



➤ **PATHWAY** *to a Successful Future*



2022 EXECUTIVE SUMMARY



Dear Fellow Beef Industry Members,

One thing that has become abundantly clear in the past few years is that the beef industry is both strong and resilient. This is due to the hard work that we all put into continual improvement in the processes of raising beef. The 2022 National Beef Quality Audit (NBQA) continued our 30-year legacy of measuring progress and evaluating opportunities to enhance consumer confidence in beef. The results of this audit again give us valuable science-based information to help guide our path forward.

The data from this audit clearly show that progress has been made in areas such as efficiency, the quality of beef produced, a lower incidence of carcass lesions, and a better focus on food safety. The data also show that there are areas for improvement, such as minimizing bruising, better mobility scores in fed cattle, and eliminating any foreign objects found in beef. The results also revealed the need for a continued focus on disease traceability and systems to improve animal health and well-being.

A key strategy, which is consistent with the Beef Industry Long Range Plan, is to encourage more Beef Quality Assurance (BQA) certifications and awareness. BQA, which is a voluntary education effort, is a producer-owned program that uses information like that collected in the 2022 NBQA to improve consumer confidence in and acceptance of beef. It has worked in the past and it will continue to be a catalyst for improvement in our industry.

Now, more than ever, BQA is being leveraged in our industry to show consumers that we are working to make continual strides in beef quality while focusing on how animals are raised and cared for. Let's get on board with these efforts to help assure that beef remains the choice protein for our consumers. This is the right time to make sure you have a current BQA certification.

The hard work that is put into the NBQA is much appreciated. This information is critical to helping us along the path of continual improvement. We have a bright future to look forward to!



Trey Patterson, PhD
Chair, Beef Quality Assurance Advisory Group

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INTRODUCTION

Since 1991, the Beef Checkoff-funded National Beef Quality Audit (NBQA) has delivered a set of guideposts and measurements for cattle producers and other stakeholders to help determine quality conformance of the U.S. beef supply.

GLOSSARY OF TERMS

Dark Cutter: A carcass subjected to undue stress before slaughter. The beef appears darker and less fresh, making it undesirable to consumers.

Dressing Percentage: Based on the relationship between the dressed carcass weight and the live animal weight after hide and internal organs have been removed. Dressing percentage = (weight of the carcass/ weight of live animal) x 100.

Fat Thickness: Refers to the thickness of subcutaneous fat; used to determine yield grade.

Hot Carcass Weight (HCW): The un-chilled weight of the carcass after slaughter and the removal of the head, hide, intestinal tract and internal organs. It is used to determine Yield Grade and dressing percentage.

KPH: The internal fat surrounding the heart, kidneys and in the pelvic area; used to determine Yield Grade.

LM/Ribeye Area: The longissimus muscle is exposed when a beef carcass is ribbed between the 12th and 13th rib; used to determine Yield Grade.

Marbling Score: Intermingling or dispersion of fat within the lean. Degree of marbling is the primary determination of the Quality Grade.

Quality Grade: Composite evaluation of factors that affect palatability of meat, such as tenderness, juiciness and flavor. Beef carcass quality grading is based on degree of marbling and maturity. Quality Grades include Prime, Choice, Select and Standard/Commercial.

Yield Grade: Estimates the amount of boneless, closely trimmed retail cuts from the high-value parts of the carcass (round, loin, rib, chuck). Rated numerically from 1 to 5, Yield Grade 1 denotes the highest yielding carcass and 5 the lowest.

Early NBQAs focused on the physical attributes of beef and beef by-products such as marbling, external fat, carcass weight and carcass blemishes. These cattle industry concerns have evolved to include food safety, sustainability, animal well-being and the growing disconnect between producers and consumers. As a result, over the past 30 years, NBQA researchers have made significant changes to the research, leading to an increasingly meaningful set of results.

With supply chain disruptions and a backlog of cattle due to the COVID-19 pandemic, the data from the 2022 National Beef Quality Audit was collected under extraordinary circumstances and stands apart from previous (and future) audits. Weather impacts, such as drought across most of the country, also impacted 2022 NBQA results. It is important to note that data was collected at a specific point in time and results provide a representation of what was occurring in the industry at that time.

The NBQA provides an understanding of what quality means to the various industry sectors, and the value of those quality attributes. This research helps the industry make modifications necessary to increase the value of its products. The efforts of the findings from the 2022 NBQA serve to improve quality, minimize economic loss, and aid in advancements in producer education for the U.S. beef industry.

The 2022 NBQA provides valuable information about the production of live cattle into beef carcasses and serves as a benchmark for the beef industry. This document provides a summary of results as well as industry implications for both fed cattle and market cows and bulls.

Table 1

INDUSTRY PRIORITIES, RANKED BY IMPORTANCE, 1991 VS. 2022

1991	2022
External Fat	Food Safety
Seam Fat	Cattle Genetics
Overall Palatability	Eating Satisfaction
Tenderness	Weight and Size
Overall Cutability	Visual Characteristics
Marbling	Lean, Fat and Bone

Beef farmers and ranchers are dedicated to producing beef in a way that prioritizes the planet, people, animals, and progress. Sustainability continues to be an area of focus for the beef supply chain with many end users establishing beef sustainability goals.

SUSTAINABILITY



WHAT IS SUSTAINABILITY?

A sustainable food system is comprised of three different, but intersecting, pillars: social responsibility, economic viability and environmental stewardship. True sustainability is a balance of these three aspects.

Investigating the importance of sustainability to the beef industry was incorporated into the 2022 NBQA to create an initial benchmark of where market segments are in terms of understanding and implementing sustainability initiatives.

The top two definitions of sustainability across market sectors interviewed were “environmentally friendly practices” and “using practices to keep current and future generations in business.” The majority of companies interviewed also indicated that they had sustainability goals, primarily related to environmental goals, with more than half claiming goals encompassing the entire supply chain.

DISEASE TRACEABILITY

Interviewees noted that increased traceability could improve the beef industry’s ability to combat animal diseases and potentially increase export opportunities. Concerns of animal disease and continued international trade success were top of mind for many individuals in the Government/

Trade Organization (GTO) portion of the survey. Many GTO respondents were concerned with the lack of traceability in the U.S. beef supply chain, citing that if a disease like Foot and Mouth were to come to the U.S., it would be catastrophic.

TRANSPORTATION

Transportation, especially time and distance traveled, continues to be a focus area for the National Beef Quality Audit.

According to the Federal “Twenty-Eight Hour Law” enforced by USDA, cattle can only be on the trailer for 28 hours without feed, water or space to rest and must be provided five hours of rest time after 28 hours of confinement.

The average time traveled for fed cattle was 2.9 hours for 152.4 miles, and the maximum was 23 hours for 1,320 miles. The average area allotted per head was 12.5 square feet.

