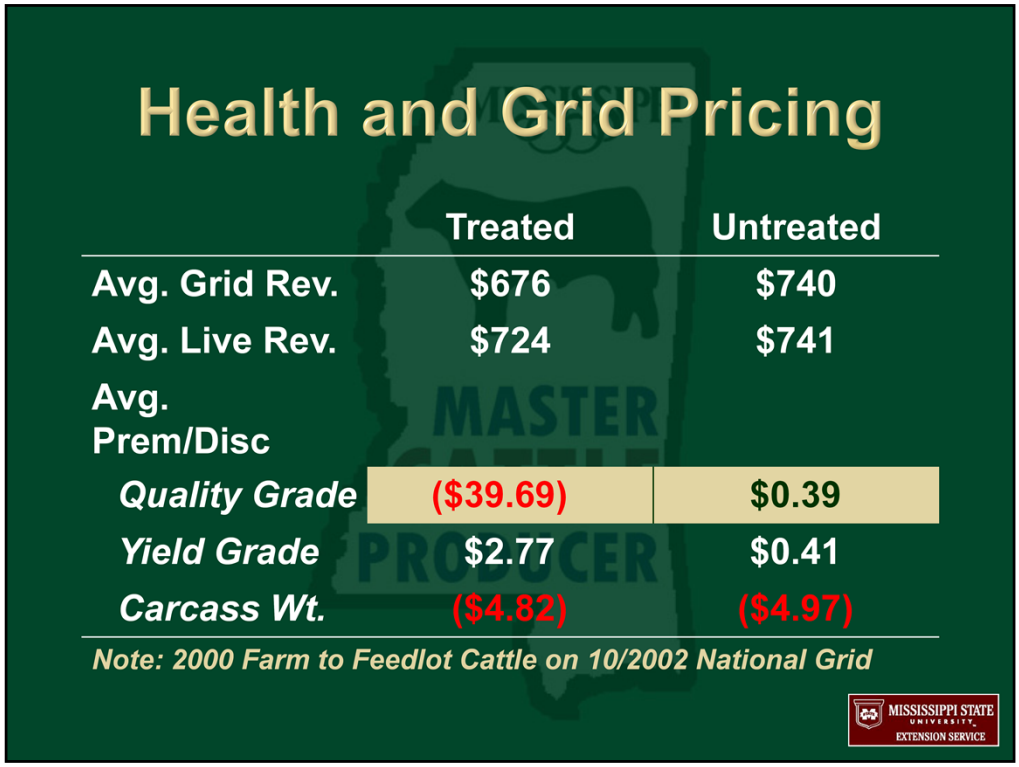
In this example, having a 1% higher dressing percentage than the plant average used to determine base price is worth about $15 per head in comparison to pricing live. Some (or all) of that $15 could be given back in discounts related to carcass merits (SE or NR quality, YG 4 or 5, light/heavy carcass, dark cutter, hard boned, etc.).



