



## Evolution of Beef Grading

Bucky Gwartney – USDA/AMS

# USDA Inspection vs. Grading

- Meat Inspection (FSIS)



- **Required Service**

- In order to sell meat commercially, it must be federally inspected.

- **Funded via tax dollars**

- depending on if Required or Voluntary service. \*Species based



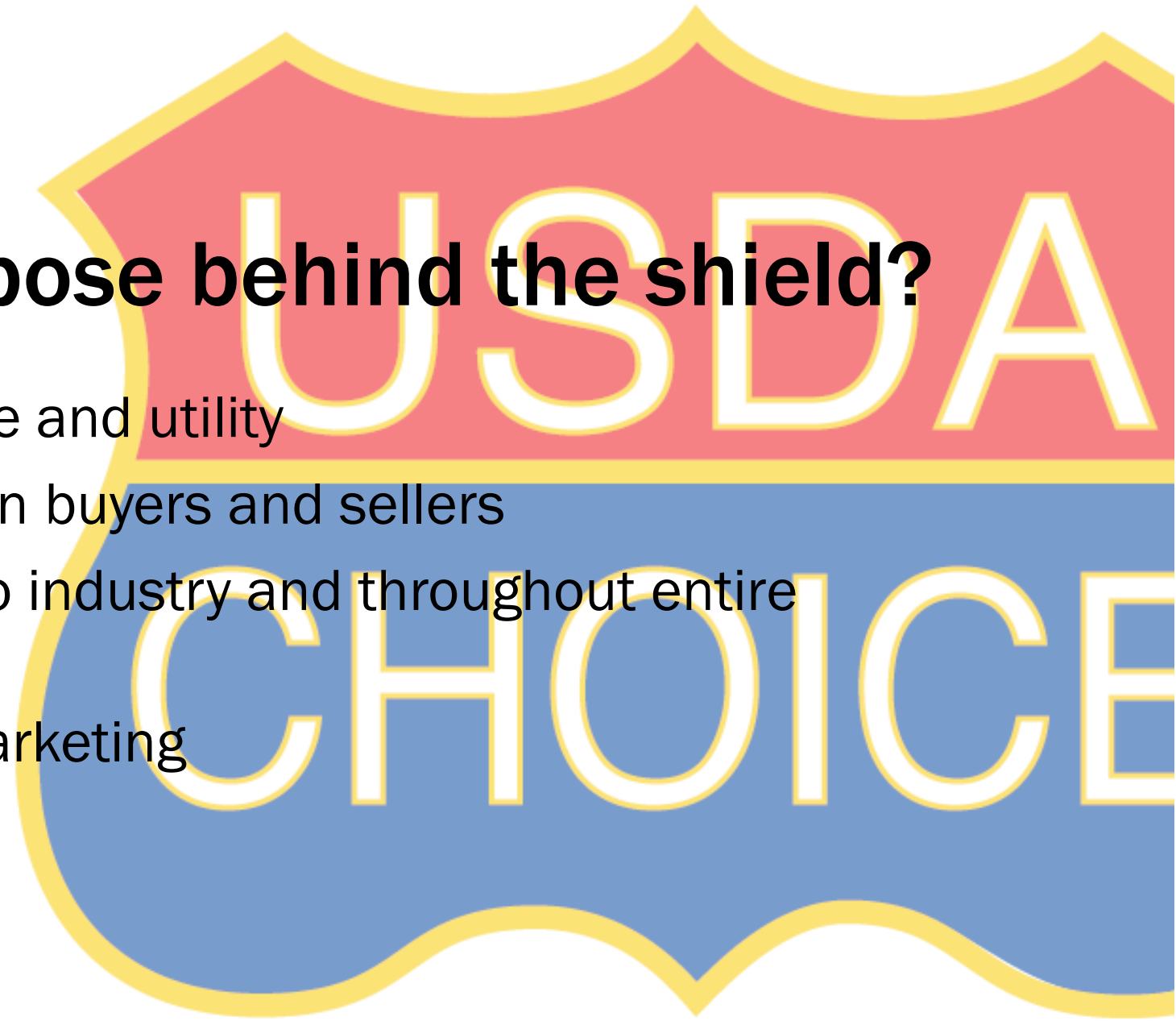
- Grading (AMS)

- **Voluntary service**

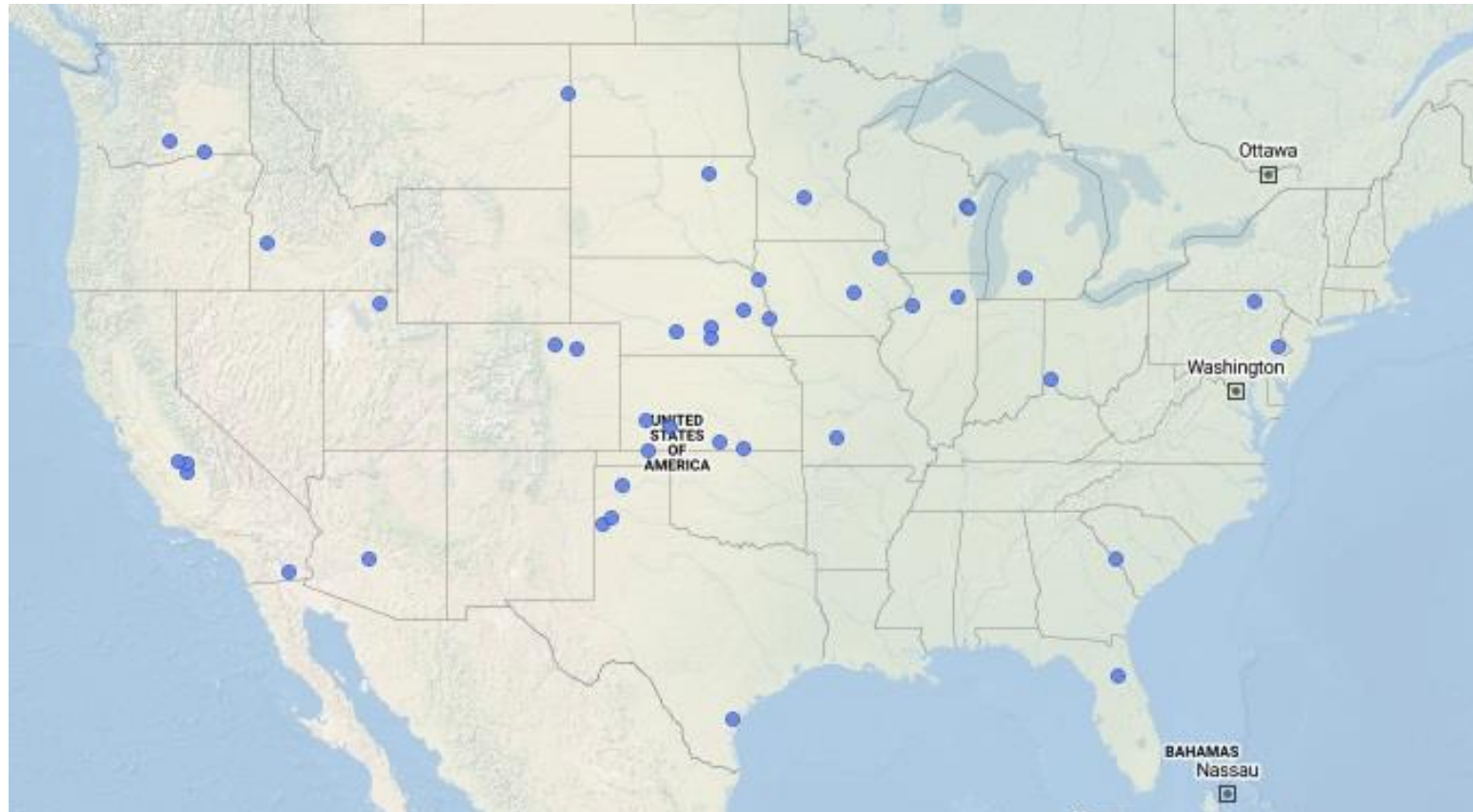
- We allow companies to sell meat as USDA Choice, USDA Select.
- **User – Fees Paid by Applicants**
- USDA sends a bill to the packer requesting the service. The packer pays the USDA and that is how AMS is paid.

