


**NAVIGATING
PATHWAYS
to SUCCESS**

In-Plant Fed Survey



Overview

- Conducted approximately every 5 years:
 - National Beef Quality Audit - 1991
 - National Non-Fed Beef Quality Audit -1994
- Identify industry shortfalls and improvements to:
 - Improve beef quality
 - Minimize economic loss
 - Aid in advancements and research



NBQA-2022: Harvest-floor Assessments (September 2021-November 2022)

- Transportation and cattle mobility
- Animal identification method
- Hide color
- Hide brand
- Mud or manure
- Cattle horns
- Carcass bruises
- Offal and head/tongue condemnations
- Dentition

In-Plant

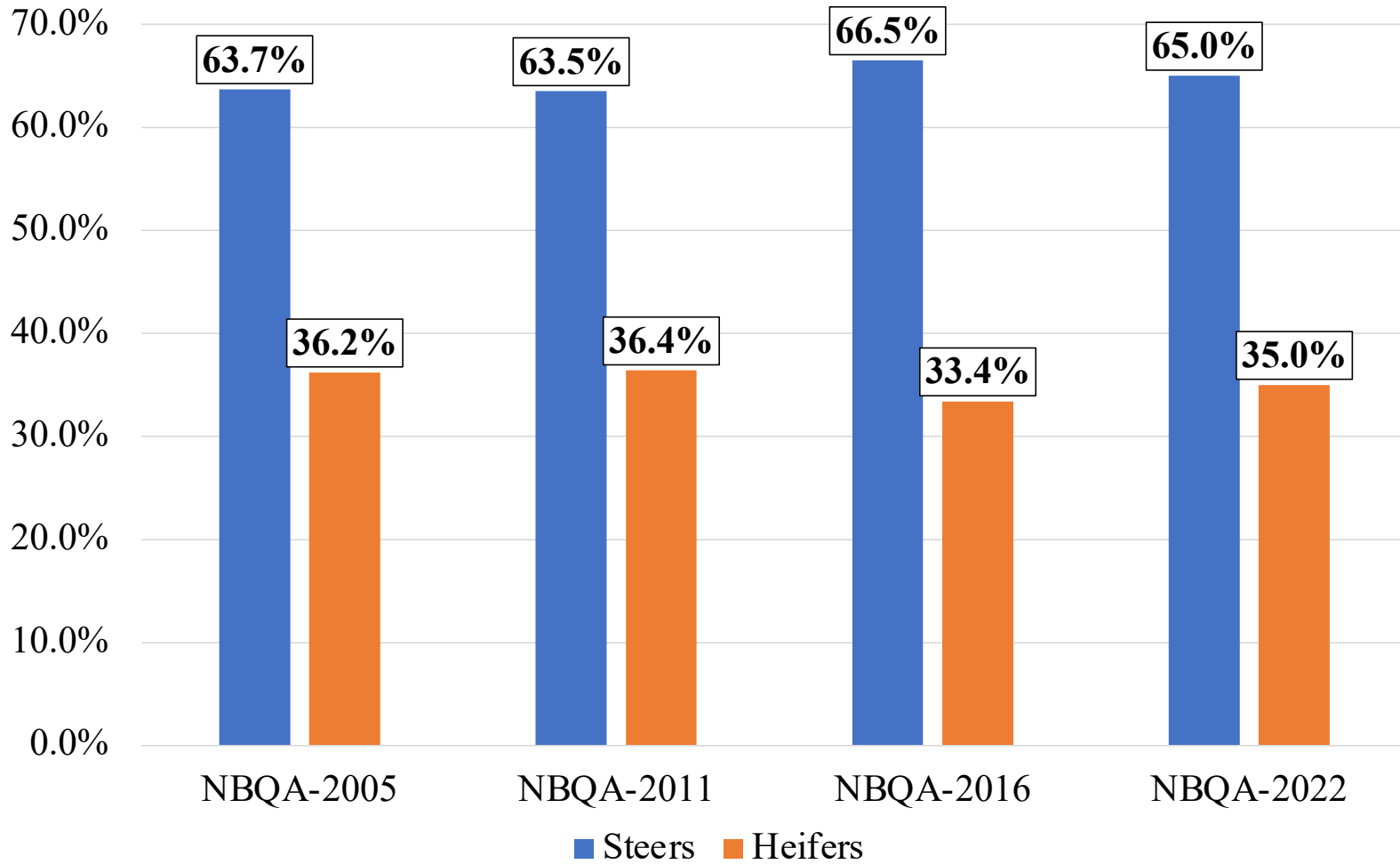
- $n = 9,746$ fed beef carcasses
- Data were collected from September 2021 to November 2022
- 35 Plants
- 10% of the day's production



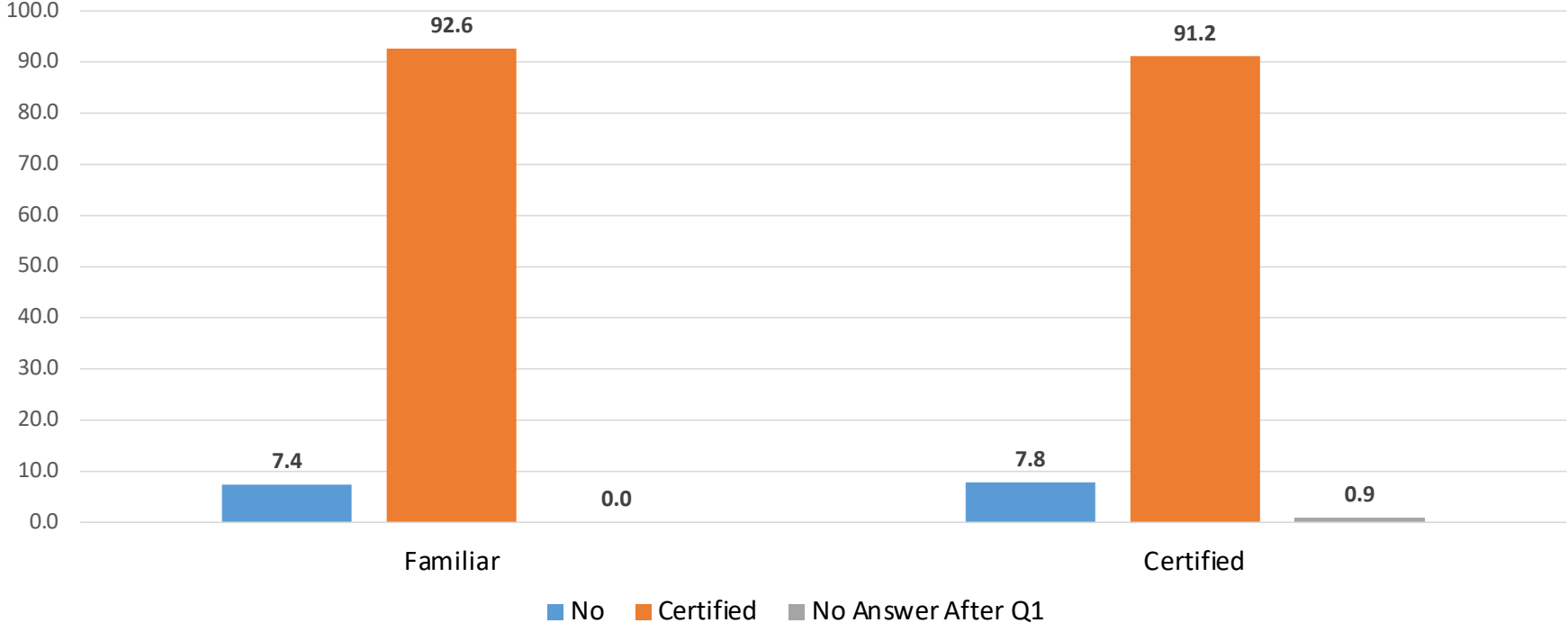
BEEF



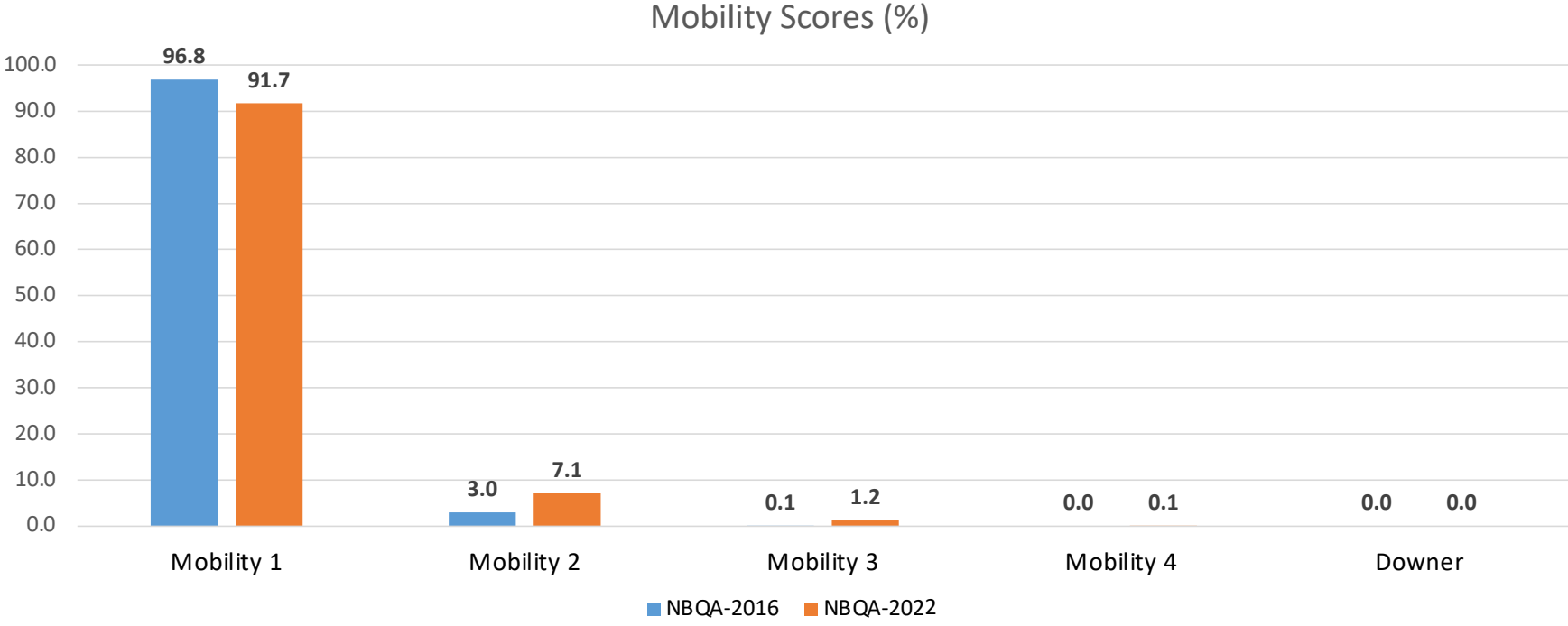
Steers and Heifers



BQA Transportation



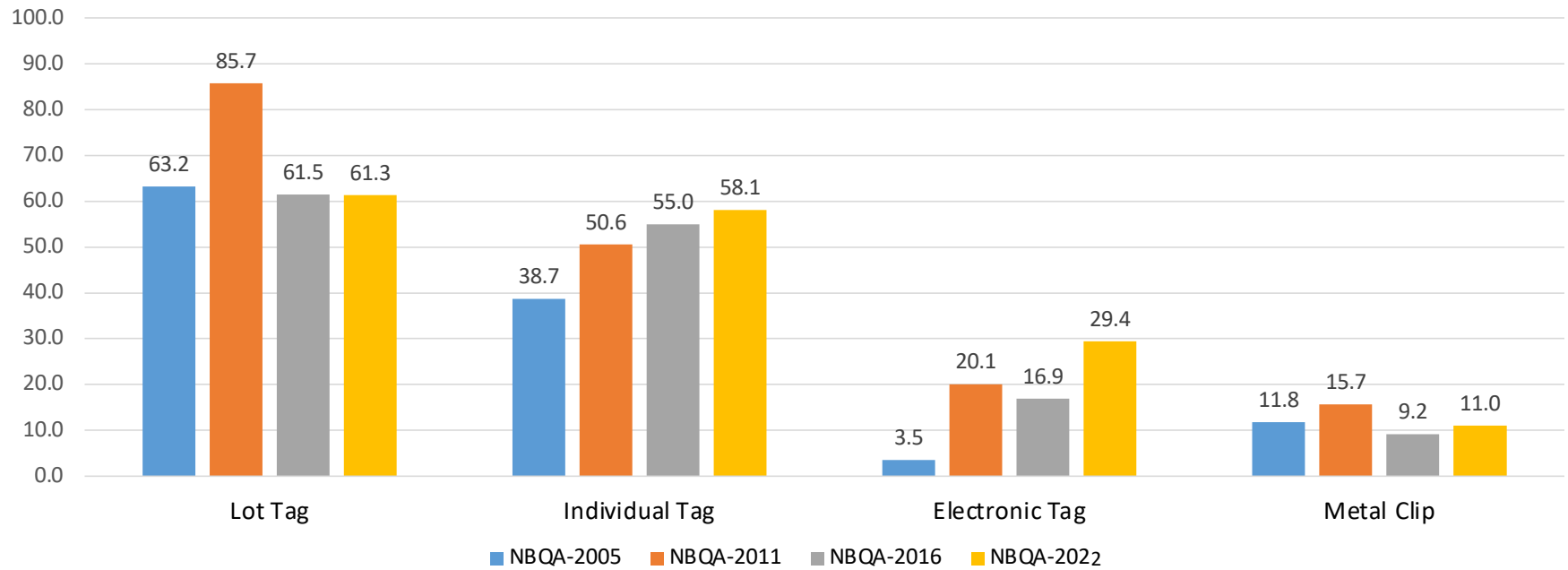
Cattle Mobility



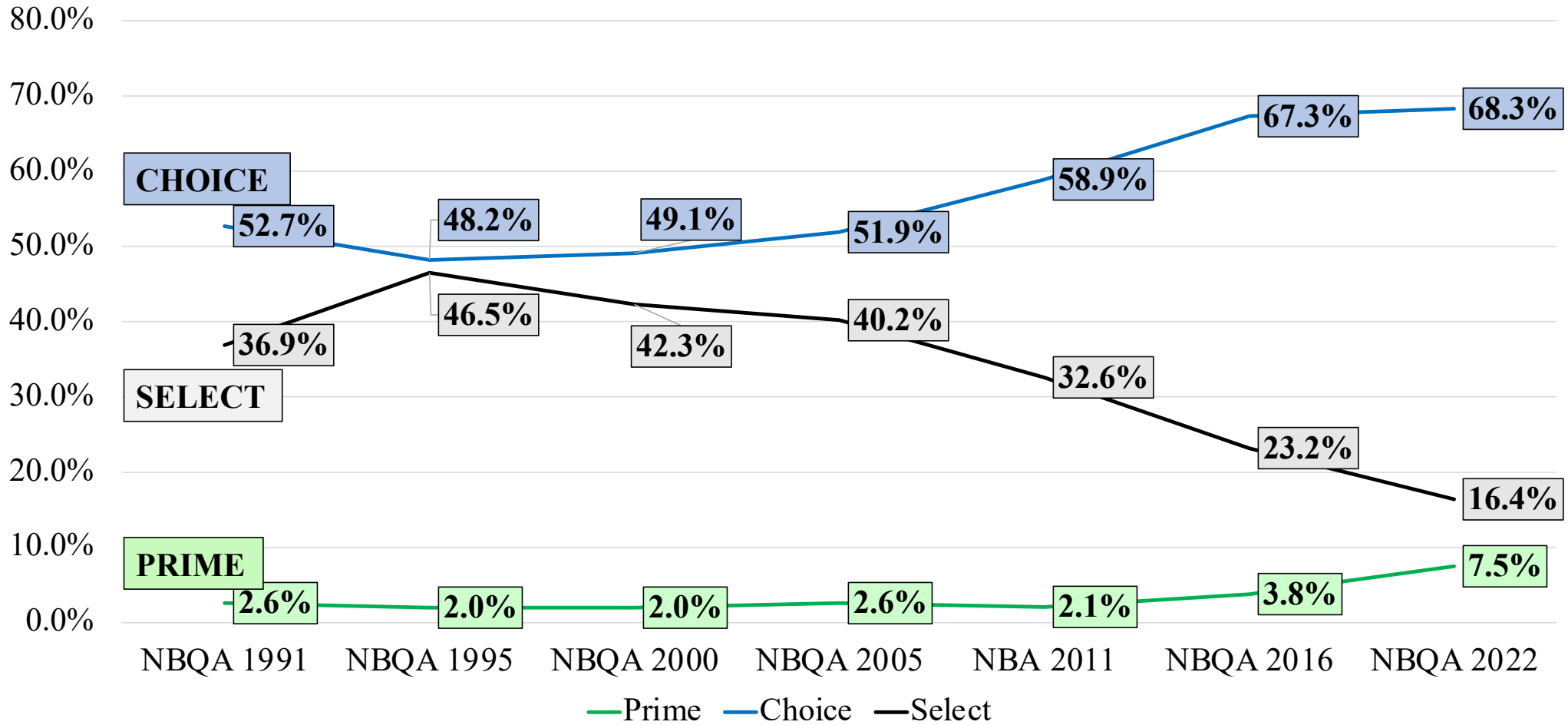
Types of Identification



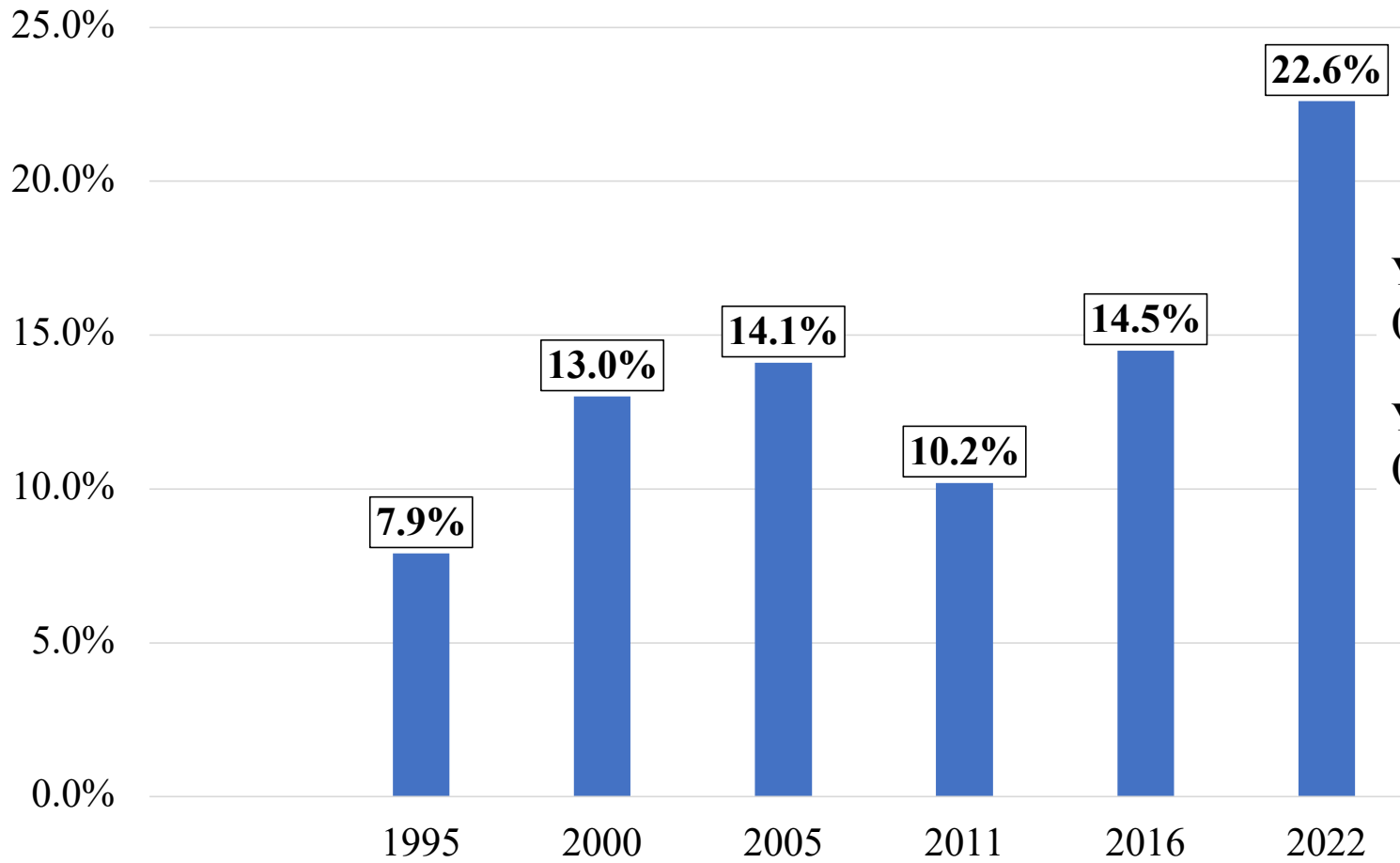
Type of ID (Top 4)