Table 2

TRANSPORTATION FACTORS FOR FED CATTLE

Transportation Characteristic	n	Mean	Min	Max
Time traveled (h)	203	2.9	0.10	23.0
Distance traveled (mi)	198	152.4	2.0	1,320.0
Number of cattle in load	215	36.0	8.0	47.0
Number of compartments used	216	3.7	2.0	6.0
Trailer dimensions (ft ²)	187	444.5	100.0	715.5
Area allotted per head (ft ²)	186	12.5	6.3	32.0

For all trailer types surveyed, approximately 10% of cattle trucks sampled within a day’s production at each plant.

Table 3

TRANSPORTATION FACTORS FOR MARKET COWS AND BULLS

Transportation Characteristic	n	Mean	Min	Max
Time traveled (h)	114	6.3	0.10	24.0
Distance traveled (mi)	112	304.8	2.0	1,099.8
Number of cattle in load	123	27.2	1.0	49.0
Number of compartments used	119	4.0	1.0	8.0
Trailer dimensions (ft ²)	102	380.0	3.2	451.0
Area allotted per head (ft ²)	102	25.5	8.7	221.0

The average time traveled for market cows and bulls was 6.3 hours for 304.8 miles, and the maximum was 24 hours for 1,099.8 miles. The average area allotted per head was 25.5 square feet.

For all trailer types surveyed, approximately 10% of cattle trucks sampled within a day’s production at each plant.

THE RESEARCH PROCESS

The 2022 National Beef Quality Audit was comprised of three major components including individual interviews, in-plant research and a strategy session.

INDIVIDUAL INTERVIEWS

Individual interviews with representatives of the different market sectors (packers, retailers, foodservice operators, further processors and government/trade organizations) were conducted between July 2021 and November 2022 to help determine how seven different quality categories (how and where cattle are raised, lean fat and bone, weight and size, visual characteristics, food safety, eating satisfaction, cattle genetics) are defined, and also establish the relative importance and “must-have” requirements and “willingness to pay” quantification for those qualities.

IN-PLANT RESEARCH

Fed Cattle

- » To assess the current quality and consistency status of U.S. fed steers and heifers, researchers evaluated nearly 8,000 live cattle for attributes related to transportation, and approximately 23,000 carcasses on the harvest floor for characteristics that can affect quality and value of cattle, carcasses and by-products. This research was conducted at 22 U.S. beef processing facilities from September 2021 through November 2022.

Market Cows and Bulls

- » Market cow and bull research was designed to benchmark shortfalls and gauge industry progress towards improvements in this segment of the industry. Conducted from September 2021 through May 2022, trailers, live animals, hide-on carcasses, hide-off hot carcasses, offal items and chilled carcasses were surveyed in 20 commercial packing facilities throughout the United States.

STRATEGY SESSION

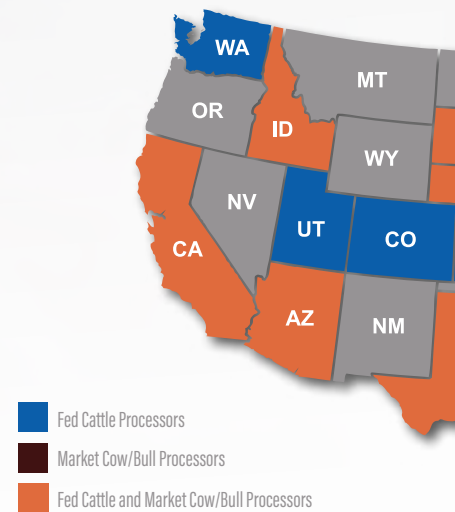
Individuals representing every sector of the beef industry met in Denver, Colorado, December 13-14, 2022, to review the results of the individual interviews and in-plant research and discuss implications for the U.S. beef industry. Outcomes from that meeting provide quality guidance to the industry for the next five years, providing “how” answers for developing a pathway to a successful future.



“Unsafe product means bad business; we want to make a good product that people love.”

—Further Processor

Figure
PLANT SURVEYED
CATTLE AND MARKET C



FED CATTLE OVERVIEW

According to audit interviews, since 2016 the industry has increased efficiency.

However, animal and carcass data show that larger cattle resulted in increased bruising frequency and hot carcass weight while mobility scores decreased. Ultimately, interviews suggest the industry is producing a high-quality product that consumers want more efficiently than five years ago.

Transportation, mobility and harvest floor assessments evaluated various characteristics that determine quality and value, including the number of blemishes, condemnations and other attributes that

may impact animal value. Transportation and mobility observations were recorded on roughly 10% of all trailers arriving at each beef harvest facility, and approximately 23,200 carcasses were evaluated on the harvest floor.

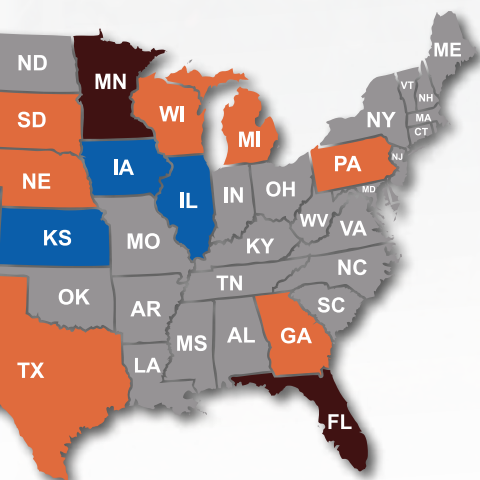
In-plant research captured data on quality and yield grade attributes and carcass defects and compared it with that of the previous surveys to assess progress in improving quality. It also provides a benchmark for future beef industry educational and research efforts.

2022 NBQA KEY FINDINGS FOR FED CATTLE

- » Market segments no longer consider food safety as a purchasing criterion, but an expectation.
- » Participation in branded beef programs has increased since previous NBQAs, showing the industry is meeting consumer demands for differentiated beef products.
- » When comparing 2016 and 2022 NBQAs, the largest improvement was overall increased efficiency across the beef supply chain.
- » Genetics, namely hide color, are attributed to high quality beef that consumers are demanding, and the industry is providing.
- » Market sectors indicated that their companies strive to increase their sustainability, and work with the entire beef supply chain to do so.
- » The entire industry felt the effects of the COVID-19 pandemic, nonetheless, beef proved to be a choice of consumers, and the industry persevered to provide products.
- » Due to pandemic pressures, more cattle over 30 months of age were harvested.
- » The beef industry's image improved within fed cattle market sectors.
- » Foreign objects continue to present a problem, but the industry is making strides to decrease incidence.
- » Nearly 93% of transportation service providers interviewed were familiar with the Beef Quality Assurance Transportation (BQAT) program and 91% are BQAT certified.
- » There was an increase in usage of electronic identification (EID).