# What is the purpose behind the shield?

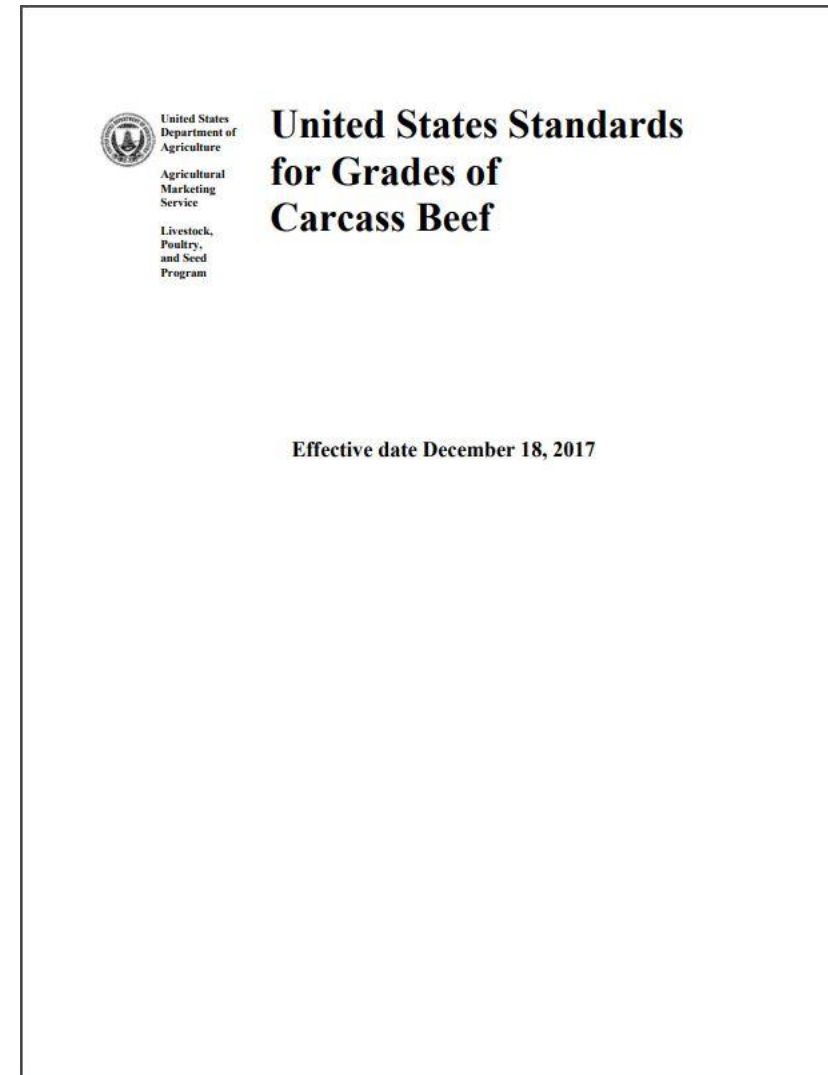
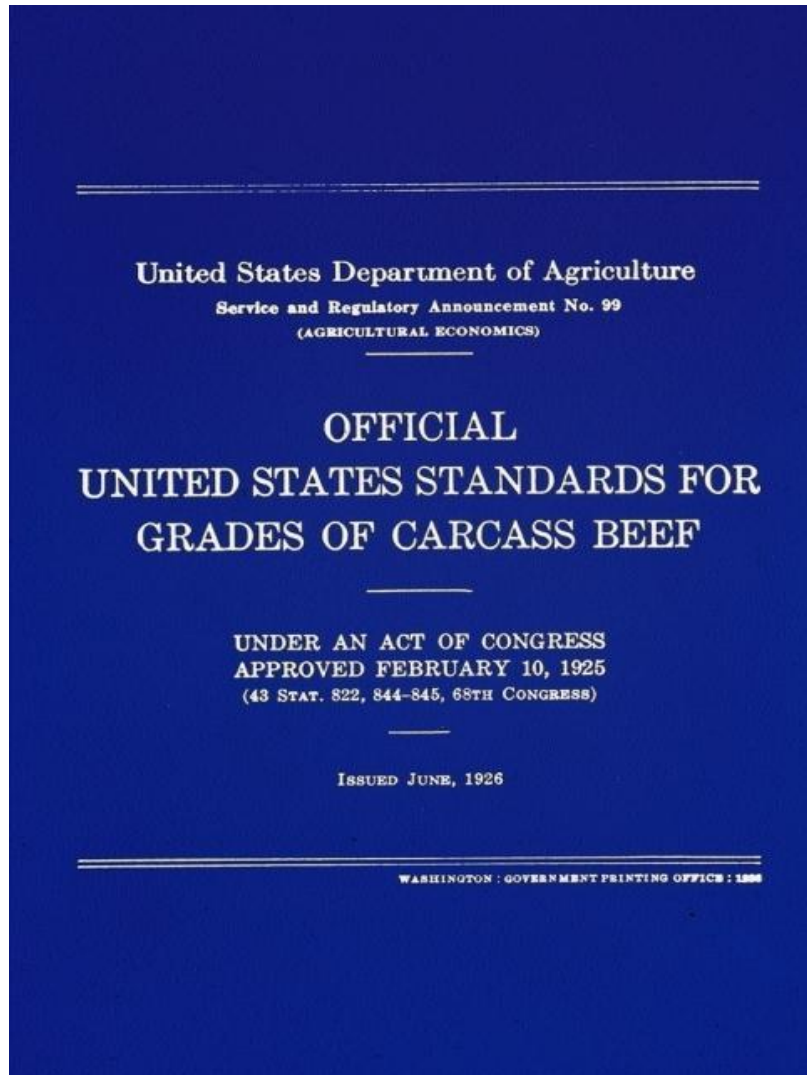
- Identify differences in value and utility
- Common language between buyers and sellers
- Transmit signals of value to industry and throughout entire marketing chain
- Assist in promotion and marketing



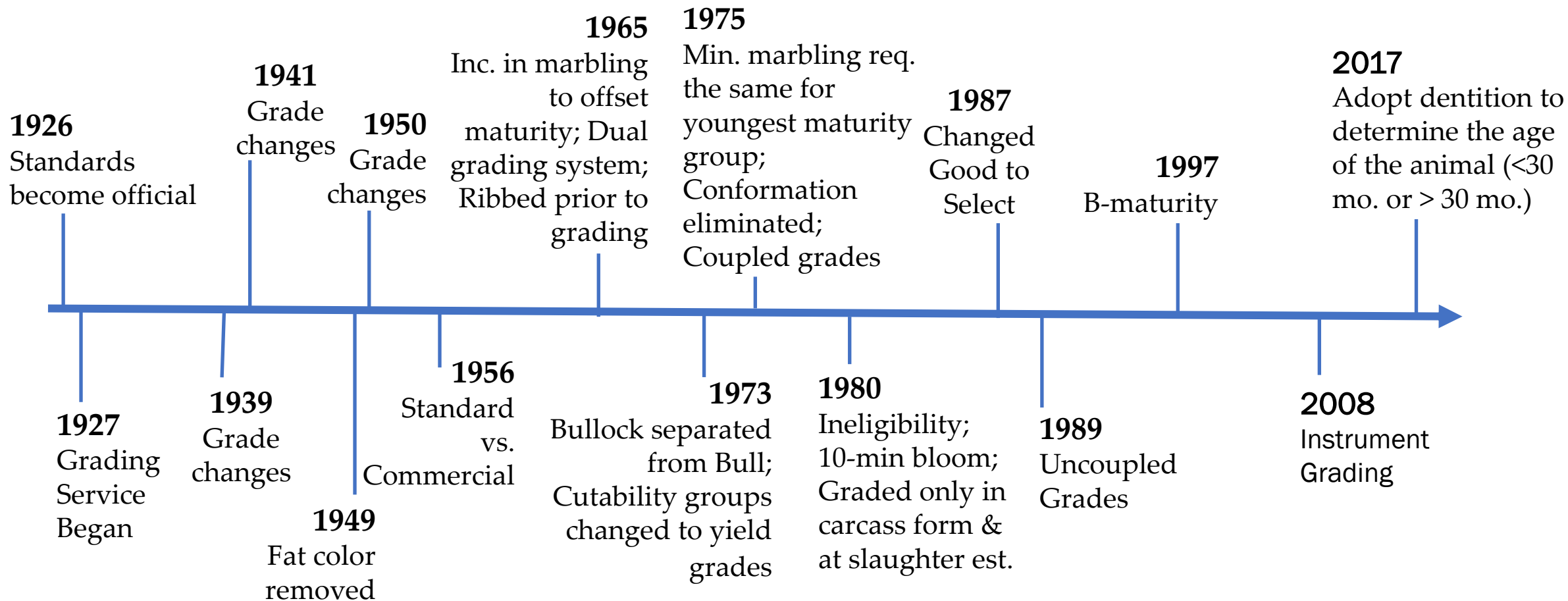
# Federally Inspected Cattle Slaughter Plants with Beef Grading



# Development of the Standards



# Historical Timeline





# Marbling

- Fat within the muscle
  - Intramuscular fat
- Evaluated on the ribeye between the 12<sup>th</sup> & 13<sup>th</sup> ribs
- Contrast to the Japanese grading system at the 6<sup>th</sup> rib