Changes in QG over Time



USDA Yield Grades 4 and 5



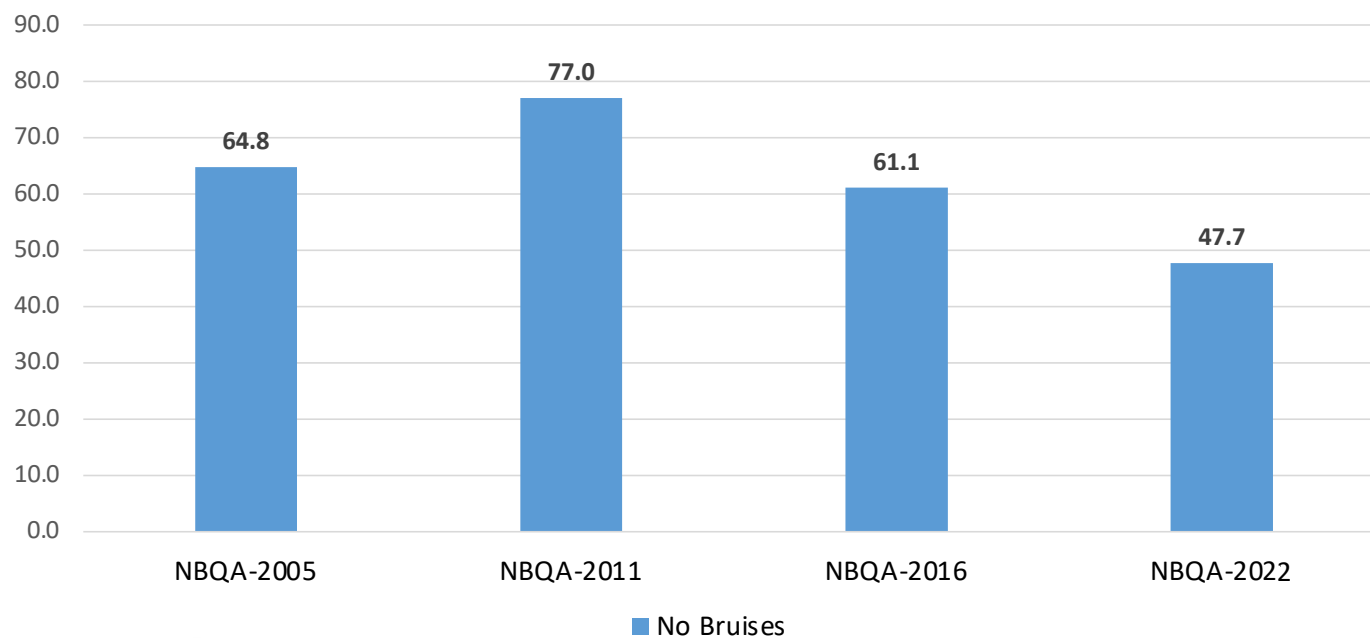
Yield Grade 4: 17.0%
(+5.0% from 2016)

Yield Grade 5: 5.6%
(+3.1% from 2016)



Carcasses Without Bruises

No Bruises (%)



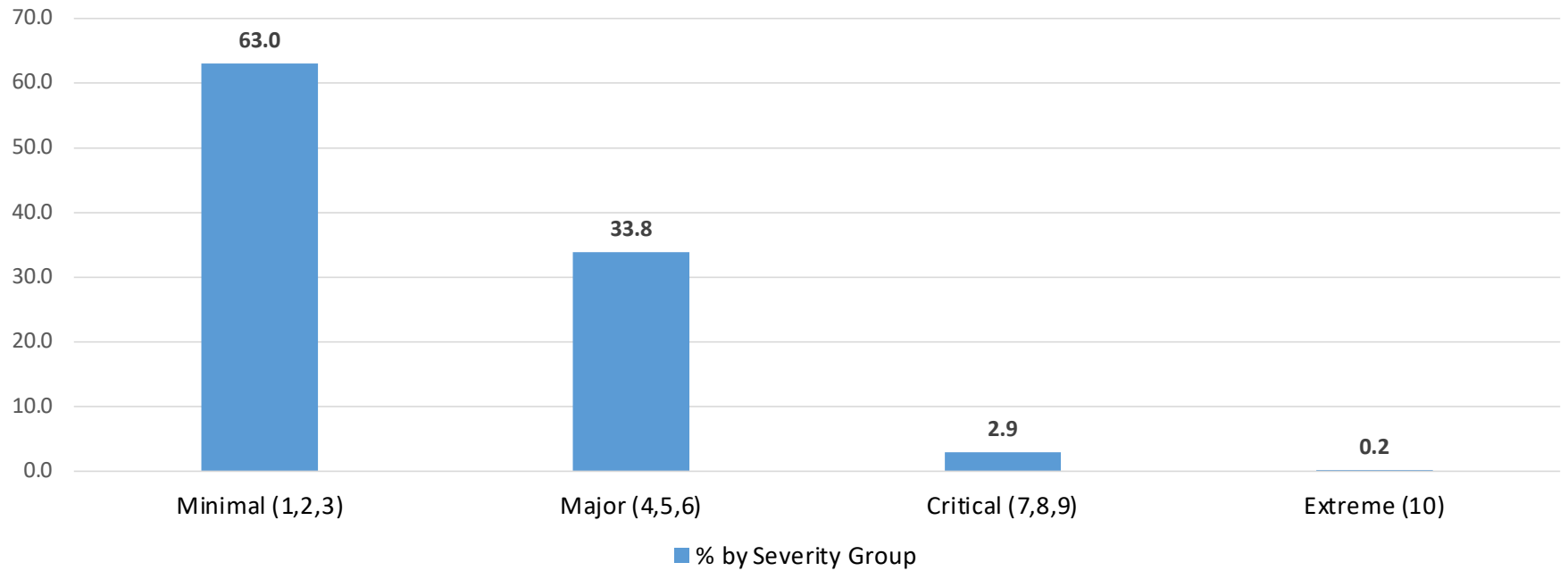
(Lee et al., 2017)

Bruise Size Key:

Minimal (<1 lb-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		

Bruise Severity (% of bruises observed)

Bruise by Severity Level



Bruise Size Key:

Minimal (<1 lb-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
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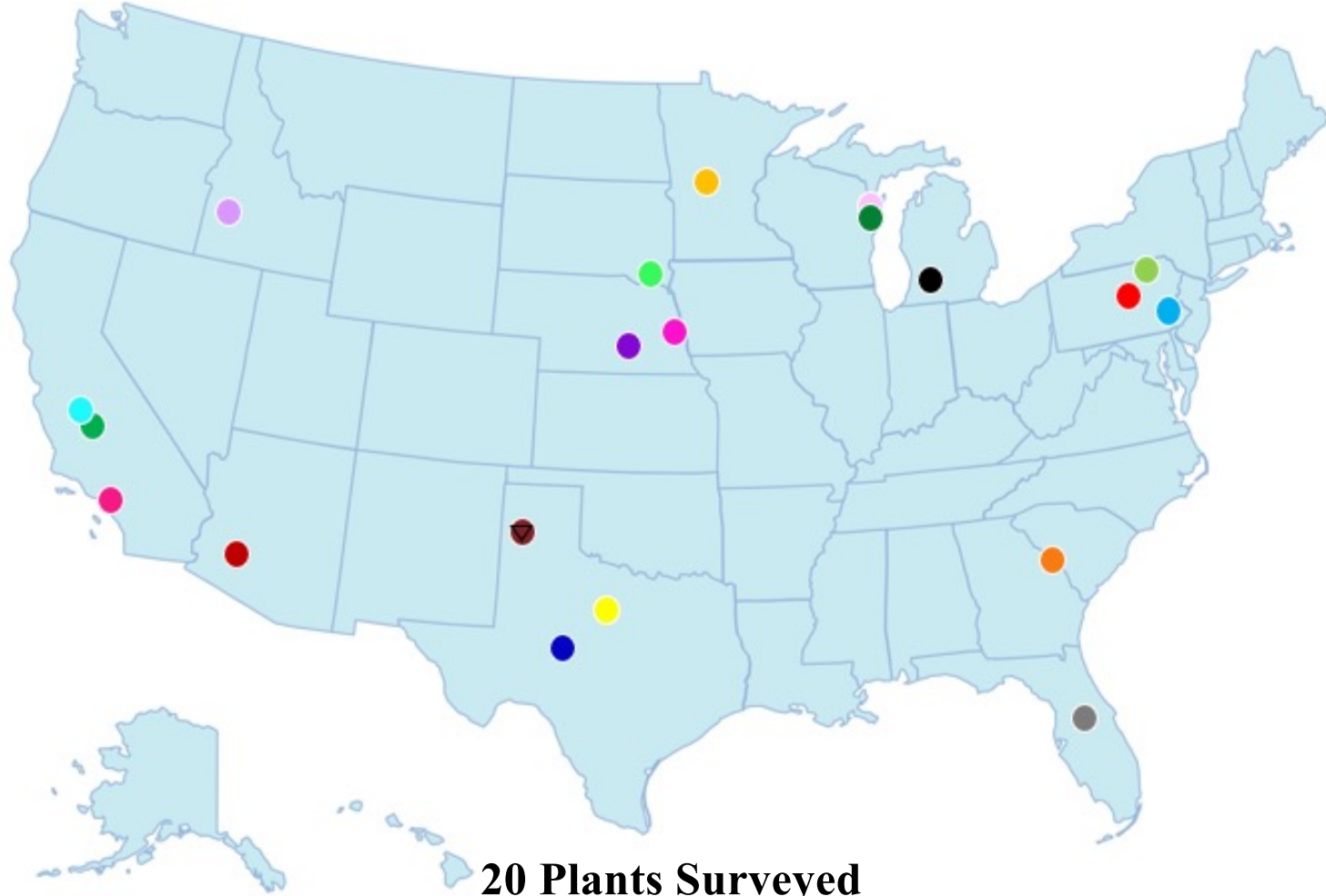
2022 National Market Cow and Bull Beef Quality Audit

Texas A&M University

Sydni E. Borders



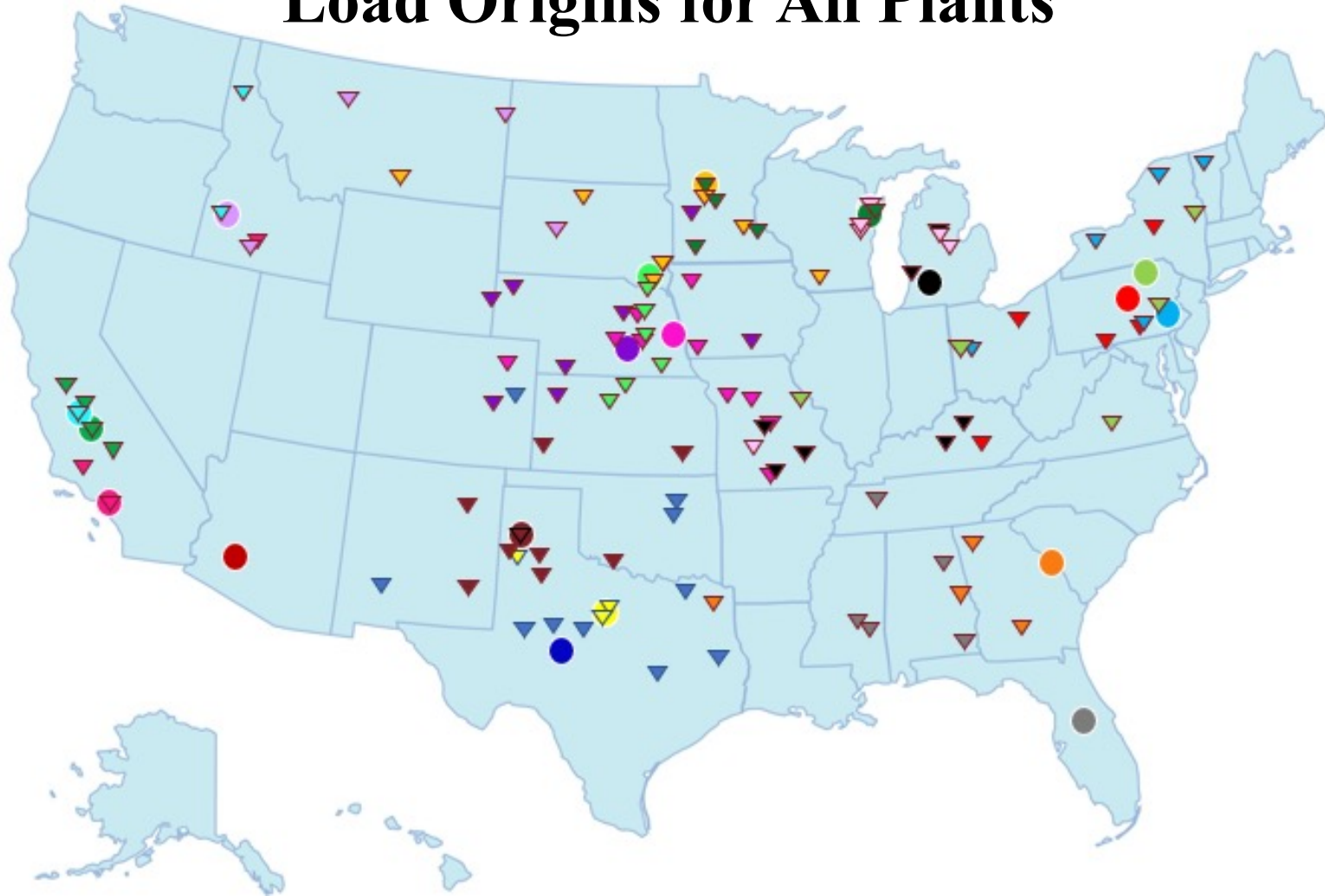
Market Cow & Bull Plant Locations



Transportation



Load Origins for All Plants



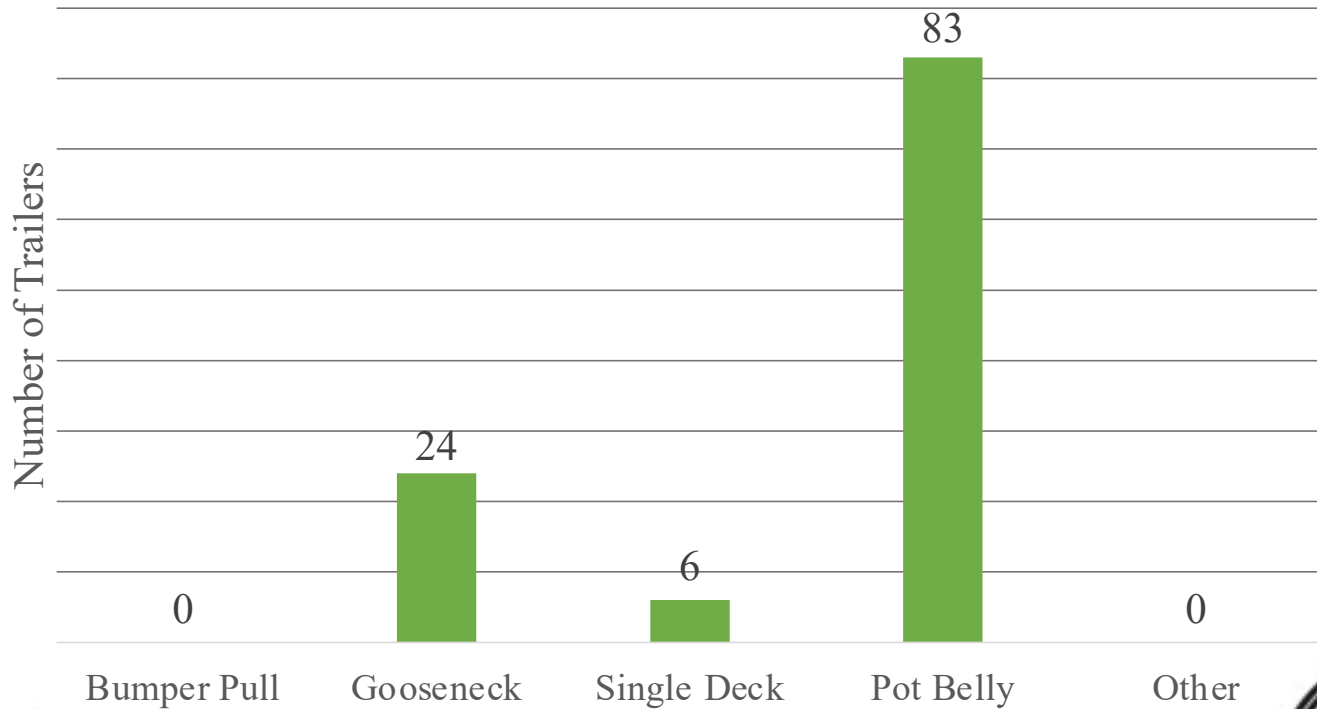
Mean Values for Time and Distance Traveled, Number of Cattle in the Load, Trailer Dimensions and the Subsequent Area Allotted Per Head for All Trailer Types Surveyed

Transportation characteristics	<i>n</i>	Mean	Std. Dev.	Min	Max
Time traveled, h	114	6.3	5.5	0.1	24
Distance traveled (miles)	112	304.8	254.0	2.0	1,099.8
Number of cattle in load	123	27.2	12.9	1	49
Number of compartments used	119	4.0	1.7	1	8
Trailer dimension (sq ft)	102	380.0	119.2	3.2	451.0
Area allotted per head (sq ft)	102	25.5	37.9	8.7	221.0