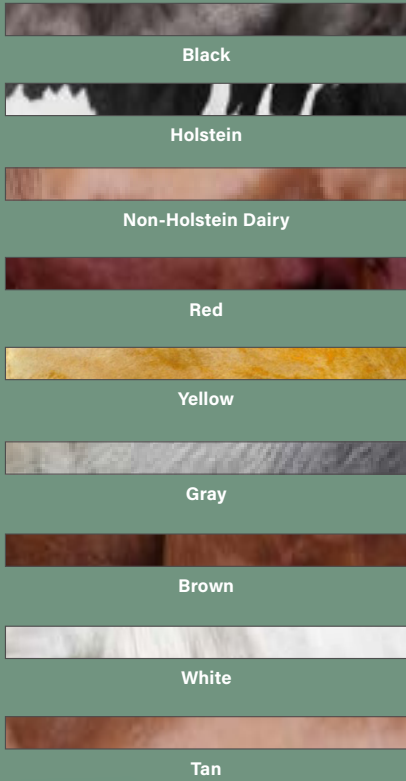
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LOCATIONS FOR FED COWS AND BULLS & BULLS



2022 NBQA KEY FINDINGS FOR FED CATTLE (CONTINUED)

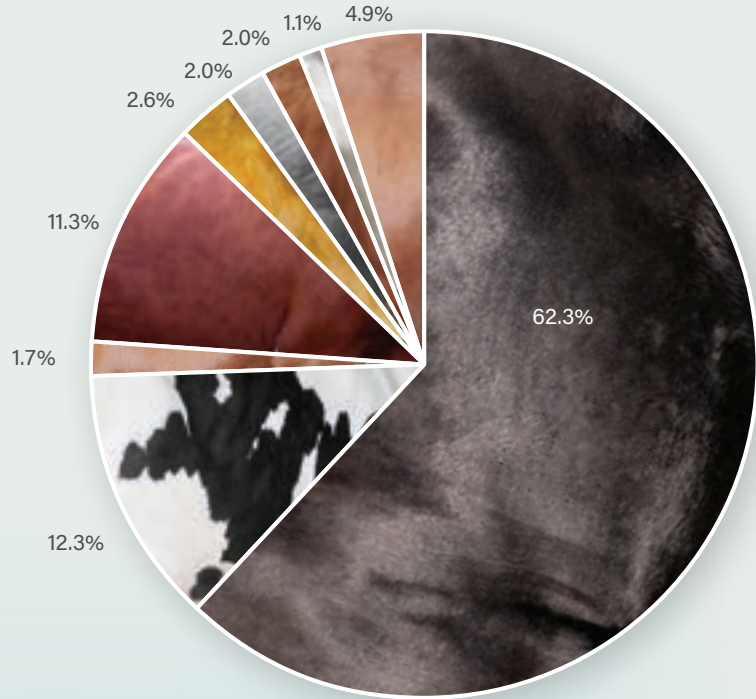
HIDE COLOR/BREED TYPE:



Black-hided cattle increased to 62% versus 58% in 2016 and 45% in 2000. Holstein hide color decreased from 20% in 2016 to 12.3% in 2022; confirming the industry trend of beef sires being used on dairy cattle.

Figure 2

HIDE-ON CARCASSES WITH PROMINENT HIDE COLOR OR BREED TYPE (%)



While the industry is improving the quality of beef being produced, that quality is being accompanied by an increase in carcass weight and fat thickness, as well as large increases in percentages of Yield Grade 4 and 5 carcasses.

Figure 3

CARCASS WEIGHT DISTRIBUTION (%)

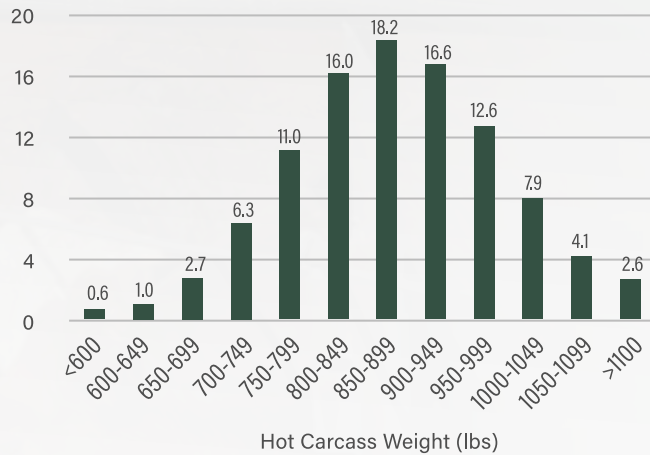


Figure 4

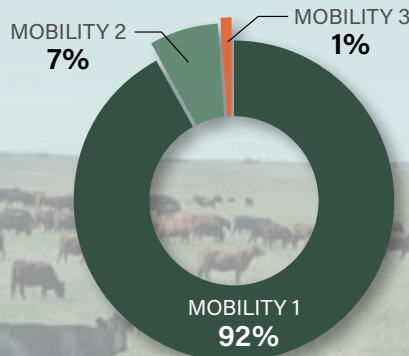
MOBILITY SCORE OF FED CATTLE ENTERING PACKING PLANTS

Mobility Score 1 - Normal, walks easily with no apparent lameness or change in gait.

Mobility Score 2 - Exhibits minor stiffness, shortness of stride or a slight limp but keeps up with normal cattle in the group.

Mobility Score 3 - Exhibits obvious stiffness, difficulty taking steps, an obvious limp or obvious discomfort and lags behind normal cattle walking as a group.

Mobility Score 4 - Extremely reluctant to move even when encouraged by a handler. Described as statue-like.

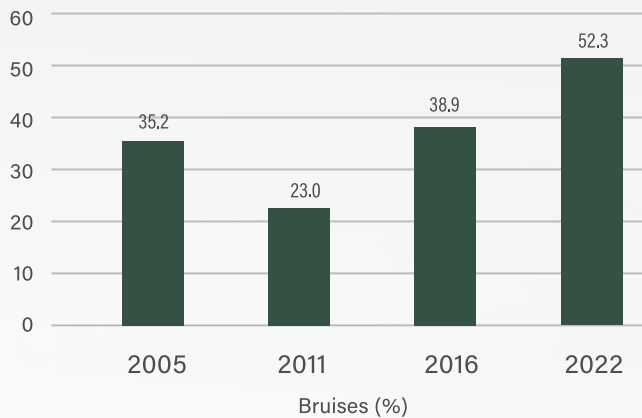


Nearly 92% of cattle received a mobility score of 1, with the animal walking easily and normally, with no apparent lameness.

