2024/2025 Corn Harvest Quality Report

November 27, 2024

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Quality, Reliability, Transparency

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Bridge to world's largest, most reliable grain supply

2024/2025 Corn Harvest Quality Report

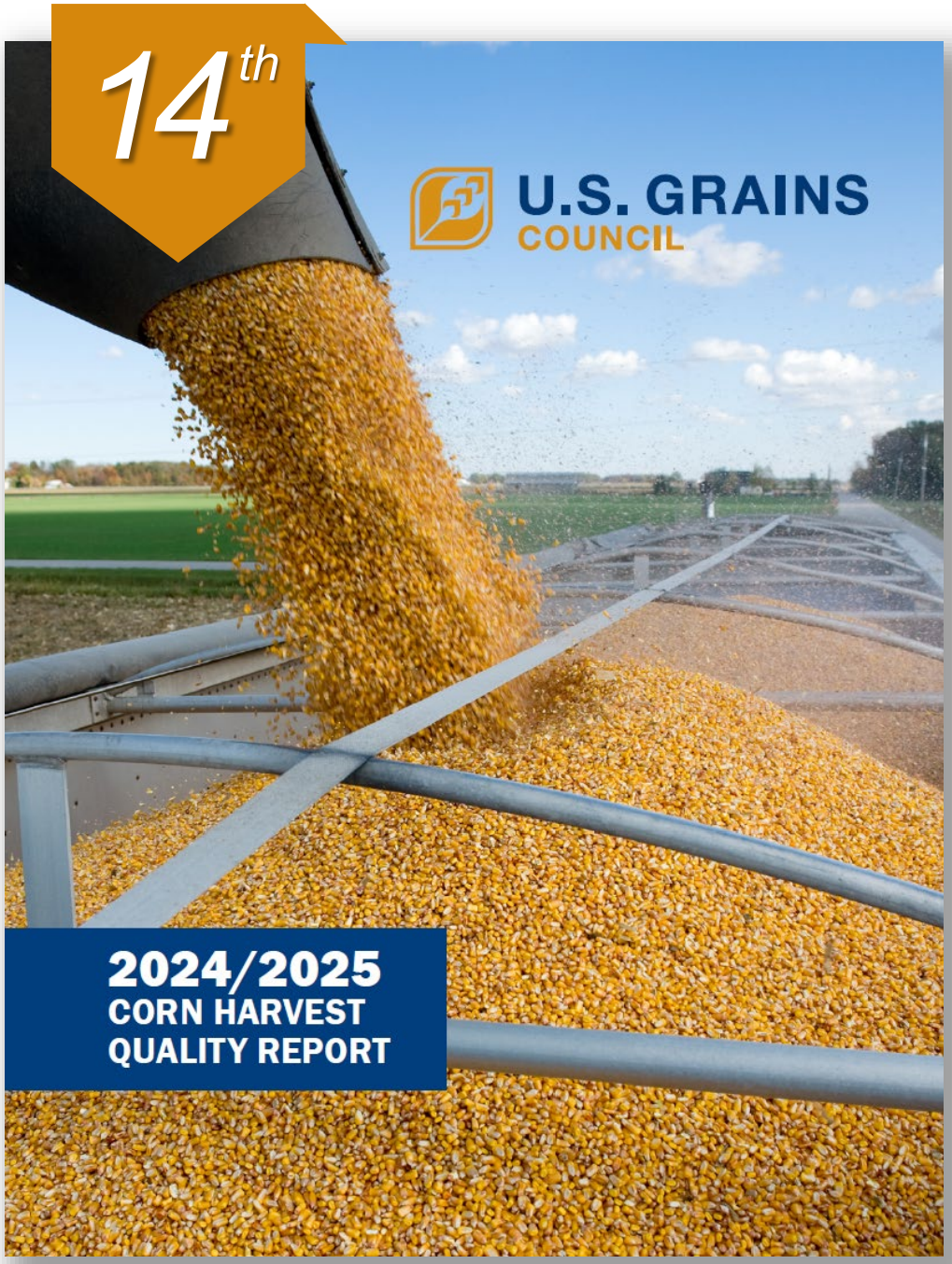
Reliable and Comparable Data

Transparent and Consistent Methodology

Early Look at General Harvest Quality

Tools for Better Decision Making

- Evaluating trends and factors that impact corn quality
- Annual Series: Enhancing knowledge over time
- Quality at export affected by many factors in the U.S. grain marketing system
- Corn Export Cargo Quality Report in March 2025 will report U.S. corn quality from samples at export points



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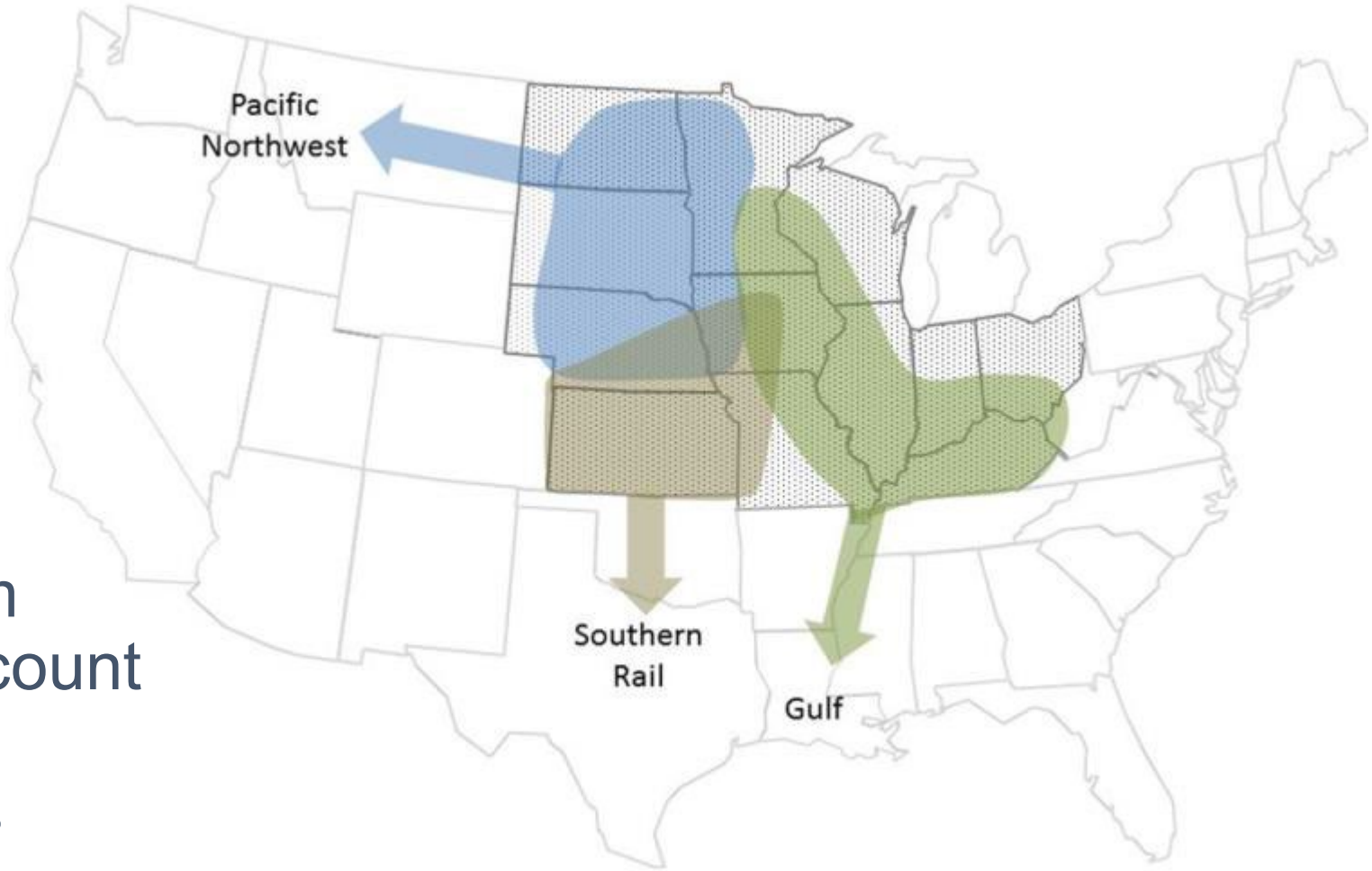
Export Catchment Areas (ECAs)



620 samples from
12 states that account
for over 90% of
U.S. corn exports

Quality Factors Tested

Grading Factors
- Test weight
- Broken corn
- Foreign material
- Total damage
- Heat damage

Moisture

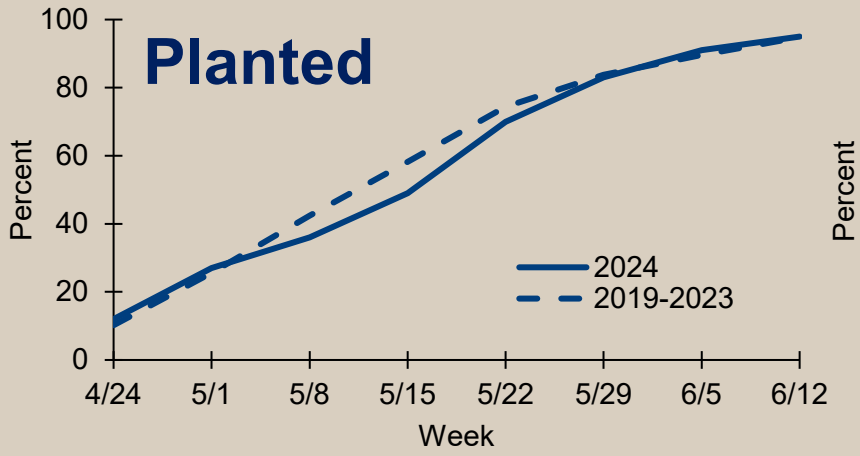
Chemical Composition
- Protein
- Starch
- Oil