Recommended:
11.8 – 18.3 – polled
12.9 – 19.4 - horned



Trailer Types Surveyed

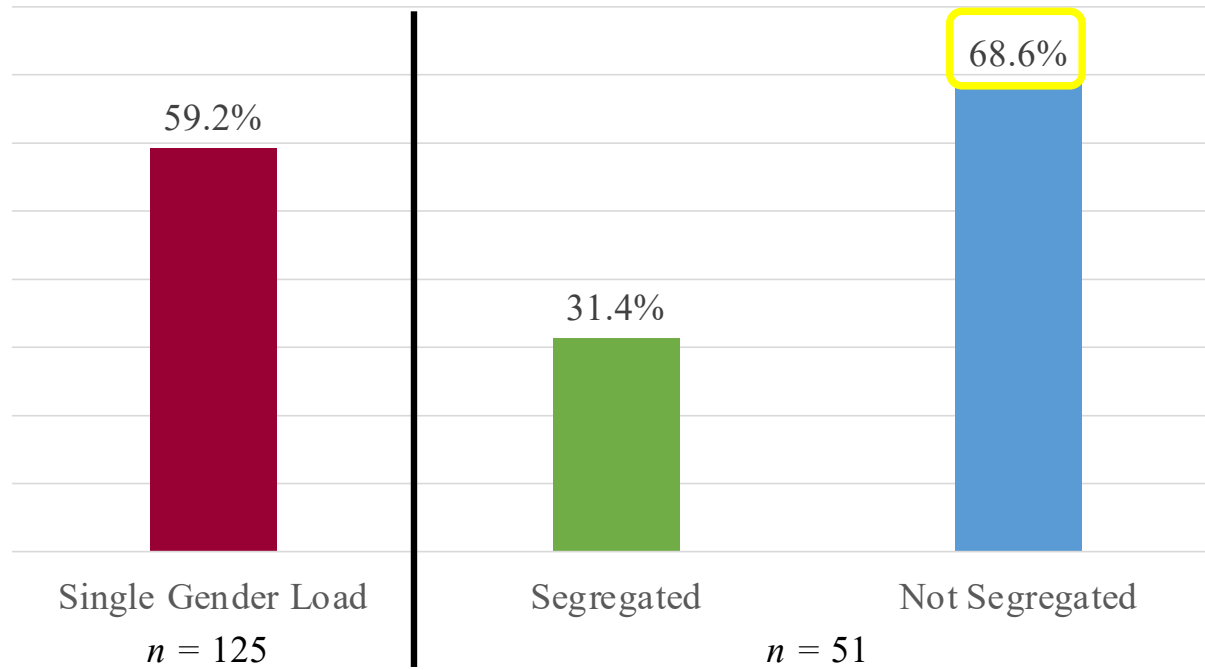


Percentages:
Pot Belly – **73.5%**
Gooseneck – **21.2%**
Single Deck – **5.3%**

$n = 113$



Percentage of Mixed Gender Loads that Segregated Bulls from Cows for Hauling



2016: 64.4%
2007: 66.7%

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Use of Compartments

Front Upper
50.0%

Center Gate
56.5%

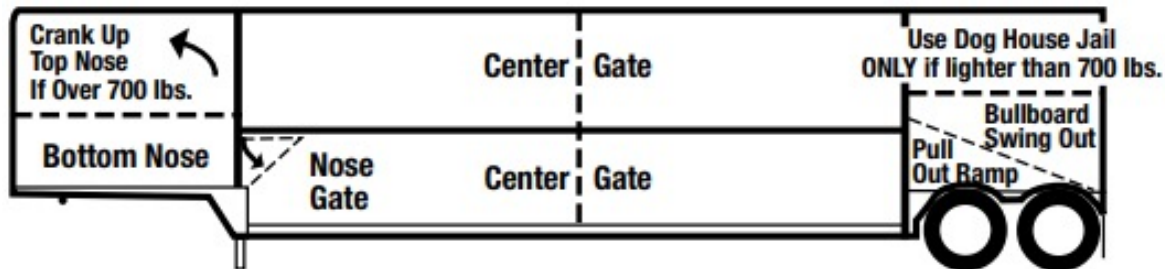
Rear Upper
36.1%



63.5% in 2016

15.9% in 2007

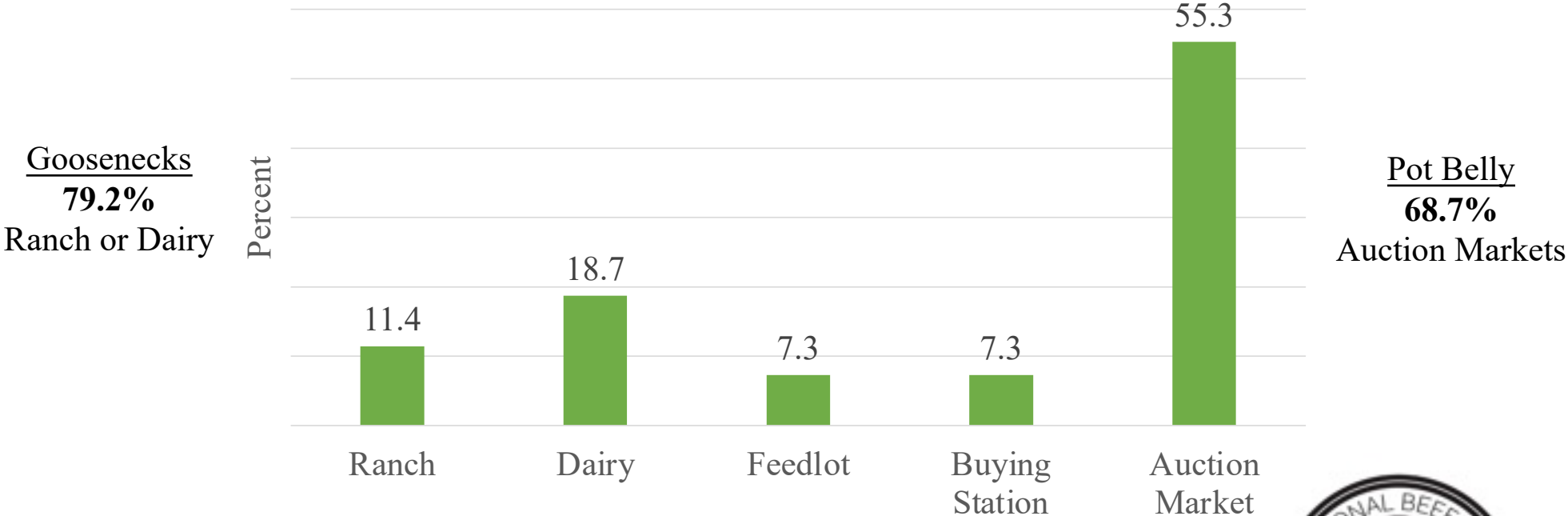
10.8% in 2016



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Location of Origin



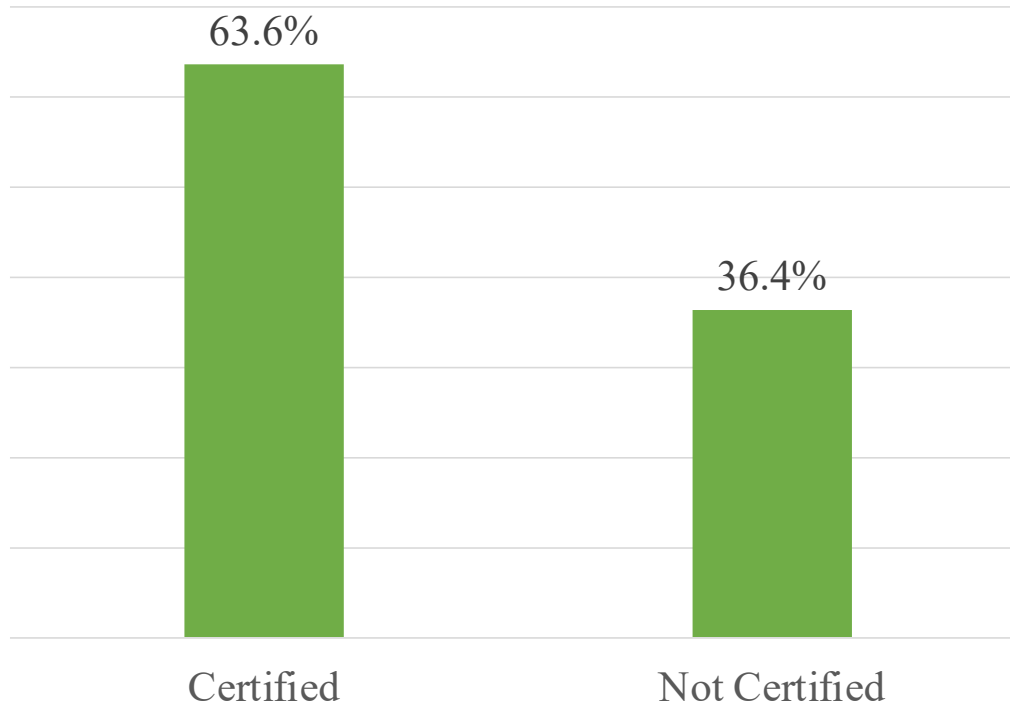
Goosenecks
79.2%
Ranch or Dairy

Pot Belly
68.7%
Auction Markets

n = 123



Beef Quality Assurance



Certified

Not Certified

$n = 118$

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Mobility Assessments



Mobility Scoring System

Scores 1- 4 (North American Meat Institute Animal Welfare Committee, 2015).

1 = sound

2 = slight limp, keeps up with others

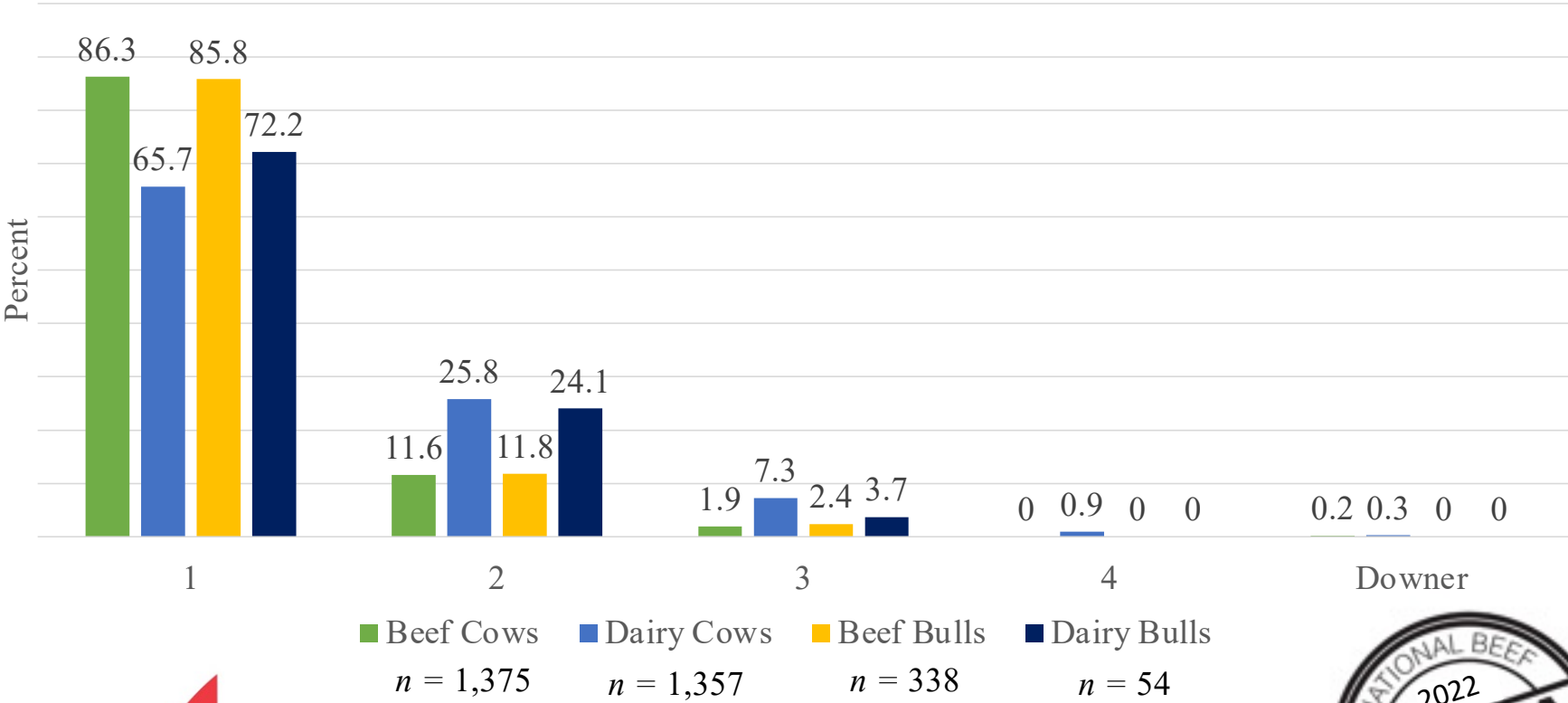
3 = obvious stiffness, lags

4 = reluctant to move

Downer = unable to rise



Distribution of Mobility Scores



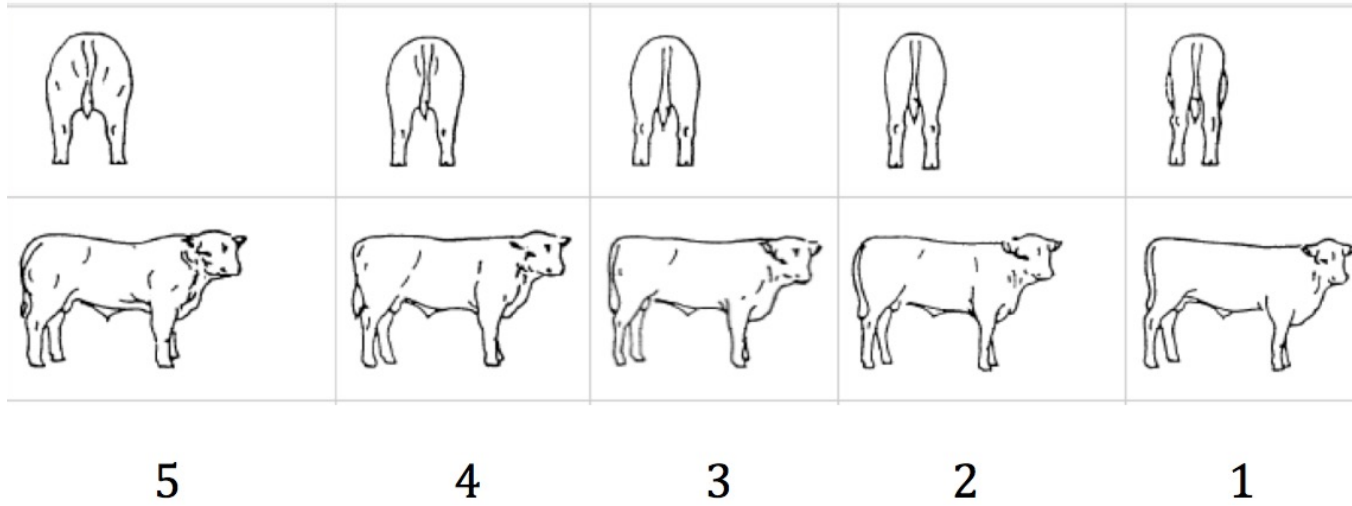
77.0% of all cattle (*n* = 3,124) had a score of 1



Live Animal Evaluation



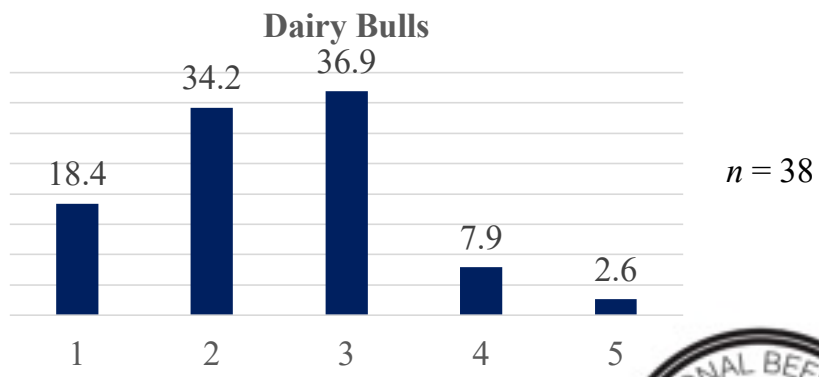
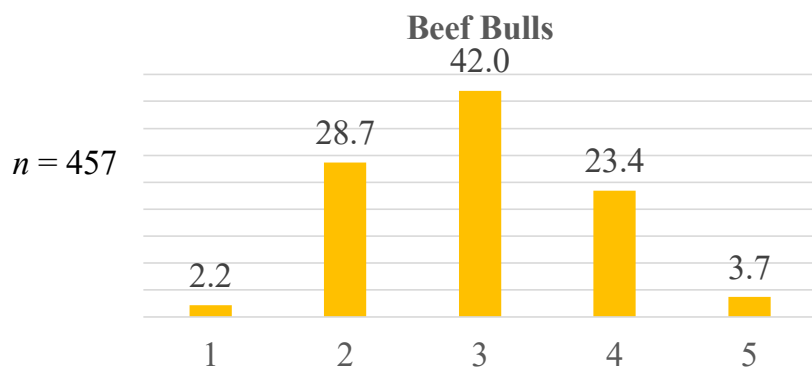
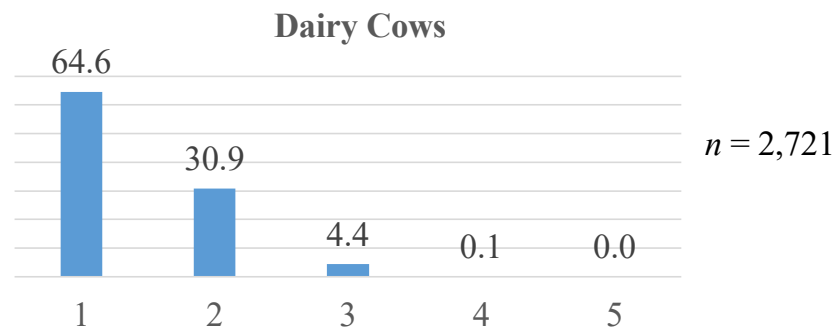
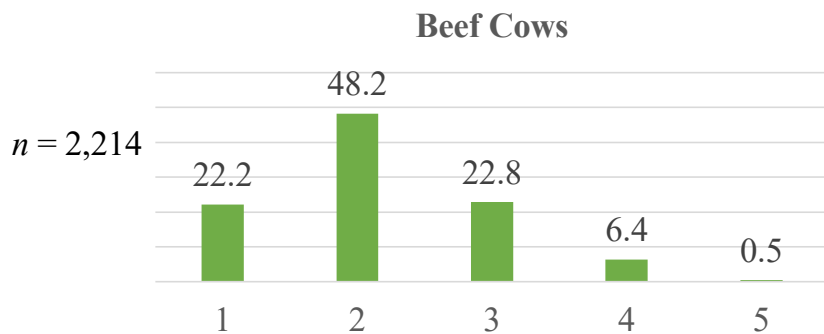
Muscle Scoring



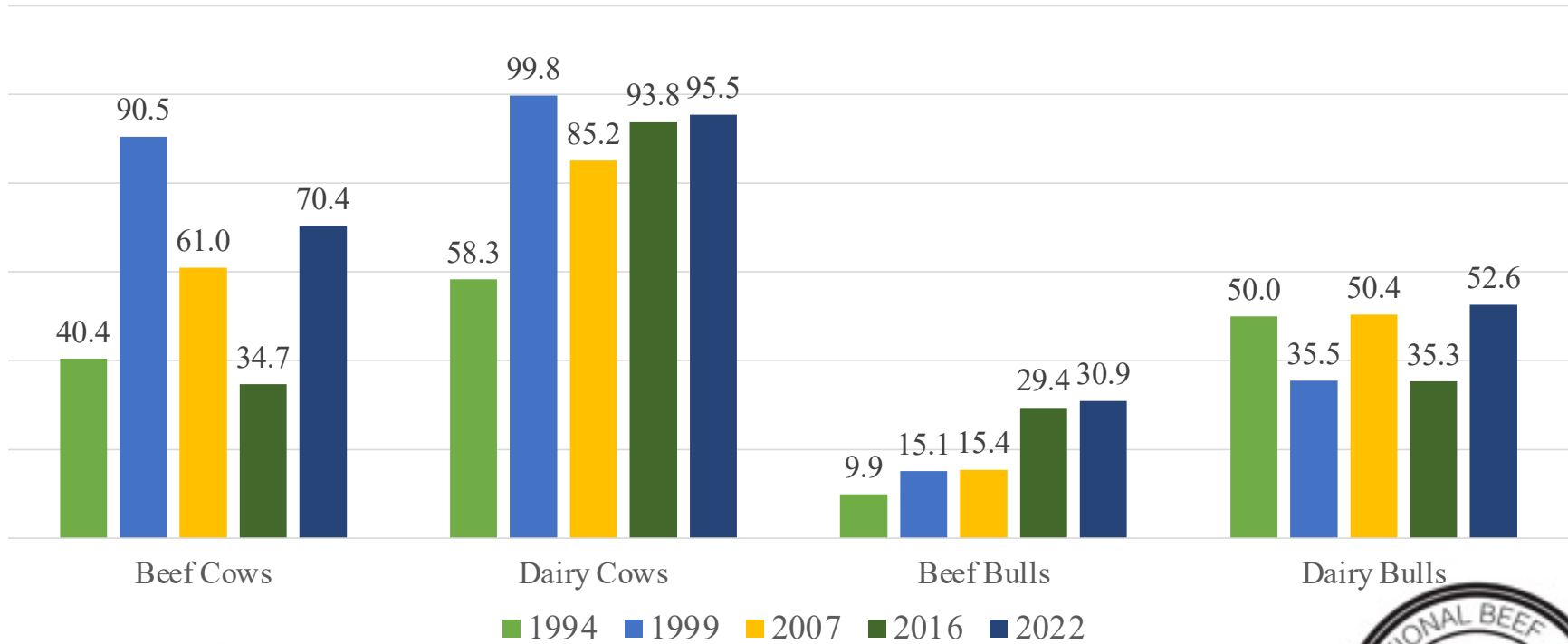
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Percentage of Muscle Scores



Comparison Between Percentages of Cattle Classified as Inadequately Muscled



Inadequately muscled = muscle scores of 1 or 2



Body Condition Scoring of Beef Cattle



Cows:
Mean Score of 3.8

Bulls:
Mean Score of 4.4



Body Condition Scoring of Dairy Cattle



Cows:
Mean Score of 2.3

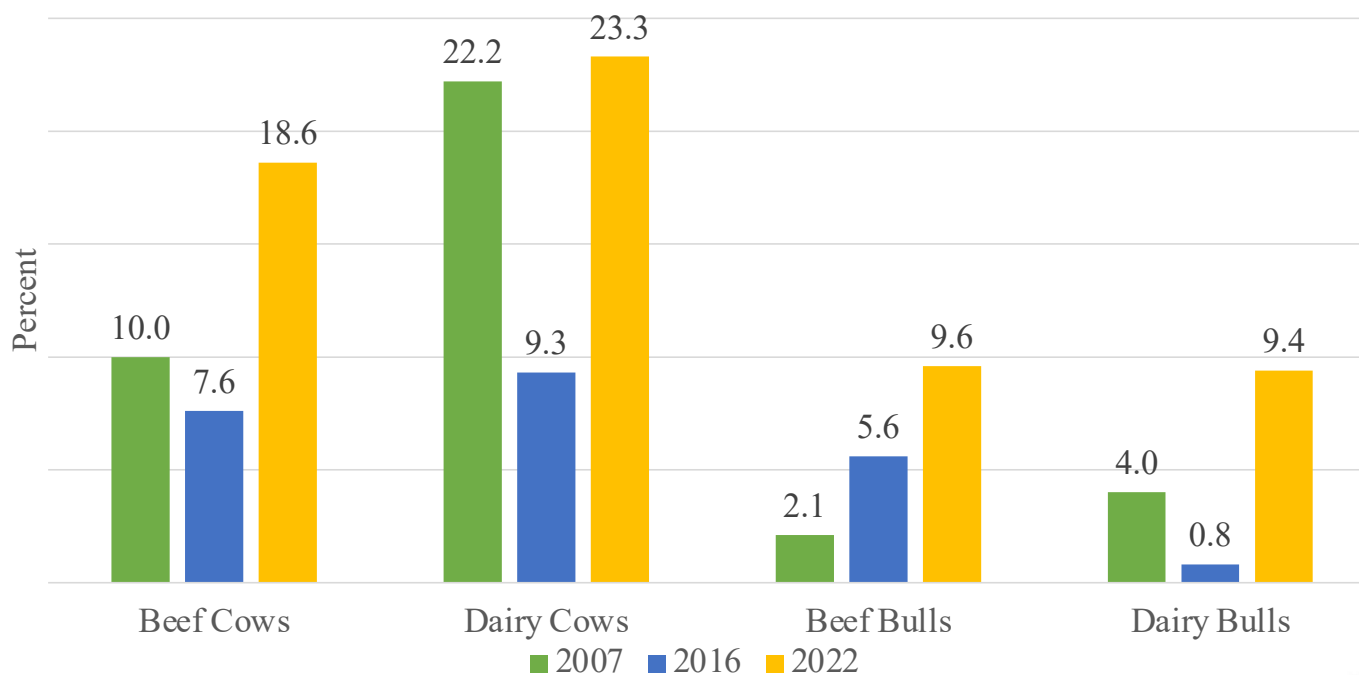


Bulls:
Mean Score of 2.6

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Comparison Between Percentages of Cattle Classified as “Too Thin”