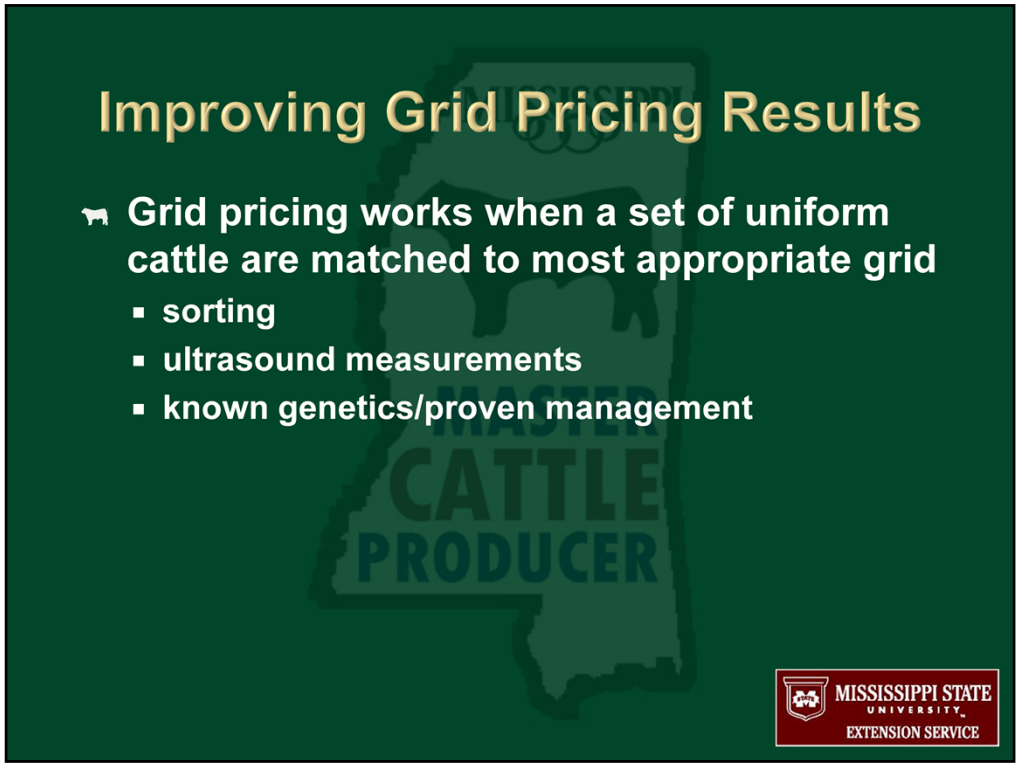
In this example, dressing percentage differs by 1 percent point (63.5% versus 64.5%). While live pricing is not affected, carcass pricing is impacted with the lower dressing percentage resulting in a higher base carcass price. Similarly, live revenue is not affected by the difference in dressing percentage, but grid revenue is $15.96 higher with the lower dressing percentage.



Mississippi Farm to Feedlot data show the impact of cattle health on Quality Grade. Healthy, untreated cattle typically have higher Quality Grades than cattle with health problems. Similarly, less excitable cattle generally have higher Quality Grades at harvest.

