FEEDING QUALITY FORUM

JOHN STIKA

2025

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CHOPPING BLOCK: WHAT'S NEW FOR GRADING & RED MEAT YIELD

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John F. Stika, Ph.D.
Certified Angus Beef LLC

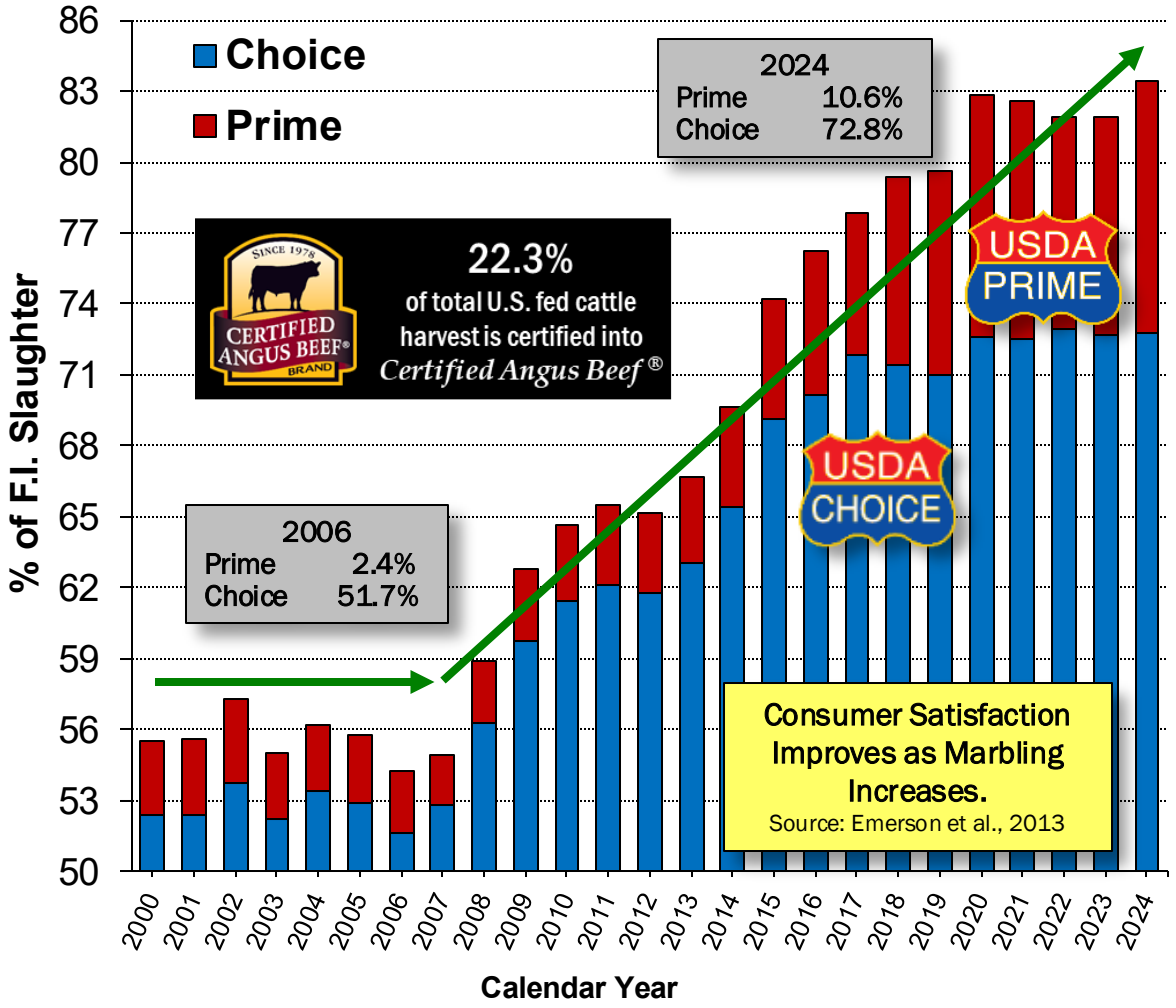
National Beef Quality Audit
Industry Priorities, Ranked by Importance

Funded by the Beef Checkoff

1991	1995	2000	2005	2011	2016	2022
External Fat	Overall Uniformity	Overall Uniformity	Traceability	Food Safety	Food Safety	Food Safety
Seam Fat	Overall Palatability	Carcass Weights	Overall Uniformity	Eating Satisfaction	Eating Satisfaction	Cattle Genetics
Overall Palatability	Marbling	Tenderness	Instrument Grading	How and Where Cattle were Raised	Lean, Fat and Bone	Eating Satisfaction
Tenderness	Tenderness	Marbling	Market Signals	Lean, Fat and Bone	Weight and Size	Weight and Size
Overall Cutability	External and Seam Fat	Reduced Quality Due to Implant Use	Segmentation	Weight and Size	How and Where Cattle were Raised	Visual Characteristics
Marbling	Cut Weights	External Fat	Carcass Weights	Cattle Genetics	Visual Characteristics	Lean, Fat and Bone

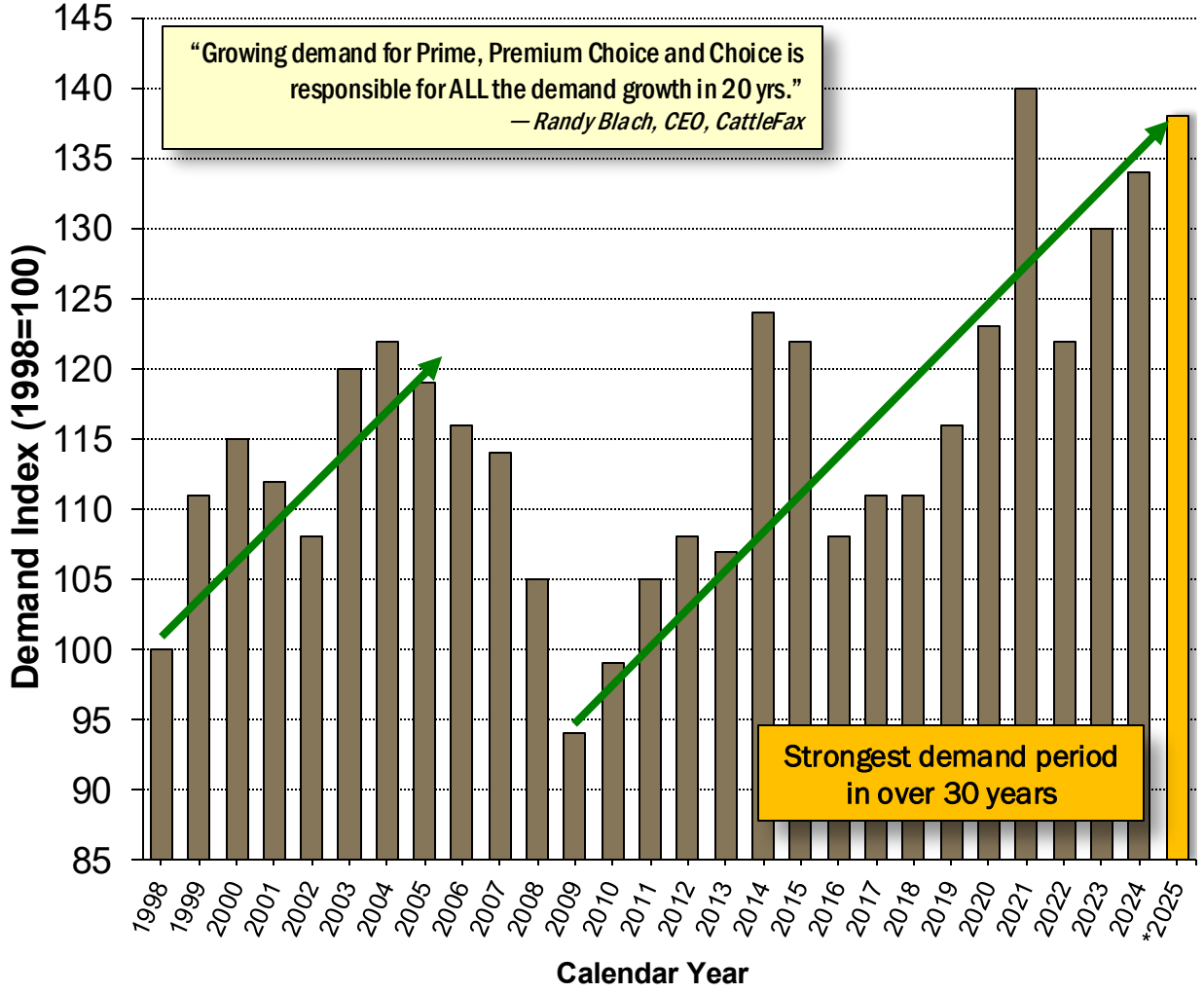
Yield/Composition Focused Quality/Palatability Focused

Annual % USDA Prime & Choice Grade



Source: USDA

Annual U.S. Wholesale Beef Demand Index



Sources: USDA, BLS, Kansas State University
*CattleFax Projections

Dynamics Shaping Current Interest in Yield

Lost Opportunities ($/hd) Due to Quality Issues

(using 2022 prices)