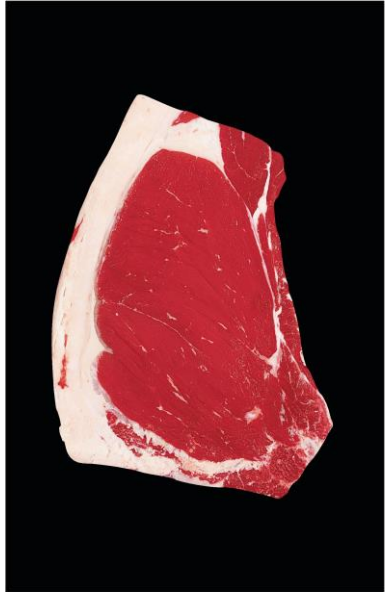
# Marbling Evaluation

- Amount
- Texture
- Distribution

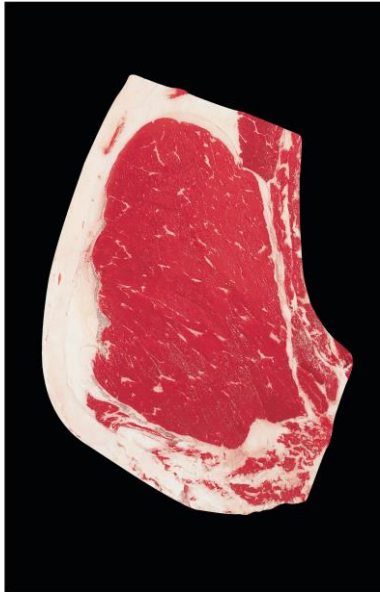




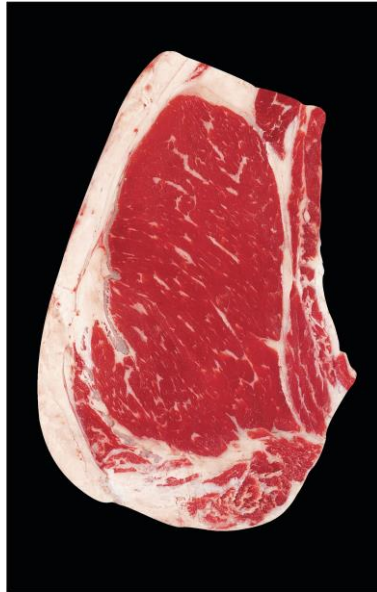
# USDA Marbling Scores – 40 Years and going strong!!!



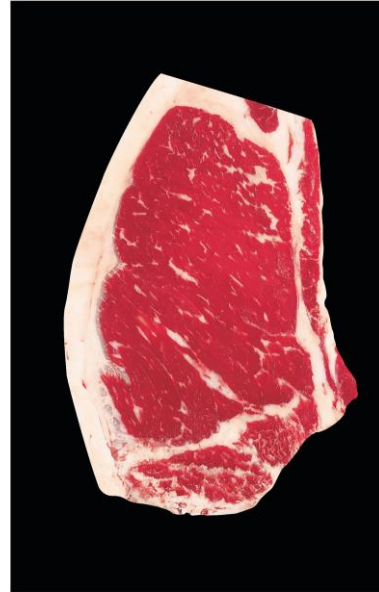
Slight (Sl<sup>+</sup>)



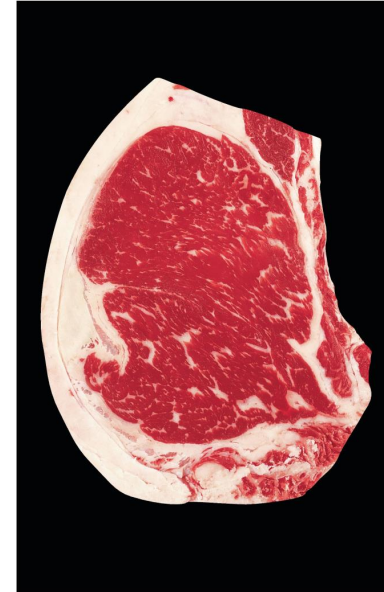
Small (Sm<sup>+</sup>)



Modest (Mt<sup>+</sup>)



Moderate (Md<sup>+</sup>)

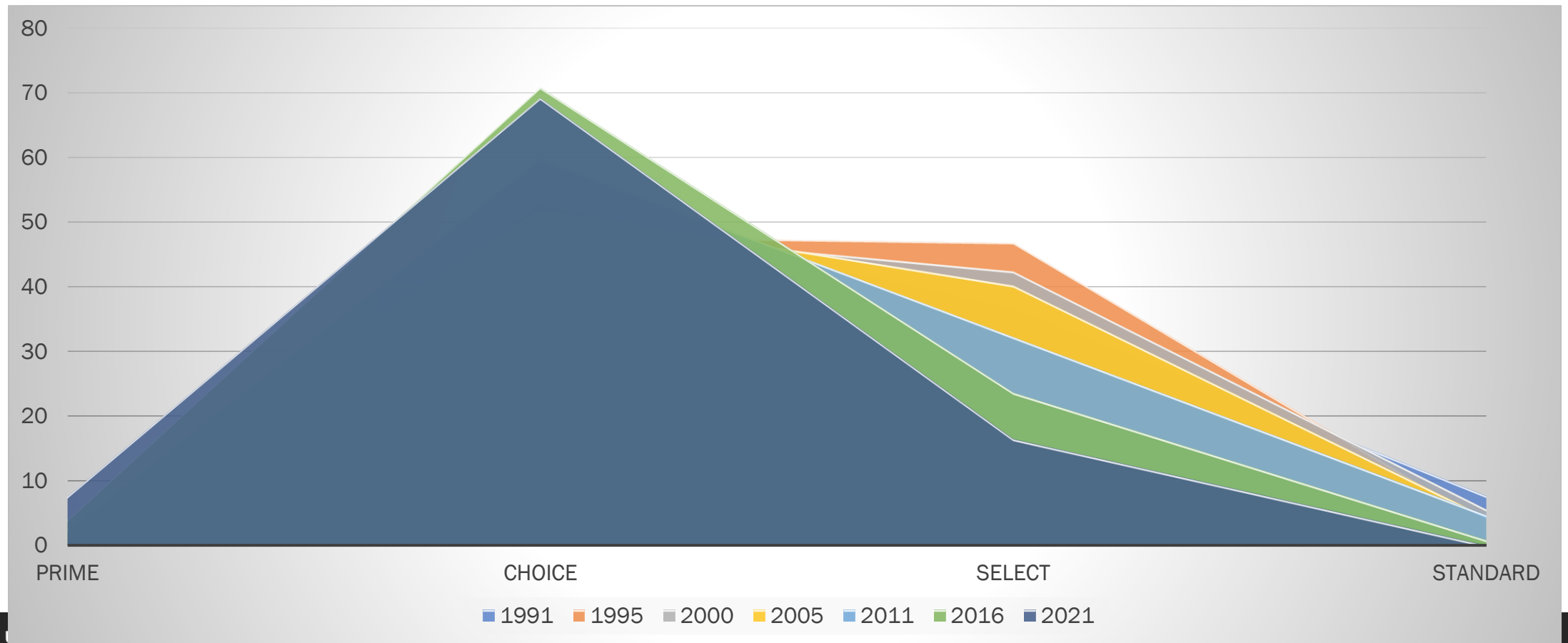


Slightly Abundant (SlA<sup>+</sup>)