Physical Factors
- Stress cracks
- 100-kernel weight
- Kernel volume
- True density
- Whole kernels
- Horneous (hard) endosperm

Mycotoxins
- Aflatoxin
- DON (Vomitoxin)
- Fumonisin
- Ochratoxin A
- T-2
- Zearalenone

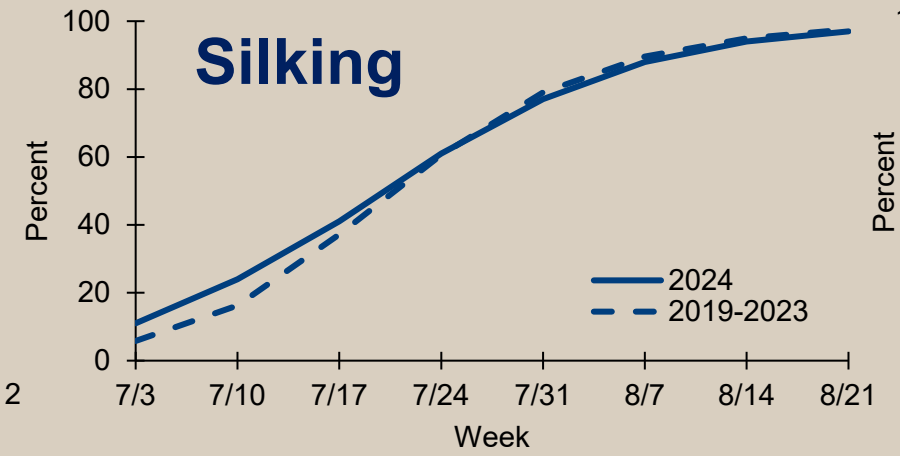
2024 Growing Conditions and Impact on Crop Development

Planting progress similar to 5YA despite some planting interruptions from rain



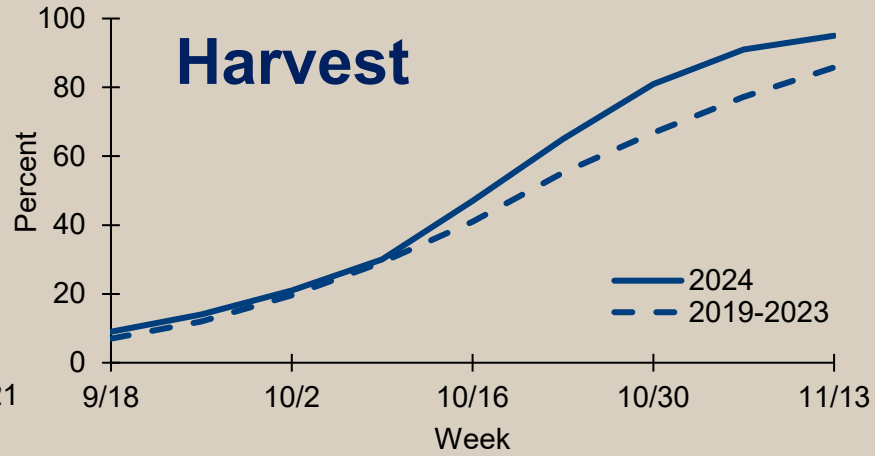
Ample moisture and warm conditions fostered quick emergence and strong growth

Pollination initiated slightly earlier than the 5YA



Low crop stress and mild conditions were ideal conditions for grain development

Warm and dry conditions led to quick field drying and timely harvest



Lower BCFM, higher percentage of whole kernels and historically low moisture

2024/2025 Corn Harvest Quality Highlights

Overall Crop

67% of crop rated good or excellent condition & **highest yields** on record projected

Harvest about **81%** complete as of October 27, higher than 2023 (68%) and the 5YA† (64%)

Grade Factors/Moisture vs. 5YA

Test Weight
Higher

BCFM
Lower

Total Damage
Lower

Moisture
Lower

Chemical Composition vs. 5YA

Protein
Same

Starch
Higher

Oil
Lower

Physical Factors vs. 5YA

Stress Cracks
Similar

100-Kernel Weight
Higher

True Density
Higher

Whole Kernels
Higher

Mycotoxins

98.9% of samples ≤ FDA action level for Aflatoxin‡

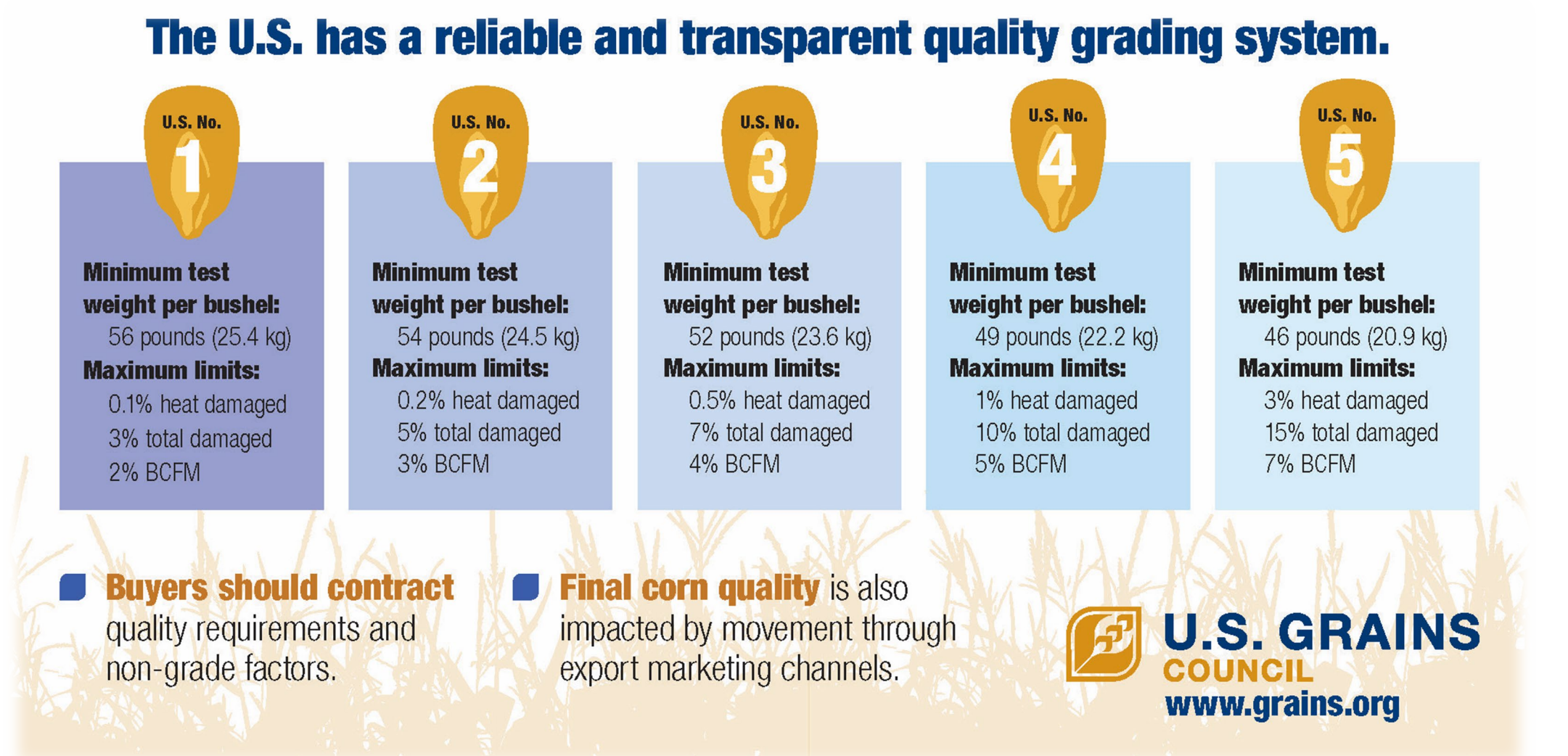
98.9% of samples below FDA advisory level for DON of 5.0 ppm‡

97.2% of samples ≤ FDA Fumonisin guidance level of 5 ppm‡

†5YA = 2019-2023 crop years ‡Action, advisory and guidance levels for corn intended for feed use