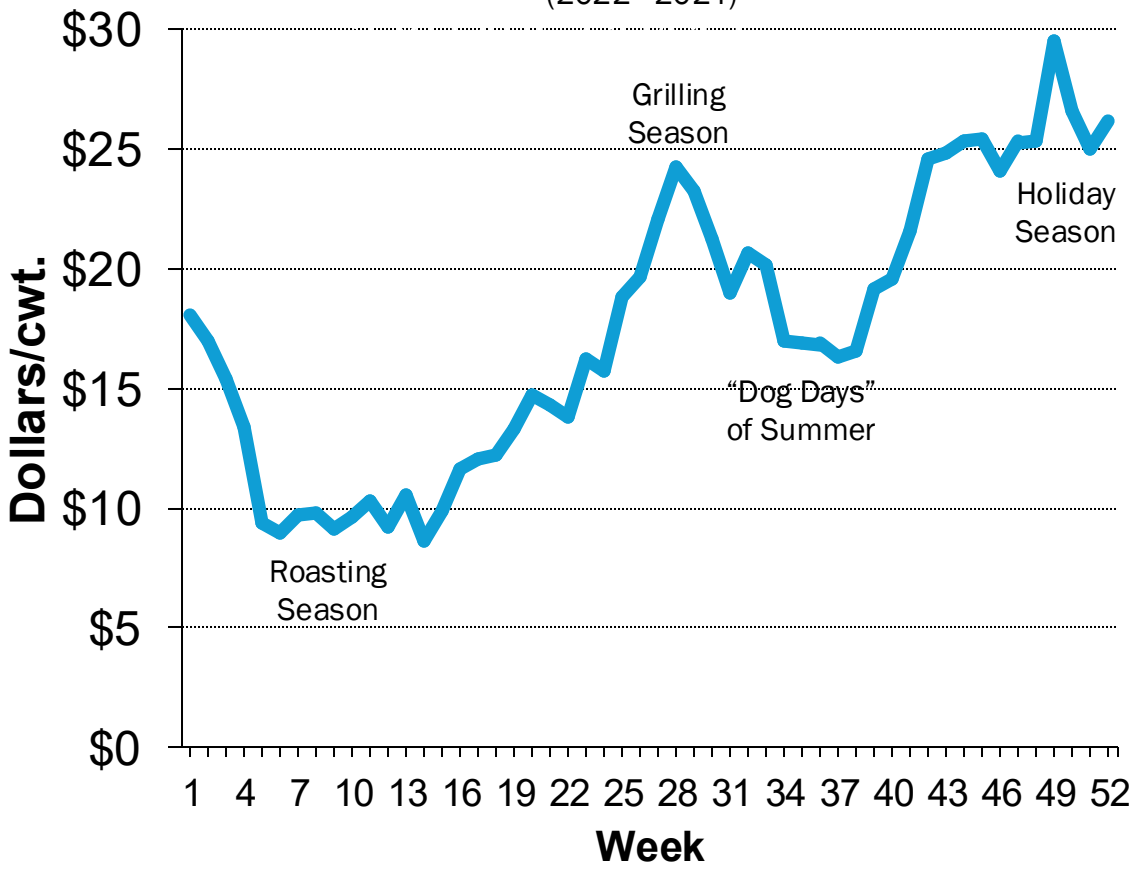
	2022		1991	
	$/hd	% of Total	$/hd	% of Total
Quality Grade	-$27.17	46%	-$45.77	56%
Yield Grade	-$18.21	31%	-$21.76	26%
Carcass Weight	-$2.97	5%	-$5.59	7%
Hide/Branding	-$4.16	7%	-$5.71	7%
Offal	-$6.33	11%	-$3.17	4%
Total	-$58.84	100%	-$82.00	100%

Source: 2022 National Beef Quality Audit

Industry-wide Lost Opportunity (2022 fed-harvest = ~26.5 million hd)	
Quality Grade	$720.0 million
Yield Grade	$482.5 million

3 Year Average Weekly USDA CH-SEL Spread

(2022 - 2024)

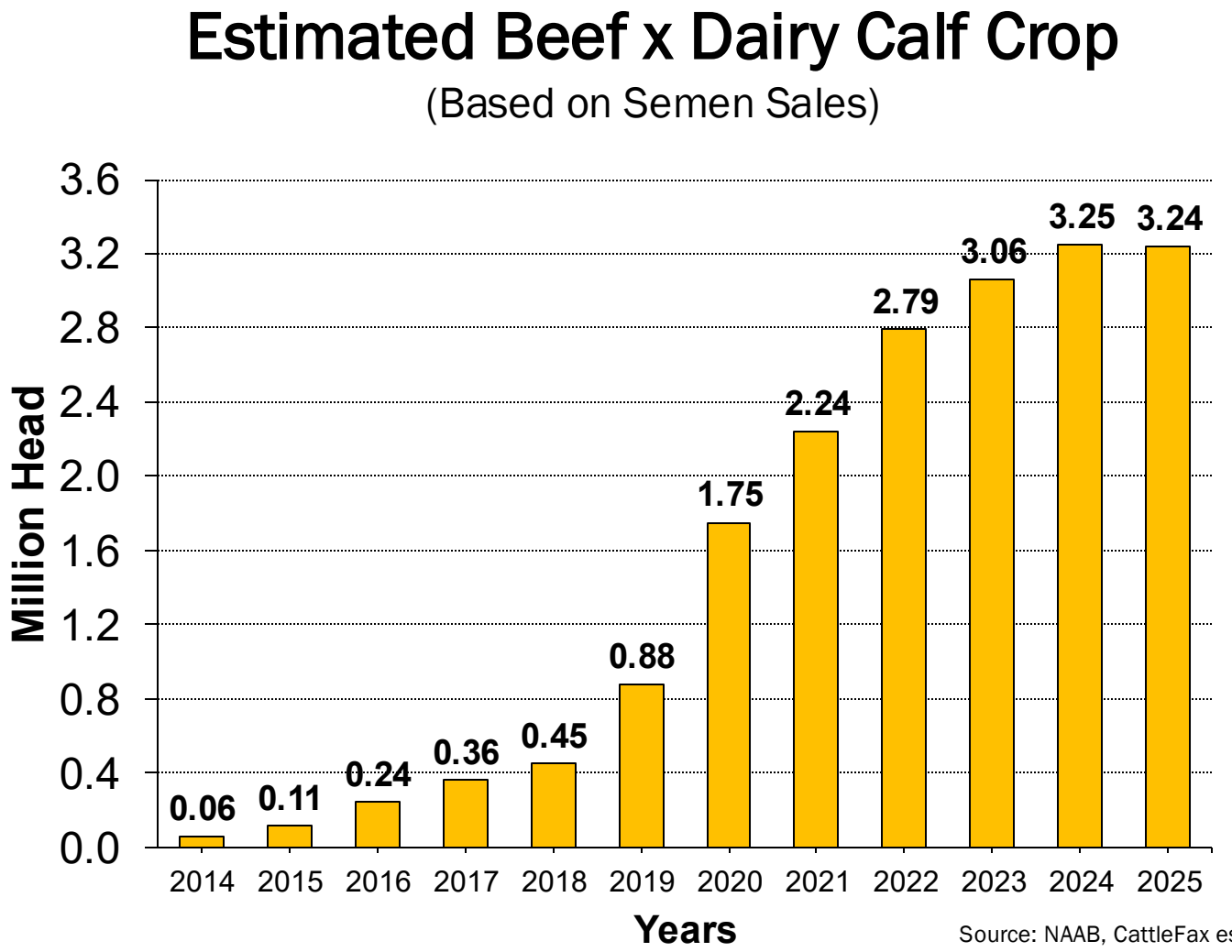


Source: USDA

Dynamics Shaping Current Interest in Yield

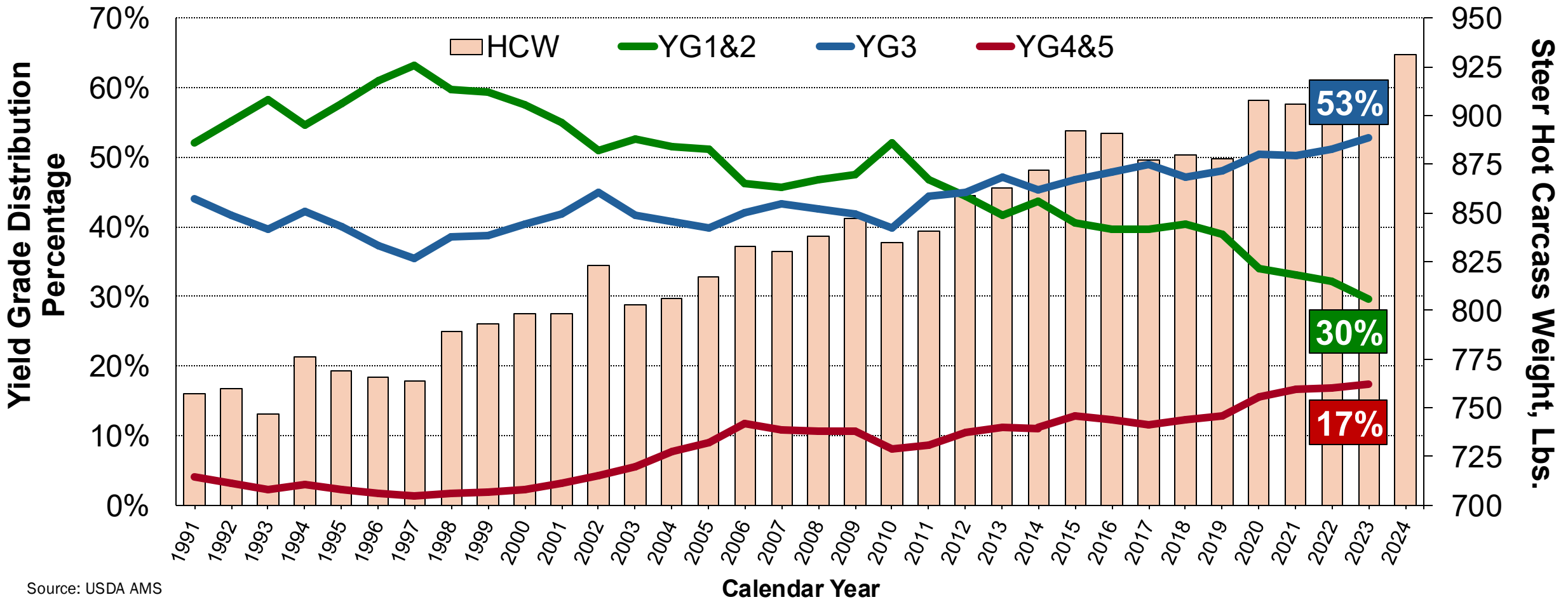
Growth in Beef x Dairy Fed-cattle Inventory.