“Too Thin” = BCS 1 or 2 (9-point scale), 1.0 or 1.5 (5.0-point scale)



Physical Defects



Visible Defects

Full Bag

Bottle Teats

Broken Tail

Calf in Pen

Mastitis

Swollen Joints

Retained Placenta

Failed Suspensory Ligament

Foot Abnormality

Broken Penis

Multiple Udder Problems

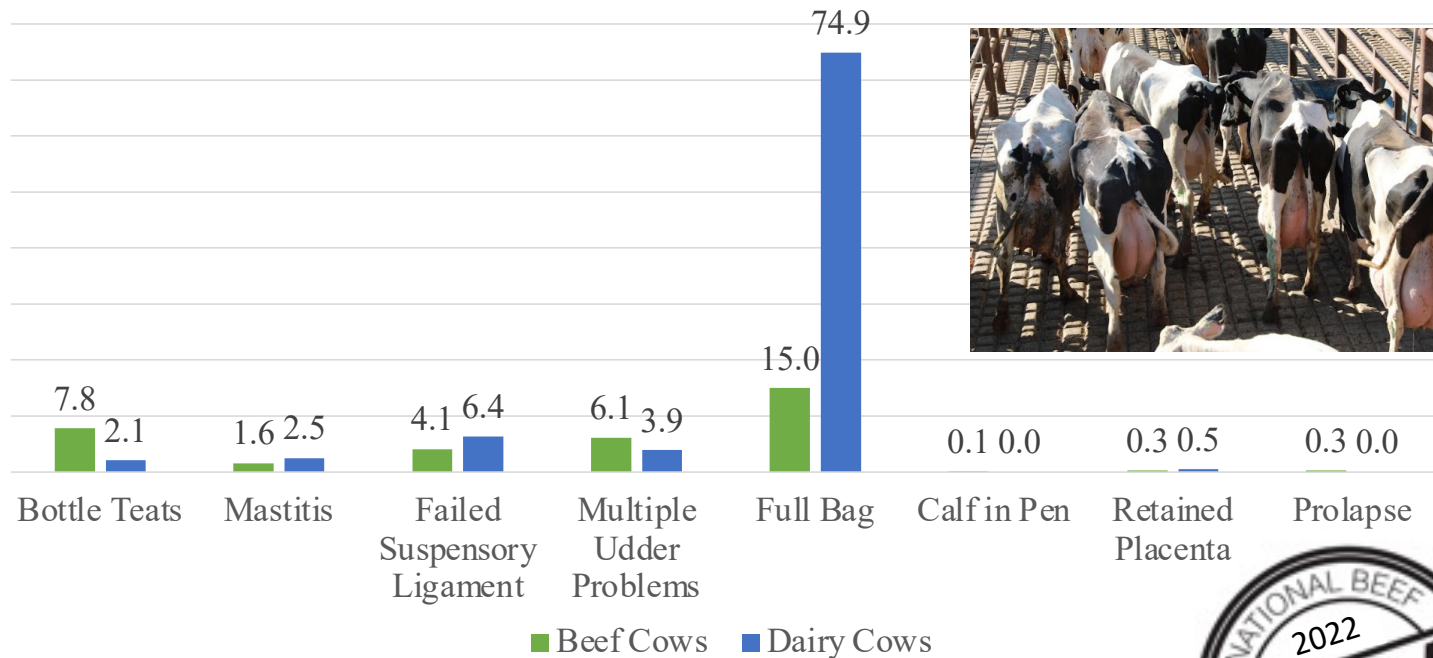
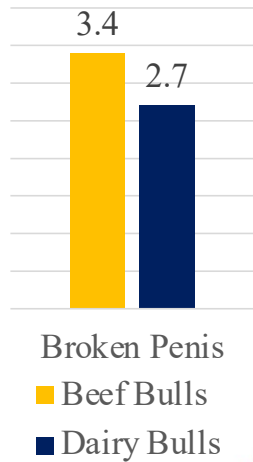
Lumpy Jaw



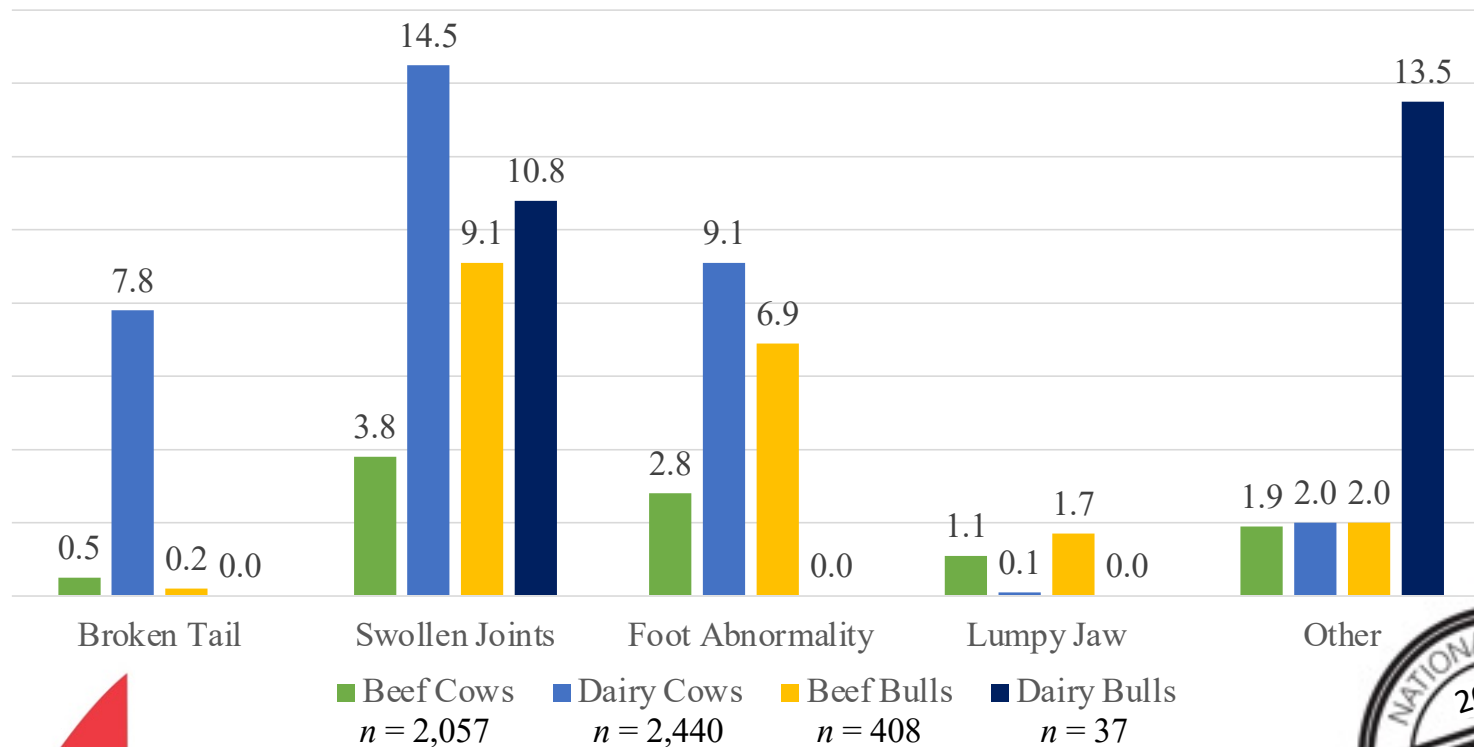
Percentage of Reproductive Defects in Surveyed Cattle

Reproductive Defects in Cows

Reproductive Defects in Bulls



Other Visible Defects of Surveyed Cattle



Bovine Ocular Neoplasia (Cancer Eye)

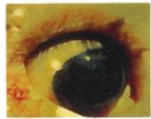
Cancer Eye Scoring Standards



Grade 1
Small benign tumor producing
finger like growth
Precancerous



Grade 3
Growth on the third eyelid
or a tumor that is vascular in
nature
Cancerous



Grade 2
Small white elevated plaque on
the eyeball
Precancerous



Grade 4
Tumors that have metastasized
to the bony structure around
the eye or exhibit lymphatic
involvement of the parotid
gland
Cancerous



Grade 2
Small white elevated plaque
on the eyeball
Precancerous



Grade 4
Tumors that have metastasized
to the bony structure around
the eye or exhibit lymphatic
involvement of the parotid
gland
Cancerous



Grade 2
Papilloma on the eyeball
Precancerous



Grade 5
Cattle in which the eyeball
has prolapsed from the orbit
and/or exhibits a necrotic
condition
Cancerous

Was not observed in **96.5%** of all surveyed cattle ($n = 5,491$).

99.0% in 2016
($n = 4,065$).

Of reported cases, **73.7%** were Grade 1
($n = 140$)

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Percentages of Location of Abscesses Present in Surveyed Live Cattle

Abscess Location	All Cattle (<i>n</i> = 125)	Beef Cows (<i>n</i> = 40)	Dairy Cows (<i>n</i> = 63)	Beef Bulls (<i>n</i> = 21)	Dairy Bulls (<i>n</i> = 1)
Facial	26.4	35.0	15.9	42.8	0.0
Knee/Hock	49.6	32.5	61.9	42.8	100.0
Hooks/Pins	21.6	27.5	22.2	4.8	0.0
Other	3.2	5.0	0.0	9.6	0.0

97.7% of all cattle surveyed did not have an abscess (*n* = 4,942).



Percentages of Knot Presence and Location in Surveyed Cattle

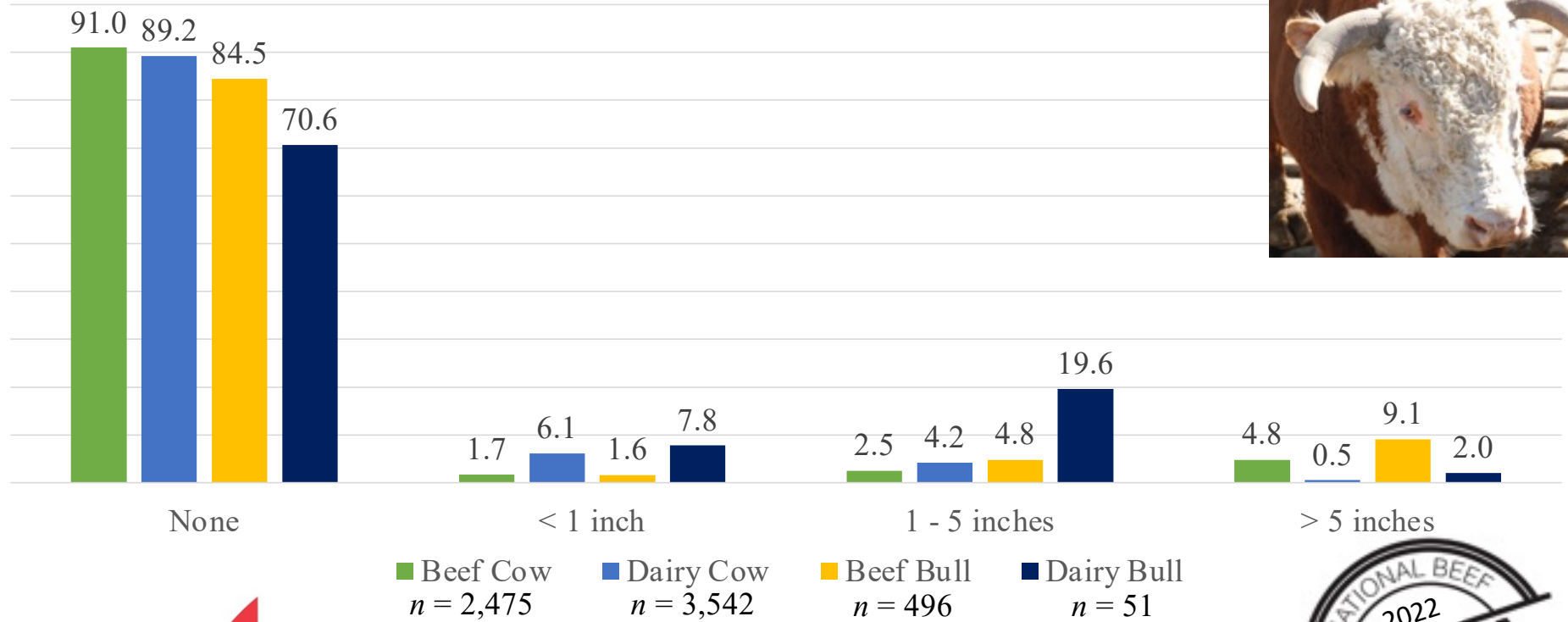
Location	All Cattle (<i>n</i> = 6,605)	Beef Cows (<i>n</i> = 2,489)	Dairy Cows (<i>n</i> = 3,555)	Beef Bulls (<i>n</i> = 510)	Dairy Bulls (<i>n</i> = 51)
No knots	98.2	98.5	97.9	98.2	100.0
Neck	1.0	0.8	1.2	0.6	0.0
Shoulder	0.3	0.2	0.4	0.6	0.0
Top butt	0.2	0.2	0.2	0.2	0.0
Round	0.1	0.2	0.1	0.2	0.0
Other	0.2	0.1	0.3	0.2	0.0



97.9% in 2016



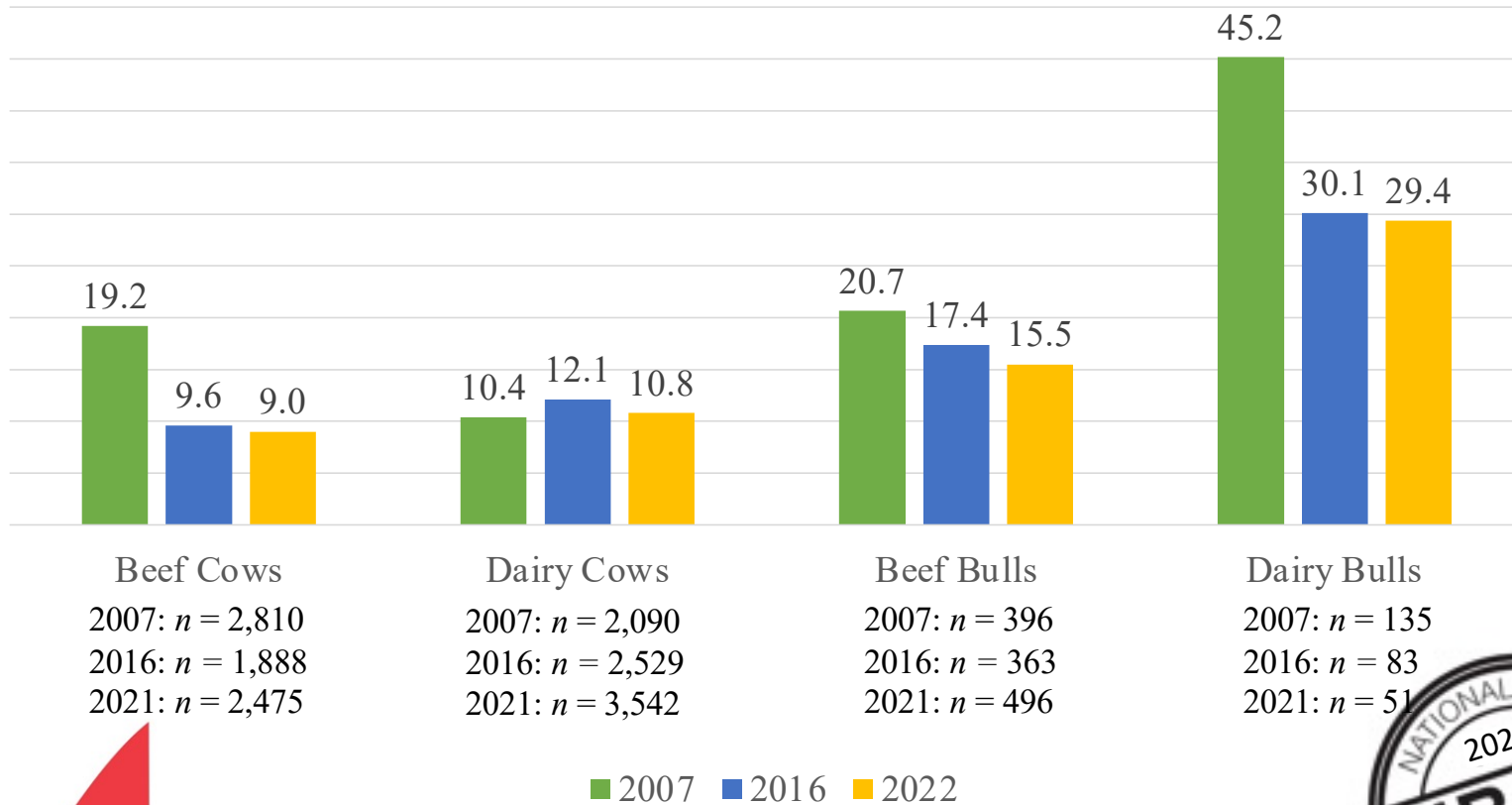
Percentage of Horn Presence and Size



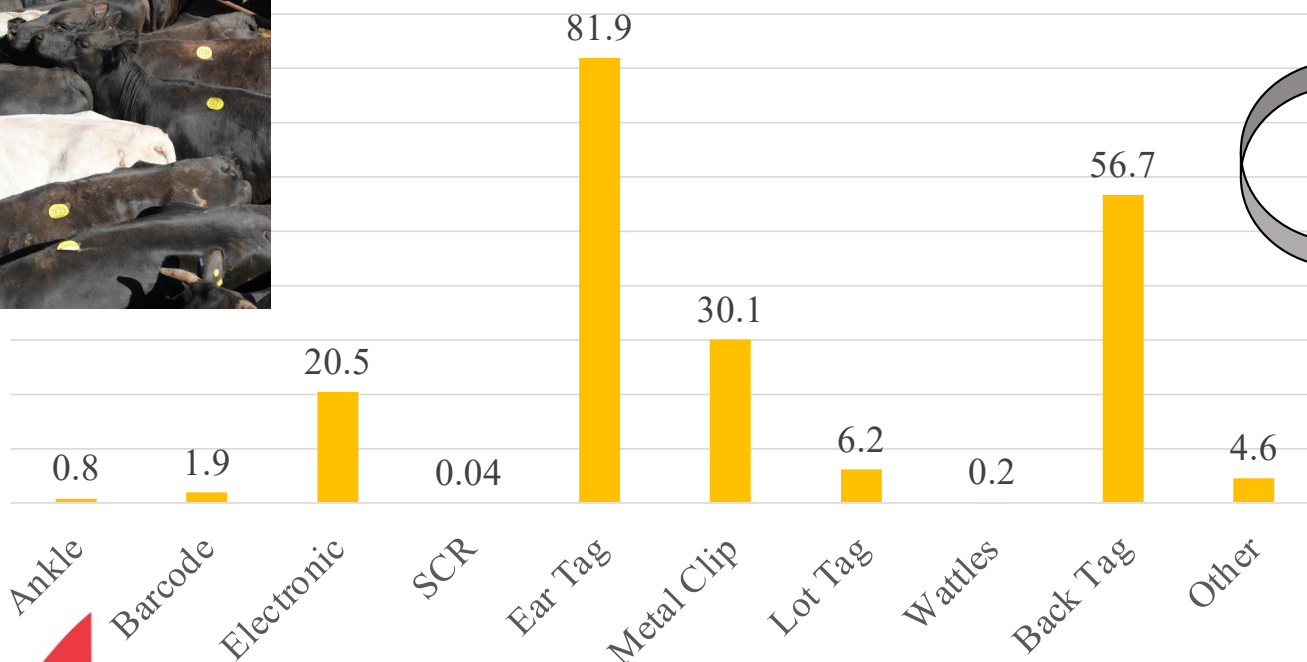
89.4% of all cattle ($n = 6,564$) were polled.