This was a decrease from 97% in 2016 and is attributed to larger cattle and longer time spent during transport.

Figure 5

CARCASSES WITH BRUISES (%)



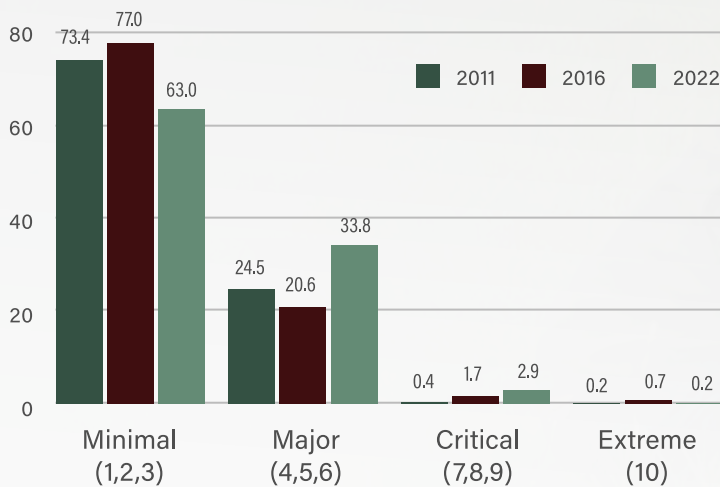
The 2022 NBQA displayed the highest frequency of carcass bruising (52.3%) recorded since audits began.

BRUISE SIZE KEY

Minimal (<1lb-surface)	1 = a quarter size	2 = a silver dollar size	3 = a deck of cards size
Major (1-10 lbs)	4 = 1-3 lbs	5 = 4-7 lbs	6 = 8-10 lbs
Critical (>10 lbs)	7 = 11-20 lbs	8 = 21-30 lbs	9 = 31-40 lbs
Extreme	10 = Entire Primal		

Figure 6

BRUISE SEVERITY (% OF BRUISES OBSERVED)



POSITIVE CHANGES

"A lot of people out there [are] for the fake meat, but the pandemic showed people wanted beef."
 —Packer

There were several notable results in the 2022 NBQA, including a reduction in horn presence and an increase in use of electronic identification.

HORN PRESENCE DECREASES

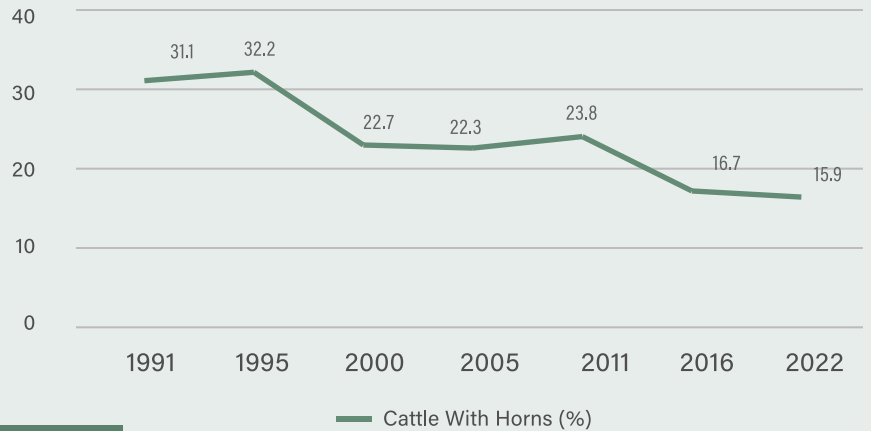
Cattle with horns can potentially cause injury or muscle bruising to other animals, damage to hides and can pose risks to humans.

Horn presence has steadily decreased since audits started in 1991. Cattle evaluated for the 2022 NBQA displayed the lowest percentage of horns thus far (15.9%).

As producers get further away from breeds that have horns, and management practices (dehorning) become more efficient, the number of cattle free of horns should continue to improve.

Figure 7

PRESENCE OF HORNS (%)



ELECTRONIC IDENTIFICATION

BQA promotes total quality management to producers, encouraging management steps that improve day-to-day activities through all aspects of the animal's life, including nutrition, herd health, well-being, biosecurity, and other aspects. These seemingly small changes, like improved animal identification and record keeping, can positively affect the entire operation and its end products. The increase in individual animal identification, including electronic identification, within the cattle industry contributes to several important aspects of the BQA program.

Figure 8

CATTLE BRANDS AND LOCATION (%)

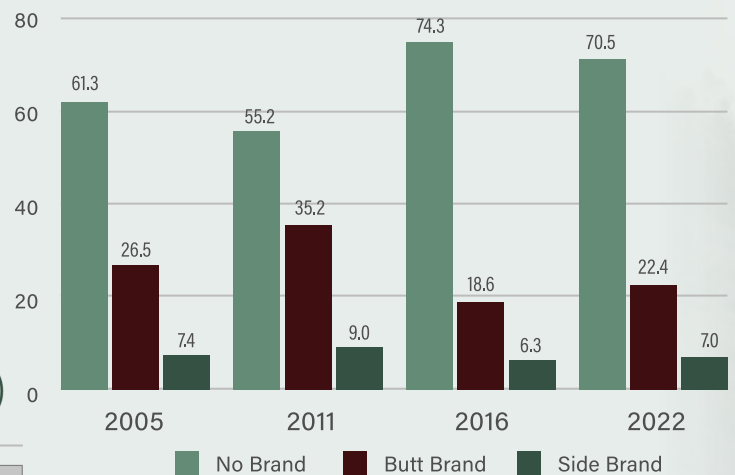
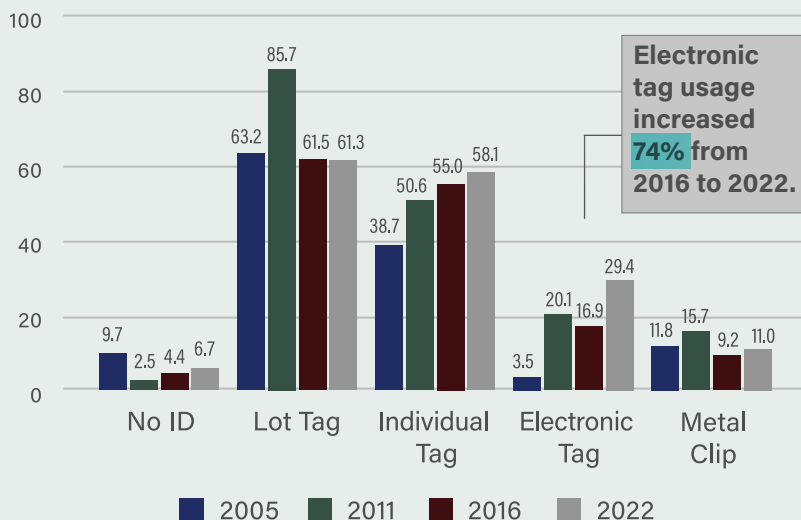


Figure 9

PRESENCE AND TYPES OF CATTLE IDENTIFICATION (%)



Improved record keeping at the animal level can better track genetic contribution and performance throughout the life of that calf, leading to better decision making at the cow-calf level and potential marketing benefits. As processing, treatment, and other herd health records expand at all levels of cattle production, this contributes to a continuous commitment to animal welfare, antimicrobial stewardship, and food safety, which are integral to the beef industry and its customers.