- Yield differences and impact on carcass value determination.



Dynamics Shaping Current Interest in Yield

Historical Yield Grade Distribution & Hot Carcass Weight Trends

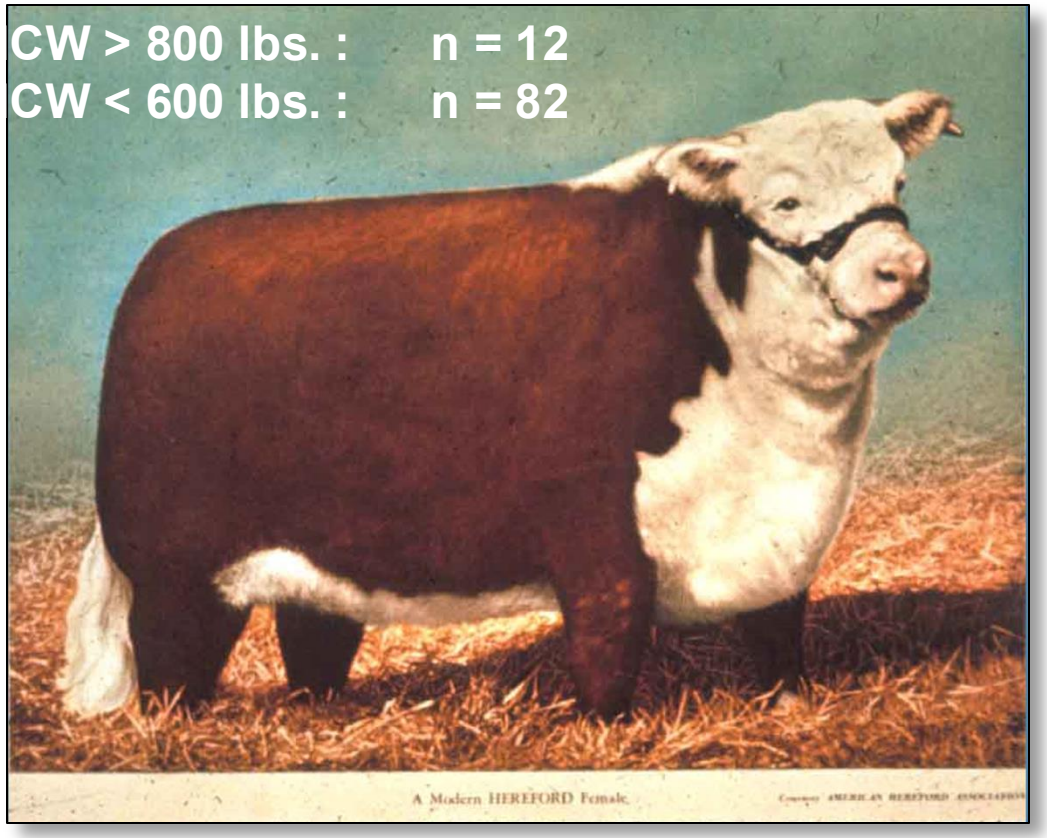


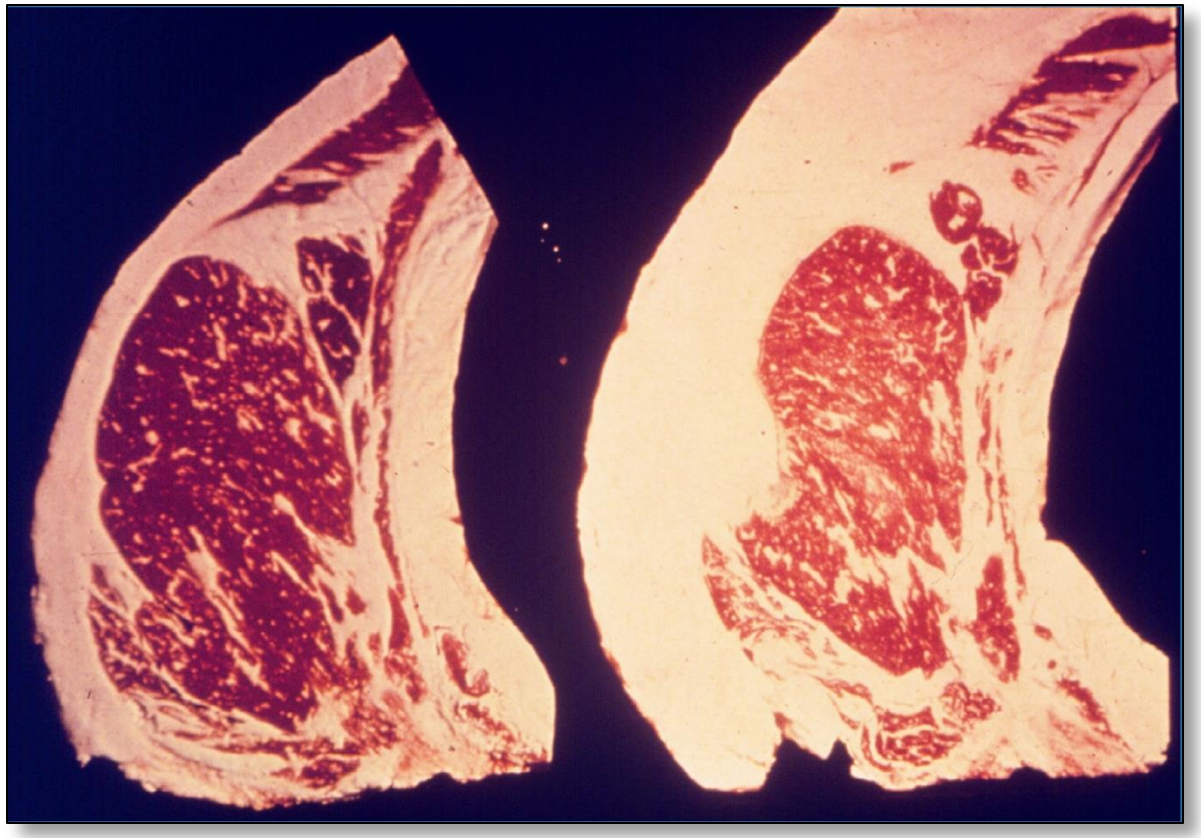
Source: USDA AMS

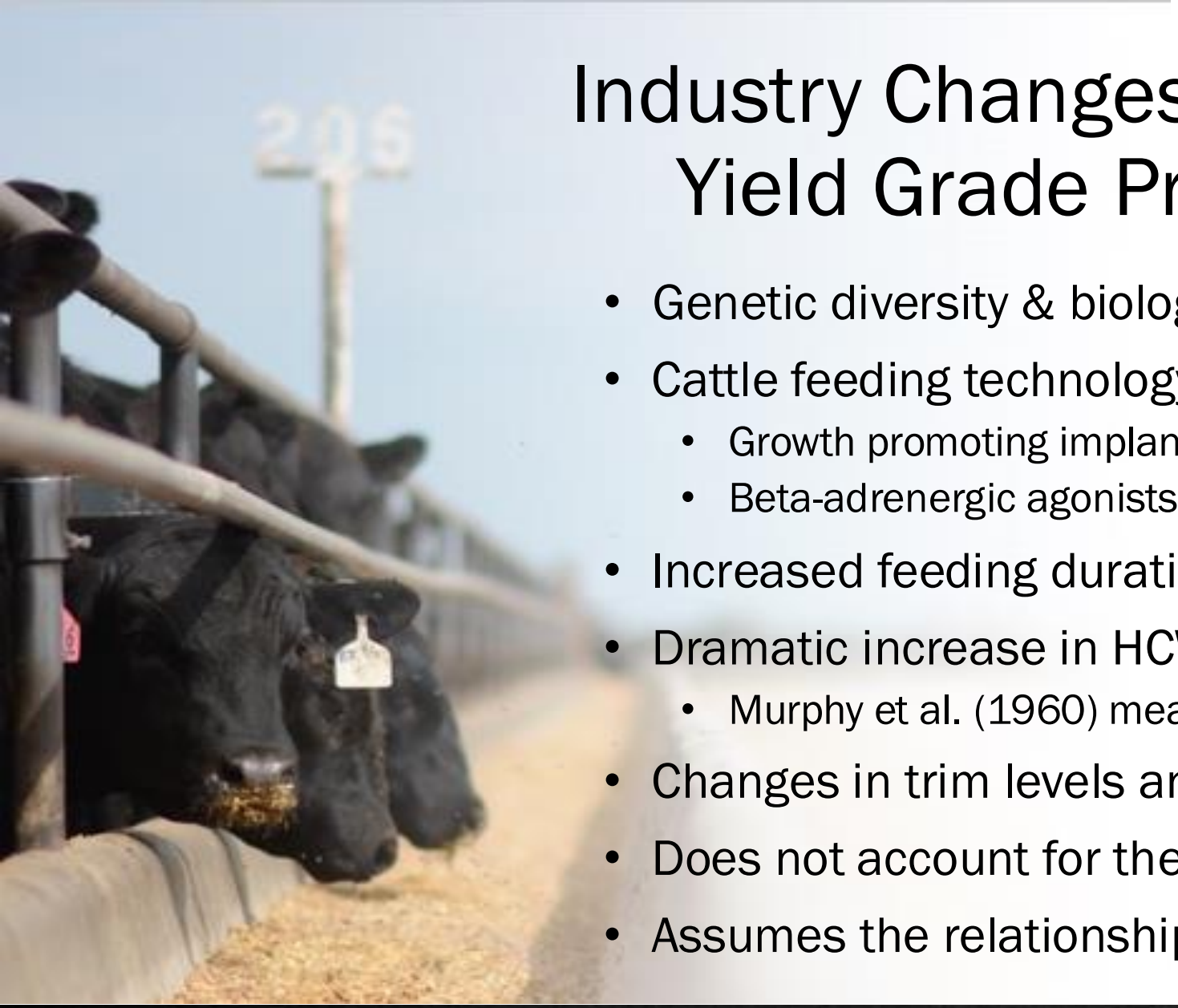
Murphey et al., 1960 (N = 162)