Audit Comparison: Percentage of Cattle with Horns



Percentage of Identification Types in All Surveyed Cattle



Most Prevalent Forms of ID:

1. Ear tag
2. Back tag
3. Metal clip
4. Electronic

7.3% ↑ since 2016.

72.3% of all animals had multiple forms of ID

n = 6,699

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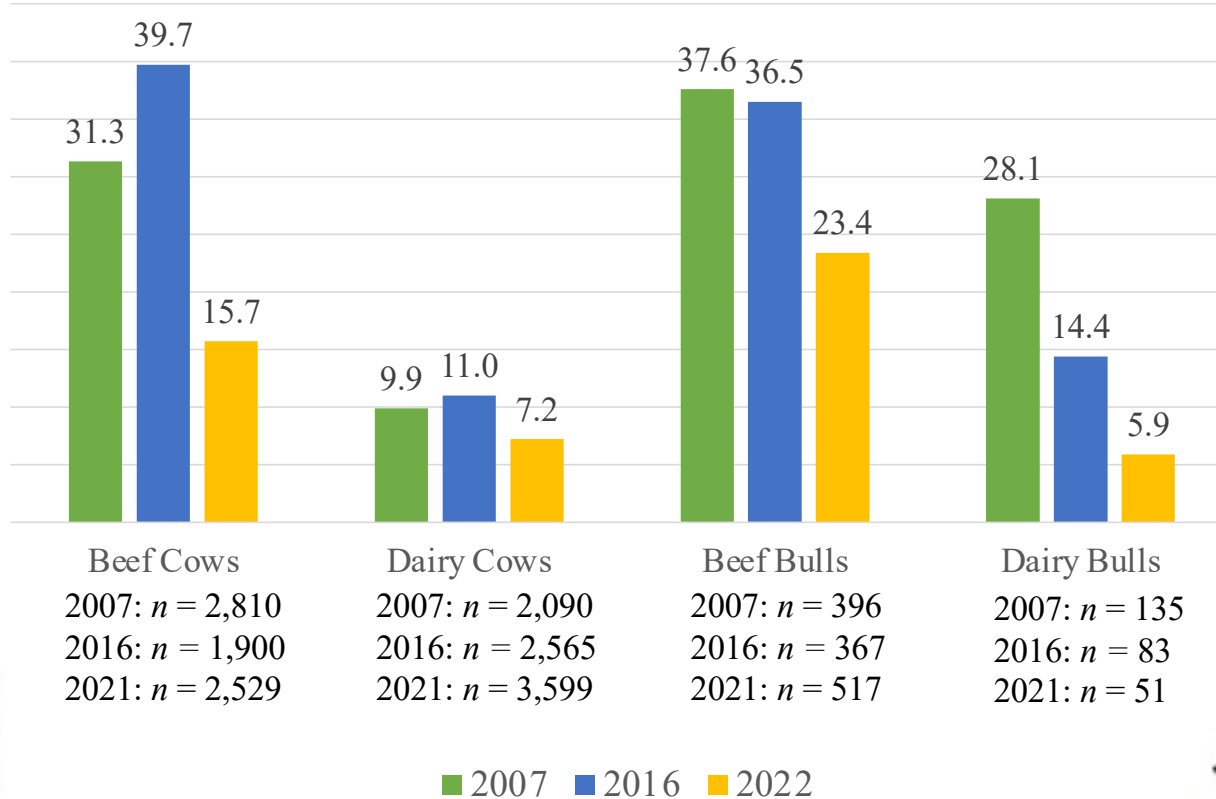
Hide Evaluation



Audit Comparison: Prevalence of Brands in Cattle Surveyed

88.3%
Native Hides

11.0% ↑
since 2016



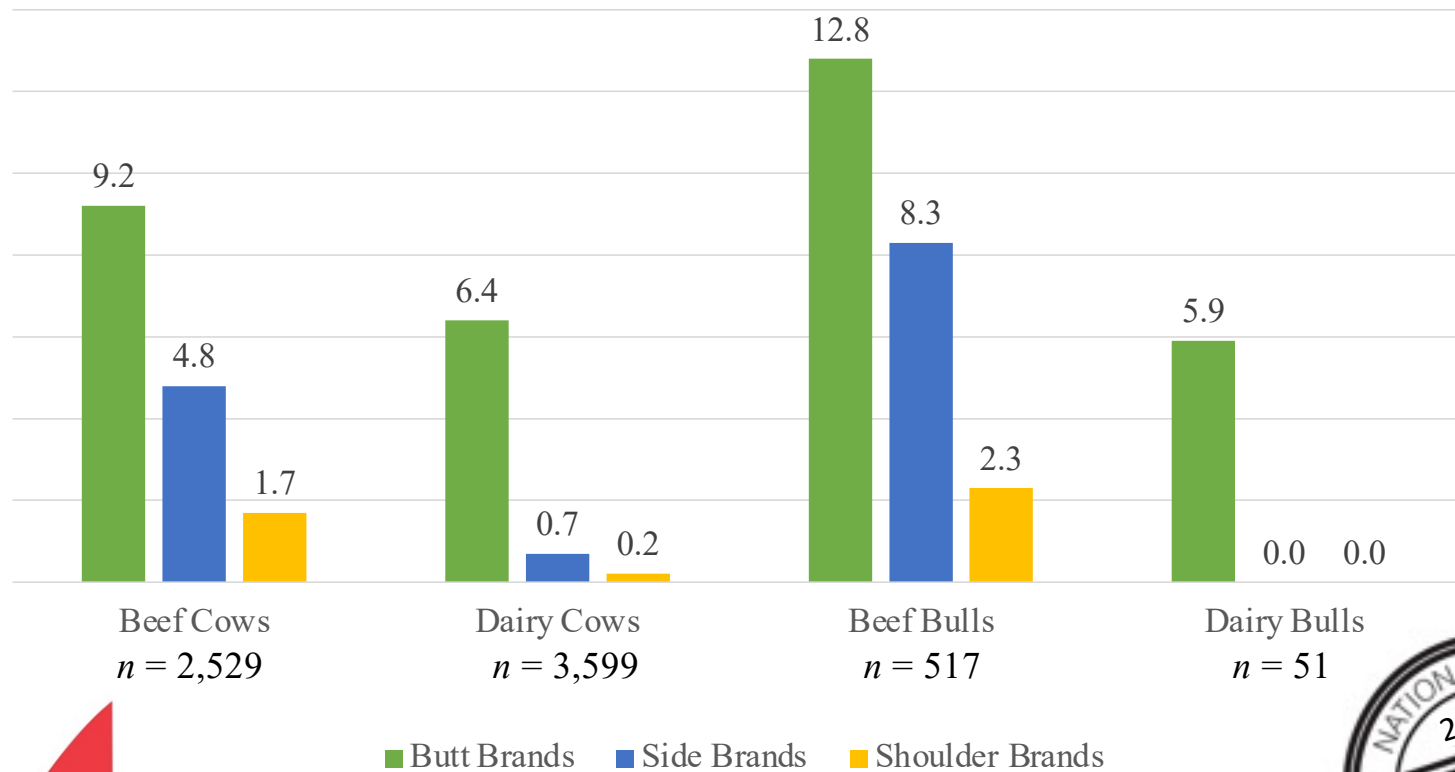
Beef Cows	Dairy Cows	Beef Bulls	Dairy Bulls
2007: <i>n</i> = 2,810	2007: <i>n</i> = 2,090	2007: <i>n</i> = 396	2007: <i>n</i> = 135
2016: <i>n</i> = 1,900	2016: <i>n</i> = 2,565	2016: <i>n</i> = 367	2016: <i>n</i> = 83
2021: <i>n</i> = 2,529	2021: <i>n</i> = 3,599	2021: <i>n</i> = 517	2021: <i>n</i> = 51

■ 2007 ■ 2016 ■ 2022

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Distribution of Location of Brands in Surveyed Cattle



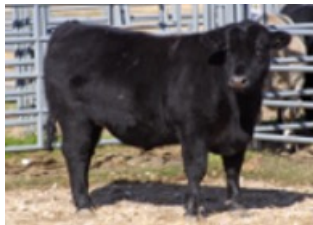
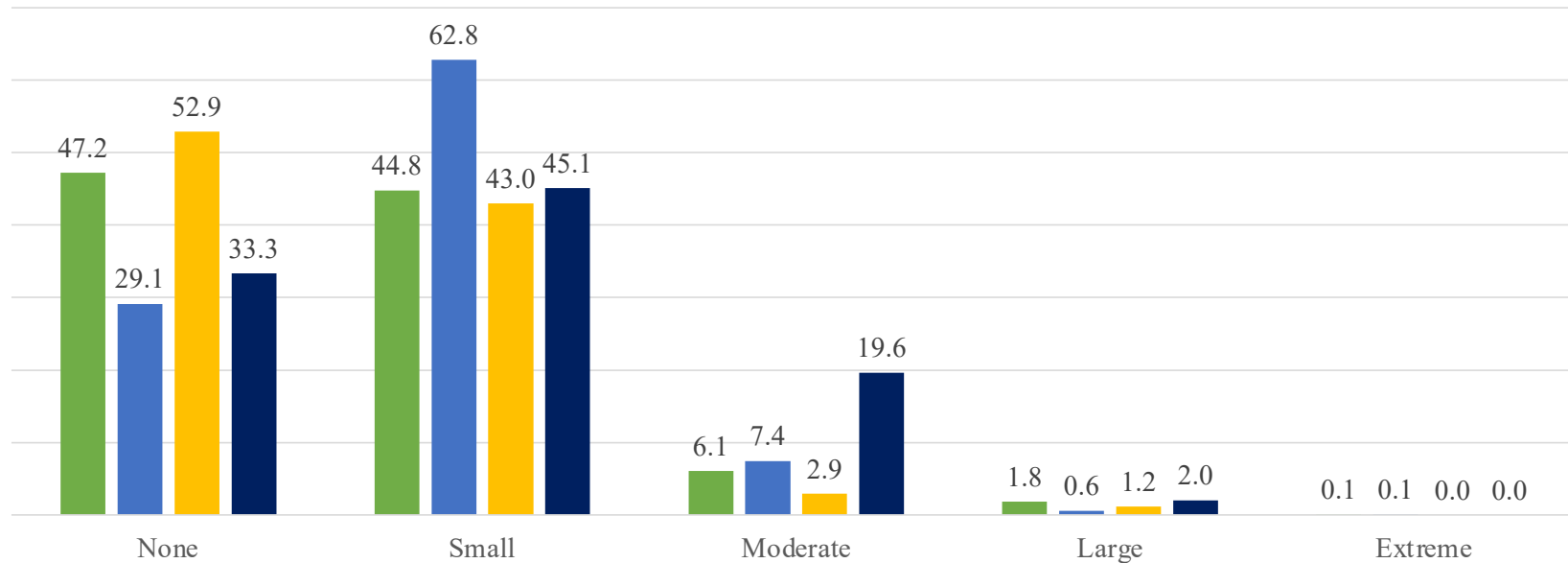
Mean Size (cm²) of Brands Located on the Butt, Side, and Shoulder of All Branded Cattle Surveyed

	<i>n</i>	Mean	Std. Dev.	Min	Max
Beef cows					
Butt	232	55.8	55.25	10.2	365.8
Side	122	129.9	155.67	7.6	736.6
Shoulder	43	37.9	14.35	15.2	76.2
Dairy cows					
Butt	229	46.1	27.16	10.2	254.0
Side	23	69.5	39.44	10.2	182.9
Shoulder	8	68.9	34.17	40.6	121.9
Beef bulls					
Butt	66	71.4	45.65	10.2	203.2
Side	43	163.8	246.40	20.3	1270.0
Shoulder	12	71.3	60.49	10.2	243.8
Dairy bulls					
Butt	3	74.5	11.55	40.6	91.4

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Percentage of Mud Observed in All Cattle



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■ Beef Cows
n = 2,521

■ Dairy Cows
n = 3,590

■ Beef Bulls
n = 512

■ Dairy Bulls
n = 51



Percentage of Mud on Various Locations

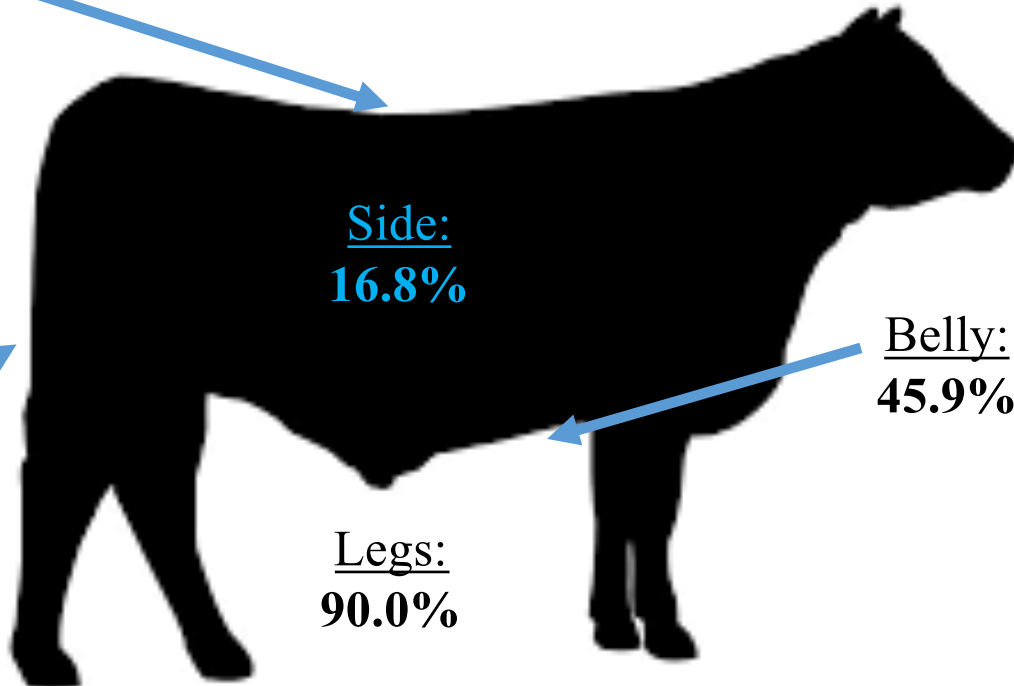
Topline:
5.8%

Side:
16.8%

Belly:
45.9%

Tail Region:
16.5%

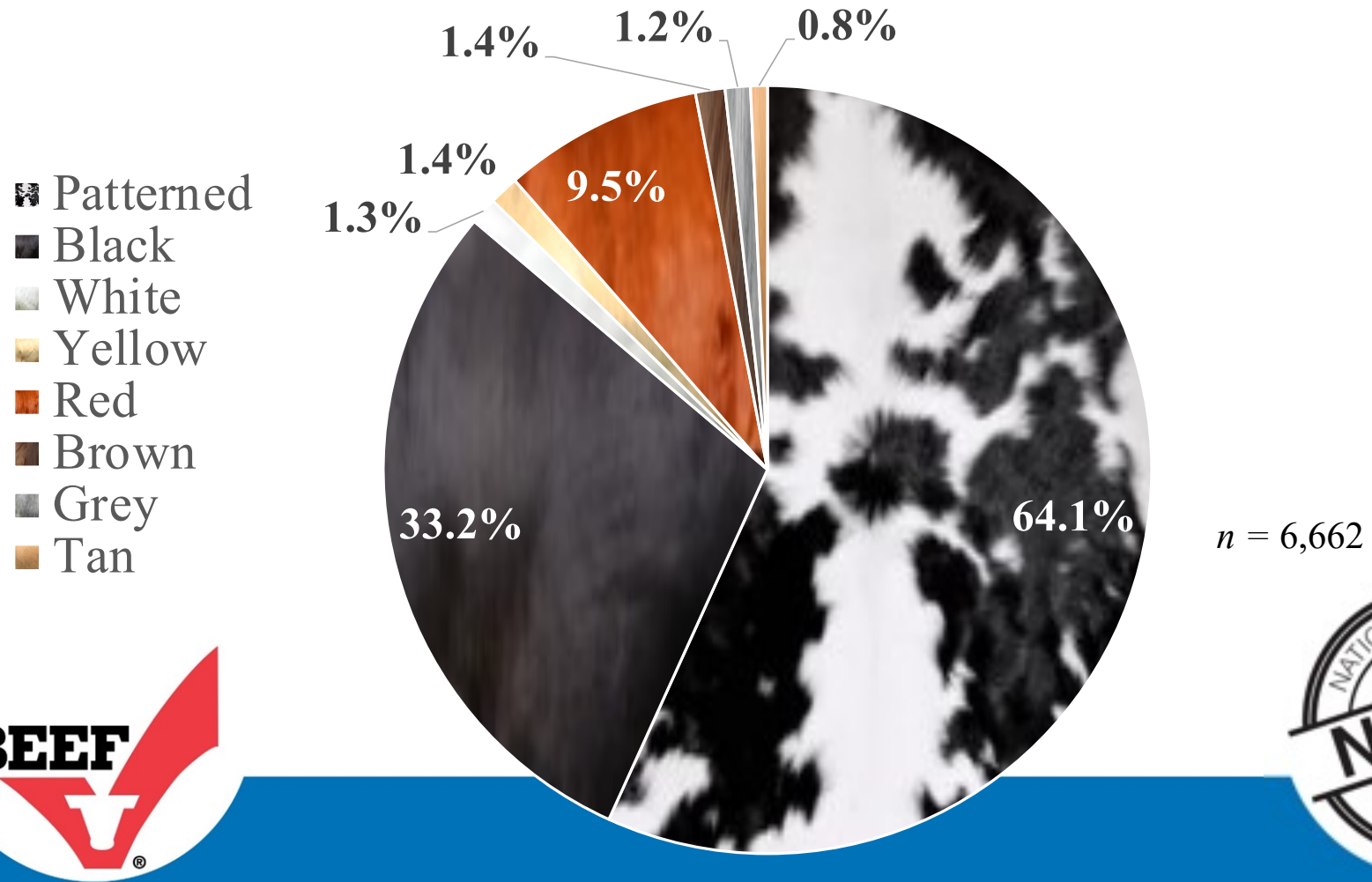
Legs:
90.0%



$n = 4,171$

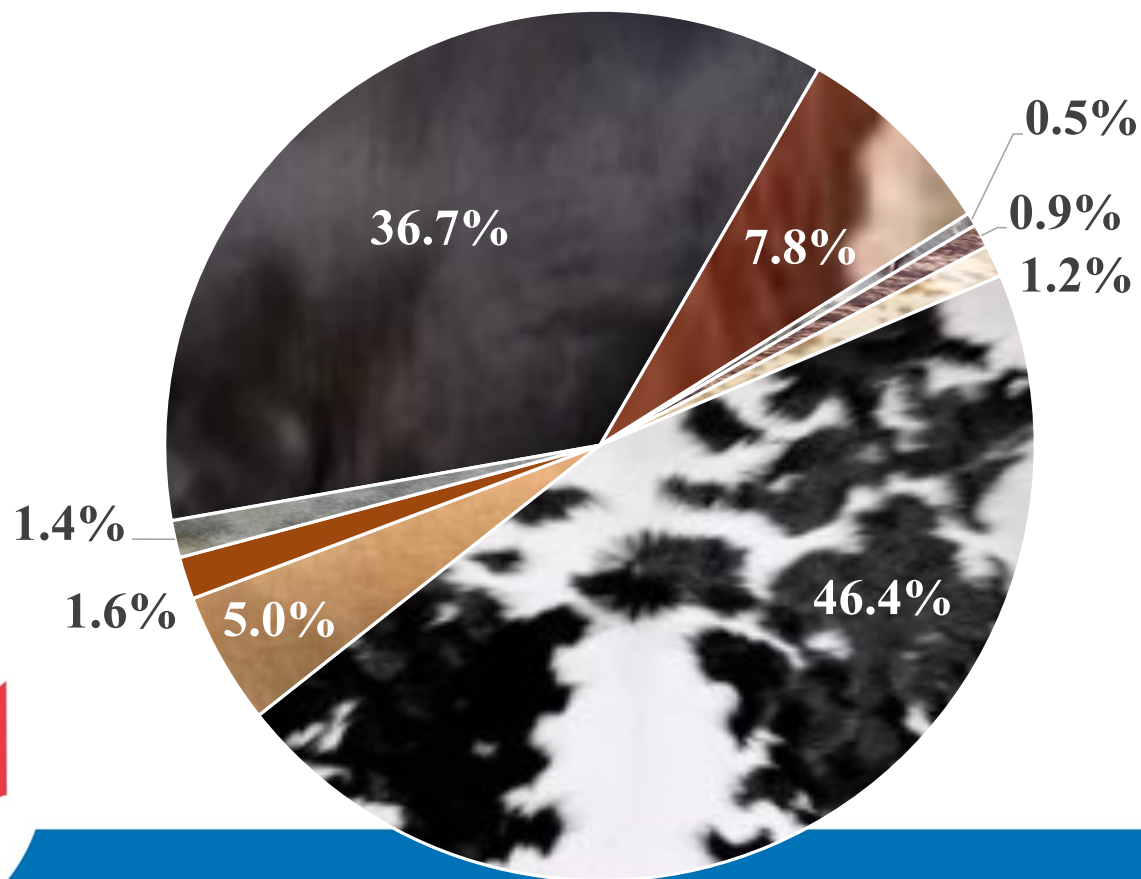


Percentage of Primary Hide Color Observed in All Cattle



Percentage of Hide Pattern Observed in All Cattle

- None
- Baldy
- Roan
- Brindle
- Spots
- Holstein
- Jersey
- Dairy Cross
- Other