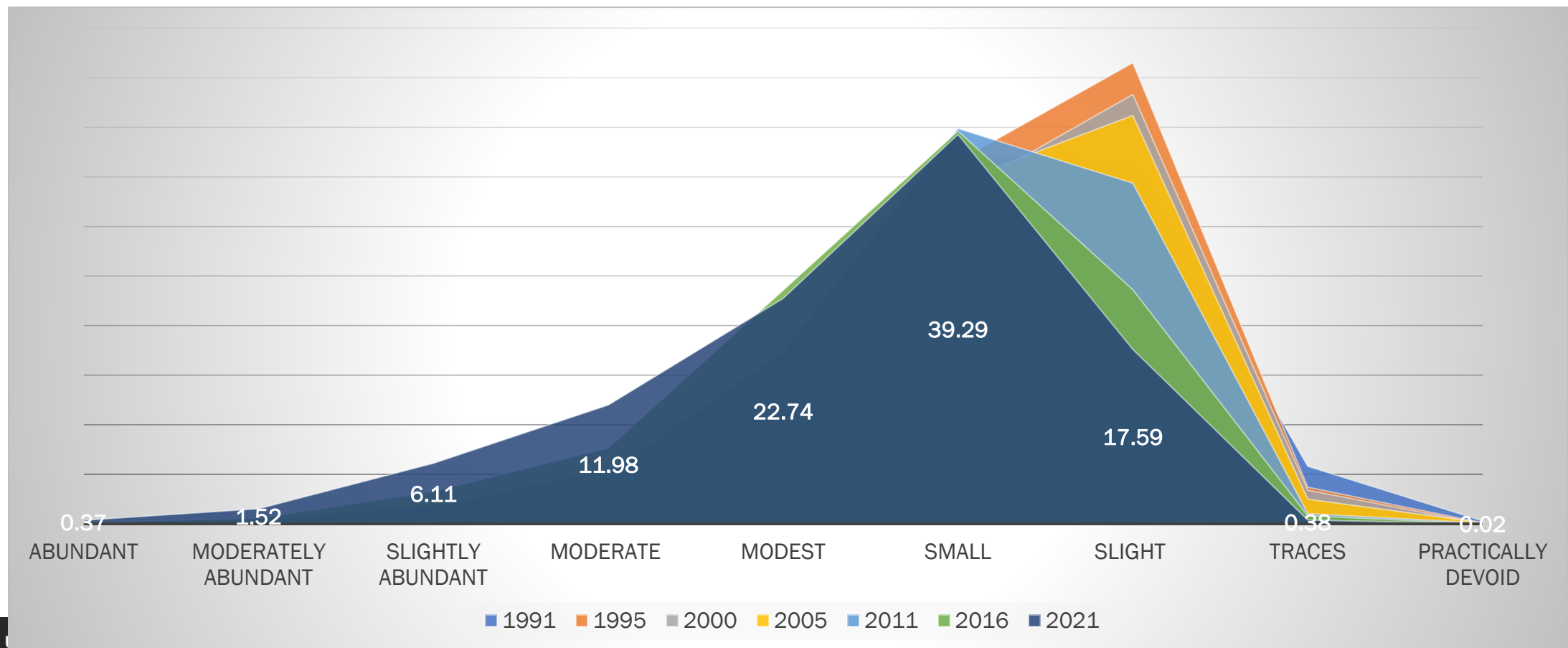


Moderately Abundant (MdA<sup>+</sup>)

# USDA Quality Grade Distribution

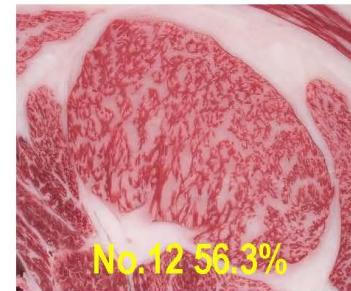
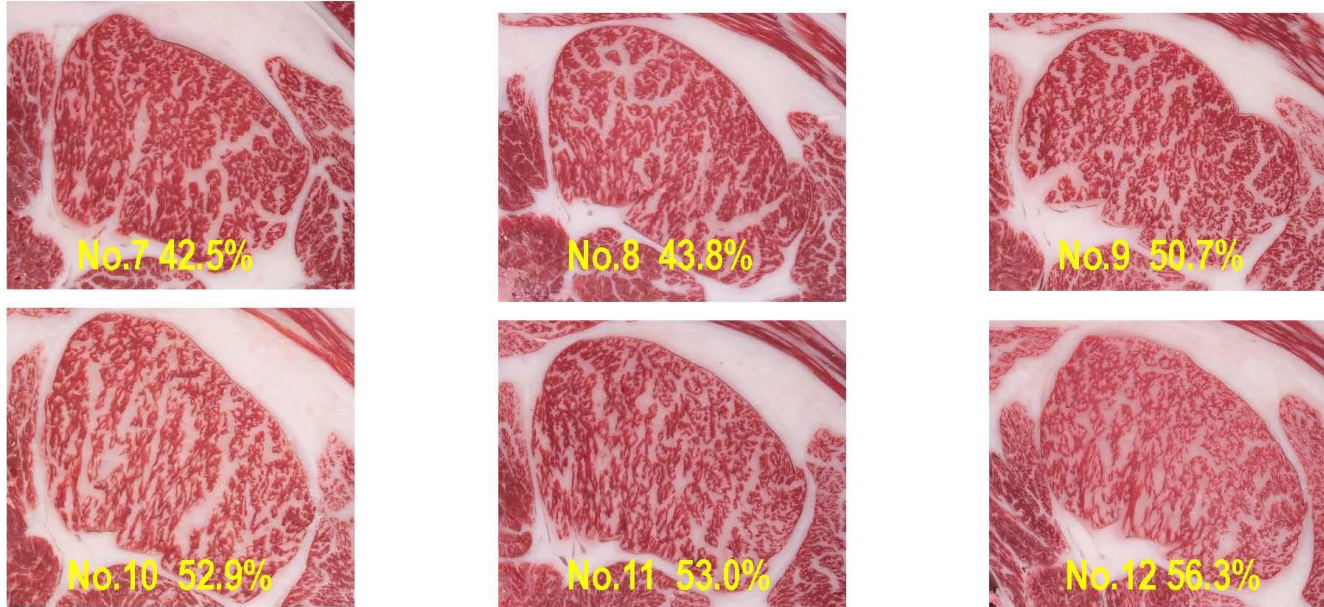
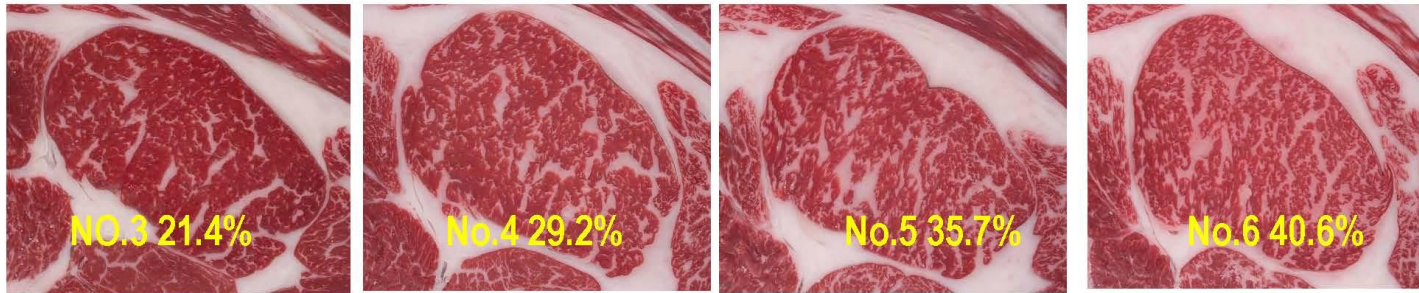


# USDA Marbling Score Distributions





## New Beef Marbling Standard from 2008 - JMGA



Each marbling chip shows the **minimum IMF%** required to achieve each BMS number

6<sup>th</sup> rib conversion to 12<sup>th</sup> rib (.66)

BMS	IMF% adj	IMF% adj pub.	USDA Grade
3	13.9	6	Ch-
4	19	9	Ch+
5	23	12	Pr-
6	26	14-17	Pr
7	28	18-21	Pr+
8	29	22-24	Pr+
9	33		
10	35		
11	35		
12	37		

Meat Sci. 38 (1994) 361-364

Meat Sci. 40 (1995) 211-216



# A new grid to assess meat quality in France

**C. Denoyelle**

**A. Nicolazo de Barmon**

**I. Legrand**

**J. Normand**

**Meat quality department**

**UNECE – 28/09/22**

# Context

- Meat marbling, a dilemma for consumers !

Marbling  
level

Low



Medium



High



Raw meat  
packed

75 %

75 %

40 %

After the  
tasting

35 %

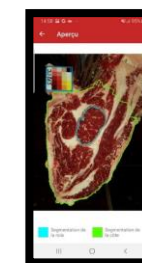
55 %

65 %



# Conclusion

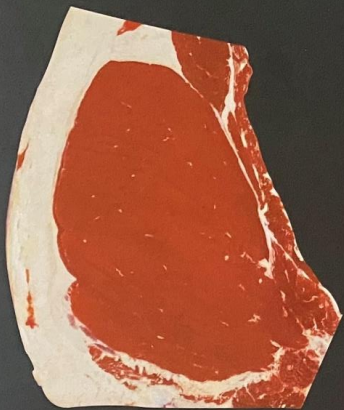
- Marbling : major roles in meat quality
- New French grid is available
- Development of marbling instrumental measurement (research in progress)
- Development of on farm strategies to increase marbling (research in progress)





Developing USDA Marbling Photos  
(Left to Right) Ken Johnson, Russell Cross, Gary Smith, Herb Abraham





Slight (Sl)

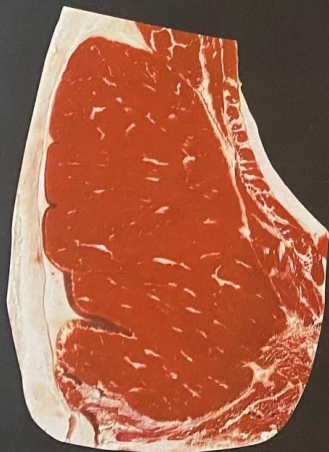


Slightly Abundant (SlA)



Small (Sm)

1.65  
1.52  
1.45  
1.02



Small (Sm)



Moderate (Md)



Moderately Abundant (MdA)