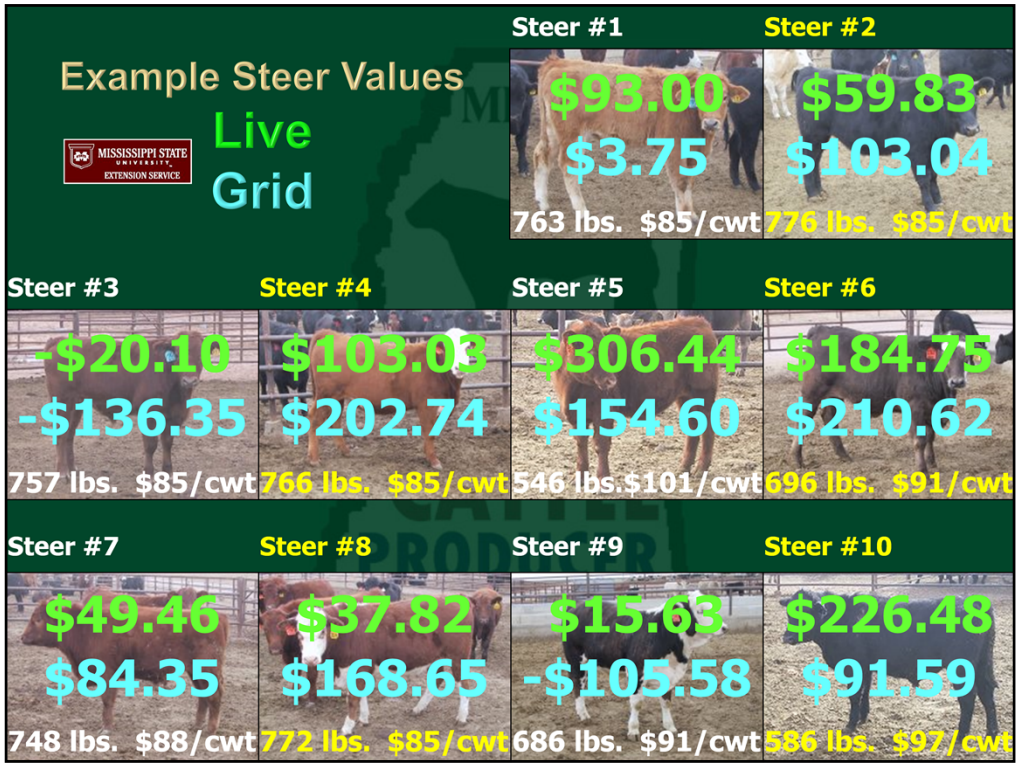


Using the Mississippi Farm to Feedlot cattle example, there is approximately $40.00 difference between healthy and sick cattle in this sample grid marketing scenario.



Grid pricing works best when cattle are uniform and matched to the most appropriate grid. Sorting cattle based on known genetics and management or sorting cattle based upon ultrasound scanning data can reduce uncertainty with grid marketing and facilitate identification of the best grid for a particular set of cattle.

Carcass traits are important in determining Beef Yield Grades and Quality Grades. They are an important consideration for beef cattle producers in cattle selection and management, especially when cattle ownership is retained through harvest and cattle are marketed on value-based carcass grids. The 2005 National Beef Quality Audit indicated that 62 and 42 percent of branded beef programs had specifications for marbling and Yield Grade, respectively. Producers who provide carcass information to potential buyers position themselves to be rewarded for producing a quality product.



Mississippi beef producers were challenged to predict which three calves in the Farm to Feedlot Contest would be most profitable beyond the farm gate. They were given pictures, weights, and live prices for 10 randomly selected steers in the 2003-2004 Mississippi Farm to Feedlot program.

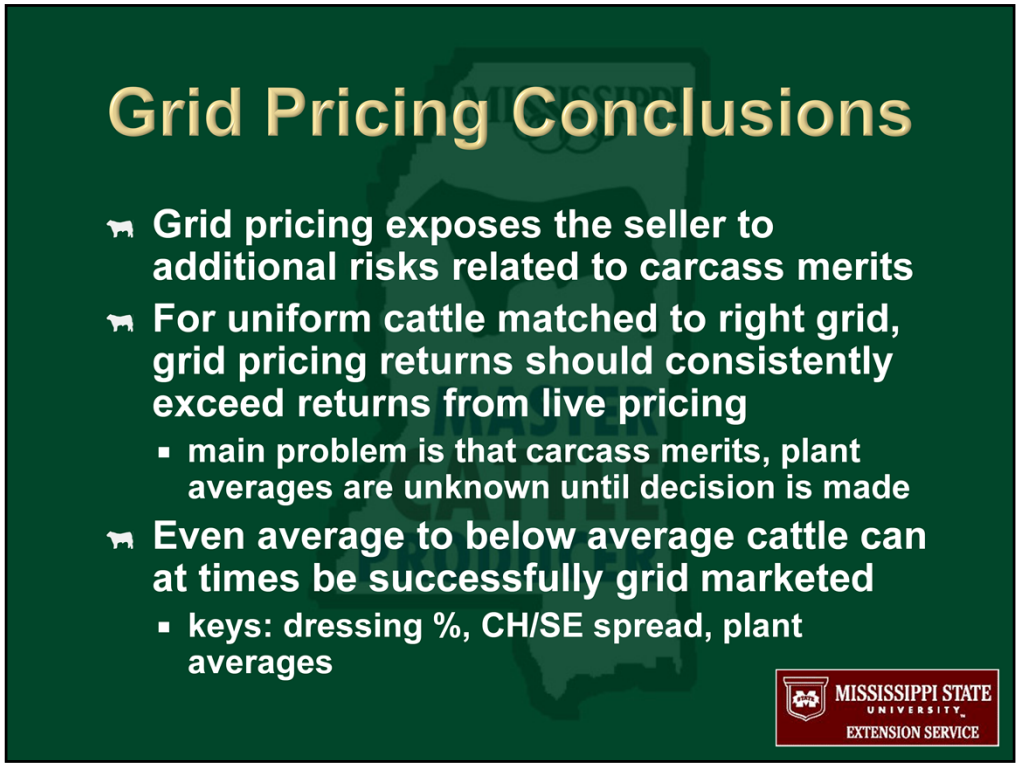
For contest purposes, fed cattle were priced on a grid basis. The contest grids favored cattle grading USDA Choice or higher and USDA Yield Grade 3 or less. Discounts were imposed for any USDA Select and Standard Quality Grades, USDA Yield Grades 4 and higher, dark cutters, hard bones, and out weights. Among the 10 contest steers, there were no dark cutters, hard bones or cattle hanging carcasses weighing less than 550 lbs. or over 950 lbs.