Grade Factors and Moisture

USDA Corn Quality Grades



Grade Factors and Moisture

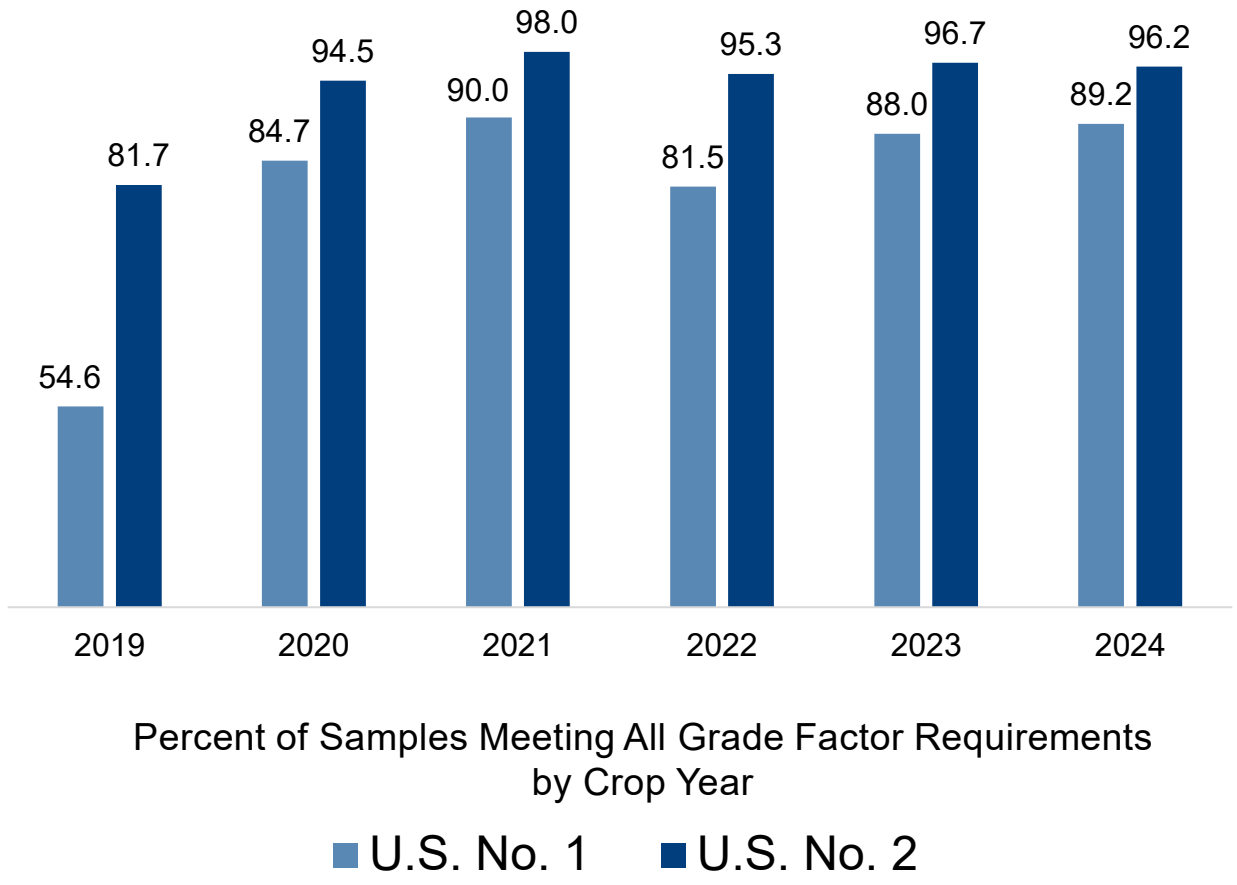
	Number of Samples	Average	Standard Deviation	Minimum	Maximum
Test Weight (lb/bu)	586	58.9	1.27	52.5	63.8
Test Weight (kg/hl)	586	75.8	1.63	67.6	82.1
BCFM (%)	586	0.6	0.38	0.1	7.4
Broken Corn (%)	586	0.4	0.26	0.0	4.6
Foreign Material (%)	586	0.1	0.19	0.0	3.5
Total Damage (%)	586	1.1	1.05	0.0	21.3
Heat Damage (%)	586	0.0	0.00	0.0	0.0
Moisture (%)	618	15.3	1.74	9.6	23.6

Grade Factors Summary

89.2% of samples No. 1 grade (88.0% in 2023)

96.2% of samples No. 2 grade (96.7% in 2023)

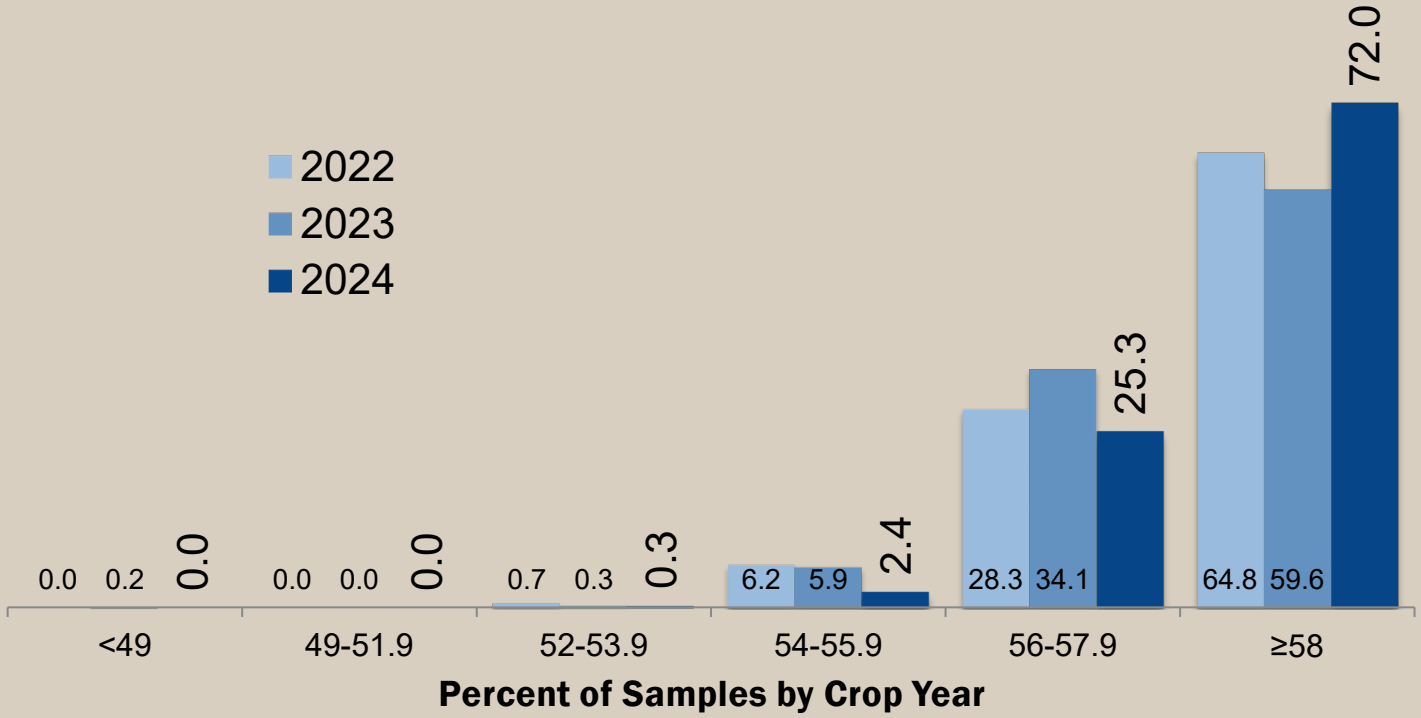
Average aggregate quality of the samples tested was better than all grade factor requirements for U.S. No. 1 grade



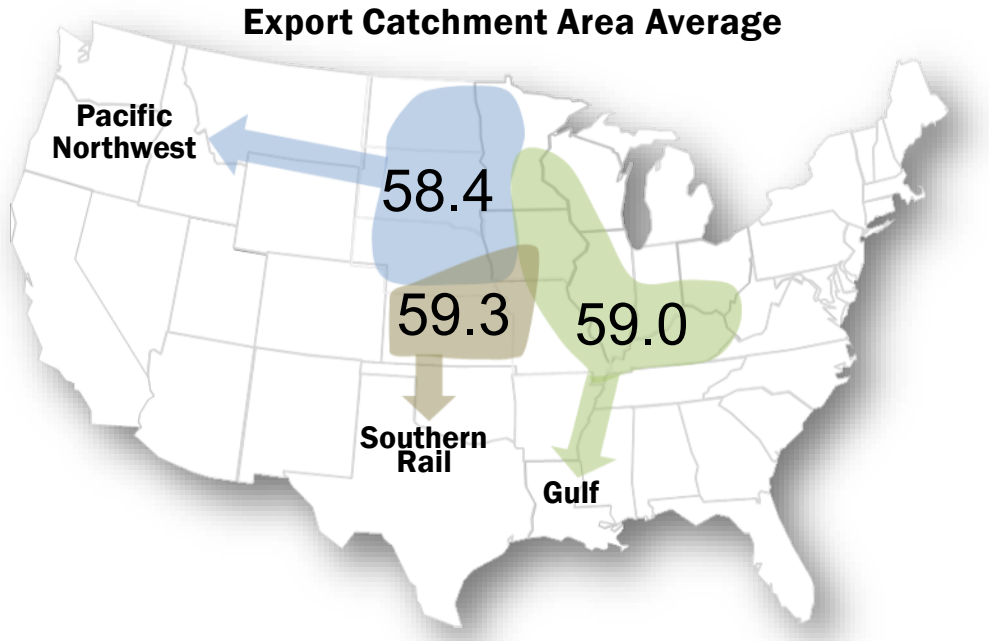
Test Weight — U.S. Units

U.S. Aggregate: 58.9 lb/bu

- **Highest** average in the history of the report
- Average **higher** than the 5YA (58.2 lb/bu)
- **97.3%** No. 1 grade (93.7% in 2023)