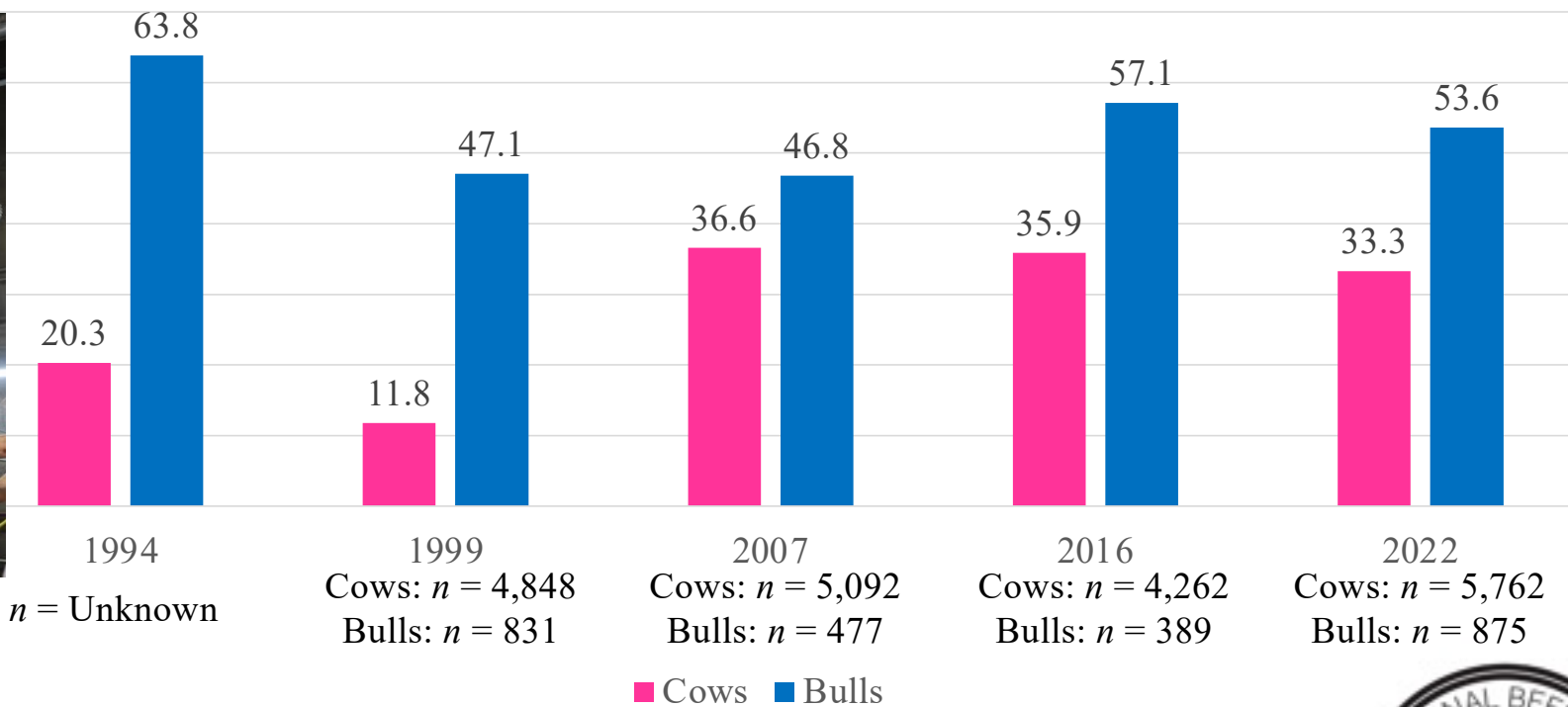
n = 6,362



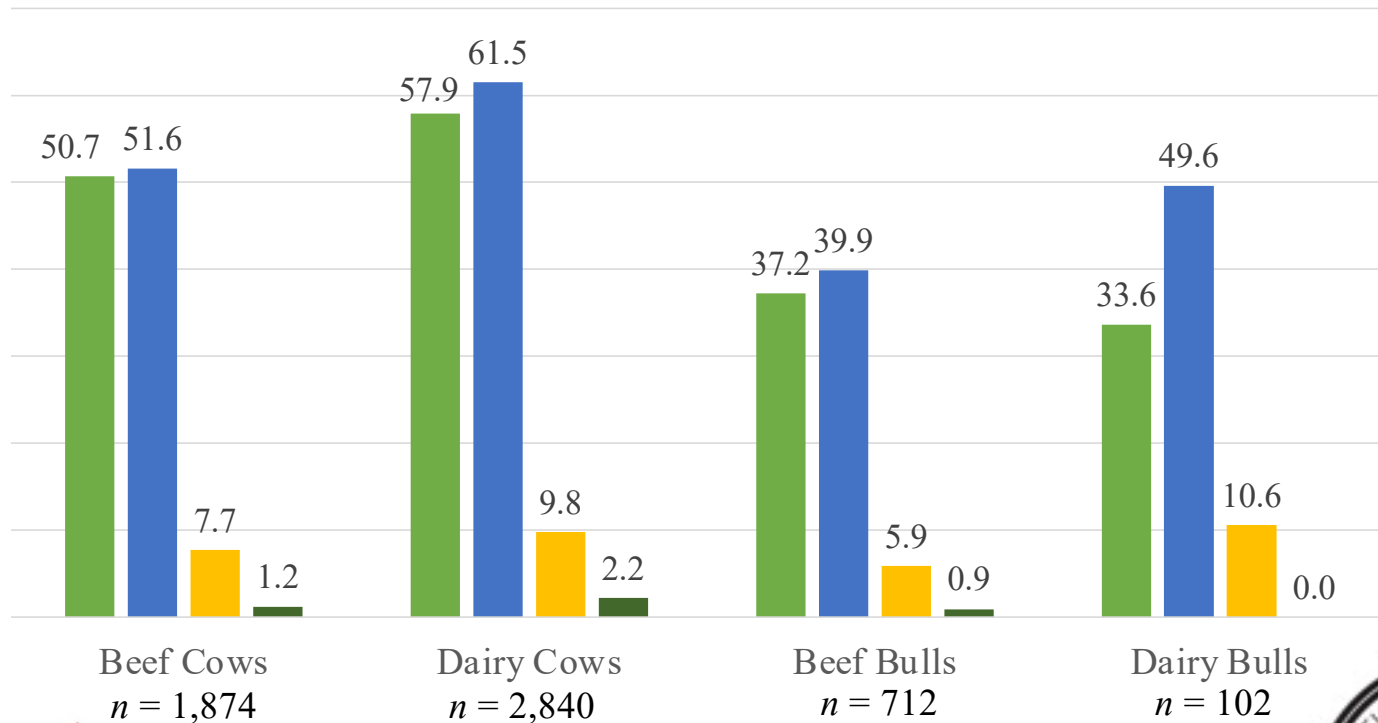
Hide-Off Evaluation



Audit Comparison: Percentage of Cattle With No Bruises



Percentage of Each Severity of Bruises



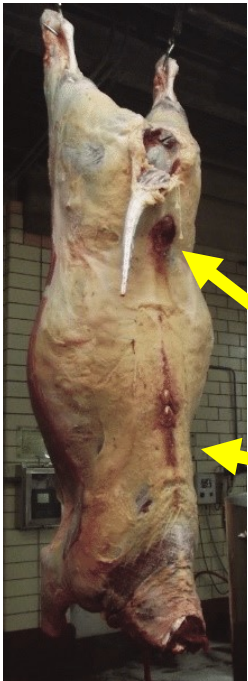
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■ Minimal < 1 lb
 ■ Major 1-10 lbs
 ■ Critical > 10 lbs
 ■ Extreme Entire Primal



Percent of Bruise Locations in All Cattle



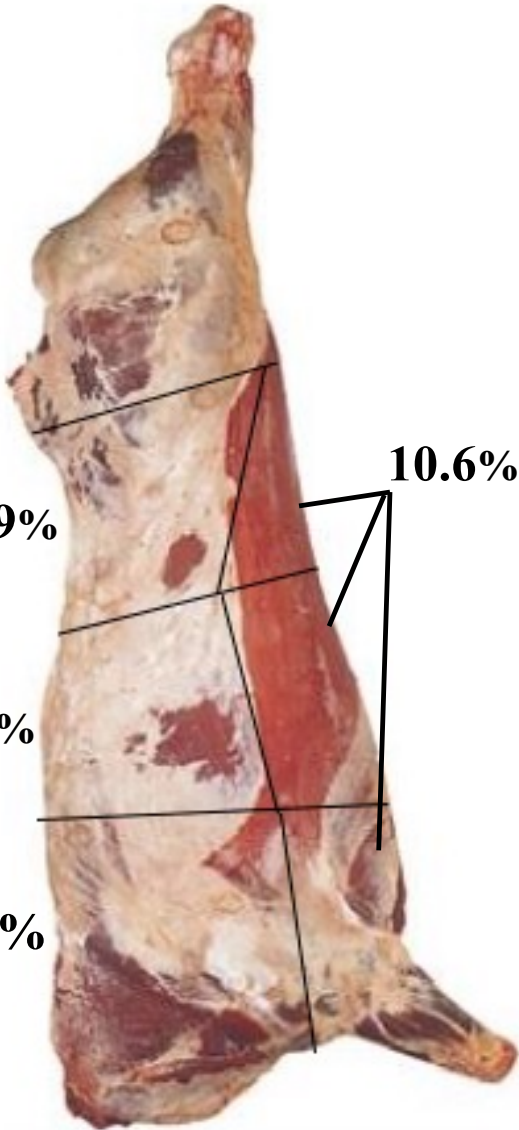
(Lee et al., 2017)

29.9%

43.9%

16.3%

16.8%



10.6%



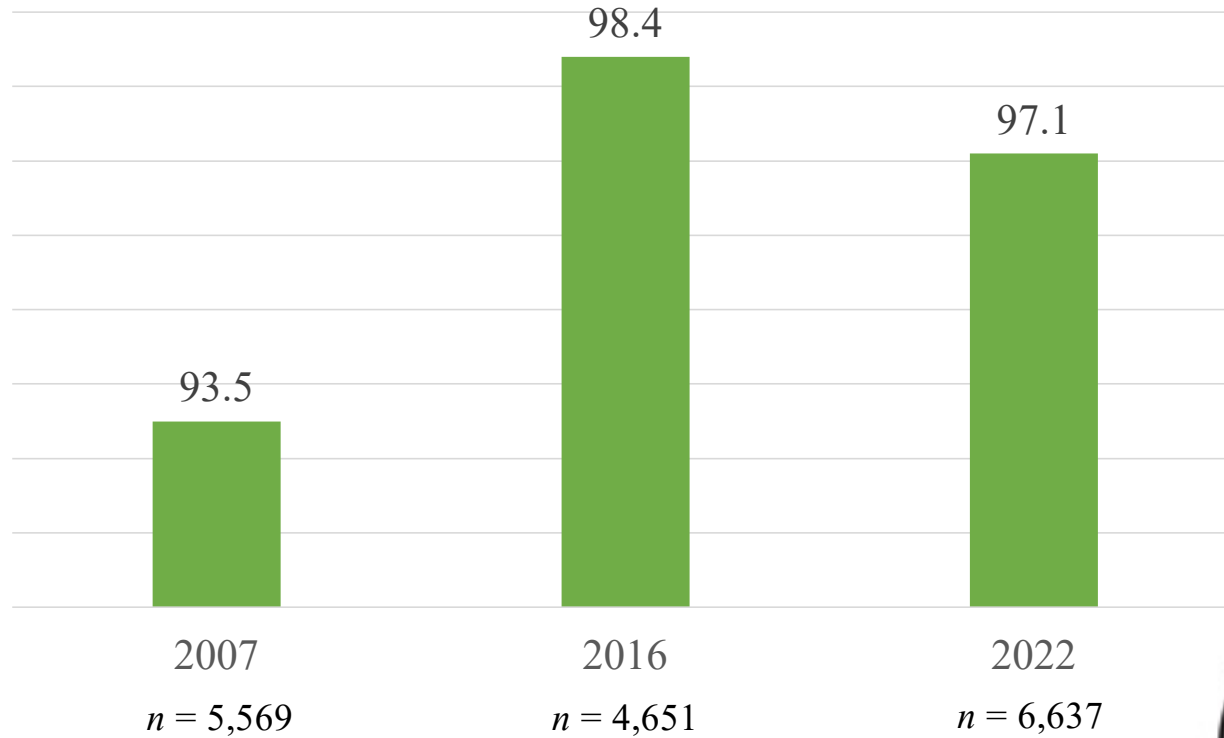
n = 5,746



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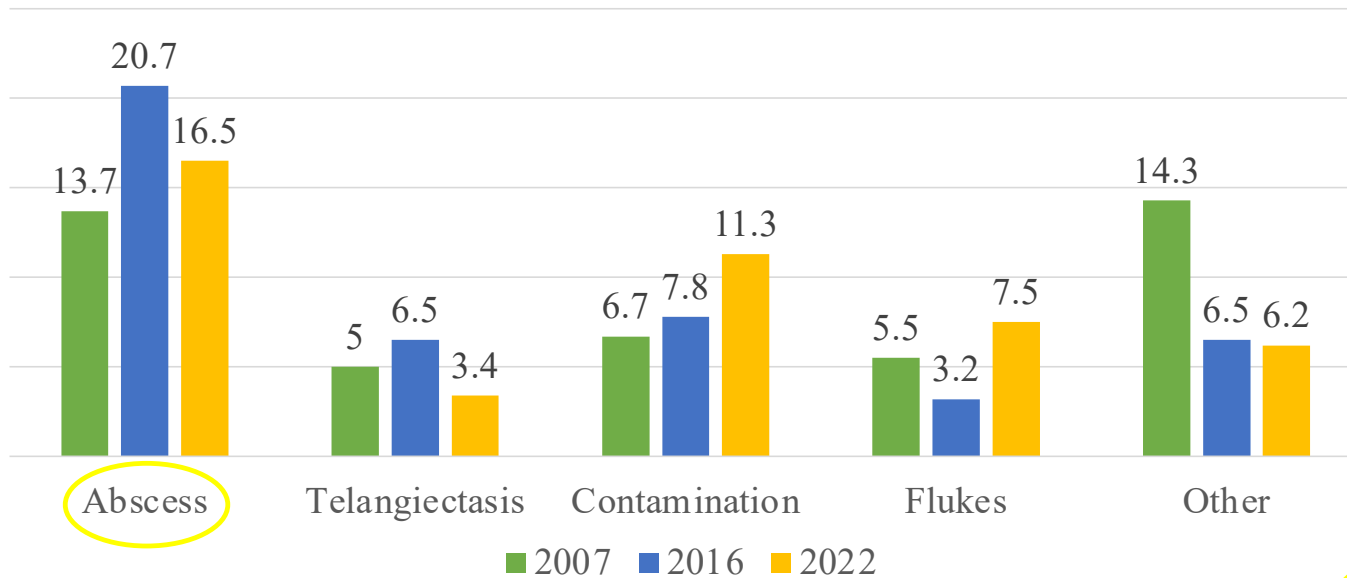
Audit Comparison: Percent of Cattle with No Injection-Sites



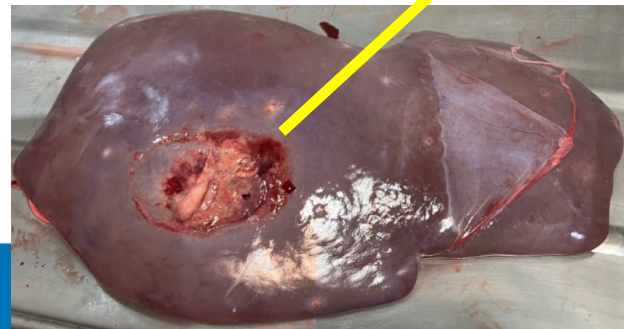
Offal Condemnations



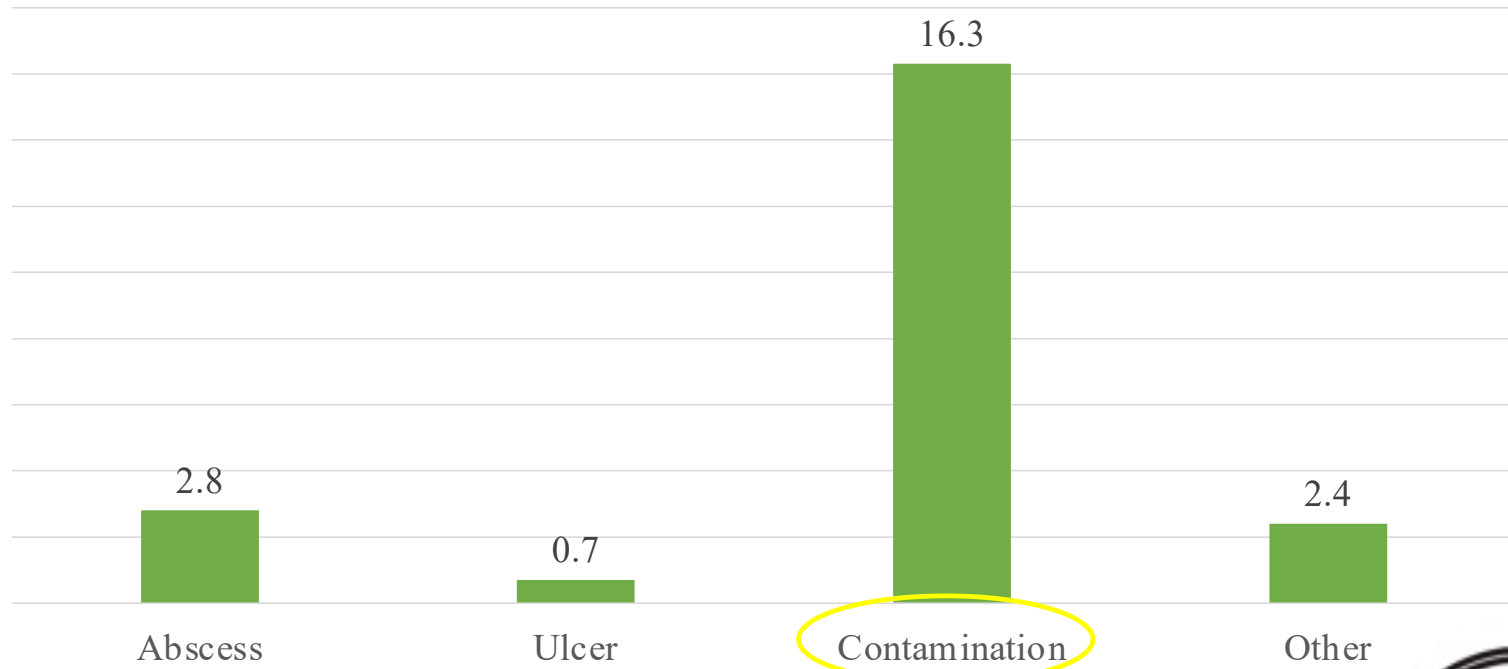
Audit Comparison: Reason for Liver Condemnations



2007: $n = 4,896$
 2016: $n = 4,800$
 2021: $n = 6,358$

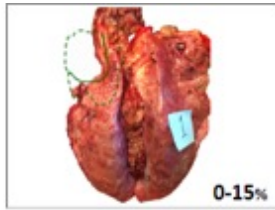
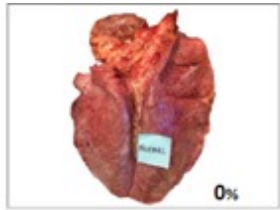