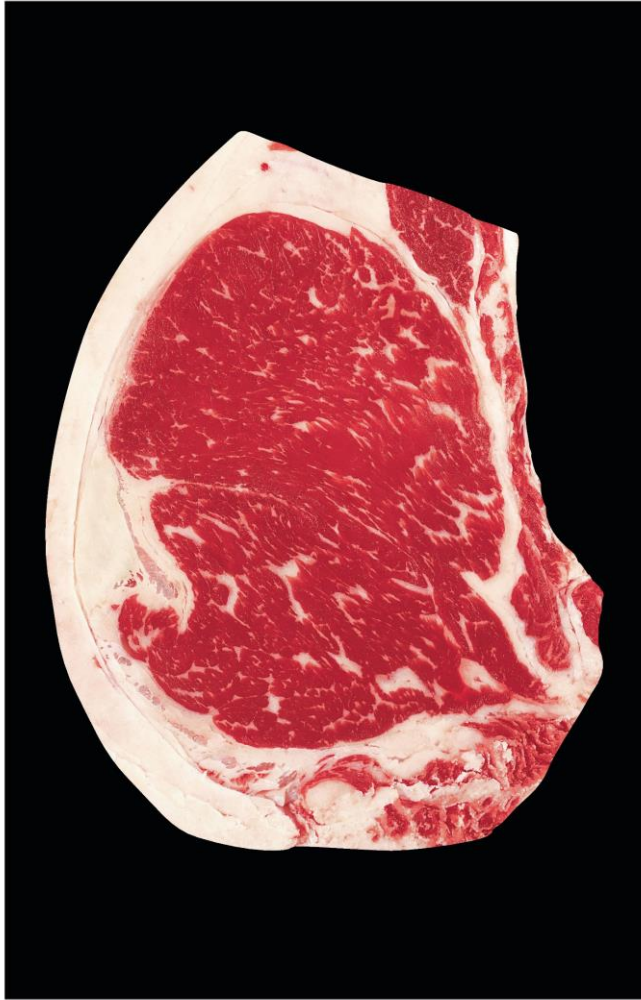


Modest (Mt)



# USDA Quality Grade – Minimum requirement

## PRIME

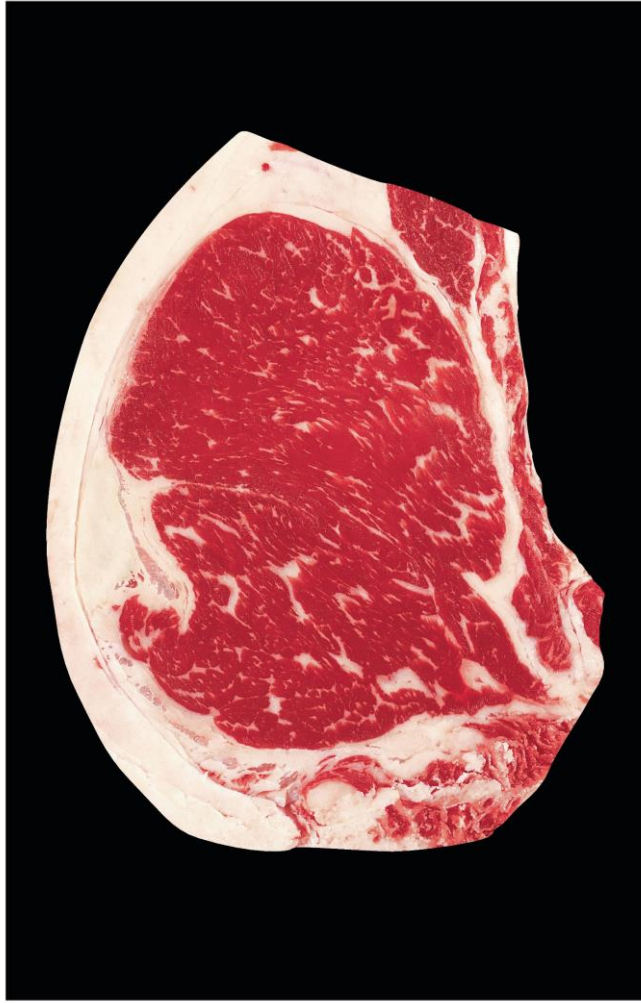


Slightly Abundant (SIA°)

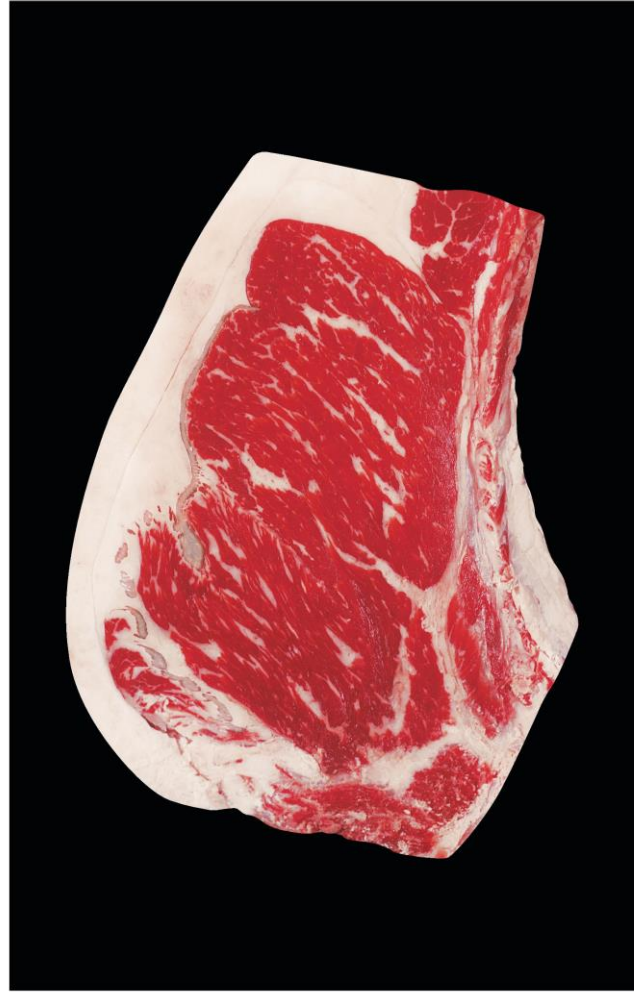
- Ribeye is light red in color
- Ribeye has fine texture
- Ribeye is moderately firm
- Ribeye has “slightly abundant” amount of marbling

# USDA Quality Grade – Marbling standards

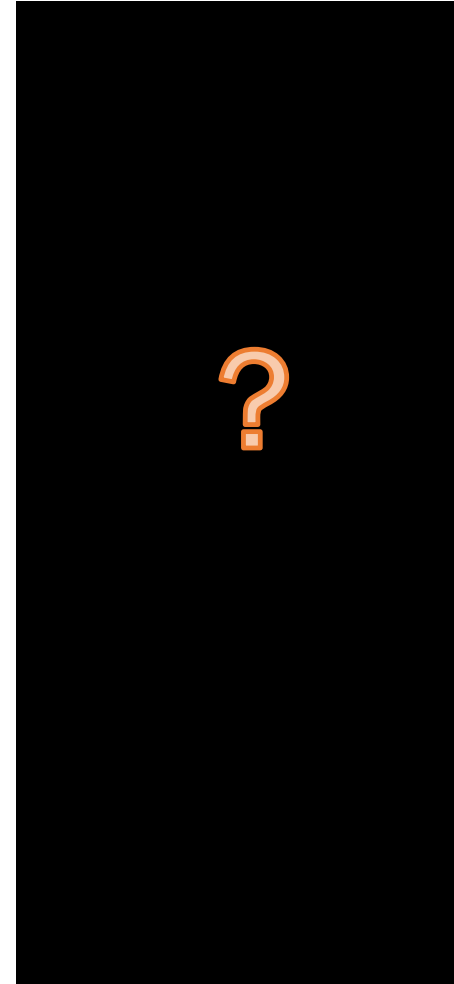
**PRIME**



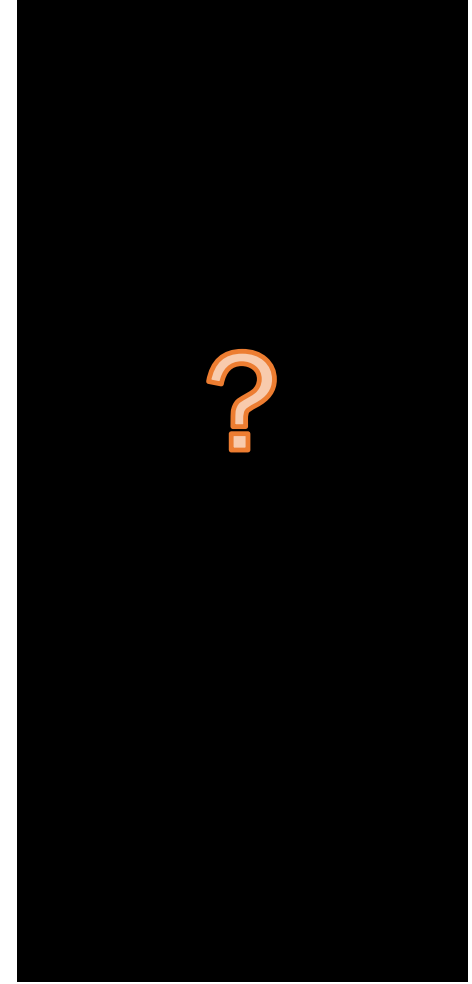
Slightly Abundant (SIA°)