The grids used for the contest were representative of actual industry grid pricing at the time of each closeout. Cattle were harvested on four dates: March 25, April 19, April 30, and May 20. Notice that the grids changed quite a bit from late March to late May. Discounts for Yield Grade 4's and 5's were $6.36/cwt. and $6.42/cwt. larger, respectively, in May than March. The Choice-Select spread moved from $10.50/cwt. to $20.00/cwt. from March to May as well.

Feedlot average daily gains (ADG) ranged from 2.99 lbs. to 4.11 lbs. for the 10 contest steers. Dressing percentage ranged from 62.3% to 65.4% with the average being 63.8%. Carcass weights ranged from 740 lbs. to 929 lbs and averaged 829 lbs. Calves with higher growth performance in the feedlot also tended to have higher carcass weights. All 10 steers graded Choice or Select. The average Yield Grade for the cattle grading Select was 1.68, while the average Yield Grade for the cattle grading Choice was 2.81. The general trend was for cattle with higher Quality Grades to have higher (less desirable) Yield Grades and vice-versa, but there were some exceptions. STEER #7 graded mid-Choice and had a Yield Grade of 1.97. Yet STEER #7 was ranked 8th for feedlot ADG and hung the lightest carcass of the group. In terms of profitability, STEER #7 ranked just 7th among the 10 contest steers

Only two of the 10 contest steers lost money: STEER #3 and STEER #9. These two steers had the lowest feedlot average daily gains and were among the bottom three steers for carcass weight. STEER #3 and STEER #9 also had the two highest total costs and the two lowest carcass values. Neither steer graded Choice. This shows that cost, carcass weight, and Quality Grade were important factors in determining feeding profitability.

Choosing cattle that will be the most profitable through a finishing phase just by looking and knowing a starting weight is very challenging as evidenced by the wide variety of answers submitted on the 10 contest steers. Did perceived breed composition influence predictions of which calves would be the most profitable? Would it have made a difference if health histories of the calves were part of the initial information? Would knowing a little bit more about the genetic potential of the calves up front have helped in identifying the more desirable calves to feed? The Mississippi Farm to Feedlot program is just one of many opportunities for beef producers to learn more about cattle performance in the feedlot and on the rail.



Although seller risk is increased with grid pricing, its returns should exceed live cattle pricing returns when uniform cattle are matched to appropriate grids. This can be the case even with below average cattle if dressing percentage, Choice/Select spread, and plant averages are favorable. The greatest challenge is that carcass merits and plant averages are unknown until after harvest.

Grid pricing was developed with the goal of improving the overall quality and consistency of beef produced in the U.S. and ultimately to improve demand for the product. This occurs by rewarding improved quality and by creating a more consistent way to report and collect data at the individual animal level. The most important factors affecting carcass value through grid pricing are marbling and the indicators of Yield Grade (back fat, hot carcass weight, ribeye area and internal fat). However, changing these characteristics through genetic selection and management require dedication and forward thinking by all parties in the beef production chain.