Table 4

USDA CARCASS GRADE TRAITS

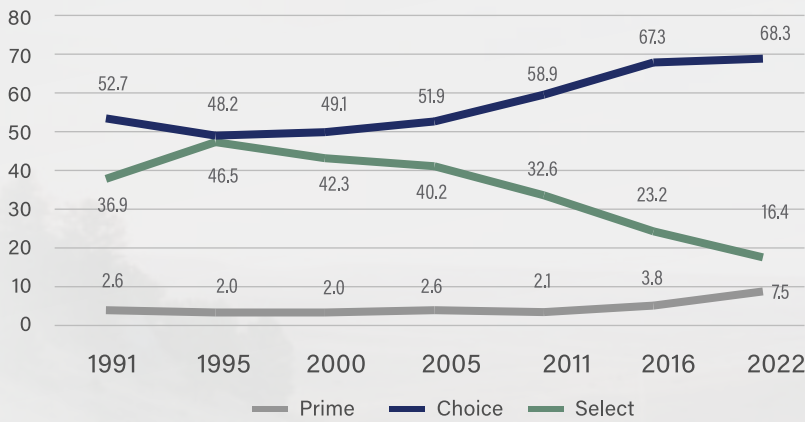
Trait	1991 n=7,375	1995 n=11,799	2000 n=9,396	2005 n=9,475	2011 n=9,802	2016 n=9,106	2022 n=9,746
USDA Yield Grade	3.2	2.8	3.0	2.9	2.9	3.1	3.3
USDA Quality Grade ¹	686	679	685	690	693	696	716
Adjusted Fat Thickness (in)	0.59	0.47	0.47	0.51	0.51	0.56	0.59
HCW (lbs)	760.6	747.8	768.8	793.4	824.5	860.5	886
Ribeye Area (in ²)	12.9	12.8	13.1	13.4	13.8	13.9	14.1
Marbling Score ²	424	406	423	432	440	470	498

¹600 = Select⁰⁰, 700=Choice⁰⁰, 800 = Prime⁰⁰

²400 = Small, 500 = Modest⁰⁰, 700 = Slightly Abundant⁰⁰, and 900 = Abundant⁰⁰ (USDA, 2017)

Figure 10

CHANGES IN QUALITY GRADE OVER TIME (%)



There was an increase in the frequency of Prime and Choice quality grades, while Select decreased drastically.

"Positive is new customers have tried new beef items for the first time. Secondly, COVID has forced our hands to do things we should have done 10 years ago. Like move into retail and c-stores more aggressively."

—Foodservice

AREAS FOR FOCUSED IMPROVEMENT

While there is evidence of improvements in the fed cattle segment, there is also room for advancement, especially in the following areas:

EATING QUALITY AND CONSISTENCY

- » There was an increase in the number of Yield Grade 4 and 5 cattle, and improved genetics could maintain the ideal of Yield Grade 3 or better, while maintaining marbling necessary to achieve desired quality grades.
- » Utilize advancements in genetic selection technologies to breed for carcasses with increased eating satisfaction, uniformity, and desirable end-product specifications.

FOOD SAFETY AND ANIMAL HEALTH & WELL-BEING

- » Although the percentage of producers using technology for recordkeeping and data collection has increased, there is a concern among the beef supply chain that animal disease could impact the industry and current traceability efforts do not provide a robust enough system in the U.S. to combat this potential threat.
- » Improve uptake of preventive health strategies and good cattle husbandry techniques to ensure future effectiveness of antimicrobials.
- » Carcasses were discounted for liver abscesses, causing product loss and decreased profitability.
- » Continue efforts to increase BQA certifications and awareness.
- » Heat stress and other environmental factors caused increased bruising, dark cutters and heart issues as well as decreased mobility.
- » Increased bruising frequency should be addressed through facility and trailer design as well cattle handler training.

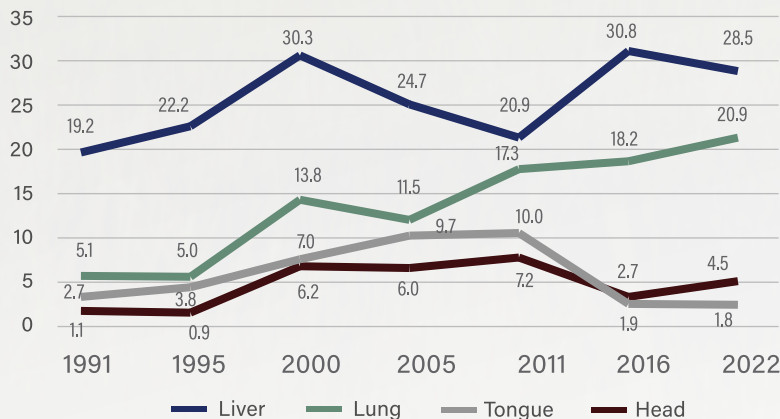


"The better it looks the better it sells."

—Retailer

Figure 11

PERCENT OF OFFAL CONDEMNATIONS BY TYPE (%)



Lost opportunities are calculated for each audit to give perspective to the value of industry losses for not producing cattle that meet industry targets.

LOST OPPORTUNITES



During the strategy workshop, participants set a target consensus for Quality Grade, Yield Grade and carcass weight.

This target consensus, presented in Table 5, identifies projections for the industry to meet by the next audit. These goals, with the actual prevalence of each from the audit and summary prices for 2022, as reported by USDA, are used to calculate values in Table 6. The total lost opportunities for previous audits are adjusted to 2022 prices to give an accurate comparison between years.

Since 2016, improvements have been made in capturing more value of each carcass, however, larger cattle have led to lost opportunities in Yield Grade. While value is being lost in Yield Grade, the industry is meeting market signals for larger cattle.

The 2022 NBQA exceeded industry goals for Quality Grades set during the 2016 audit, which led to increasing the Prime and Choice targets for the next audit. The 2016 consensus Quality Grade target was 5% Prime, with the 2022 NBQA finding that 7.5% of carcasses were grading Prime. The new target consensus is 10% Prime by the next audit.