Moderately Abundant (MdA°)



Abundant



Very Abundant

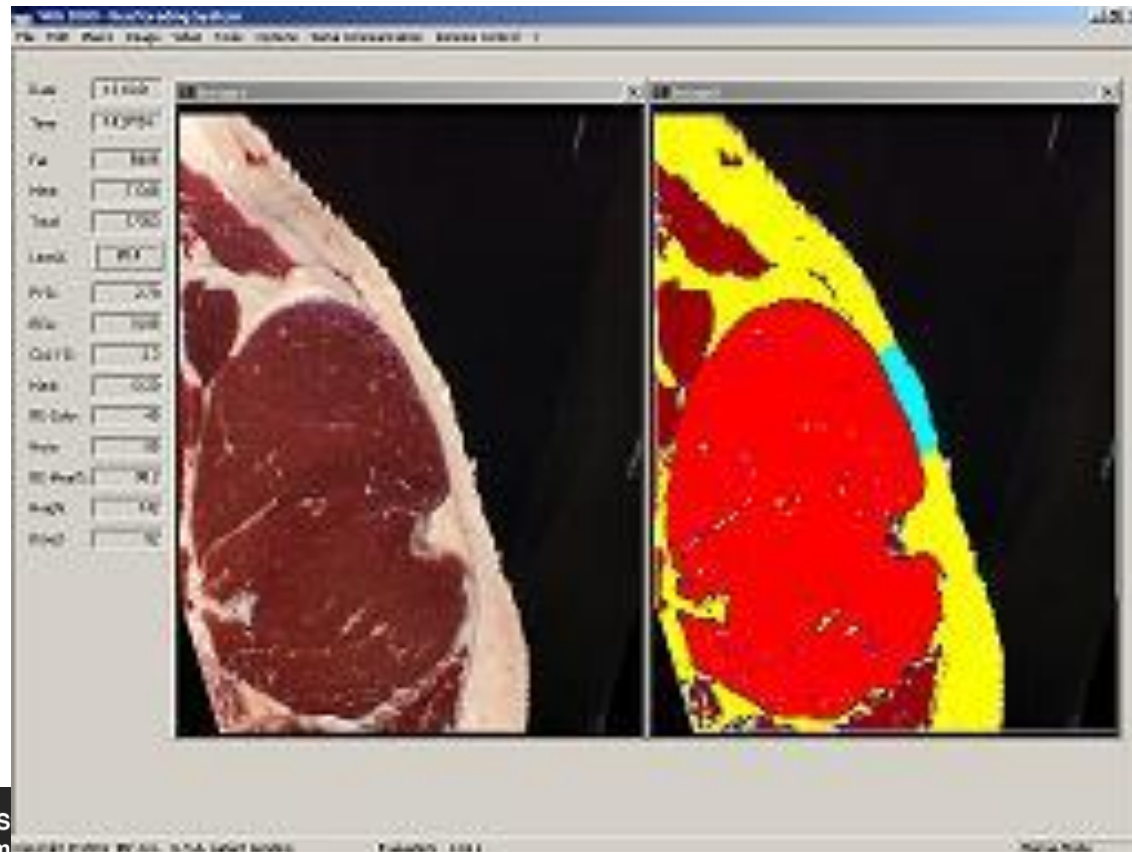
# Instrument Grading- Now & In the Future

- AMS is committed to the use of technology to enhance our services.
- By volume, 60% of USDA-graded beef is evaluated with the use of an approved instrument.
- Partner with American Meat Science Association to review validation procedures.
- Over the past year, AMS has increased in-plant supervision and correlations with graders.





# Two Instruments Originally Approved

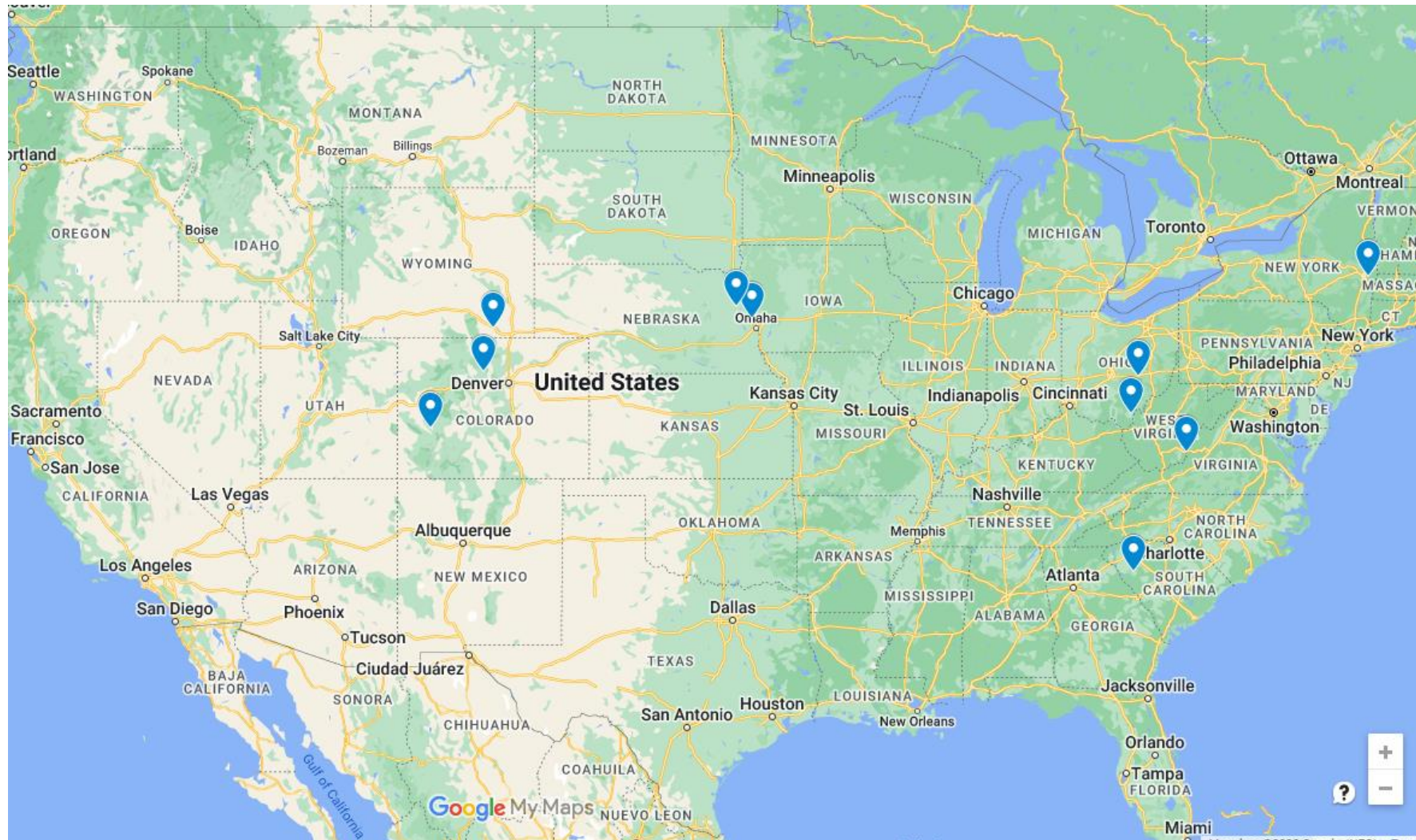


E+V  
RMS

# Camera Grading – Revised Procedures

- Instrument Approval Process
  - Instrument Installation Process
  - Continual Monitoring
- 
- Instrument Approval Process Addendum A
  - Continual Monitoring Addendum A
  - Response to Miscellaneous comments

# Small Plant Grading Pilot





# Small Plant Grading Pilot

## 3 KEY Elements

### Image acquisition

- Cost of System
- Image acquisition quality
- Distance, Angle, Lighting

### Data exchange

- Web Portal based
- Payments
- Data management

### Verification activities

- Validate images
- Accuracy of grade application
- Integrity of the grade

# Small Plant Grading Pilot

## Challenges

- Virtual component
  - Accuracy
  - Trust
  - Transparency
  - Security
- 
- Currently working with 10 plus small plants