Some estimates claim that more than half the finished cattle marketed in the U.S. are valued through a grid pricing structure. These sources also indicate that grid pricing will soon become the dominant marketing channel for fed cattle. More recently, however, data suggests that the adoption of grid pricing has been slower than projected and has not yet taken half of the market share. Regardless of the pace of adoption, grid marketing is sure to become the industry norm at some point. A working knowledge of how management protocols at the stocker and cow-calf levels change eventual carcass value is essential regardless of whether ownership of those cattle is retained through feeding.

The Mississippi State University Extension Service provides weekly cattle market updates including fed cattle and beef price information through Mississippi Cattle Market Notes.

Mississippi Cattle Market Notes

http://msucares.com/livestock/beef/cattlemarket.html

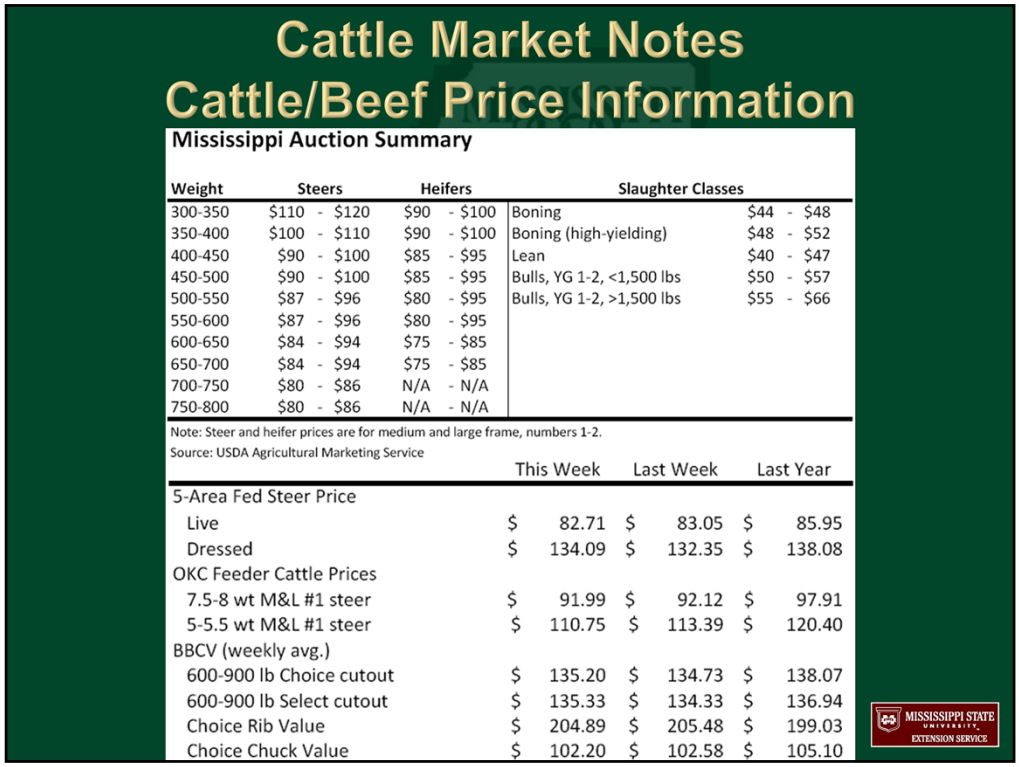
The U.S. Department of Agriculture Agricultural Marketing Service provides daily market information including fed cattle and beef price information in the National Daily Cattle and Beef Summary report.

National Daily Cattle and Beef Summary

http://www.ams.usda.gov/mnreports/lsddcbs.pdf

Mississippi State University Extension Service **beef end product publications** are available online at http://msucares.com/livestock/beef/beefpubs.html. This includes the publications referenced in this training module.