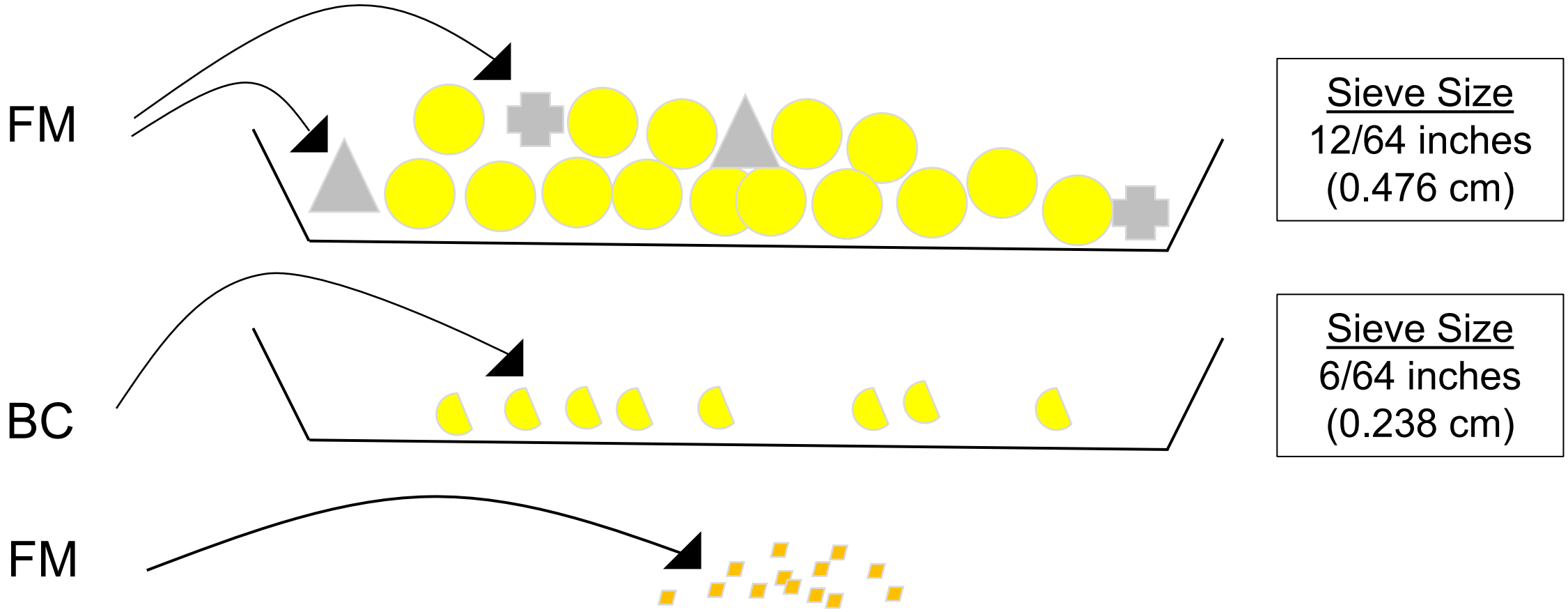


Percent of Samples by Crop Year



Historical Aggregate by Crop Year

Broken Corn and Foreign Material*

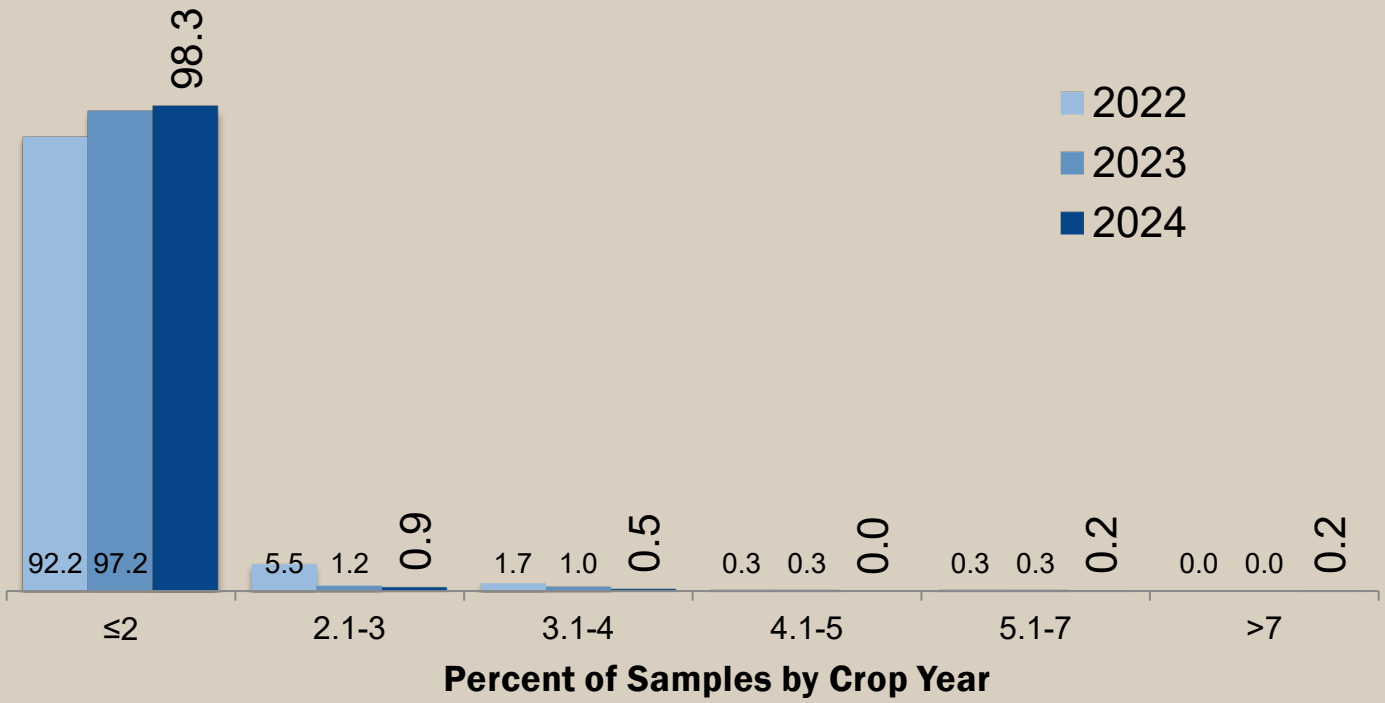


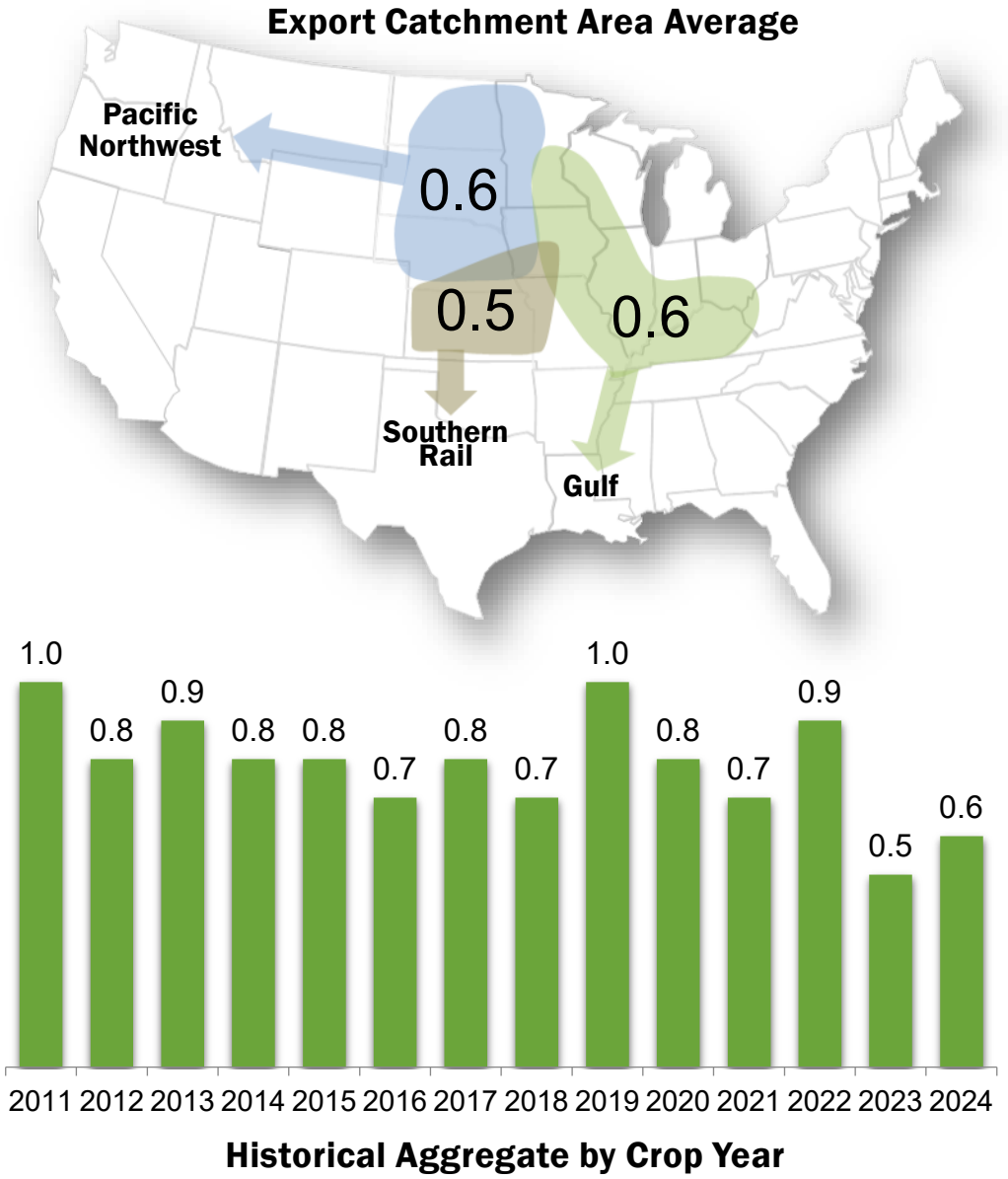
*Measured as percent of weight

Broken Corn and Foreign Material (%)

U.S. Aggregate: 0.6%

- Average **lower** than the 5YA (0.8%)
- **98.3%** No. 1 grade (97.2% in 2023)