Reason for Viscera Condemnations

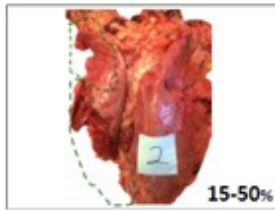


$n = 6,358$

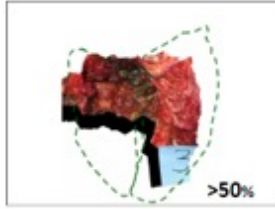




Mild:
22.8%

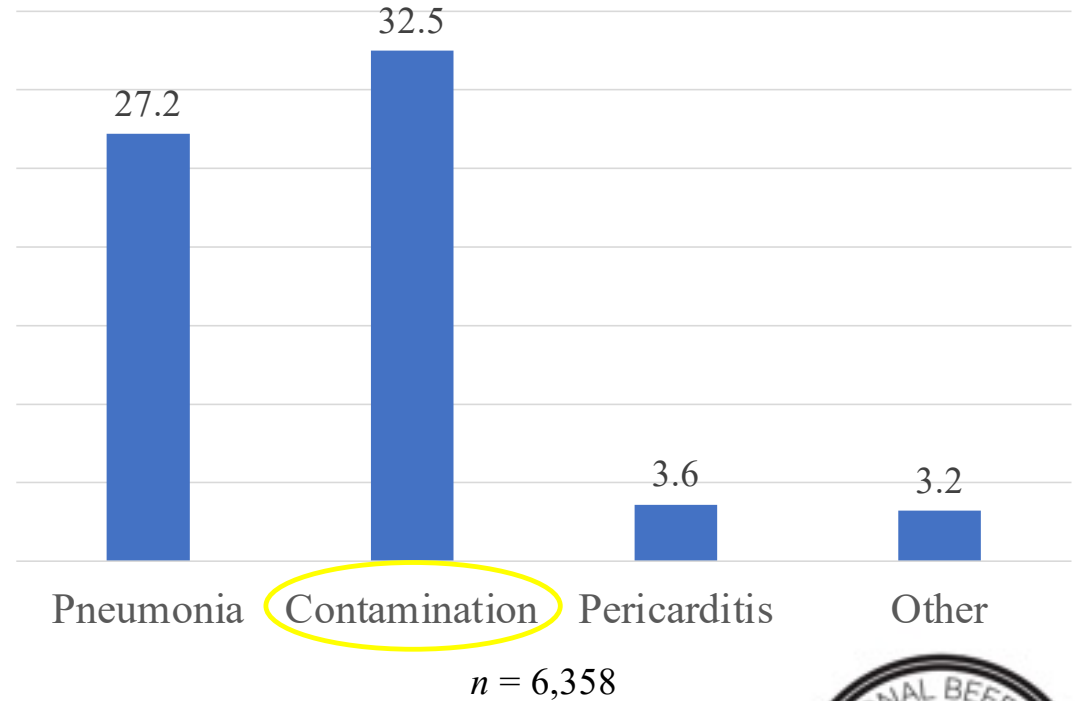


Moderate:
3.9%



Severe:
0.5%

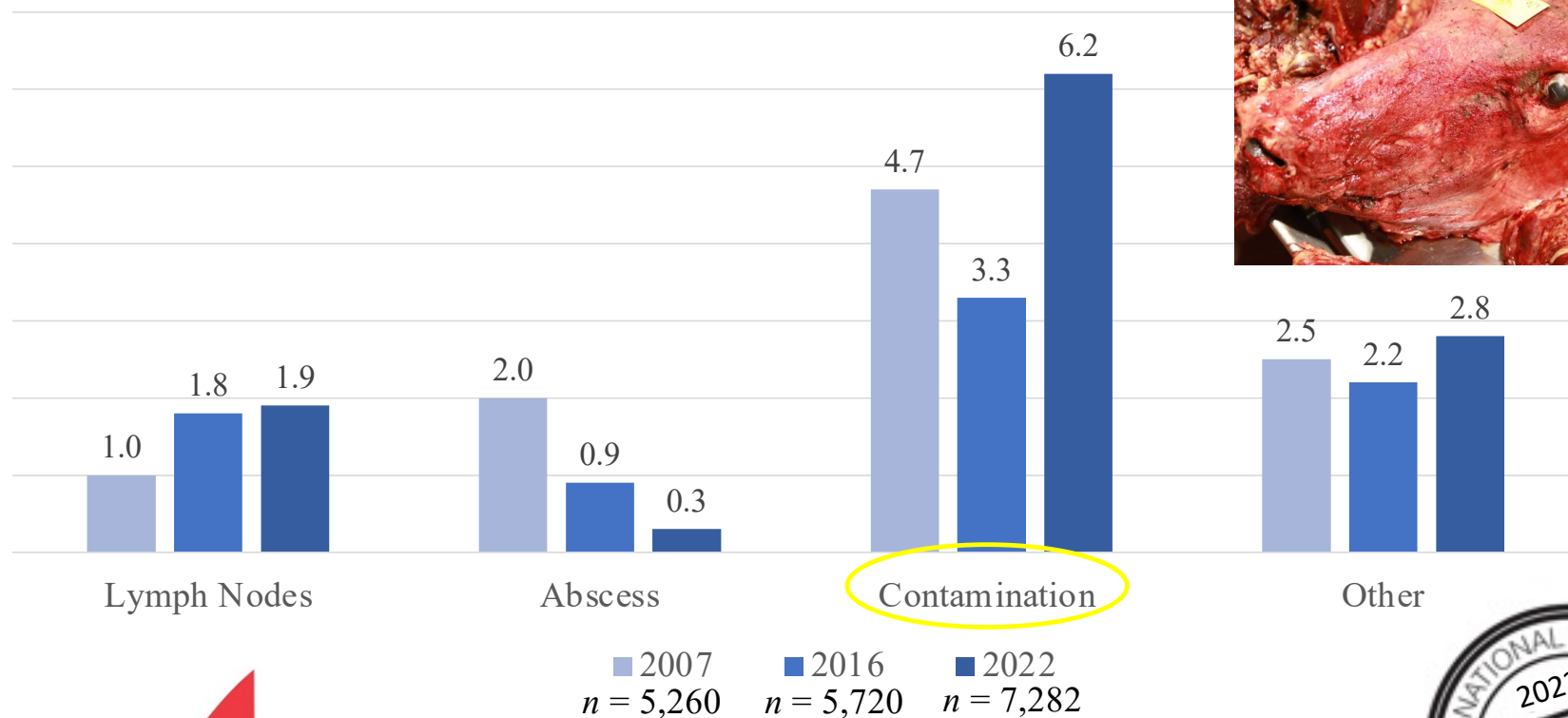
Reason for Pluck Condemnations



BEEF

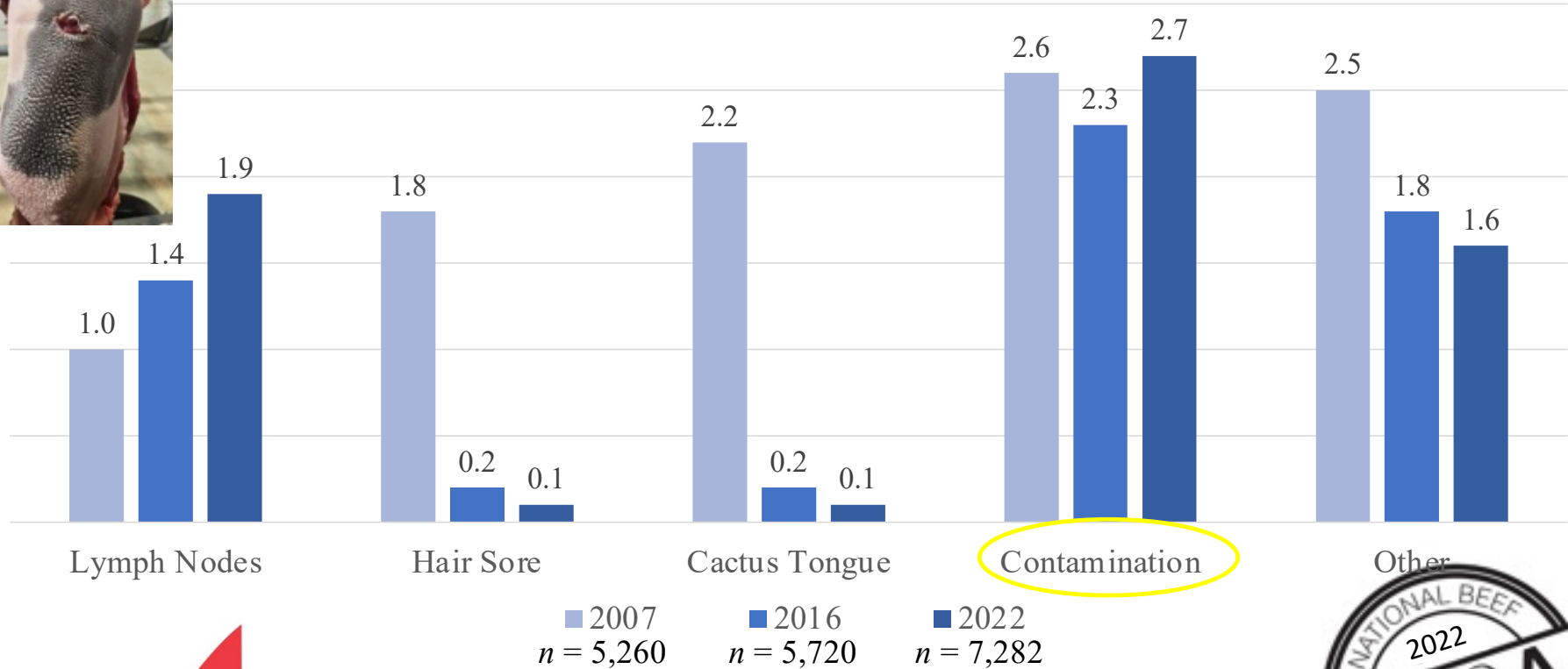


Reason for Head Condemnation

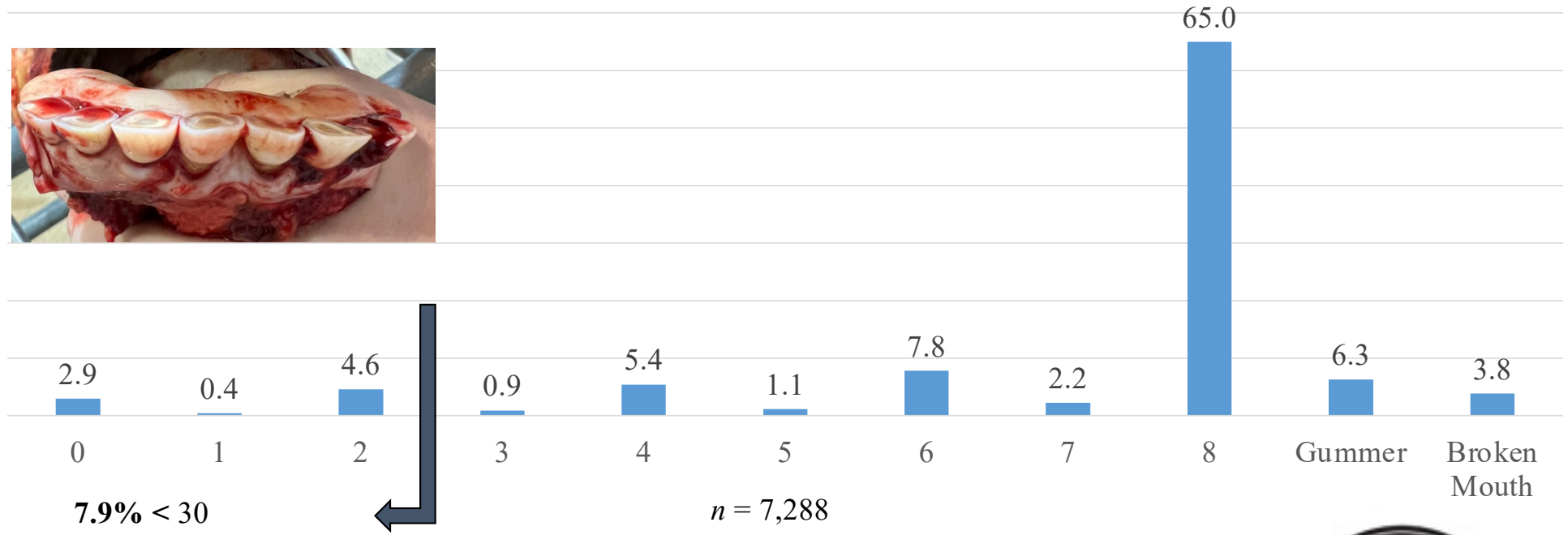




Reason for Tongue Condemnation



Frequency and the Number of Permanent Incisors and Dental Defects



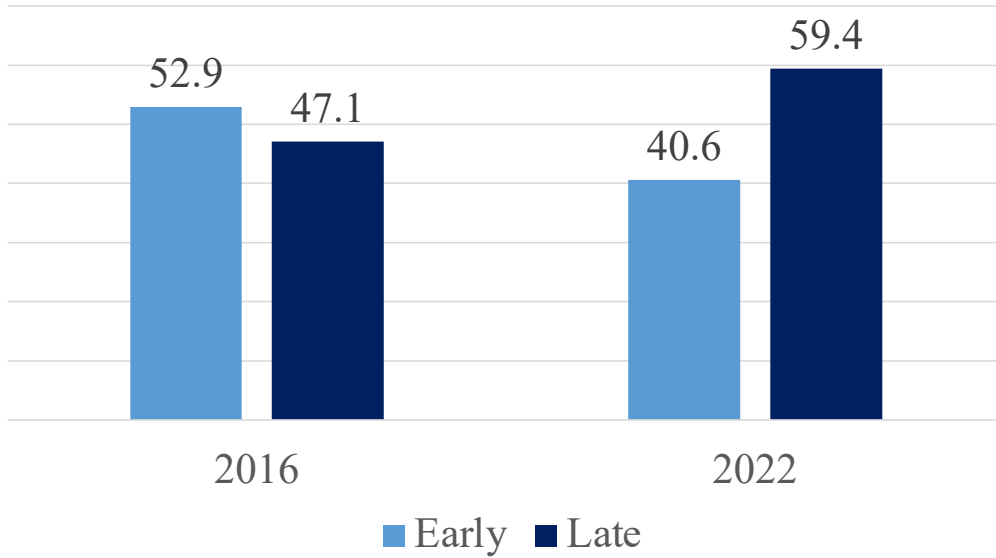
7.9% < 30 months of age

2016:
Broken Mouth: 8.5%
Gummer: 6.2%
n = 5,670

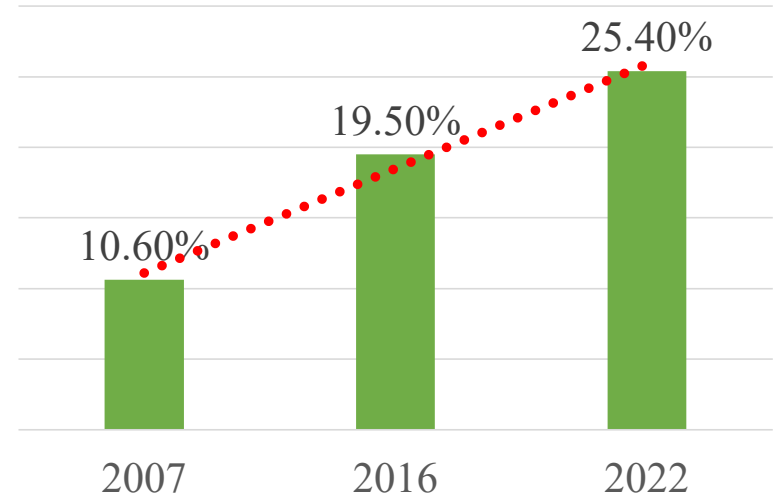
2022:
Broken Mouth: 3.8%
Gummer: 6.3%
n = 7,288