# Instrument Overview

- E+V Handheld
- MIJ
- MEQ

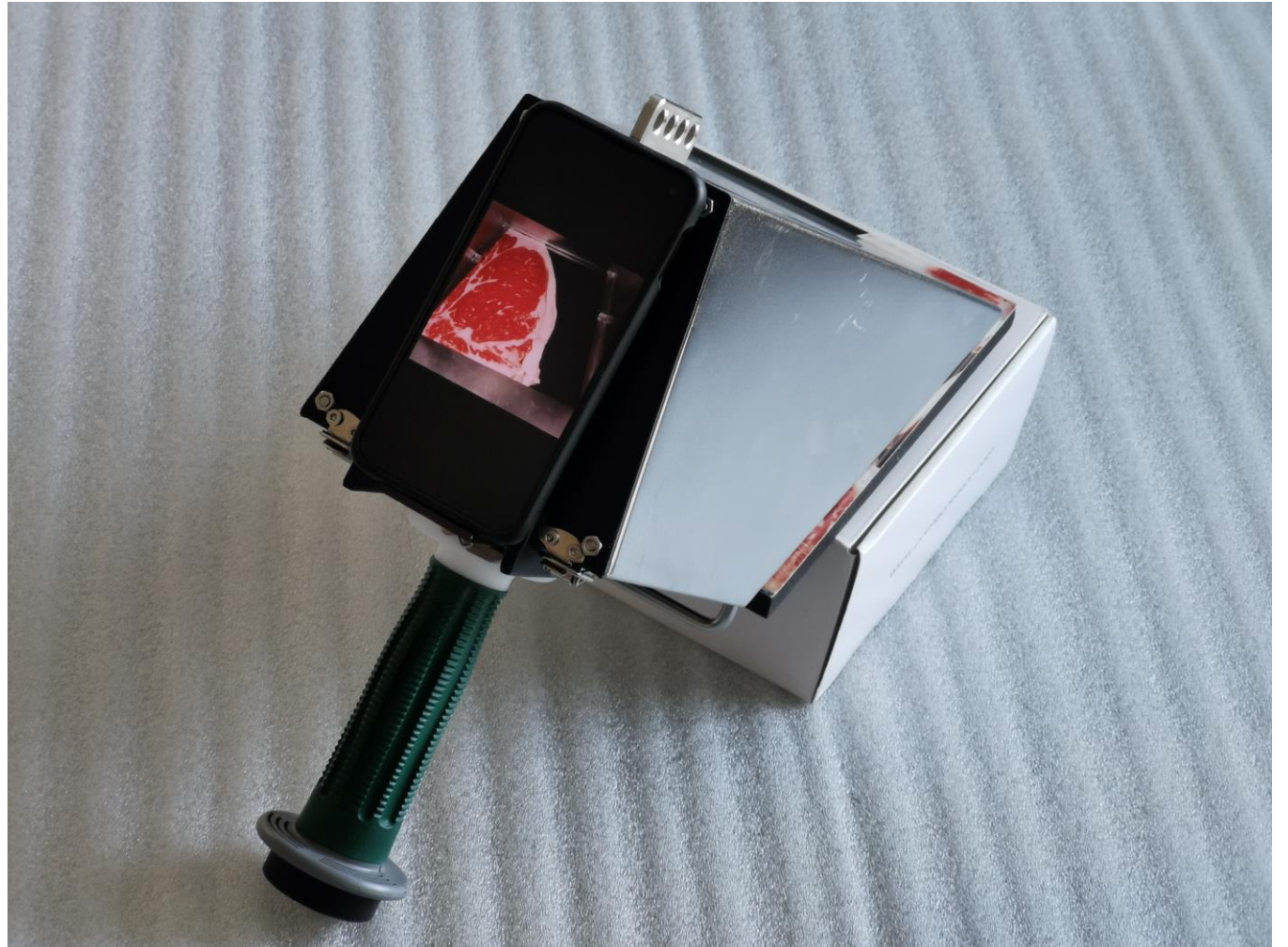




# Small Plant Grading Pilot – E+V Handheld



# Small Plant Grading Pilot – E+V Handheld

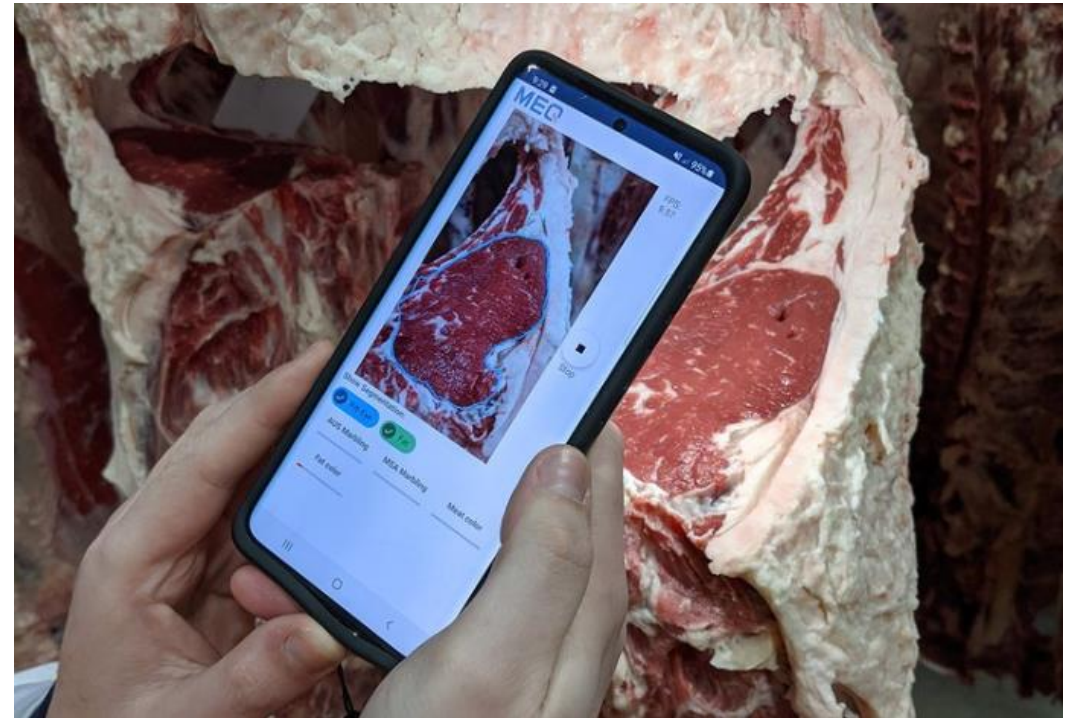




# Small Plant Grading Pilot - meqprobe.com

## Camera App

The MEQ Camera provides cold carcass yield and eating quality measures. Measures such as Rib Eye Area, Marbling, IMF%, and much more. The camera can be used on its own or as a compliment to the MEQ Probe.





# Small Plant Grading Pilot – MIJ meatimaging.com

## What is Meat Imaging?

The MIJ (Meat Image Japan) camera app can bring your program to another level and unite the Wagyu breed with consistent, objective analysis precisely creating a uniform grading system.

Wagyu breeders can use this tool to change the beef industry as we know it.

Please take the time to look at our videos and do not hesitate to contact me if you have any questions.



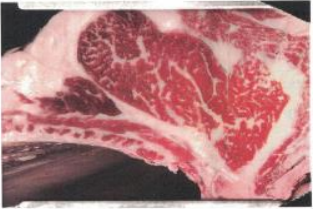
# Small Plant Grading Pilot - MIJ

2019/9/3 MIJ Carcass Image Database

Home Detail : 2019-09-02 05:52:13 / 048

MIJ Carcass image Database Upload Admin Logout

Prev Return to list Next



Cross section

User	
Taken at	2019-09-02
Body no.	048
DMp	33.20%
DMf	65.53
DMa (cm2)	87.18
DMs	9.40
Coarseness Index	18.74%
Coarseness Index 1-5	10.26%
Coarseness Index 1-10	14.44%
Coarseness Index of maximum marbling particle	4.48%
Rib eye principal axes ratio	0.483
Rib eye complexity	1.264
Rib eye binarization threshold	90
Rib eye major principal axis length (cm)	14.77
Rib eye minor principal axis length (cm)	7.14
Fineness grains count	136
Fineness index	1.560
Average of lean (R)	165.39

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# Small Plant Grading Pilot – Frontmatic's Q-fom





# Small Plant Grading Pilot – Frontmatic's Q-fom

## Q-FOM™

Q-FOM™ Beef is a shroud-less and cordless grading camera with an ergonomic design made for the specific purpose of fast and accurate grading of meat both in-chiller and at grading stations.

With Q-FOM™ you get:

- Marbling and other sorting parameters measured at the press of a button
- User-friendly and ergonomic design for speedy and error-free operation
- Plant IT integration and data management (GO MES)
- AMILSC conditional approvals obtained and permanent approval applications under evaluation

# Small Plant Grading Pilot – USDA APP



## Upload a photo

While making a photo, make sure that:

1. The image is clear.
2. There is no glare in the image.
3. The beef is vertically aligned and takes up most of the image.
4. There is no empty space above or below the beef.