Since lost opportunities are calculated based on 2022 dollars, coupled with the 10% Prime goal, we are giving up more money in Quality Grade at this time when compared to 2016. However, the industry has made outstanding strides and sees the improvement in higher quality cattle as a success.

When comparing lost opportunities of hide/branding and offal to the 2016 NBQA, hide pricing impacted value and contamination during the fabrication process increased offal condemnations. These factors impacted 2022 lost opportunities in these categories, which the industry will continue to monitor and make improvements as necessary.

Table 5

TARGET CONSENSUS FOR QUALITY GRADE, YIELD GRADE AND CARCASS WEIGHT

QUALITY GRADE:		YIELD GRADE:		CARCASS WEIGHT:	
Grade	Target	Grade	Target	Range	Target
Prime	10%	1	10%	<700 lb.	0%
Upper 2/3 Choice	40%	2	35%	700-800 lb.	20%
Low Choice	35%	3	45%	801-1000 lb.	65%
Select	15%	4	10%	1001-1100 lb.	15%
Standard/Ungraded	0%	5	0%	>1100 lb.	0%

Table 6

LOST OPPORTUNITIES IN QUALITY ISSUES (USING 2022 PRICES)

Trait	2022	2016	2011	2005	2000	1995	1991
Quality Grade	-\$27.17	-\$17.26	-\$36.64	-\$36.27	-\$40.80	-\$44.47	-\$45.77
Yield Grade	-\$18.21	-\$13.38	-\$5.80	-\$15.33	-\$15.13	-\$9.99	-\$21.76
Carcass Weight	-\$2.97	-\$6.94	-\$6.12	-\$4.07	-\$3.76	-\$7.24	-\$5.59
Hide/Branding	-\$4.16	-\$3.05	-\$5.53	-\$4.85	-\$6.32	-\$6.58	-\$5.71
Offal	-\$6.33	-\$6.52	-\$8.66	-\$8.77	-\$8.45	-\$4.87	-\$3.17
TOTAL:	-\$58.84	-\$47.15	-\$62.75	-\$69.29	-\$74.46	-\$73.15	-\$82.00



MARKET COWS AND BULLS OVERVIEW

Cows and bulls are the foundation of cattle herds.

They are also sources of beef that are significant and worth understanding.

The beef industry conducted its first Market Cow and Bull Audit in 1994 to complement the National Beef Quality Audit for Fed Cattle. That initial Market Cow and Bull Audit found that carcasses had excessive bruising and were often condemned, too many market cows and bulls were disabled prior to harvest, cows and bulls frequently had inadequate

muscling, and animals were often not marketed in a timely manner. Since then, the industry has made significant improvements in herd management techniques; animal well-being and handling; injection-site location; and mobility. The 2022 research assessed progress in managing these issues and suggested improvements for increasing the value and marketability of cows and bulls.

POSITIVE CHANGES



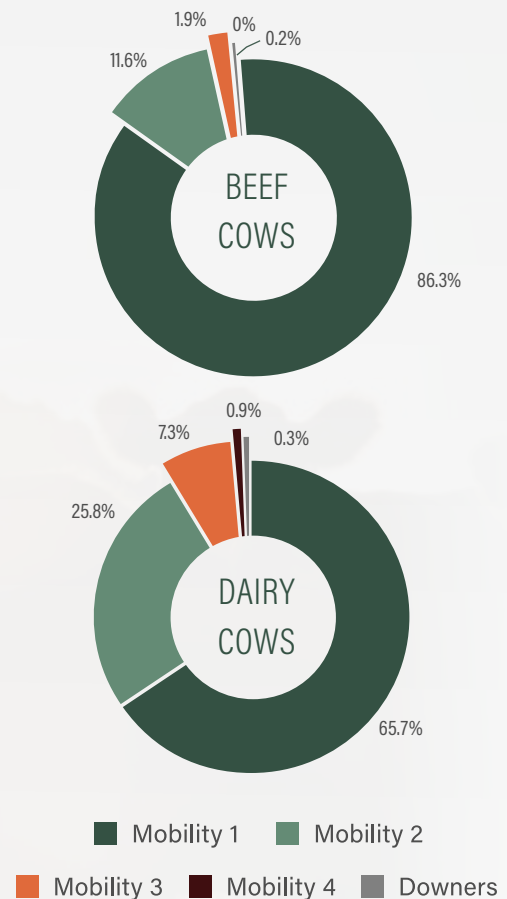
Results from the 2022 National Beef Quality Audit for Market Cows and Bulls show that there have been improvements made in the quality of market cows and bulls since the first non-fed beef audit in 1994. The following areas have seen improvements since the last audit:

2022 NBQA KEY FINDINGS FOR MARKET COWS AND BULLS

- » Food safety is non-negotiable and an expectation for those who purchase beef.
- » Market cows and bulls have the potential to yield valuable retail cuts, beyond ground beef.
 - Reducing defects allows the market cow and bull sector to capture additional value.
- » Appropriate management of market cows and bulls can increase muscle condition before harvest.
- » Animals should be culled before physical defects are severe, and there should be more timeliness in the marketing of animals at both ranch and dairy.
- » Although the percentage of producers using technology for recordkeeping and data collection has increased, there is a concern among the beef supply chain that animal disease could impact the industry and current traceability efforts do not provide a robust enough system in the U.S. to combat this potential threat.
- » Producer education on the use of projectiles when handling cattle could help to reduce food safety concerns due to foreign objects and further improve animal well-being.
- » Animal well-being has improved through a focus on better animal handling at all levels.
- » Education in the Dairy FARM and Beef Quality Assurance programs can propel the momentum of the market cow and bull industry.
- » The Beef Quality Assurance Transportation program can improve communication about animals that are not fit for transport.
- » Full udders are considered a defect and a contaminant if milk gets onto the carcass at the processing facility causing food safety issues, and they impact the animal's well-being.

Figure 12

MOBILITY SCORE OF MARKET COWS (BEEF AND DAIRY) ENTERING PACKING PLANTS



MOBILITY AND DEFECTS

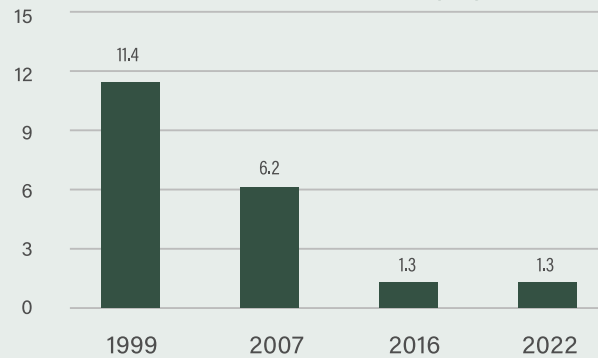
Of market cows and bulls entering the packing facility, 77% were sound with a mobility score of 1. There was a higher incidence of cattle with a mobility score of 2, compared to downers and scores of 3 and 4, displayed in the current audit. Approximately 45.1% of all cattle surveyed had no visible defects and 37.9% of cattle with defects only displayed a single defect. This demonstrates that producers are making an effort to market cows and bulls before mobility issues and health-related defects progress further, however, there is still room for improvement.