The Mississippi **Beef Quality Assurance** Program **information, training materials, manual, and online training module** are available at http://msucares.com/livestock/beef/bqa.



Cattle Market Notes
Cattle/Beef Price Information

Mississippi Auction Summary

Weight	Steers	Heifers
300-350	$110 - $120	$90 - $100
350-400	$100 - $110	$90 - $100
400-450	$90 - $100	$85 - $95
450-500	$90 - $100	$85 - $95
500-550	$87 - $96	$80 - $95
550-600	$87 - $96	$80 - $95
600-650	$84 - $94	$75 - $85
650-700	$84 - $94	$75 - $85
700-750	$80 - $86	N/A - N/A
750-800	$80 - $86	N/A - N/A

Slaughter Classes	
Boning	$44 - $48
Boning (high-yielding)	$48 - $52
Lean	$40 - $47
Bulls, YG 1-2, <1,500 lbs	$50 - $57
Bulls, YG 1-2, >1,500 lbs	$55 - $66

Note: Steer and heifer prices are for medium and large frame, numbers 1-2.
Source: USDA Agricultural Marketing Service

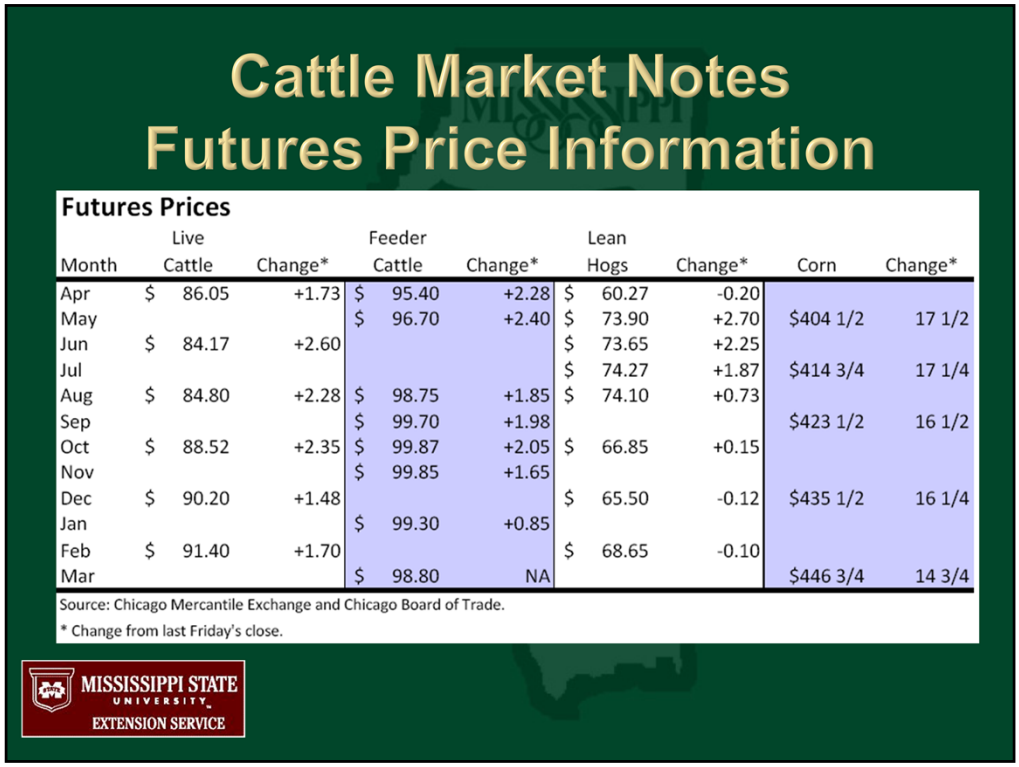
	This Week	Last Week	Last Year
5-Area Fed Steer Price			
Live	$ 82.71	$ 83.05	$ 85.95
Dressed	$ 134.09	$ 132.35	$ 138.08
OKC Feeder Cattle Prices			
7.5-8 wt M&L #1 steer	$ 91.99	$ 92.12	$ 97.91
5-5.5 wt M&L #1 steer	$ 110.75	$ 113.39	$ 120.40
BBCV (weekly avg.)			
600-900 lb Choice cutout	$ 135.20	$ 134.73	$ 138.07
600-900 lb Select cutout	$ 135.33	$ 134.33	$ 136.94
Choice Rib Value	$ 204.89	$ 205.48	$ 199.03
Choice Chuck Value	$ 102.20	$ 102.58	$ 105.10