%BCTRC (R-L-R-C) = 51.34 – (5.78*FT) – (.462*%KPH) – (.0093*HCW) + (.74*REA)

One unit YG (e.g., 2.0 to 3.0) = 2.3% BCTRC from the Round, Loin, Rib, & Chuck



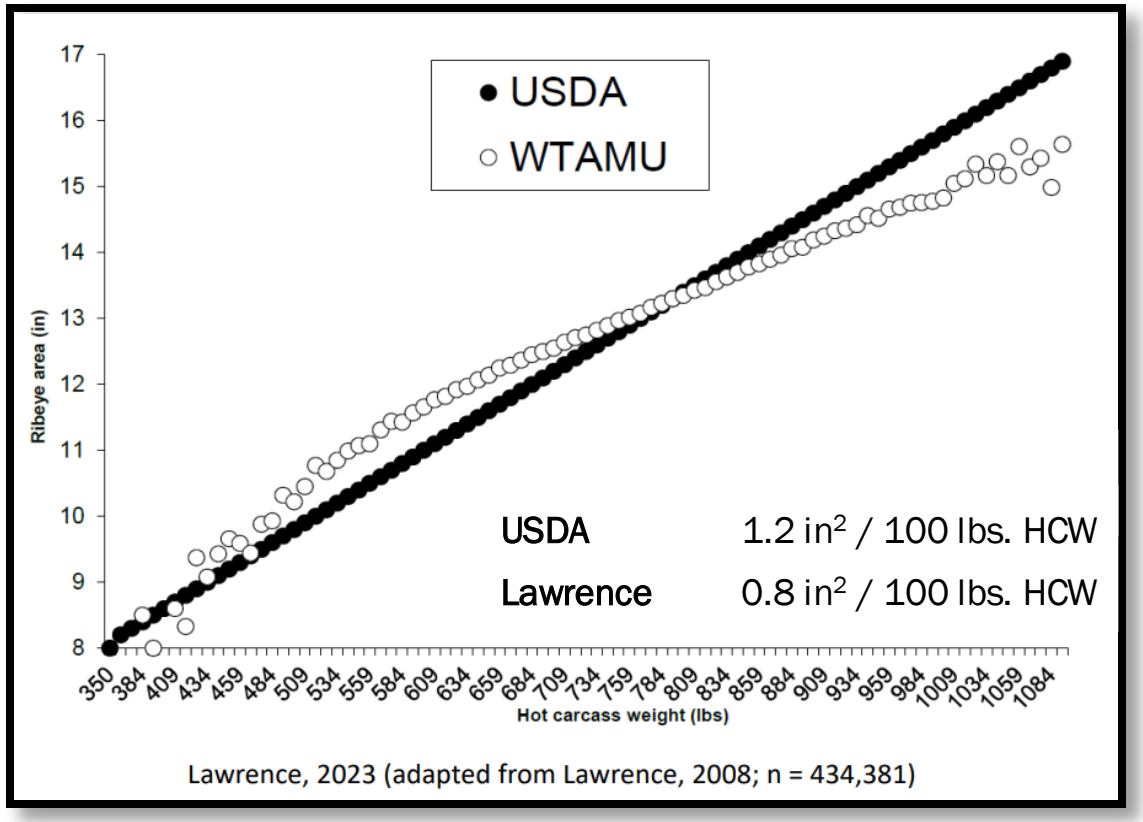




Industry Changes Potentially Impacting Yield Grade Precision & Accuracy

- Genetic diversity & biological type differences.
- Cattle feeding technology advancement.
  - Growth promoting implants
  - Beta-adrenergic agonists
- Increased feeding duration on high concentrate diet.
- Dramatic increase in HCW.
  - Murphy et al. (1960) mean HCW ~ 600 lbs. ranging from 350-900 lbs.
- Changes in trim levels and fabrication styles.
- Does not account for the entire carcass & associated value.
- Assumes the relationship between HCW & REA is linear.

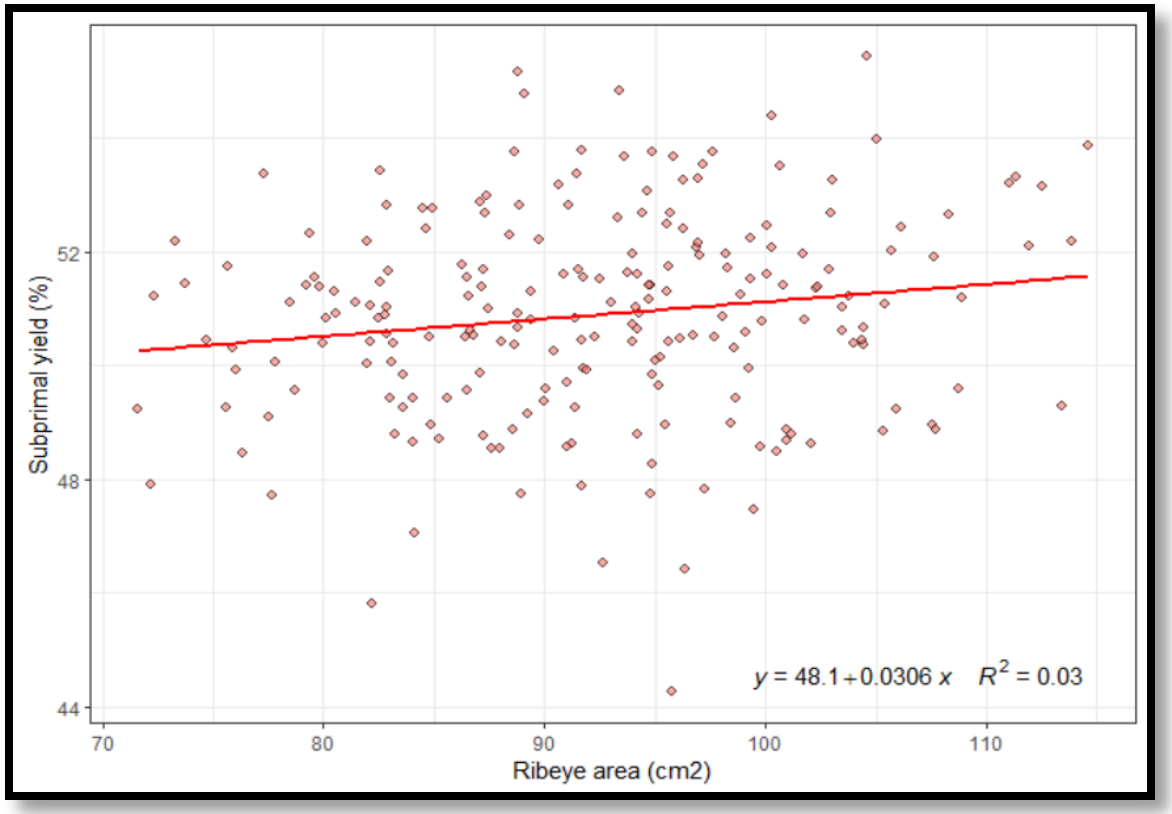
Ribeye Growth is Different than Expected



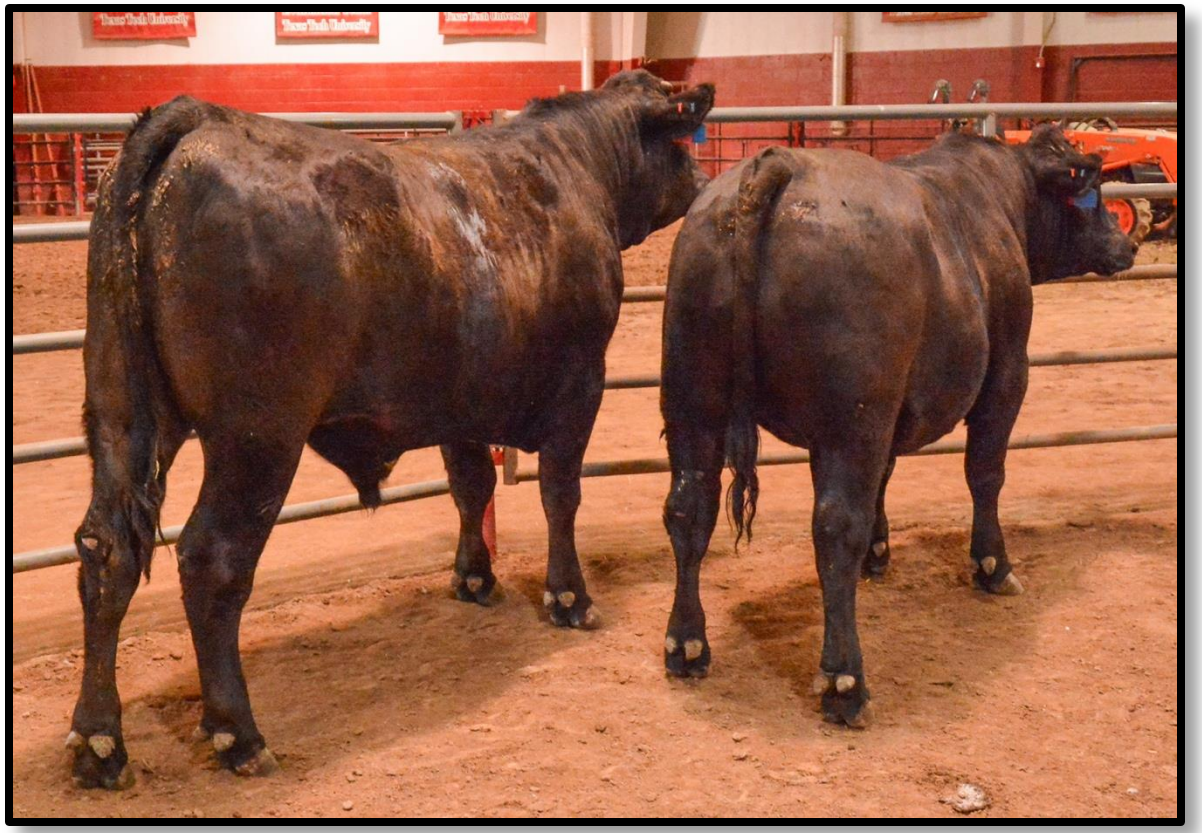
Lawrence, 2023 (adapted from Lawrence, 2008; n = 434,381)