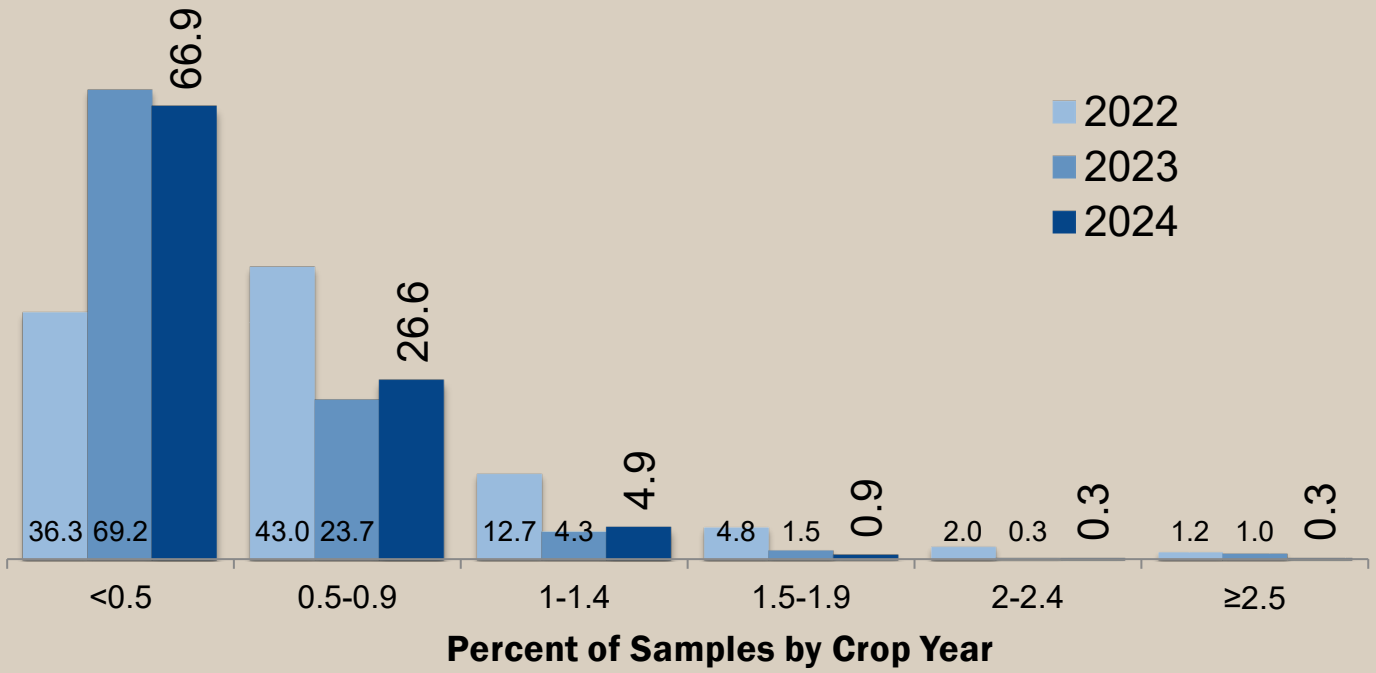


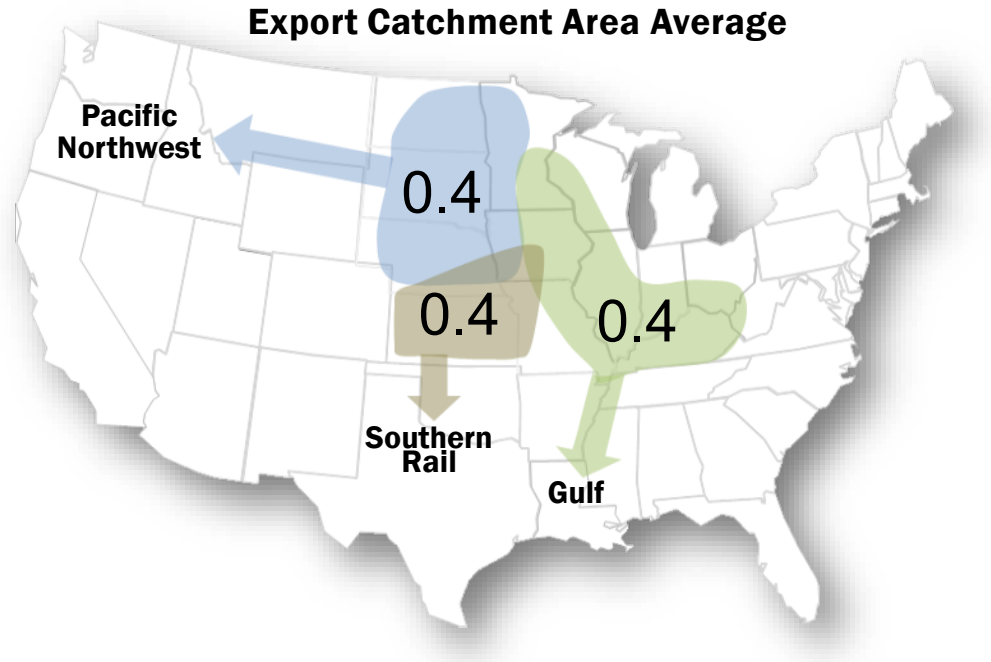


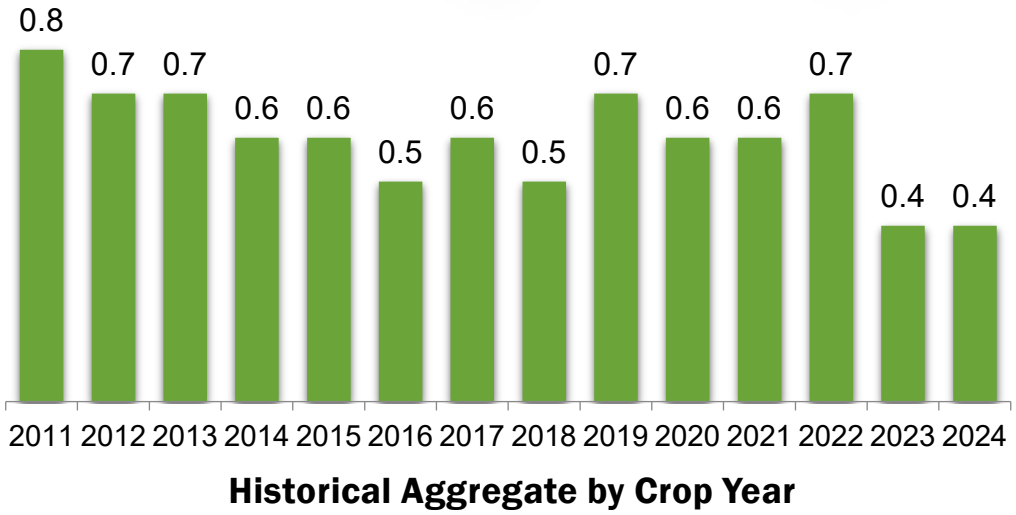
Broken Corn (%)

U.S. Aggregate: 0.4%

- Average **lower** than the 5YA (0.6%)