MISSISSIPPI STATE UNIVERSITY EXTENSION SERVICE

The Mississippi State University Extension Service provides weekly cattle market updates including fed cattle and beef price information through Mississippi Cattle Market Notes.

Mississippi Cattle Market Notes

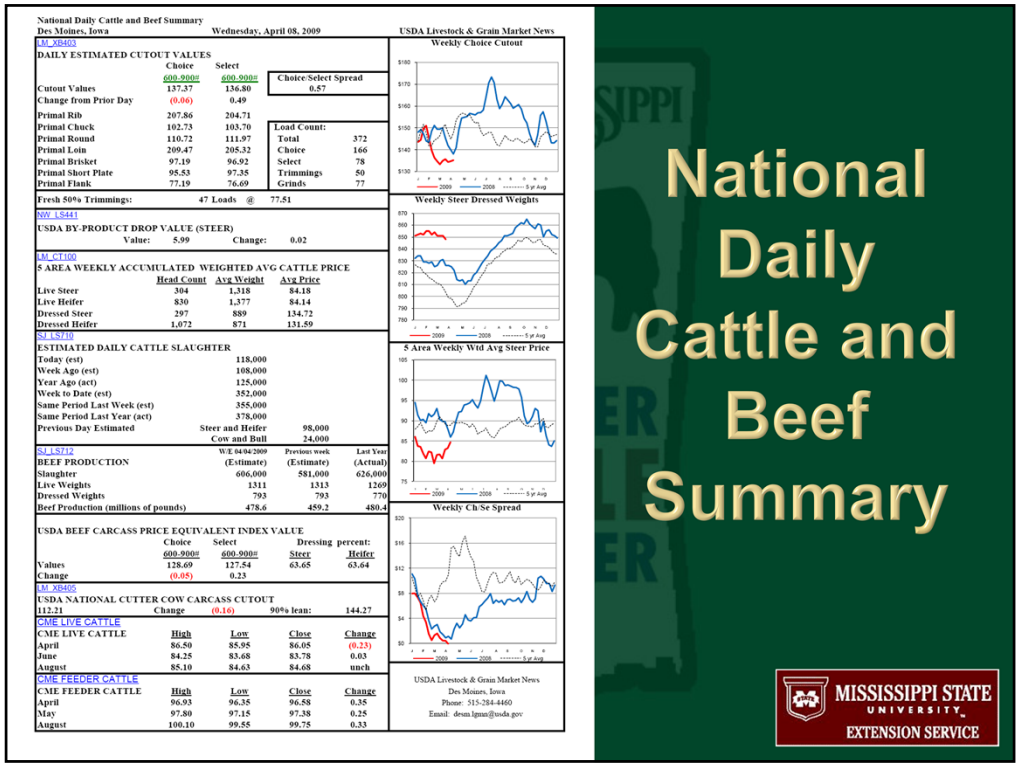
http://msucares.com/livestock/beef/cattlemarket.html



The Mississippi State University Extension Service provides weekly cattle market updates including cattle, hog, and corn futures price information through Mississippi Cattle Market Notes.