Ribeye Area : Subprimal Yield

3% variation explained as a single factor



Source: Mendizabal and Woerner (2023)

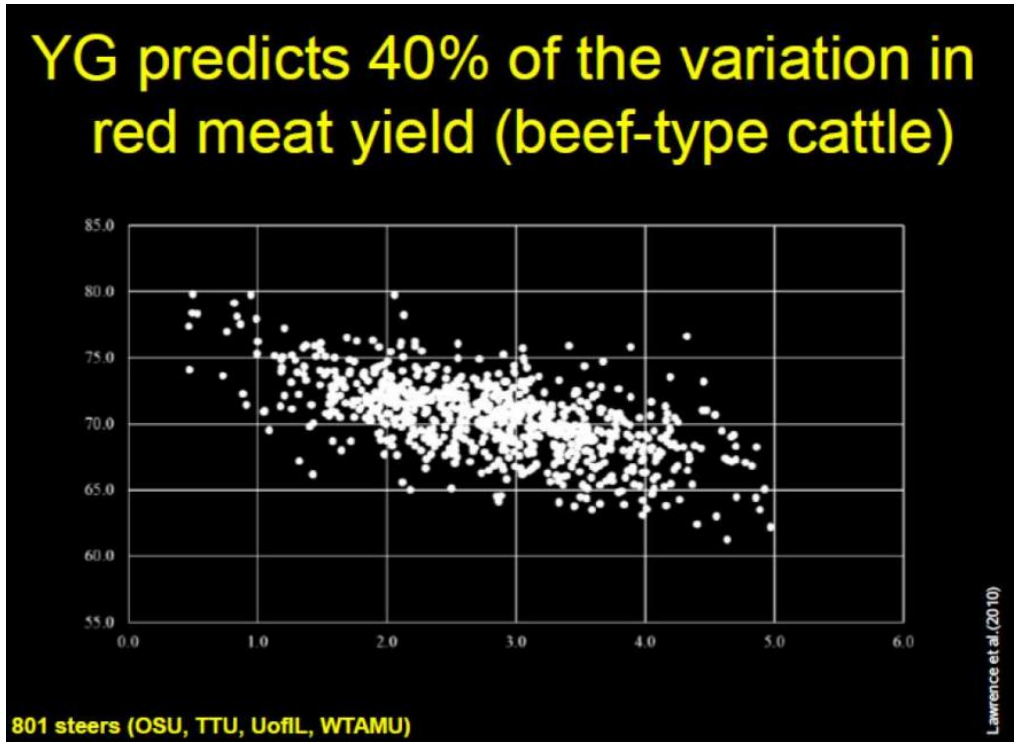


Live Weight, lbs.	1480	1510
12th Rib Fat, in	0.68	0.64
REA, in^2	18.2	18.7
Yield Grade	2.4	2.2
Quality Grade	Low Choice	Low Choice

Accuracy of the Current USDA Yield Grade

Lawrence et al. (2010)

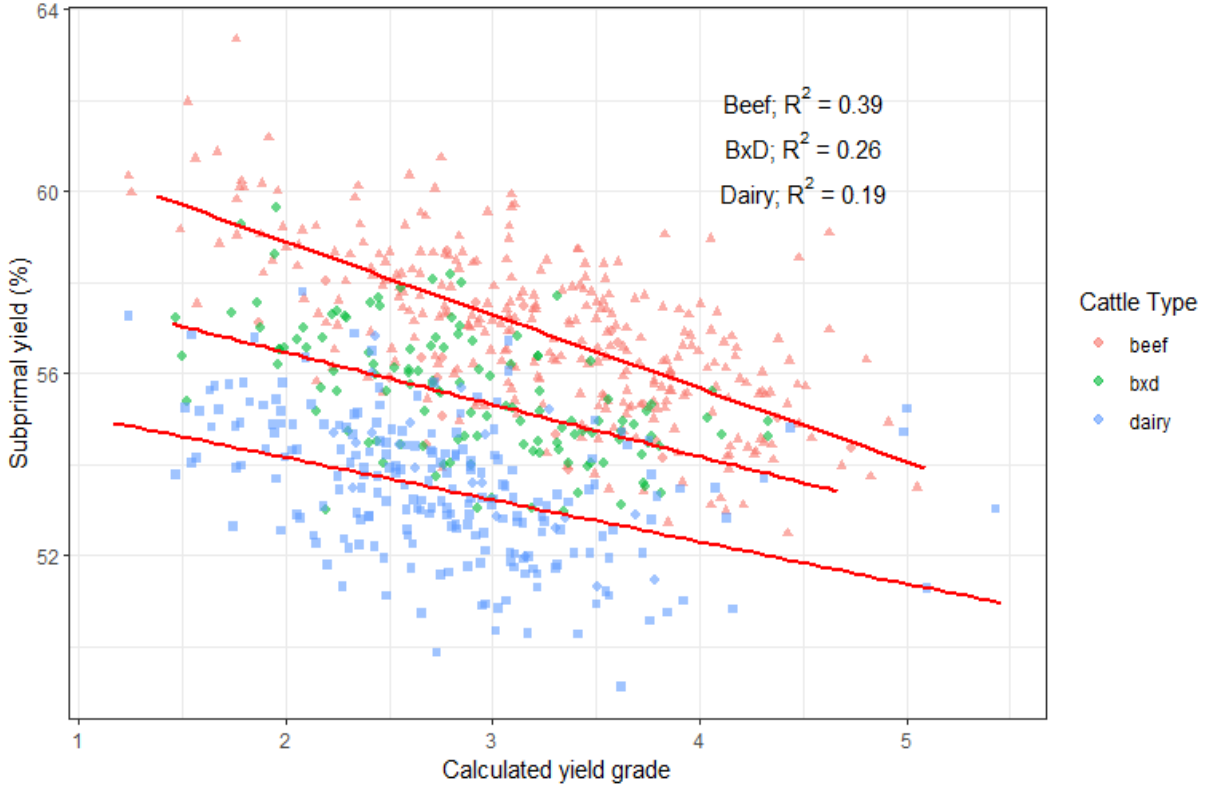
Variation in Red Meat Yield Accounted for by the Yield Grade Equation.



- YG predicted 0% of the variation in Holstein steer red meat yield (N=235)

Mendizabal and Woerner (2023)

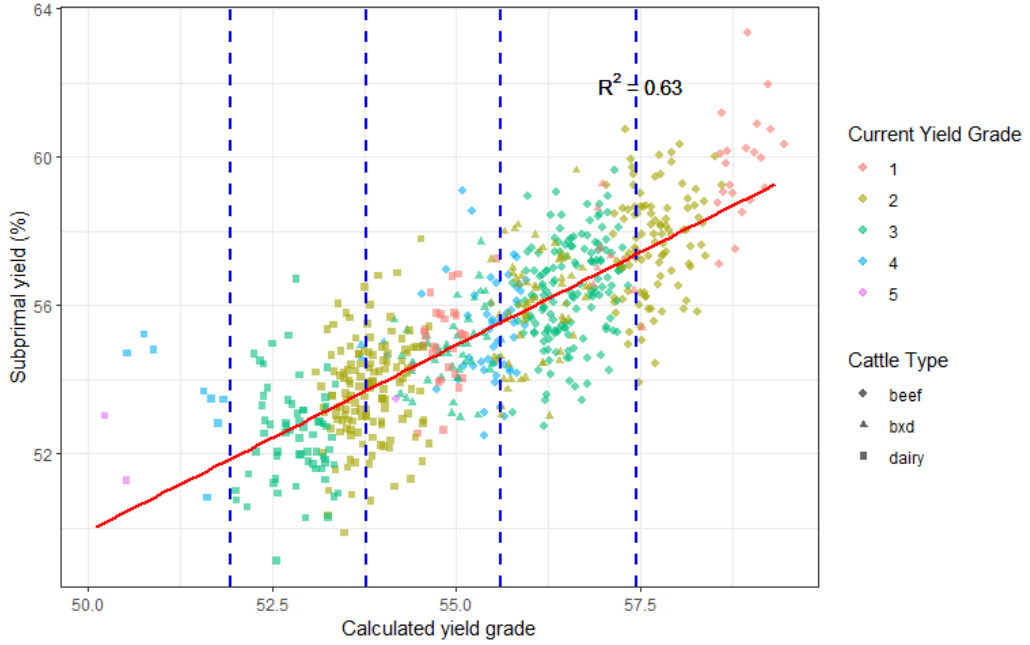
Relationship of Calculated Yield Grade and Boneless Subprimal Yield by Cattle Type.