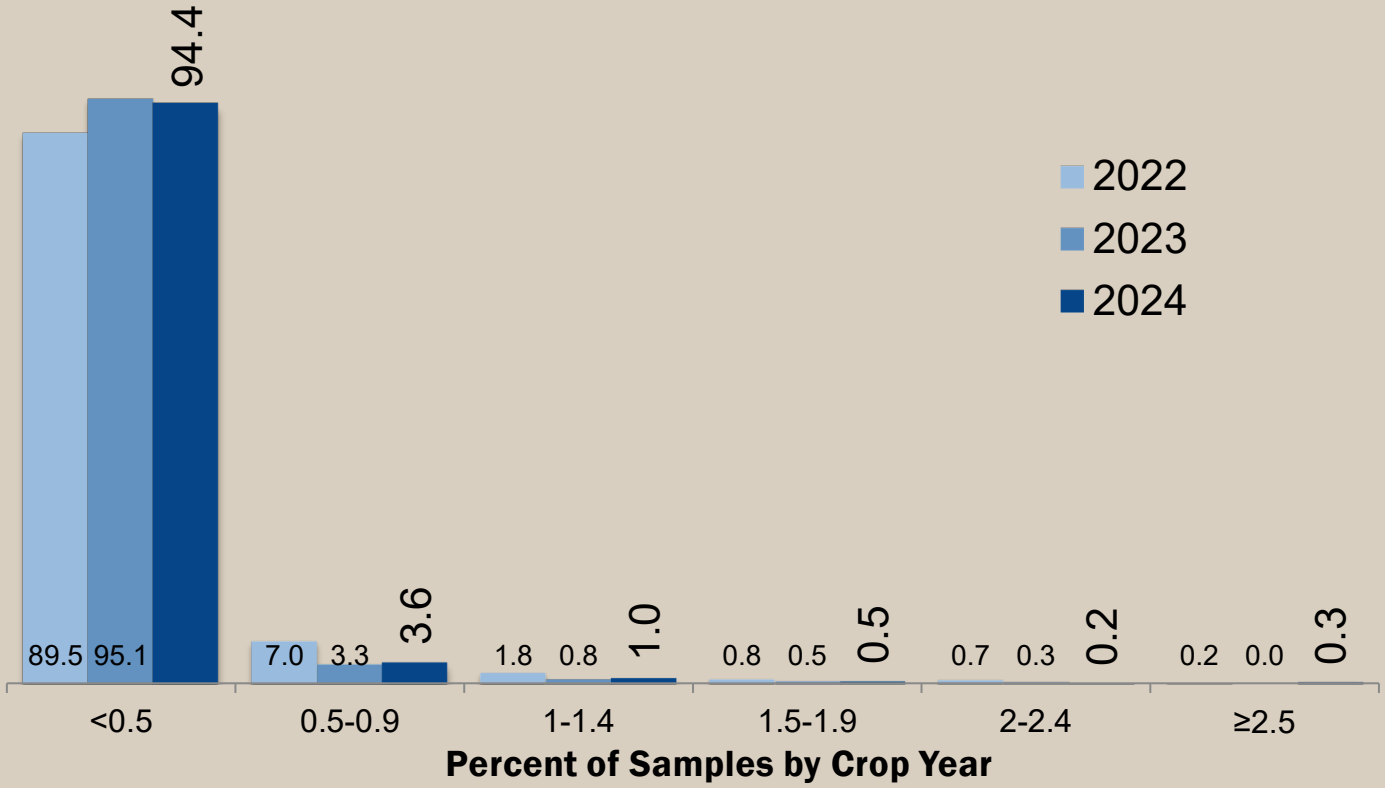


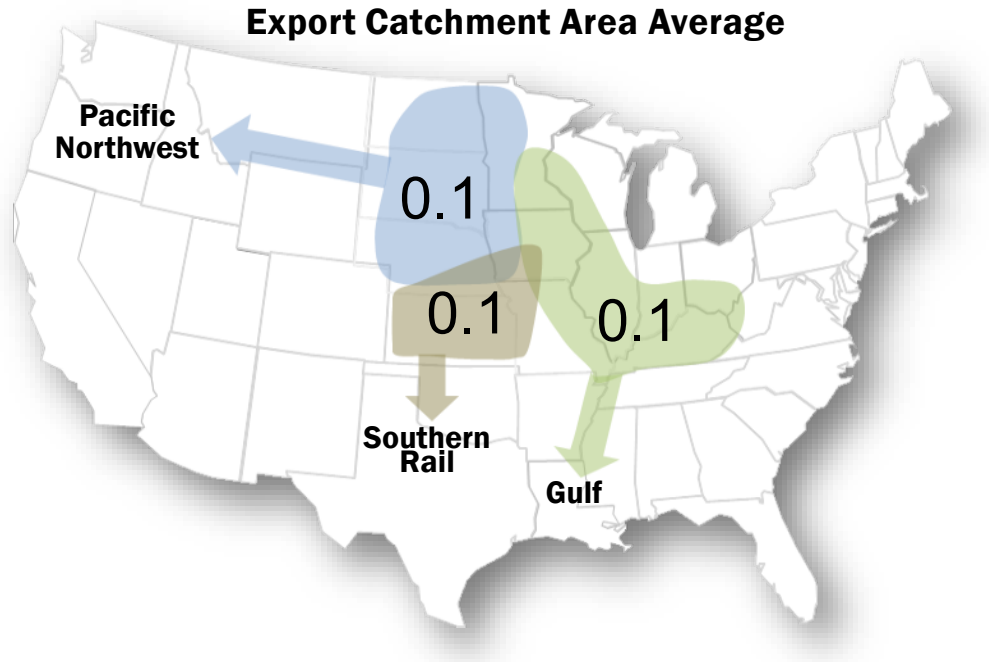


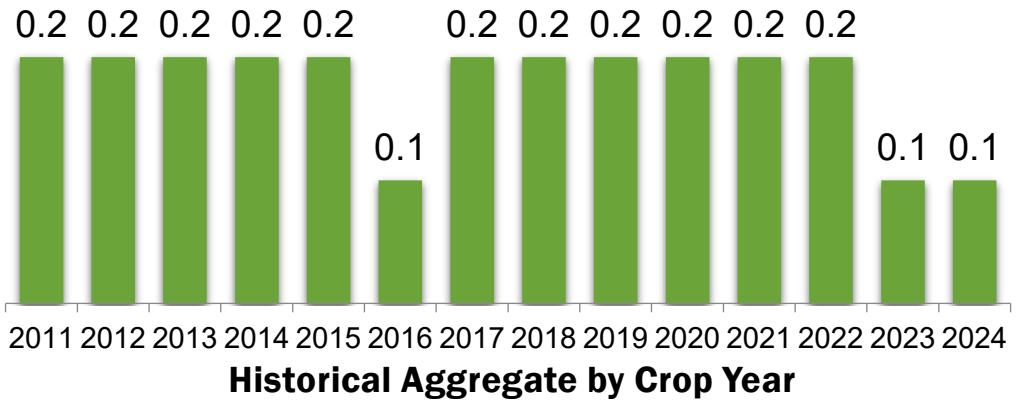
Foreign Material (%)

U.S. Aggregate: 0.1%

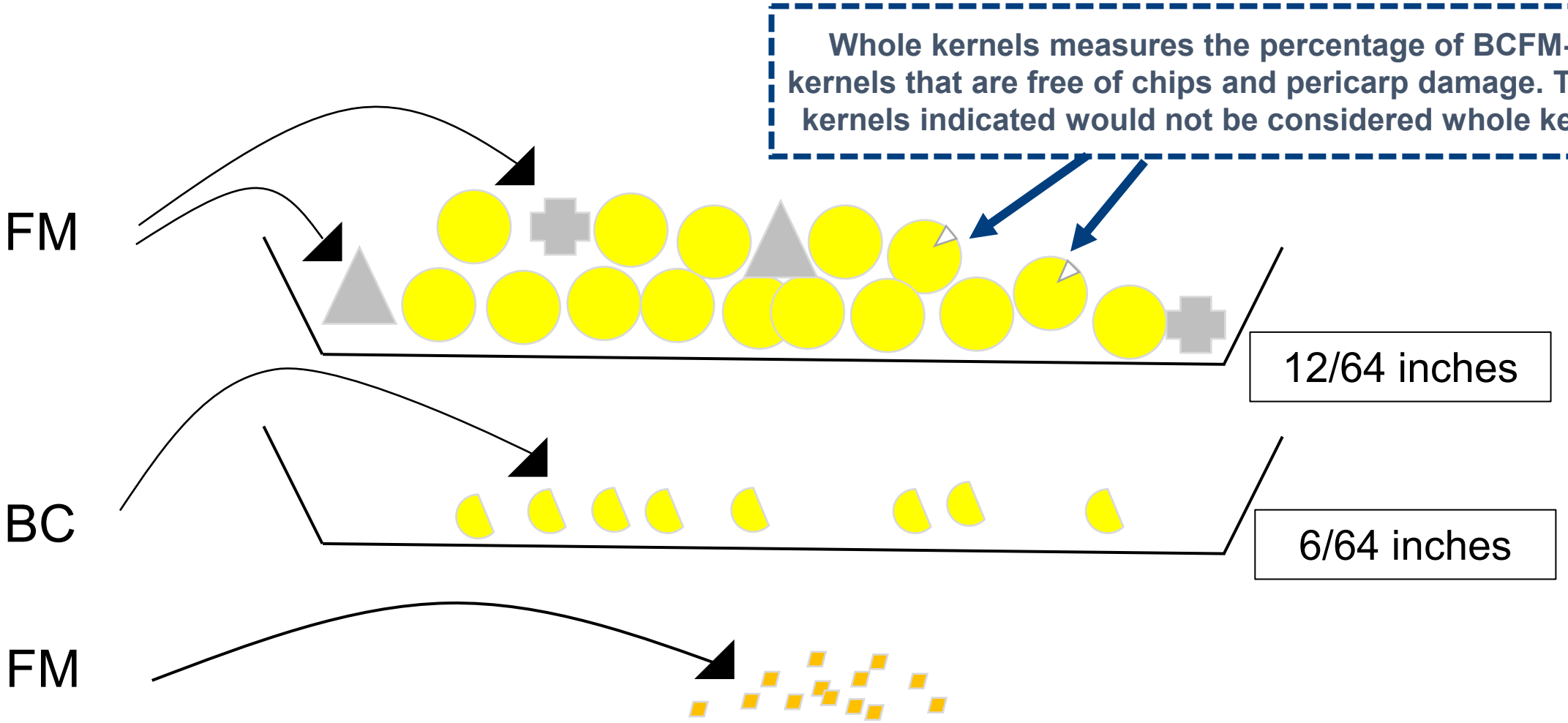
- Average **lower** than the 5YA (0.2%)
- **94.4%** contained less than 0.5% FM







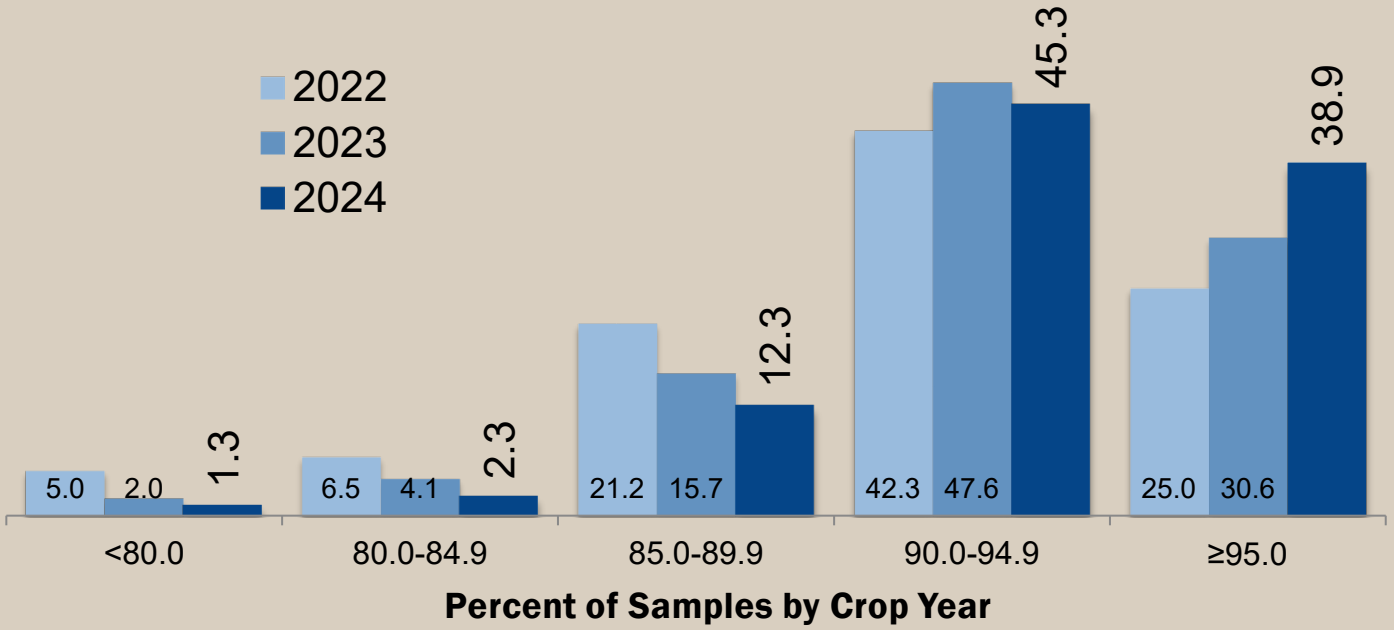
Whole Kernels (%)