A very large majority of cattle and carcasses surveyed had no instances of knots (98.2%) or injection site lesions (97.1%) visible on the exterior carcass surface, indicating great strides in producer education on the proper administration of injections.

There was a high frequency of native hides (88.3%), and of branded hides, the majority of brands were located in the rump or hip area to preserve hide quality as recommended by the Beef Quality Assurance National Manual.

Arthritic joints can impact animal welfare and can cause significant contamination in the plant. Similar to injection site

Figure 13
PERCENT OF ALL MARKET COWS AND BULLS SURVEYED WITH ARTHRITIC JOINTS (%)



lesions, dramatic improvement was made related to arthritic joints. Of all market cows and bulls surveyed, only 1.3% demonstrated arthritic joints, a decrease from 11.4% in 1999.

IMAGE

The market cow and bull sector is viewed more favorably by the beef supply chain than in the past because it provides an alternative product and a secondary value to animals once their original purpose is no longer suitable. When it comes to product fabrication, market cows and

bulls are typically associated with ground beef production. Over time, the industry has realized that some market cows and bulls have the potential to yield valuable primals to be fabricated and sold as retail cuts and to the restaurant trade.

TRANSPORTATION

Since 2016, there has been an increase in the amount of trailer loads that allotted sufficient space as outlined in the Animal Handling Guidelines. In addition, there were no cattle in the current survey that were hauled longer than 24 hours. Of truck drivers surveyed, 63.6% reported to be BQA certified. This was a new area of

research for the 2022 NBQA, added to gather data since the launch of BQA Transportation certification options in 2017. Increased trucker training provides confidence that animals coming to harvest are being handled properly, thus reducing the risks of bruising, downers, stress and negative public perception.

AREAS FOR FOCUSED IMPROVEMENT

BODY CONDITION SCORE

The current audit displayed the highest percentage of cattle that were too light muscled across all audits for the past 27 years, and there was an increase in the percentage of cattle categorized as too thin, according to body condition scores.

Producers should consider market cows and bulls and their eligibility for feeding prior to harvest to increase their muscling and finish, thus returning more revenue.

DEFECTS

Full udders are considered a defect at the plant, and of all the defects in cows identified in this year's audit, 47.5% were due to full udders. When full udders are removed, milk can potentially empty in the plant and contaminate product causing food safety issues. Full udders can also cause mobility issues, impacting the animal's well-being. In addition, 25.4% of the cows surveyed carried a fetus. Cows should be checked for pregnancy prior to harvest or culled prior to breeding.

Instances of liver condemnations remained stable since the last audit, with 45% condemned in 2022 compared to 44.6% in 2016. Abscesses continue to

be the leading cause of liver condemnations. In addition to condemnations, liver abscesses that have progressed far enough have the potential to adhere to the body wall of the animal, resulting in trim loss. If producers elect to feed cattle high concentrate diets prior to harvest for improvements in fat deposition and color as well as muscle, caution should be taken to ensure liver abscesses are not being caused as a result.

FOREIGN OBJECTS

All plants reported finding foreign objects during the harvest and fabrication of market cows and bulls, and a majority of surveyed plants (53.3%) reported instances of customers finding foreign objects in their products. While plants have installed metal detectors and x-rays to help prevent adulterated product from reaching the consumer, foreign objects remain a problem throughout the beef supply chain.

BRUISING

Today, 68.6% of all trailers with mixed-gender loads surveyed did not separate cows from bulls, leading to an increased risk of bruising and injury. Bruise damage is still a leading cause of trimming and finding ways to eliminate bruising should be a priority for the industry. Fewer instances of bruising allow for less trim loss and therefore increase the value of market cow and bull carcasses.

Table 7

PERCENTAGE OF PLANTS THAT REPORTED FOREIGN OBJECTS FOUND IN BEEF FROM MARKET COWS AND BULLS

Objects Found	Percentage (%)
Buckshot/Birdshot	100.0
Bullets	18.8
Needles	18.8
Wire	18.8
Darts	18.8
Other	12.5

50% of plants reported customer complaints.

Detection Systems: X-Ray: 87.5%
Metal Detectors 75.0%

A continued emphasis on producer, transporter, and packer education through extension, the BQA program, and other avenues for research should be focused on the appropriate management, handling, and marketing of market cows and bulls to increase their overall value and enhance animal well-being.

"Top priority that animals are treated with respect and dignity."

—Packer

Bruise damage is still a leading cause of trimming and finding ways to eliminate bruising should be a priority for the industry.

Fewer instances of bruising allow for less trim loss and therefore increase the value of market cow and bull carcasses.

Figure 14

PRESENCE AND SEVERITY OF BRUISING IN MARKET COWS (%)

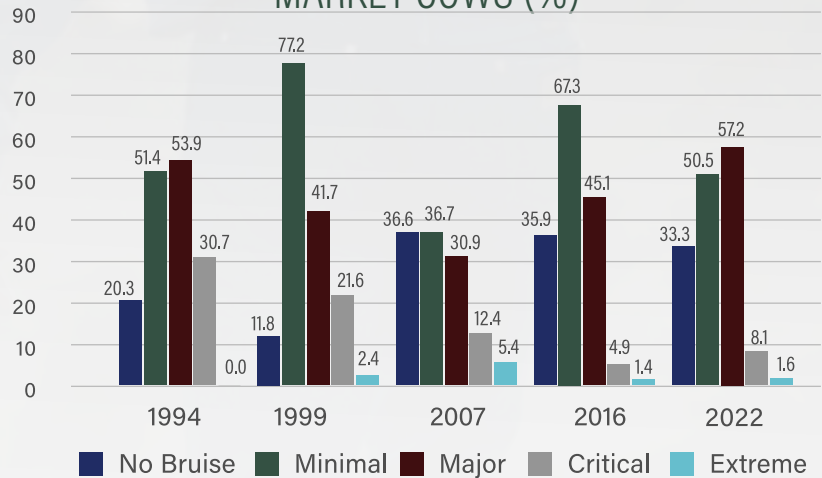
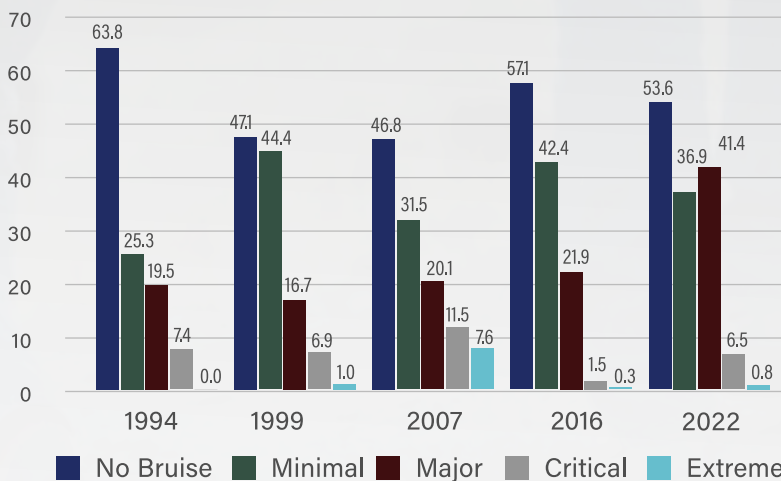