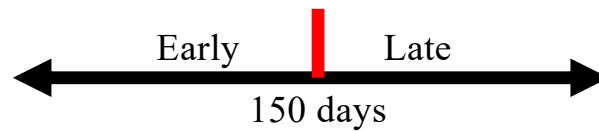
Fetal Age



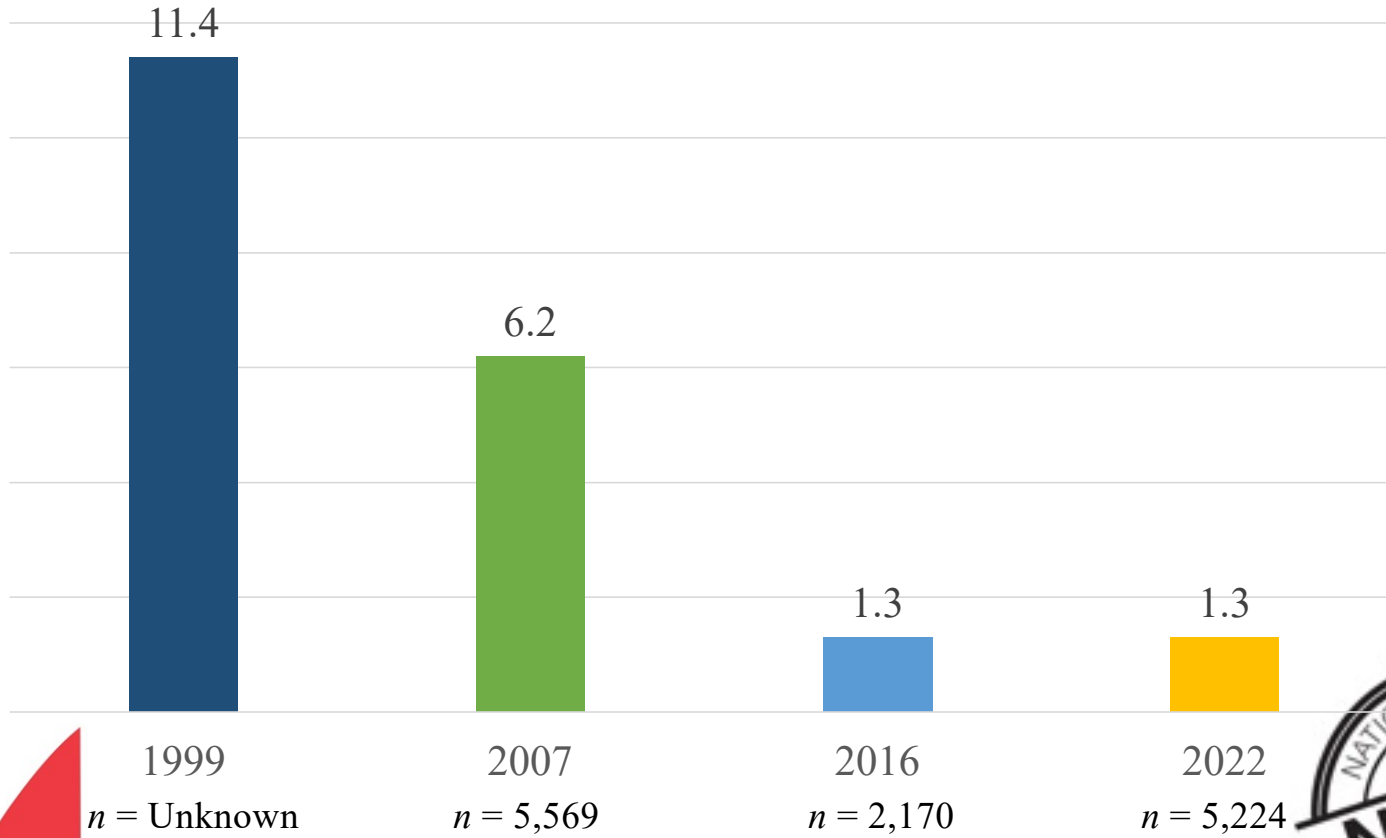
Fetal Presence



2007: *n* = 3,577
2016: *n* = 3,811
2022: *n* = 5,843



Percent of All Cattle Surveyed with Arthritic Joints



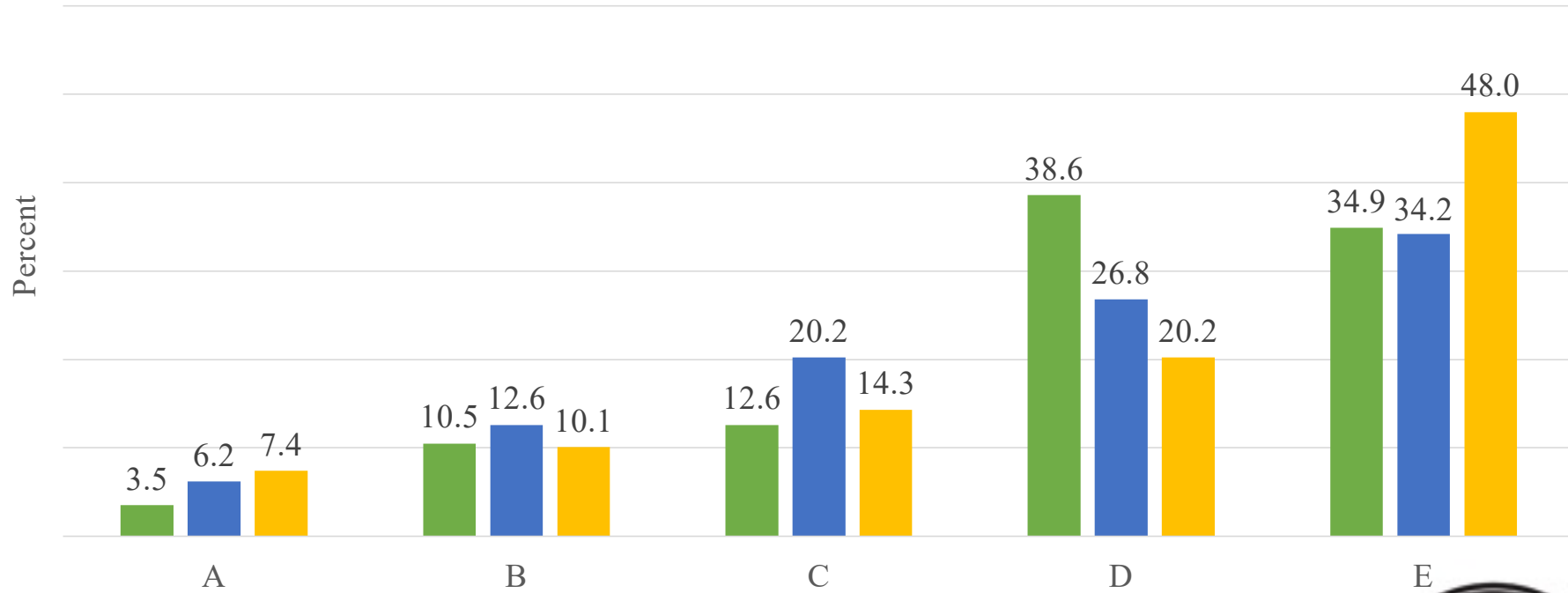
BEEF



Carcass Characteristics



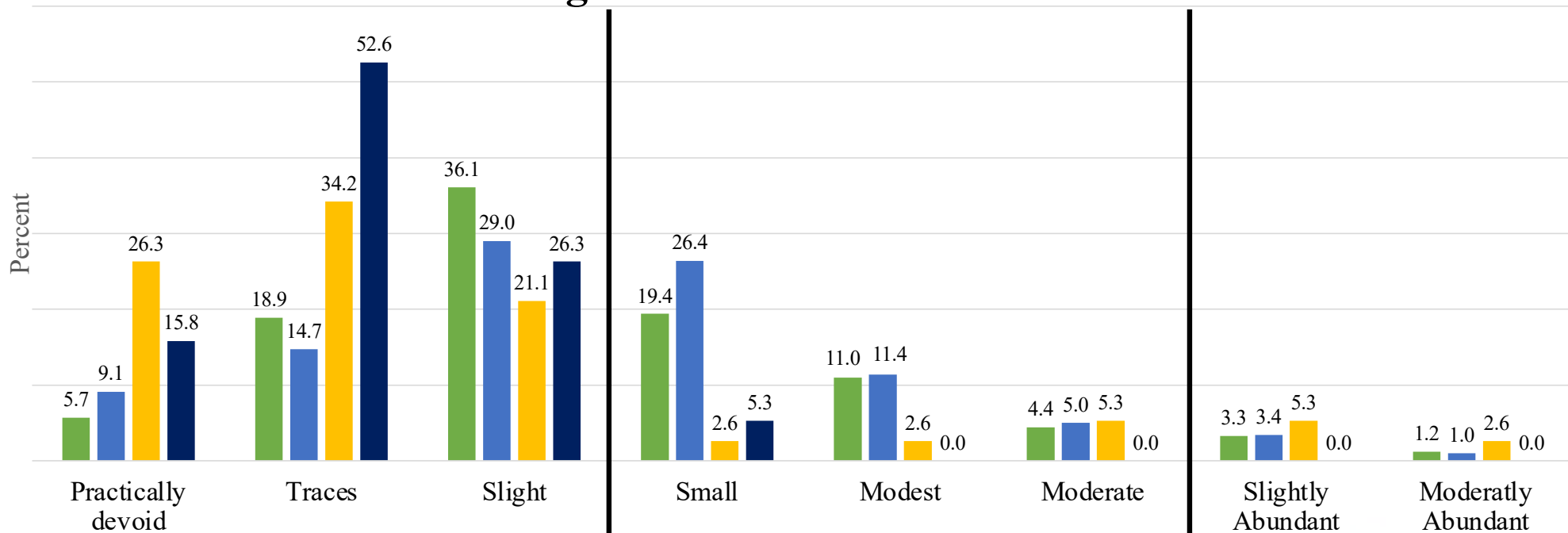
Overall Maturity Distribution



■ 2007 ■ 2016 ■ 2022
n = 1,801 *n* = 2,420 *n* = 5,417



Marbling Distributions for All Animals



■ Beef Cows
n = 861

■ Dairy Cows
n = 981

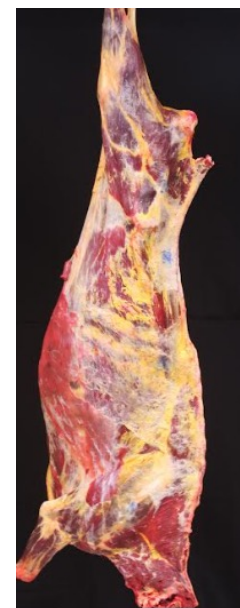
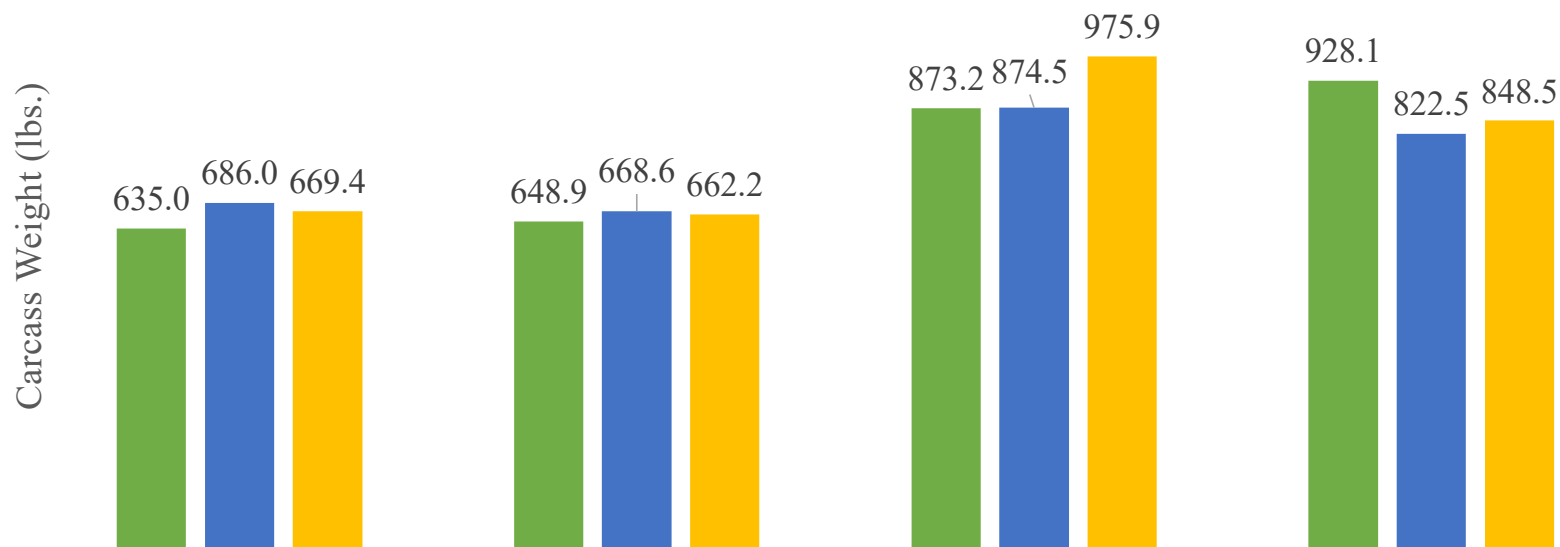
■ Beef Bulls
n = 38

■ Dairy Bulls
n = 19

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Audit Comparison: Mean Carcass Weights



Beef Cows

2007: *n* = 1,315
 2016: *n* = 1,561
 2022: *n* = 2,315

Dairy Cows

2007: *n* = 1,320
 2016: *n* = 1,693
 2022: *n* = 2,173

Beef Bulls

2007: *n* = 245
 2016: *n* = 188
 2022: *n* = 548

Dairy Bulls

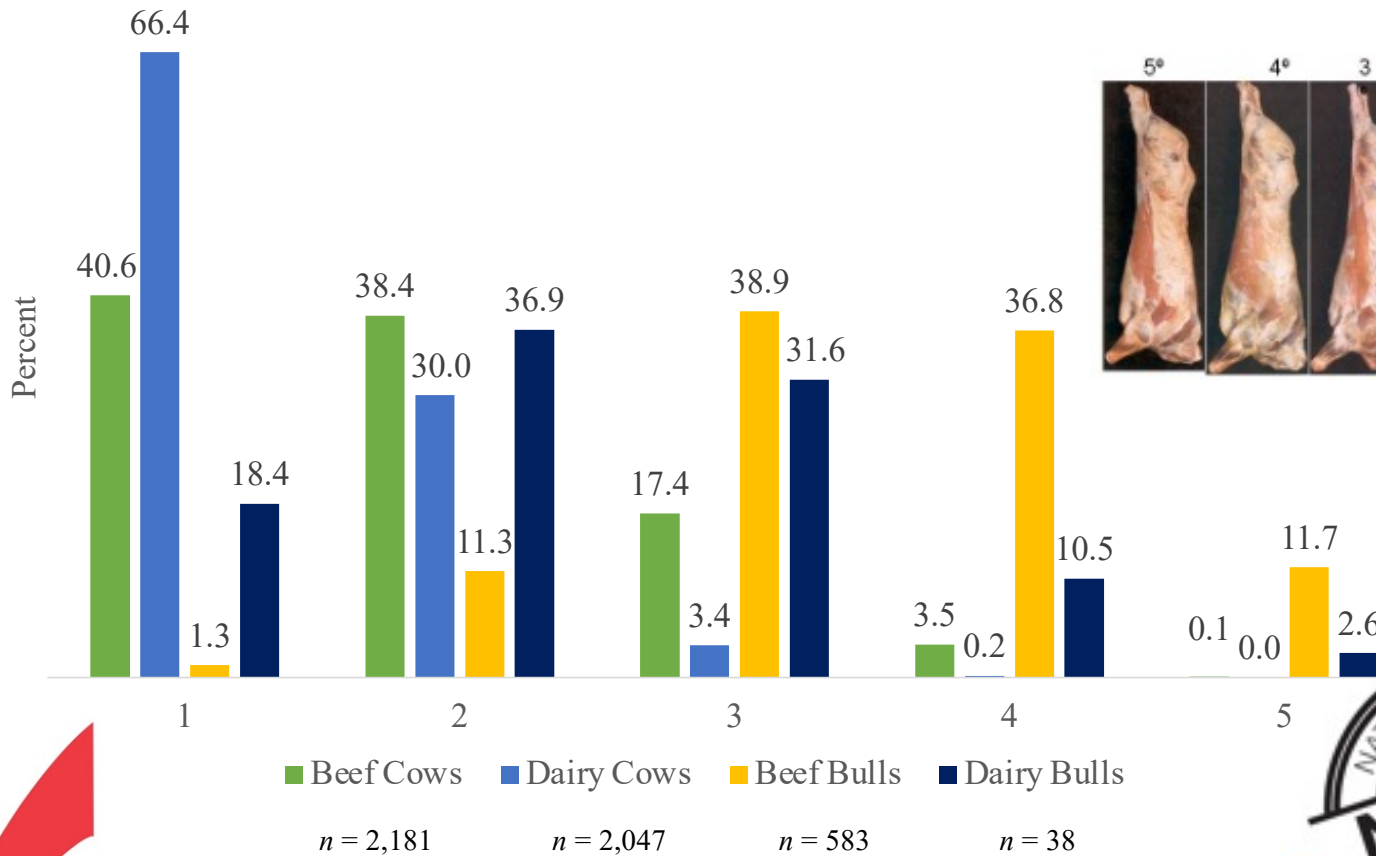
2007: *n* = 95
 2016: *n* = 58
 2022: *n* = 37

■ 2007 ■ 2016 ■ 2022

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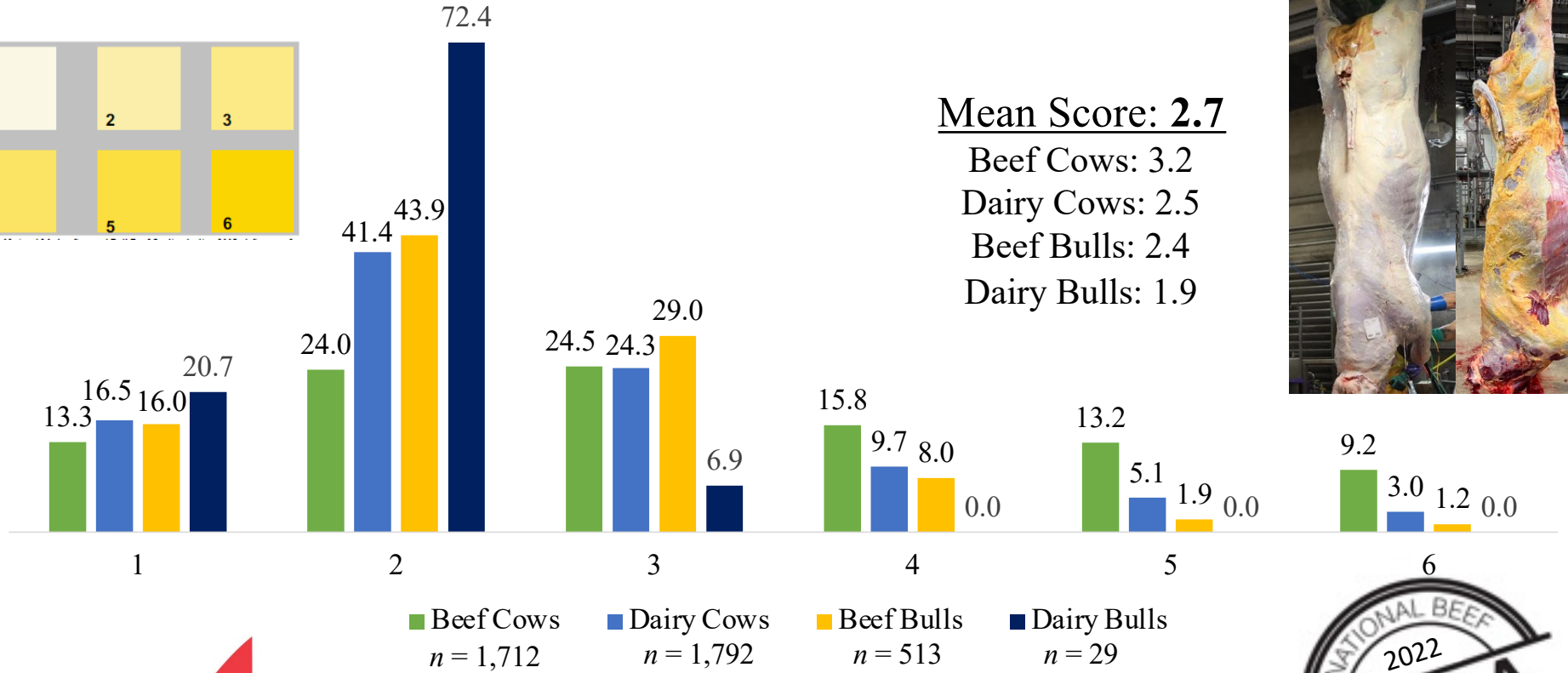
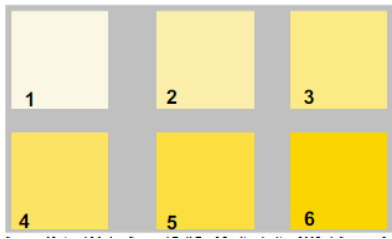
Distribution of Muscle Scores for All Cattle



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Distribution of Fat Color Scores Observed in All Cattle

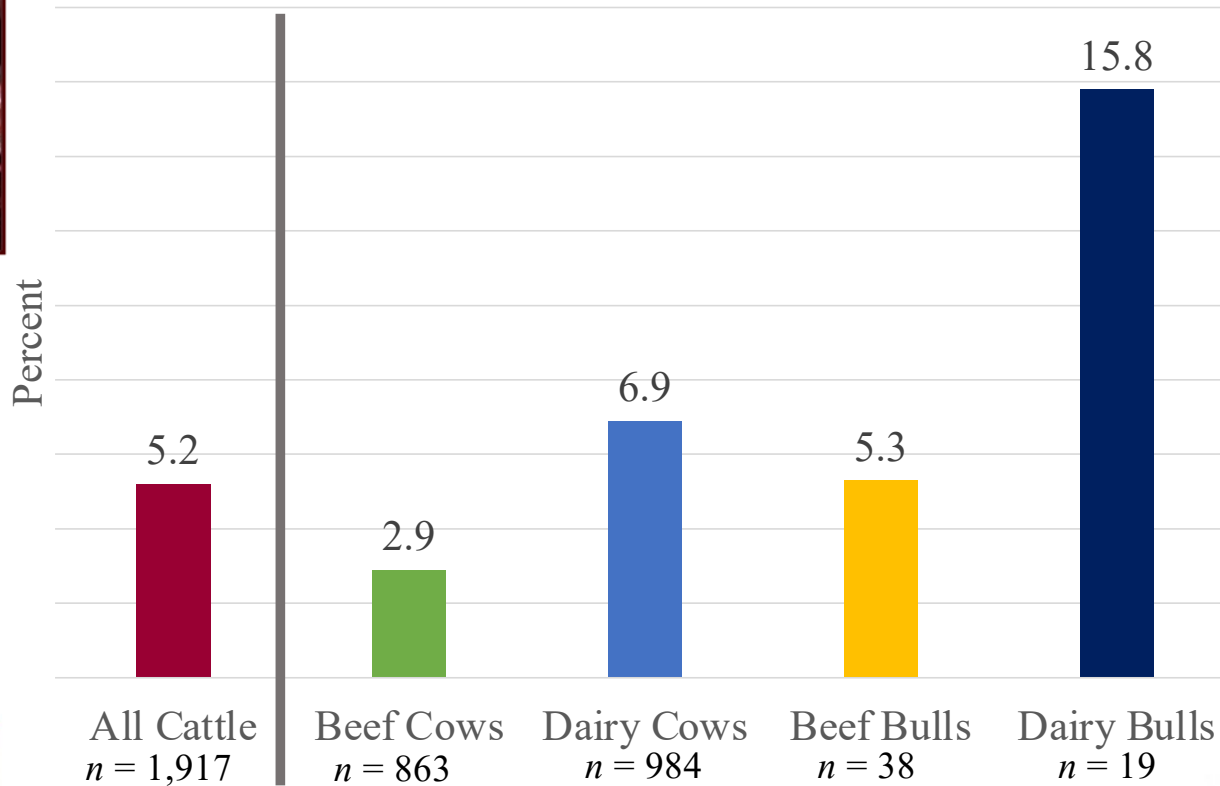
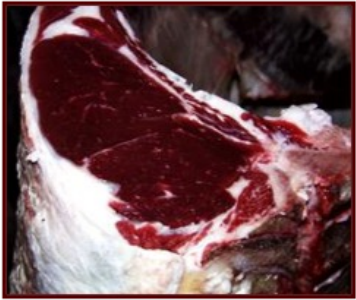


Mean Score: 2.7

Beef Cows: 3.2
 Dairy Cows: 2.5
 Beef Bulls: 2.4
 Dairy Bulls: 1.9



Dark Cutting Observed in All Animals



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Food Safety



Percentage of Plants that Reported Foreign Objects Found in Beef From Market Cows and Bulls



$n = 16$

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%**)



Issues to Report Back to Producers

25.0%

Residues



12.5%

Abscesses

Bruising
Injection-Sites

$n = 16$

18.8%

Foreign Objects



Product Fabrication



Frequency of Primal/Subprimal and Lean Trim Production in Plants that Provided Fabrication Information

Primal/Subprimal	Percentage (%)
Brisket	88.9
Chuck Roll	66.7
Ribeye Roll	88.9
Striploin	88.9
Tenderloin	88.9
Top Sirloin Butt	77.8
Whole Muscle Round Pieces	100.0
Lean Trim	100.0



Other Fabricated Cuts:

- Tri-tip
- Sirloin Ball Tip
- Flank Steak
- Sirloin Flap
- Skirt Steaks
- Beef Ribs
- Shoulder Clod



Other By-Product Items:

- Tendons
- Backstrap Ligament
- Patella
- Pizzles
- Bull Fries
- Weasand Meat
- Beef Lips



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“Three M’s” 1994:

Manage cattle to minimize defects

Monitor health and condition

Market in a timely manner



Thank You!

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