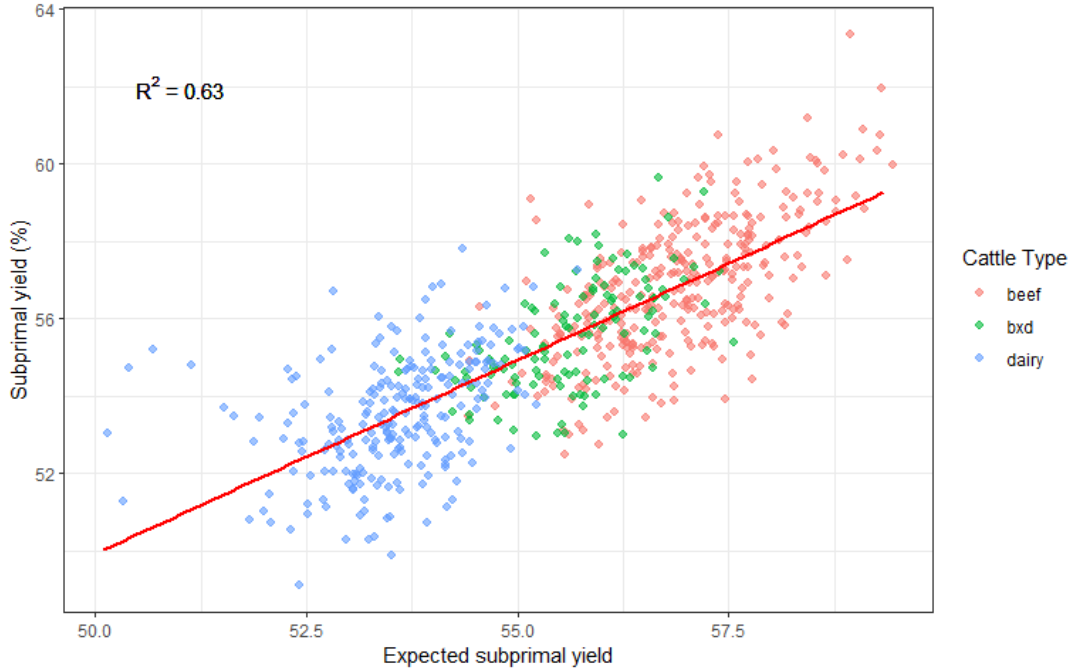


Accuracy modified subprimal yield equation ~ Adjusted for cattle type

Subprimal yield = 56.94 + (0.40*REA) – (0.0042*HCW) – (3.57*FT)

- Beef Adjustment = 0 (baseline)
- Beef x Dairy Adjustment = -1.76
- Dairy Adjustment = -4.02

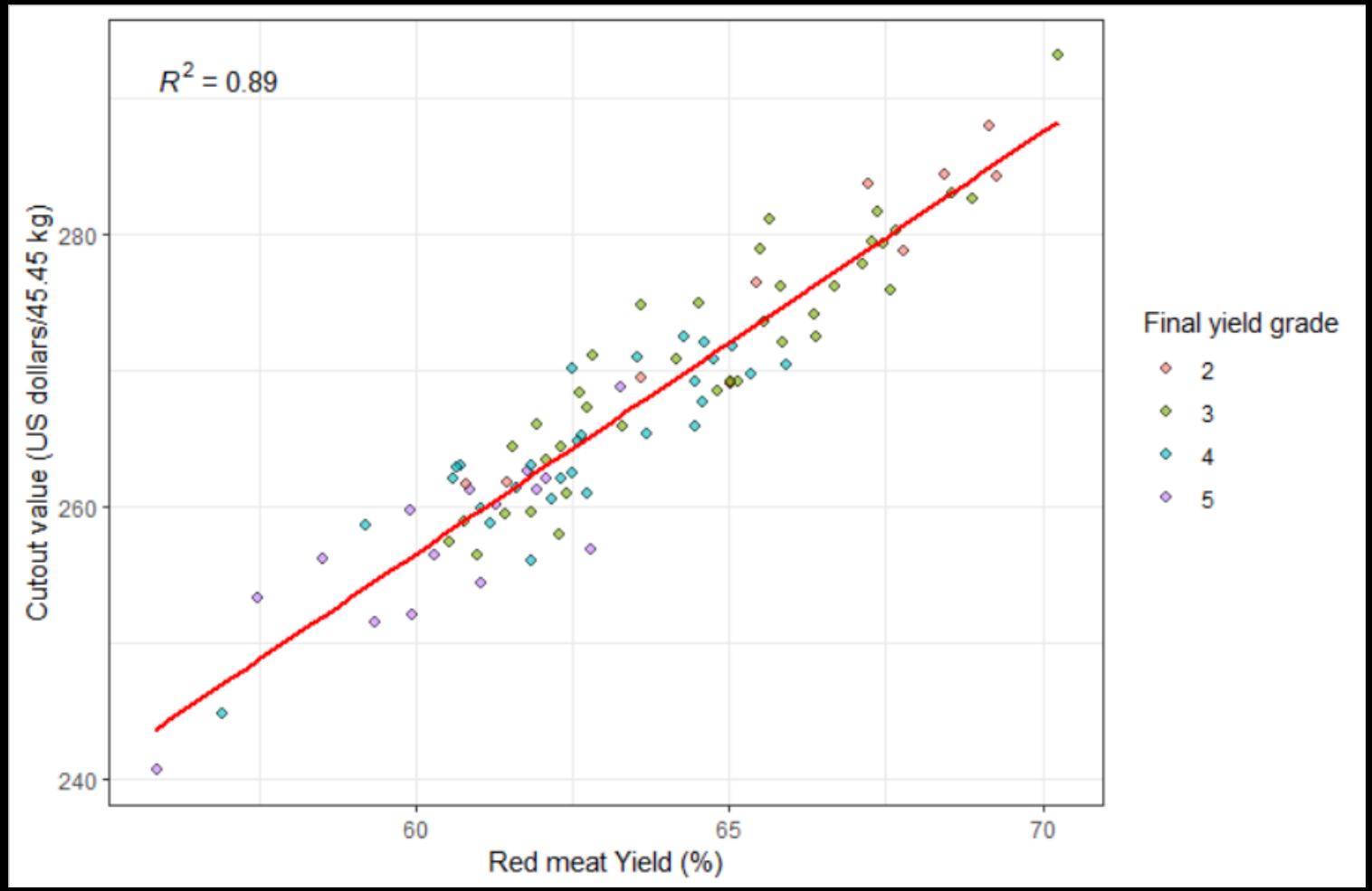




Slide credit: Texas Tech University

Red Meat Yield = Cutout Value

Cutout value = 71.00 + 3.1(RMY), (*P* = <0.01)



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Slide credit: Texas Tech University

NCBA Red Meat Yield (RMY) Working Group

- Established to investigate and communicate the scope of the opportunity to the industry.
- Broad Representation Across Industry Stakeholders.

Cow-calf Producers	Academia/Research/USDA
Cattle Feeders	Technology Expertise
Packers	Merchandising/Branded Beef

Photo credit: Texas Tech University

RED MEAT YIELD "ROADMAP"

STAGES:

SCIENTIFIC RESEARCH → PRODUCER EDUCATION → PARTNER ALIGNMENT → POLICY & REGULATORY → INDUSTRY IMPLEMENTATION

STEPS:

GATHER SCIENTIFIC EVIDENCE FOR EVOLVING A CURRENT PRACTICE	ENGAGEMENT FOR INCREASED AWARENSS & FEEDBACK	SOCIALIZE TOPIC FOR INDUSRY ALIGNMENT	EVOLVE BASED ON EVIDENCE & BUSINESS JUSTIFICATION	MODERNIZE THE PROCESS THROUGH APPLICATION OF NEW PRACTICE

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Key Science-based Determinations

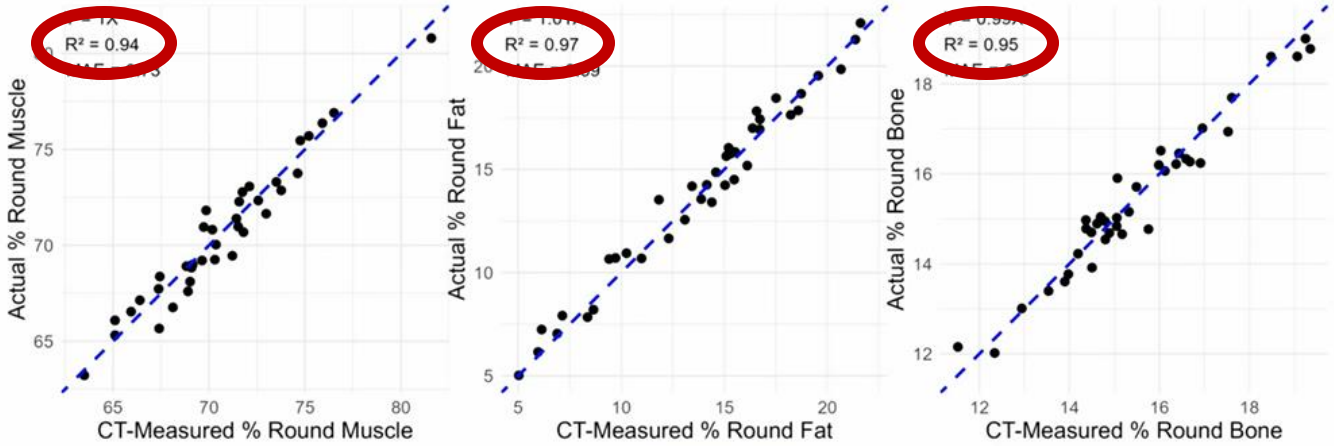
1. **Augmenting the USDA Yield Grade equation has limits.**

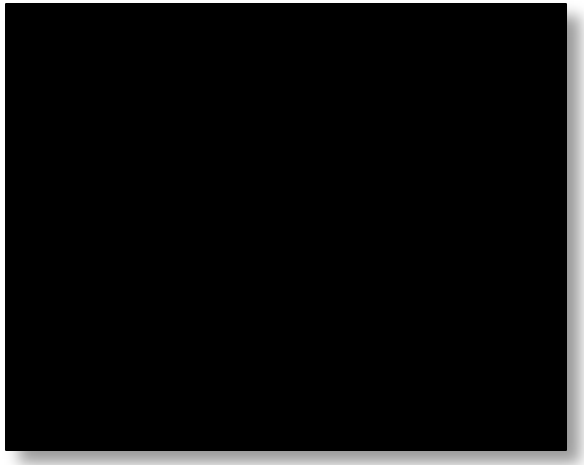
   - Focus on new technological approaches to determine RMY.