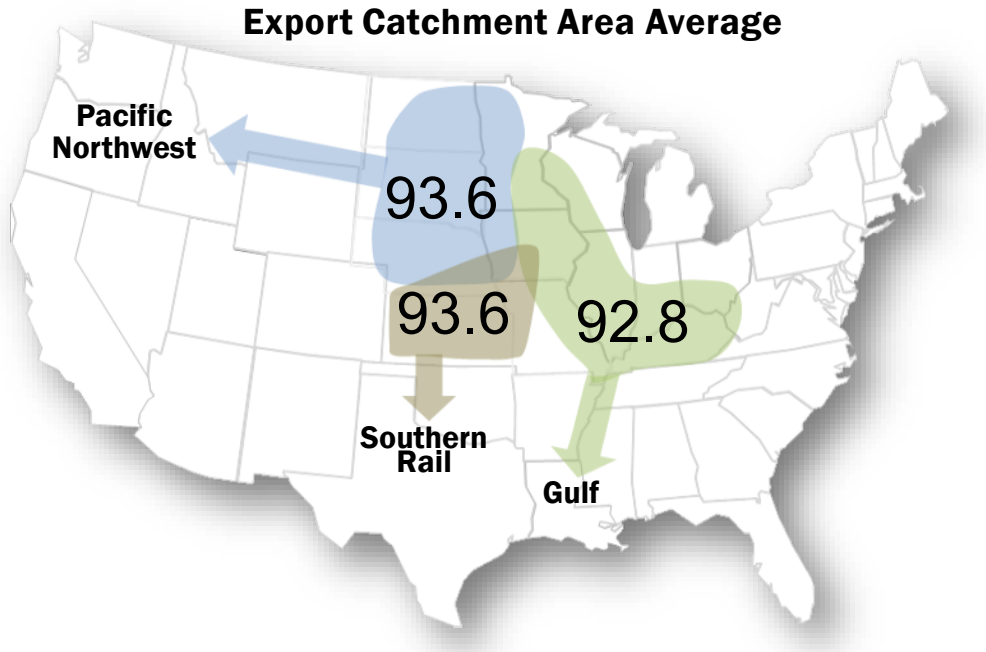
Whole Kernels (%)

U.S. Aggregate: 93.1%

- Not a grade factor
- Average **higher** than the 5YA (91.8%)



Percent of Samples by Crop Year

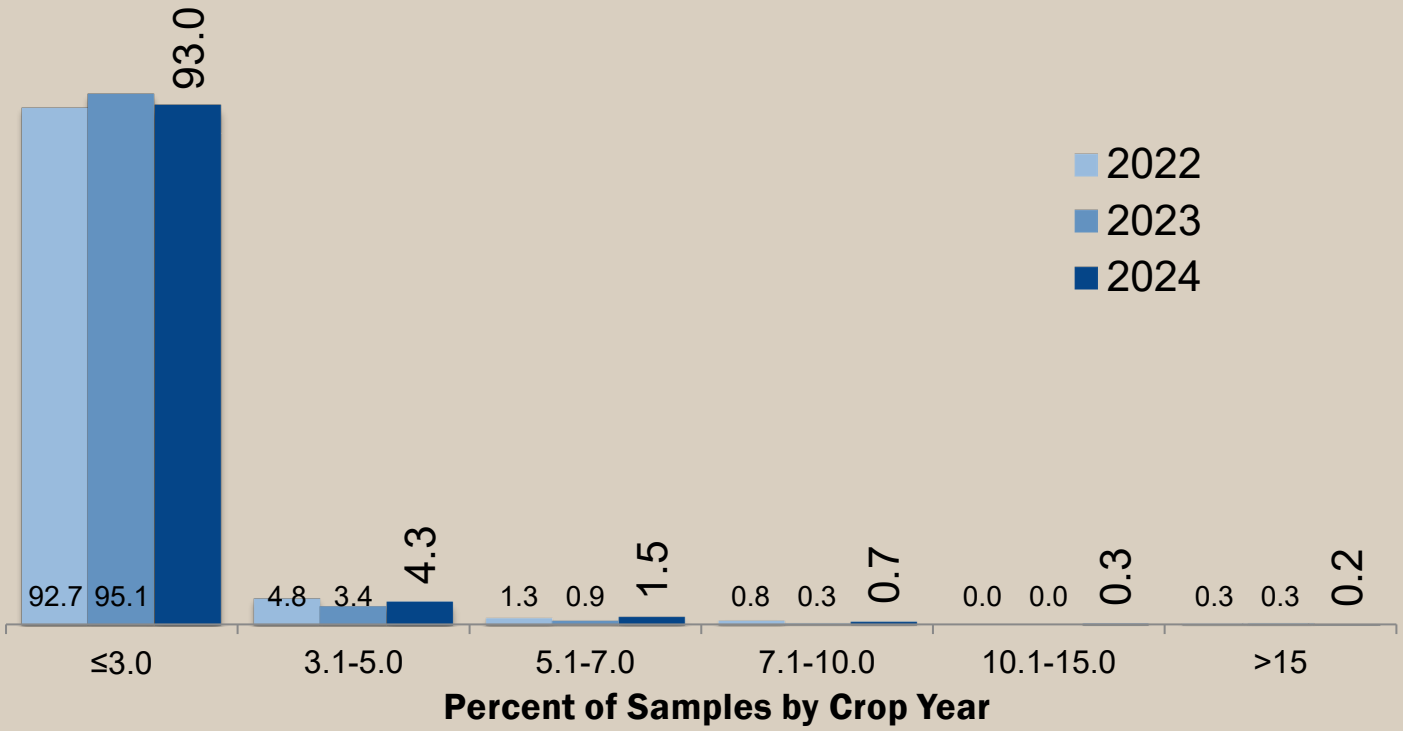


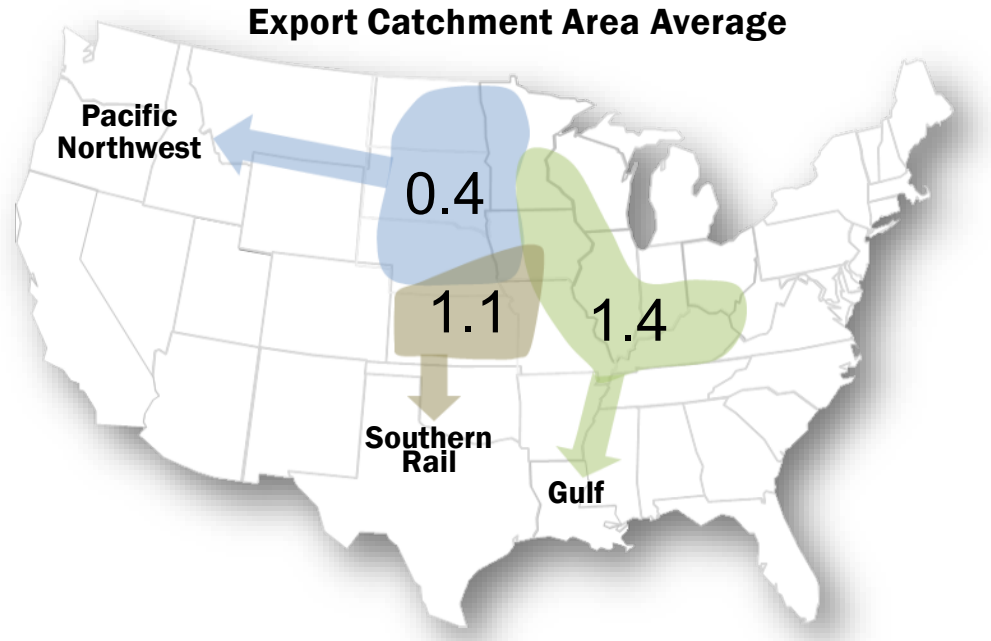
Historical Aggregate by Crop Year

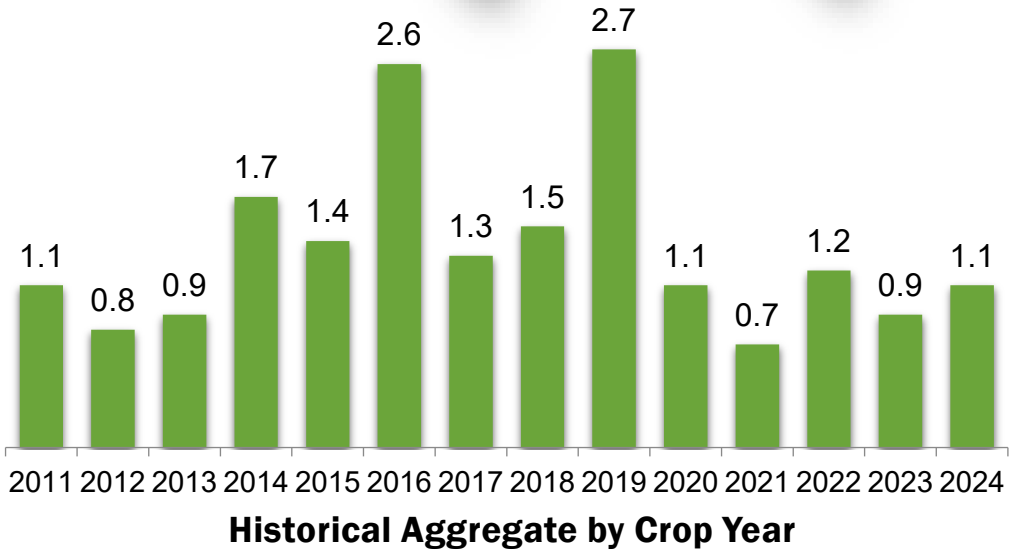
Total Damage and Heat Damage (%)

U.S. Aggregate: 1.1%

- Average **lower** than the 5YA (1.3%)
- **93.0%** No. 1 grade (95.1% in 2023)
- Average heat damage of **0.0%**