Mississippi Cattle Market Notes

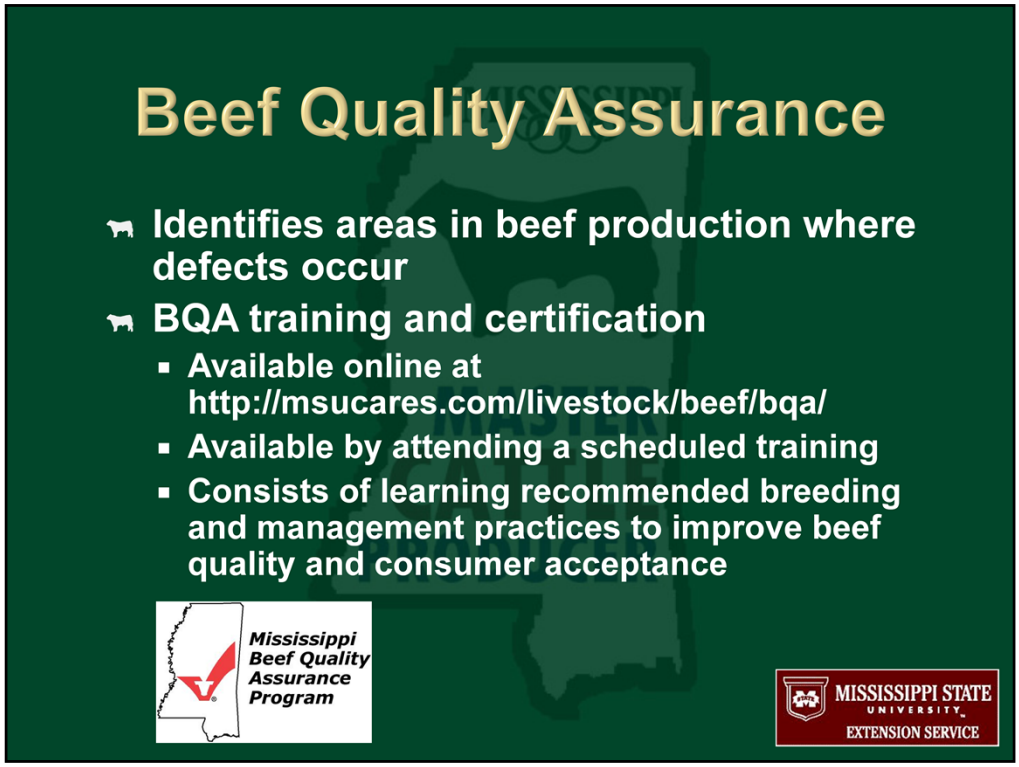
http://msucares.com/livestock/beef/cattlemarket.html



The U.S. Department of Agriculture Agricultural Marketing Service provides daily market information including fed cattle and beef price information in the National Daily Cattle and Beef Summary report.

National Daily Cattle and Beef Summary

http://www.ams.usda.gov/mnreports/lsddcbs.pdf



The Mississippi Beef Quality Assurance (MS-BQA) Program identifies areas in beef production where defects in quality occur. The MS-BQA Program is a cooperative effort between beef producers, veterinarians, nutritionists, and professionals from the Mississippi Cattlemen's Association, Mississippi Farm Bureau Federation, MSU Extension Service, and MSU College of Veterinary Medicine, who believe that cattle managed under BQA guidelines will be less likely to contain a violative residue, injection-site tissue damage, or foreign metal such as a broken needle. The program asks everyone involved with beef production to follow the FDA/USDA/EPA guidelines for product use and to use common sense, reasonable management skills, and accepted scientific knowledge to avoid beef product defects at the consumer level. Consumers purchase what they trust, and their confidence is the basis of the beef industry's future.

Beef Quality Assurance producer certification is a required component of the Mississippi Master Cattle Producer training. It can be accomplished by attending a MS-BQA training and by completing test questions and the personal contract. This can be accomplished through the online training modules or by making an appointment to meet with your Extension county director or veterinarian to complete the process.