2. **Kidney, Pelvic & Heart (KPH) Fat is a significant variant in RMY determination.**
   - Need for a more accurate assessment OR complete removal.

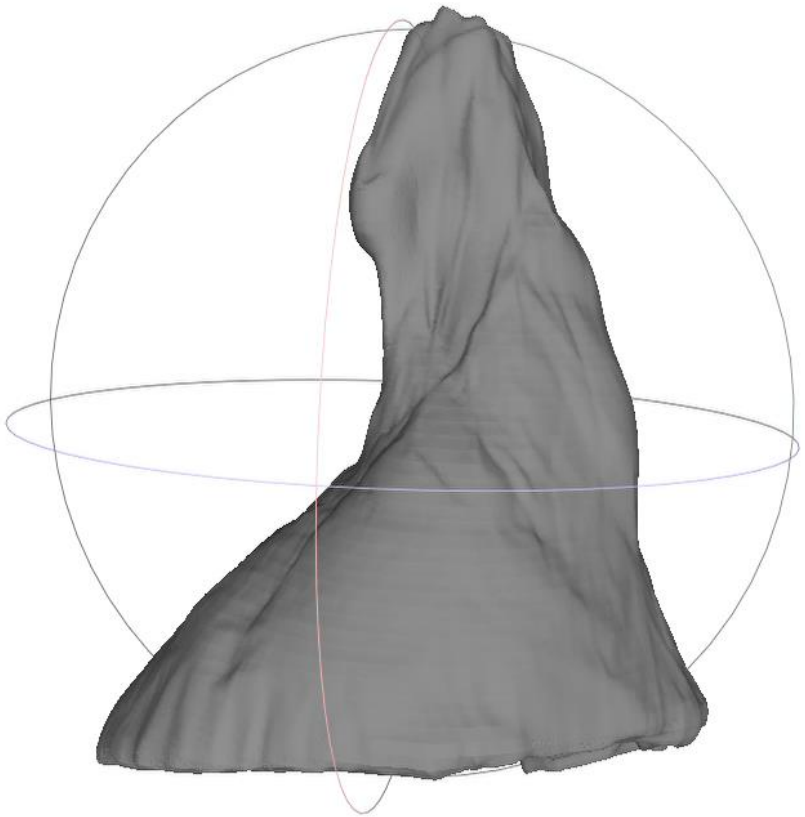
3. **CT (Computed Tomography) appears to be the "Gold Standard" for determining composition.**
   - Muscle: $r^2 = 0.94$ Fat: $r^2 = 0.97$ Bone: $r^2 = 0.95$
   - Potential to replace current cutting test procedures.
     - Reduce error and packer cutting method bias.
   - Currently impractical for use in packing plants.

COMPUTED TOMOGRAPHY PROVIDES A "GOLD STANDARD" MEASURE OF COMPOSITION



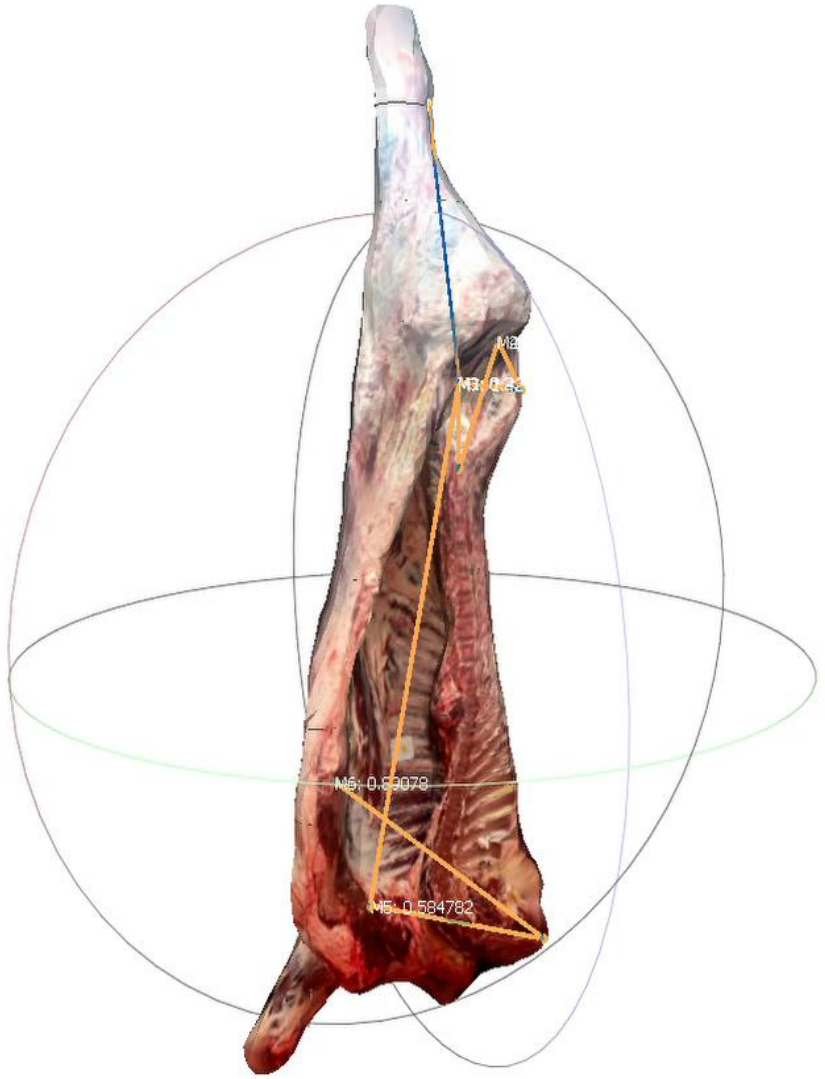


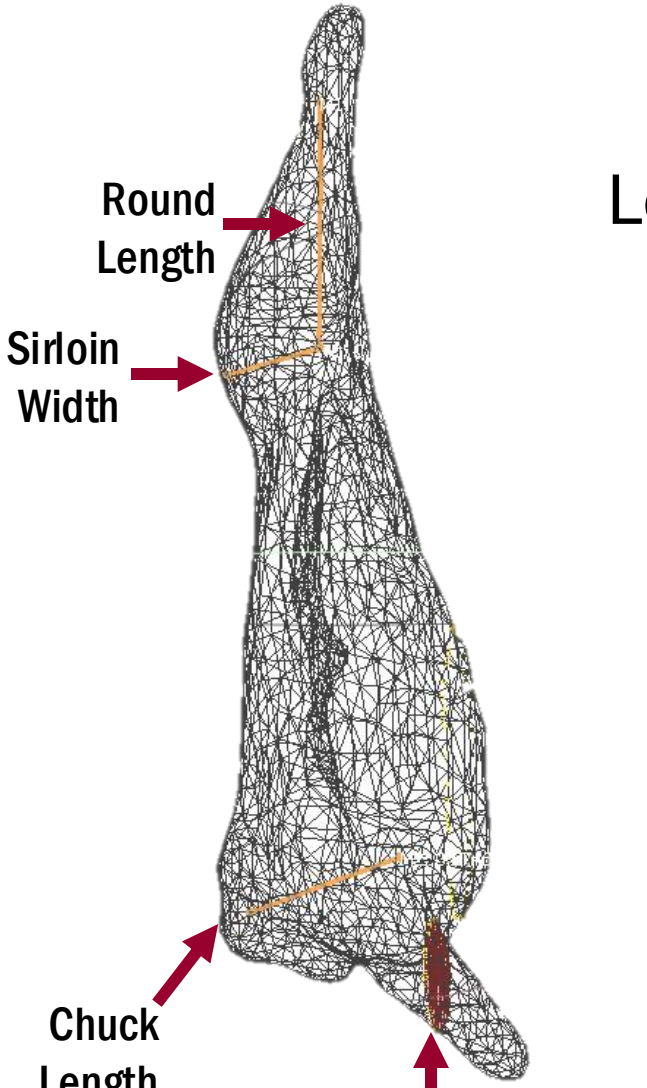
CT Data for 3D Rendering



Video credit: Texas Tech University

Potentially Applicable Imaging Technology

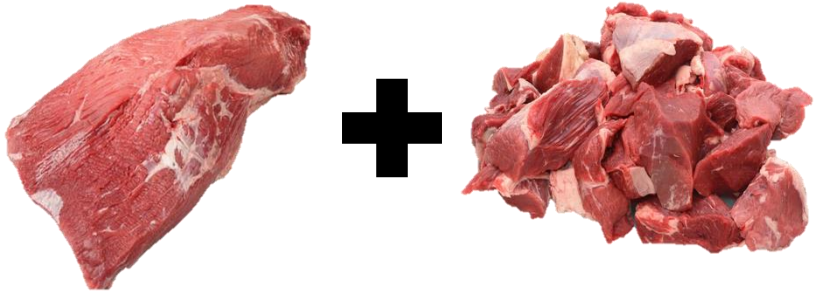




3D Imaging

Leverage any number of carcass measurements to predict % Saleable Yield

Achieve $R^2 > 0.9$



Subprimal + Trim (Adjusted to 90% lean)

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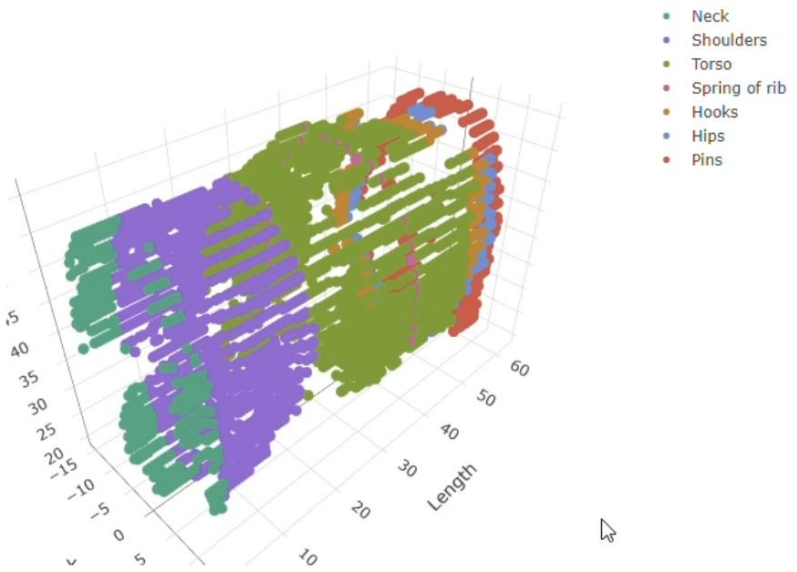
Potentially Applicable Live Animal Imaging Technology

90 datapoints/slice × 60 slices/sec × 1 sec run = 5,400 measurements

sizeR™
PRECISION RADAR BODY MEASUREMENT

Measuring Morphology of Live Cattle With Radar



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Next Steps & Research Priorities

Objective 1:

- Validate CT as the “Gold Standard” for RMY determination.
  - Relate CT to actual “Saleable Yield” via traditional plant cutout.
  - > 400 hd sampled across 3 packing plants.