View History & Download

Take photo

Choose from camera roll



Name:

44d0d146-c0b1-46b0-ba05-ca4e36acc9ae.jpg

Score: 830

USDA Prime

Edit score

Upload another photo



# Small Plant Grading Pilot



Michael.Dobernecker@usda.gov



402-281-8729

- Questions? Comments?

- For additional information, visit

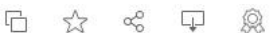
- <http://www.ams.usda.gov>

- [bucky.gwartney@usda.gov](mailto:bucky.gwartney@usda.gov)


- 202-768-0659

# L&P Meat Grading Dashboard (Beef, Lamb, and Veal)

L&P Meat Grading Dashboard (Beef, Lamb, and Veal) by [USDA Agricultural Marketing Service \(AMS\) - Livestock and Poultry Program](#)




[AMS LP Landing Page](#) [National Grading Summary](#) [Regional Beef Grading](#) [Grade Data](#) [Beef Grade Timeline Comparis...](#) [Beef Head Count Graded](#)



Agricultural Marketing Service  
Livestock and Poultry Program  
Quality Assessment Division

Beef, Lamb, and Veal Grading Dashboard

Data as of 8/5/2023



**\*\* Data Disclaimer** - Data is updated weekly on first business day. Data is subject to change. Metrics shown are weighted averages over the timeframe selected.\*\*

## Background

USDA's Agricultural Marketing Service - Livestock and Poultry Program developed a data visualization tool housing Beef, Lamb, and Veal quality grade information available in a dynamic and easily accessible format. Through this tool you have access to over 10 years worth of data which can be viewed over timeframes from an individual week to multiple years and the information is available in a variety of formats both visual and numerical.

## Tutorials

[Navigation](#)

[Using Filters](#)

[Downloading Data](#)

## Questions

For feedback, questions, or further assistance please contact us: [LPdashboards@usda.gov](mailto:LPdashboards@usda.gov)

## Table of Contents

Click on buttons below to Navigate

- [National Grading Summary](#)
- [Regional Beef Grading](#)
- [View-Download Data](#)
- [Beef Grades Year Over Year Comparison](#)
- [Beef Head Count Year Over Year Comparison](#)

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# L&P Meat Grading Dashboard (Beef, Lamb, and Veal)

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AMS LP Landing PageNational Grading SummaryRegional Beef GradingGrade DataBeef Grade Timeline Comparis...Beef Head Count Graded

USDA

Agricultural Marketing Service  
Livestock and Poultry Program  
Quality Assessment Division

National Grading Summary

Data as of 8/5/2023

YEAR:2023

MONTH:(All)

WEEK END DATE:

Beef

Head Count Graded:14.26M

Head Offered:14.63M

Prime Volume:1.35M  
Choice Volume:10.76M  
Select Volume:2.04M  
Other\* Volume:0.47M

Prime Pct.:9.21%  
Choice Pct.:73.60%  
Select Pct.:13.95%  
Other\* Pct.:3.25%

Offered For American Angus Assn. Spec:73.46%

Certified Upper 2/3 Choice and Higher\*\*\*:33.01%

74.7%

13.7%

8.7%

71.5%

16.5%

8.2%

Quality grades of beef displayed on line graphs over time.

Lamb

Head Count Graded:452.95K

Head Count Offered:479.27K

Prime Volume:41.79K  
Choice\*\* Volume:411.16K

Prime Pct.:8.72%  
Choice\*\* Pct.:85.79%

89.9%

7.3%

85.3%

Quality grades of lamb displayed on line graphs over time.

Veal/Calf

Head Count Graded:72.44K

Head Count Offered:77.06K

Prime Volume:2.48K  
Choice Volume:69.85K  
Other\* Volume:0.11K

Prime Pct.:3.21%  
Choice Pct.:90.65%

92.3%

1.8%

85.8%

3.1%

Quality grades of veal displayed on line graphs over time.

Quality Grade Color Legend:

Prime

Choice

Select

\*Other grade information refers to any head offered to grade that were either not graded or not classified as the grades shown

\*\*Choice metrics for Lamb grading include 'Choice or Higher'.

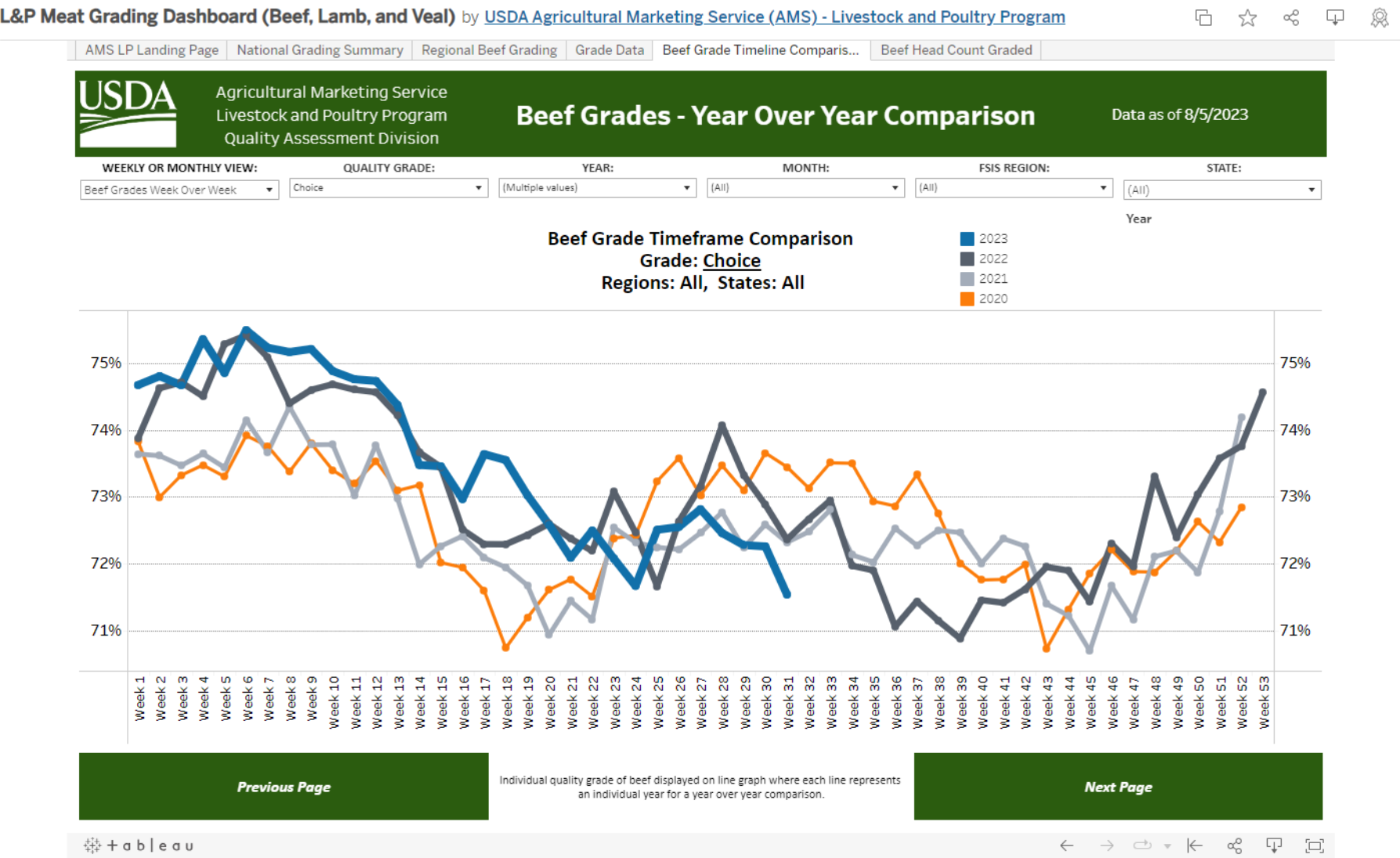
\*\*\* Upper 2/3 Choice and Higher is certified cattle meeting specification in relation to all prime and choice

Next Page

USDA

United States  
Department of  
Agriculture

# L&P Meat Grading Dashboard (Beef, Lamb, and Veal)



# What else is new?

- We continue to work with our industry and academic partners on projects impacting our programs
  - Effects of carcass temperature on camera assessments and bloom time
  - KPH assessment and impact on YG
  - IMF assessment, data and grade correlation
  - New marbling standards pictures
  - New grading instrument assessment
  - Marbling card proxy development

- Questions? Comments?
- For additional information, visit <http://www.ams.usda.gov>
- [ucky.gwartney@usda.gov](mailto:ucky.gwartney@usda.gov)
  - 202-768-0659

**Thank you**