Figure 15

PRESENCE AND SEVERITY OF BRUISING IN MARKET BULLS (%)



BRUISE SIZE KEY

Minimal	< 1 lb surface trim loss
Major	1-10 lbs trim loss
Critical	>10 lbs trim loss
Extreme	Entire Primal

LOST OPPORTUNITIES

The weight and value of market cows and bulls have steadily increased over time. This amplifies the effect of dollars lost due to inadequate muscling, live cattle/whole carcass condemnations, and bruising. These losses also contribute to a negative sustainability outcome by not capturing the value of these animals in the food supply. Depending on market status and cattle condition, market cows and bulls can be sold for ample market prices. By monitoring the health and condition of their animals, ensuring proper animal husbandry practices, and monitoring the market, cattle producers can capture profit from their market cows and bulls.

Declines in market cow and bull quality such as live animal defects, carcass defects, and the market or sale of animals unfit for consumption leave dollars on the table for

Table 8

MEAN VALUES FOR YIELD GRADE FACTORS IN ALL SURVEYED MARKET COWS AND BULLS

Factor	2016 ²	2022
Adjusted Fat Thickness (in)	0.24	0.16
HCW (lb)	686.7	703.1
LM Area (in ²)	10.1	10.0
KPH (%)	1.7	1.8
USDA Yield Grade	2.9	2.6

¹Nicholson (2008) ²Harris (2017)

cattle producers. To capture these lost opportunities for economic return, producers should abide by the “Three M’s”: manage cattle to minimize defects, monitor the health and condition of their cattle, and market their cattle in a timely manner.

Table 9

LOST OPPORTUNITIES FOR 2022 NBQA MARKET COWS & BULLS

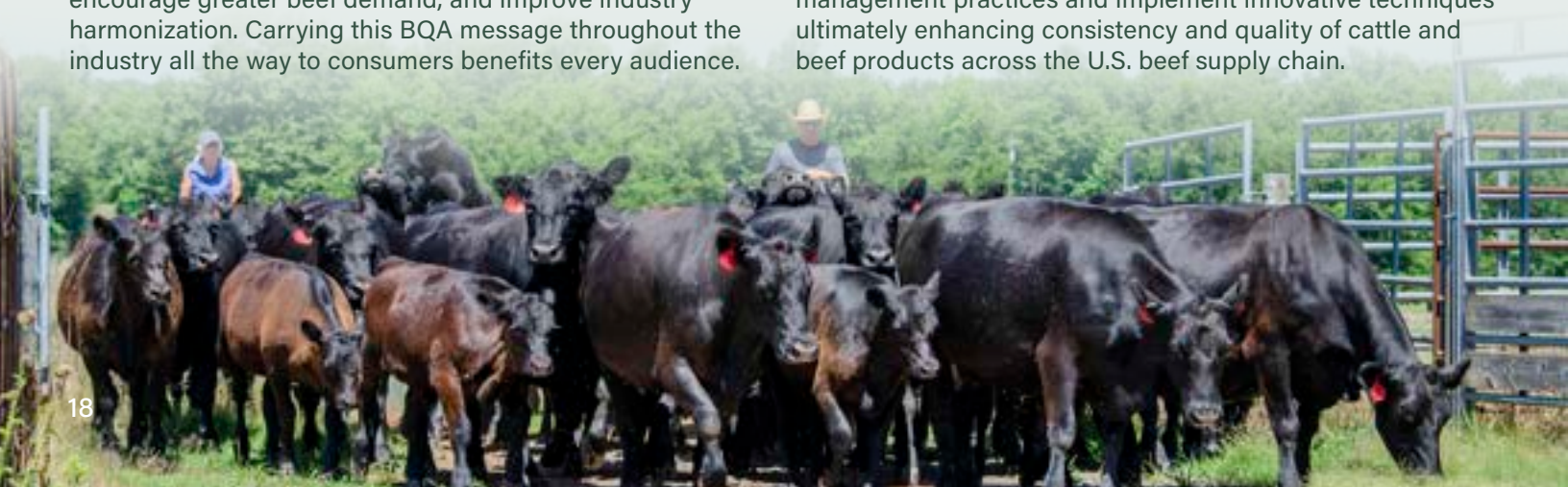
	2022	2016	1999	1994
Live cattle/whole carcass condemnations	\$28.71	\$6.82	\$4.11	\$11.99
Head, tongue, heart liver condemnations	\$5.16	\$2.56	\$1.90	\$1.75
Hide defect	\$0.54	\$7.74	\$6.27	\$6.92
Arthritic joints	\$1.82	\$1.89	\$9.72	N/A
Bruises	\$7.27	\$3.71	\$2.24	\$3.91
Injection-site lesions	\$0.10	\$0.10	\$1.46	\$0.66
Yellow fat	\$7.36	\$12.47	\$6.48	\$2.27
Inadequate muscling	\$33.34	\$31.59	\$18.70	\$14.43
Total	\$84.30	\$122.77	\$62.46	\$59.73
Total (-) DC and Fat	\$84.30	\$66.31	\$50.88	\$41.93

CONCLUSION

An important strategy for improved industry health and success was evident in the research: utilizing BQA and its principles to improve cattle well-being, increase consumer confidence, and enhance industry commitment could encourage greater beef demand, and improve industry harmonization. Carrying this BQA message throughout the industry all the way to consumers benefits every audience.

The beef industry is focused on continuous improvement, especially in the areas of safeguarding the food supply and cattle care and handling.

The NBQA remains an important measure for the U.S. beef industry as it strives to improve quality and consumer demand. Results from the 2022 NBQA can be utilized by all segments of beef production to improve upon current management practices and implement innovative techniques ultimately enhancing consistency and quality of cattle and beef products across the U.S. beef supply chain.



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