Objective 2:

- Establish a “library” of carcass CT scans (>1,000 hd) with associated RMY outcomes.
  - Intent to support technology providers in the development of prediction technologies for red meat yield.

Initiate Data Collection Fall 2025

BEEF
Funded by the Beef Checkoff

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Beef Carcass Grading Modernization Initiatives

Instrument Enhanced Grading (IEG)

GOAL: Increase beef grading accuracy, precision and consistency across and within plants.

- Instrumentation has been critically important.
  - Commercially implemented in 2009.
  - Still not universally adopted.
  - Reduced but has not removed subjectivity.
  - Opportunity to leverage technology more.

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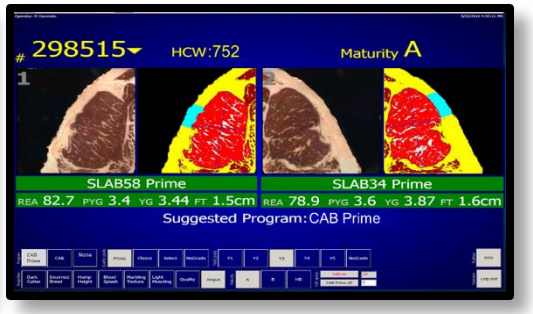
Instrument "Augmented" Grading

- Common reference = **"Camera Grading"**.

Process:

- Data is captured and presented to the USDA grader for each carcass.
- USDA grader still determines the final grade of each carcass.
  - As deemed necessary, the USDA grader can subjectively override the camera (upgrade or downgrade).



Instrument "Enhanced" Grading

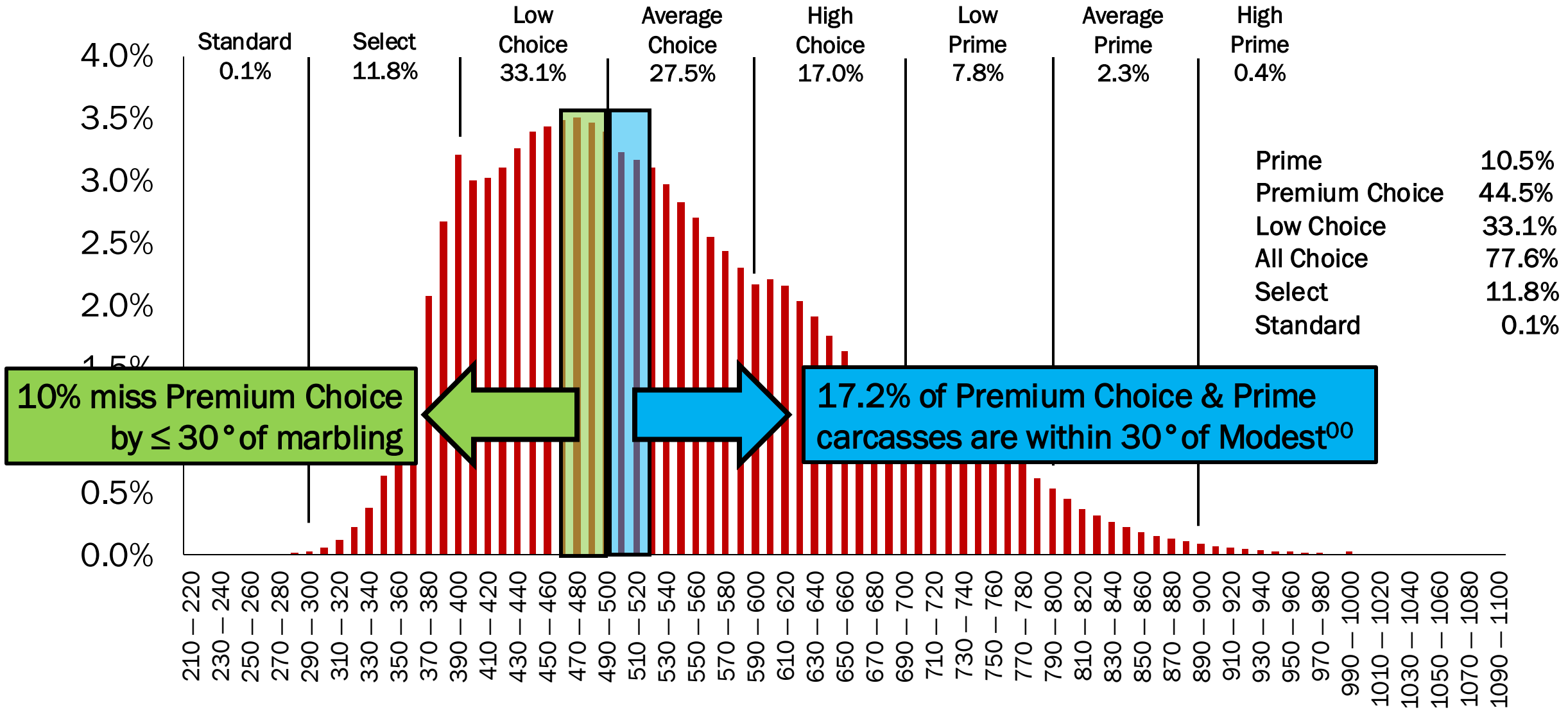
- Common reference = **IEG**.
  - Only 1 plant currently implementing IEG.

Process:

- Data is captured and the final grade as determined by the instrument is applied by a USDA-certified plant employee.
  - Instances still exist for subjective override.
- USDA stringently audits the grading process and outcome.

Objective: Increase reliance on USDA-approved technology to determine final grade and reduce subjectivity.

Marbling Score Distribution (Angus-influenced carcasses)



Source: 2022 CAB Consist Study = 1.9 million carcasses

Beef Carcass Grading Modernization Initiatives

Newly Approved Grading Technologies

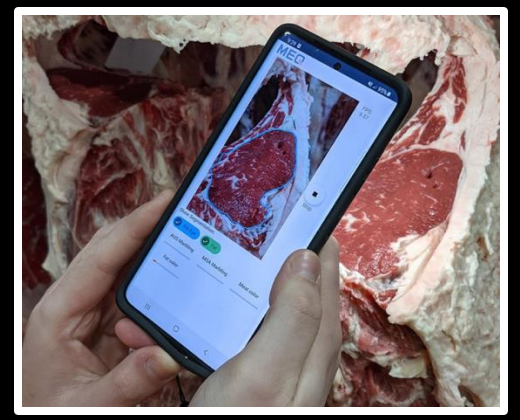
USDA Agricultural Marketing Service
U.S. DEPARTMENT OF AGRICULTURE

JBT Marel 7L

7-Laser Can Describe Positioning Error

MEQ

MEQ Camera V2



Global Meat Imaging

Google Pixel 7a

*Only approved for Marbling Score

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Beef Carcass Grading Modernization Initiatives

Objective Beef Lean Color Assessment Research

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Beef Lean Color Assessment

- Component of Official USDA Quality Grade
  - Maturity and Dark Cutter determination.
- Currently subjectively evaluated by USDA.
  - Cameras need to calibrated to the USDA standard.
- Facilitate IEG adoption.
  - Increase Quality Grade assignment accuracy, precision and consistency.
- Timeline: Final Report May 2026.

COLORADO STATE UNIVERSITY

Roman L. Hruska USMARC established 1964

BEEF Funded by the Beef Checkoff

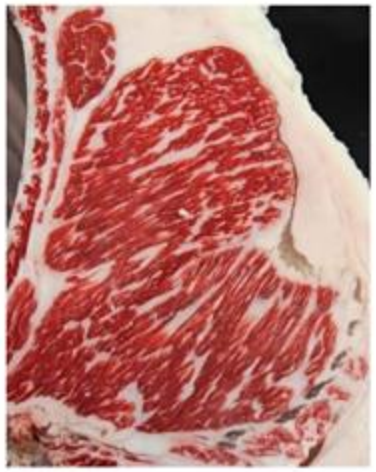
Acceptable

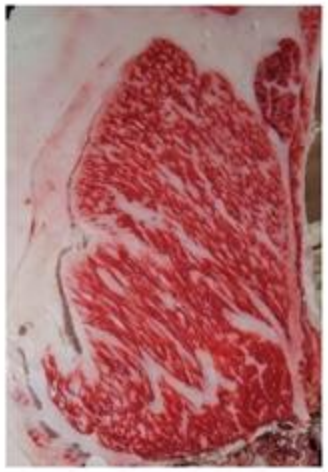
Dark Cutter

Request for Information

- Request to re-evaluate the eligibility of D and E maturity carcasses <30 months of age for USDA Prime, Choice and Select grades.

- Request to establish additional marbling scores to segregate beyond Very Abundant.






- Open to other Beef Carcass Grading Standard feedback as well.

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THANK YOU!

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