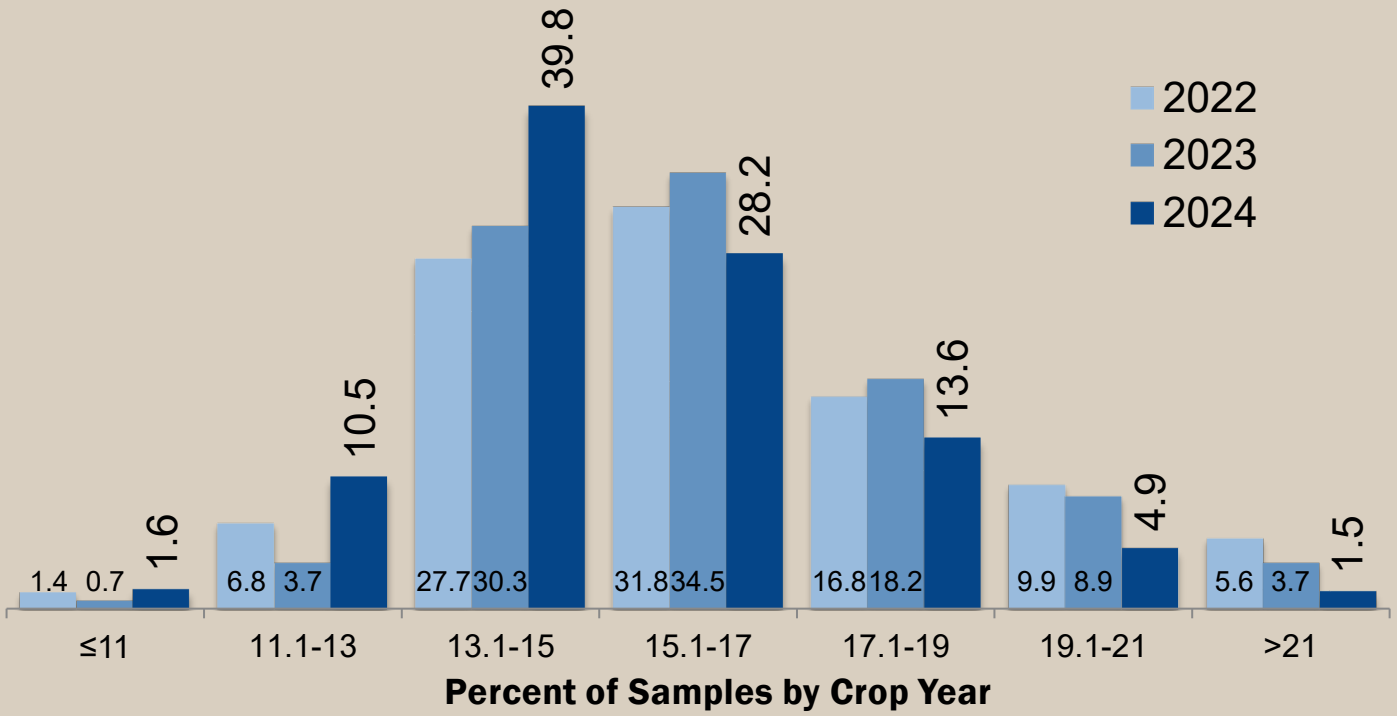


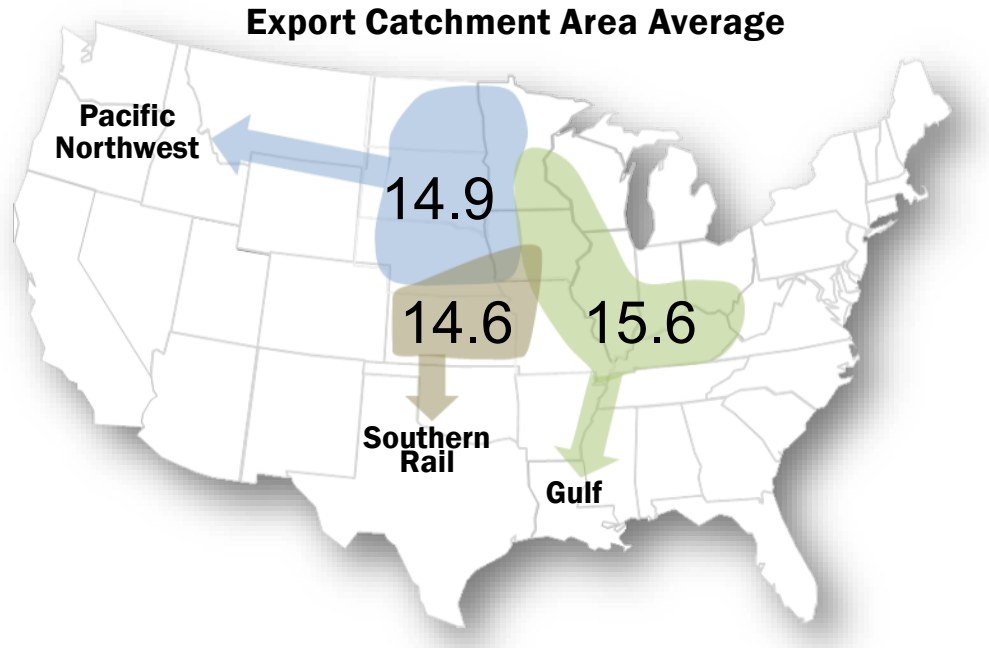


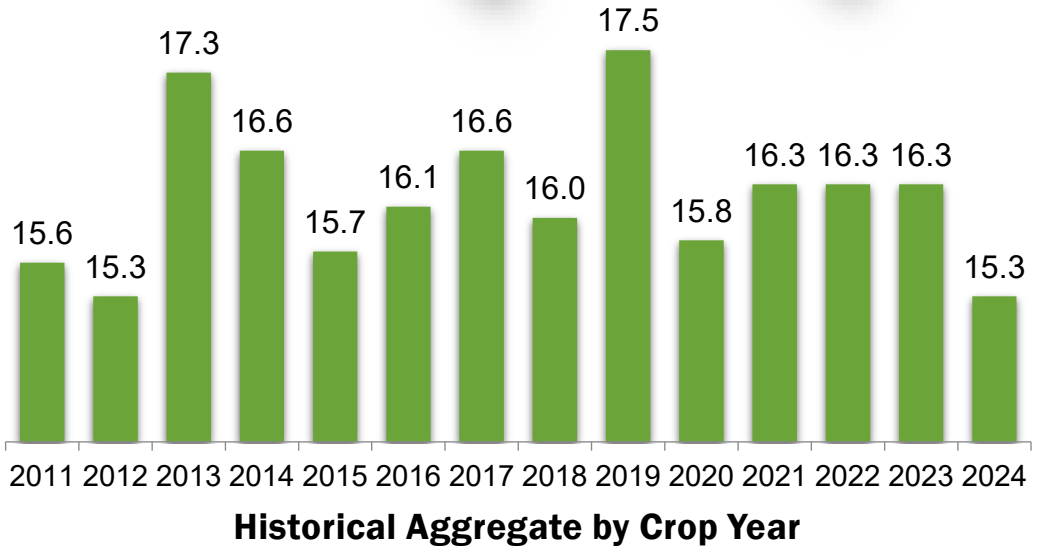
Moisture (%)

U.S. Aggregate: 15.3%

- Ties 2012 for the **lowest** average in the history of the report
- Average **lower** than the 5YA (16.4%)

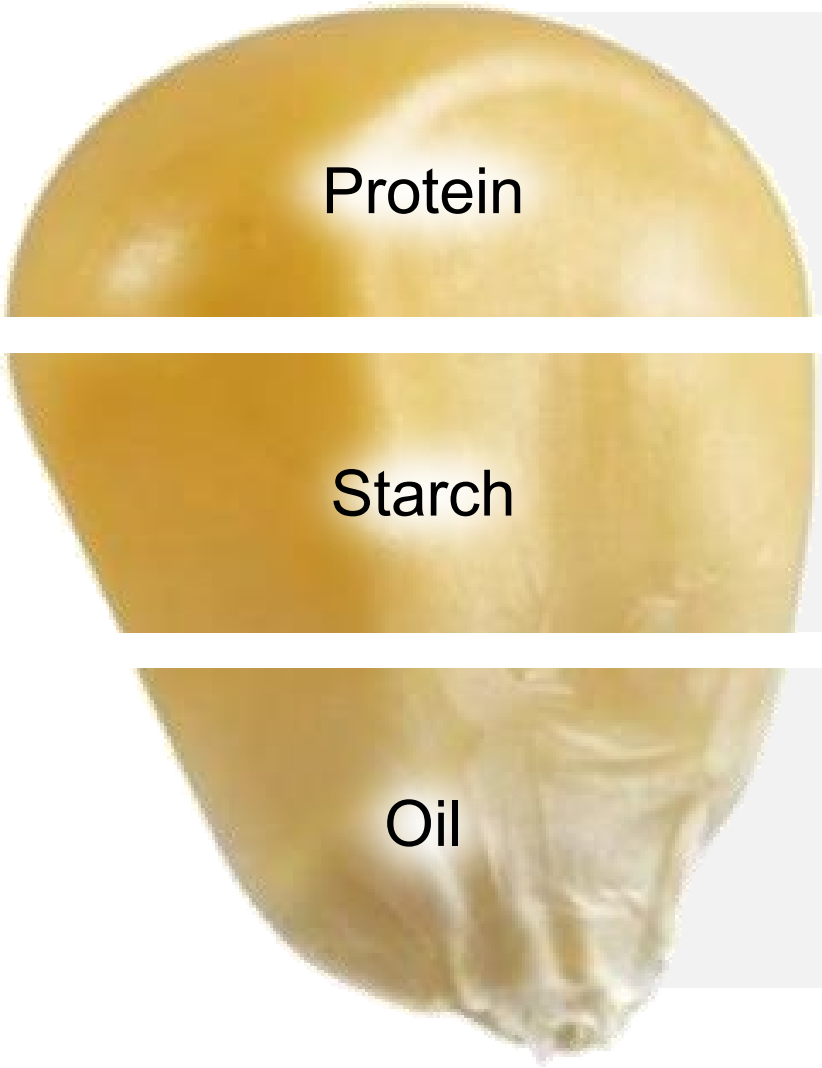






Chemical Composition

Chemical Composition



Protein	Important for poultry and livestock feeding Supplies essential amino acids	Influenced by	Genetics, weather, crop yields and available nitrogen during the growing season
Starch	Important for wet millers and dry-grind ethanol manufacturers	Influenced by	Genetics, weather and crop yields
Oil	Important by-product of wet and dry milling Essential feed component		

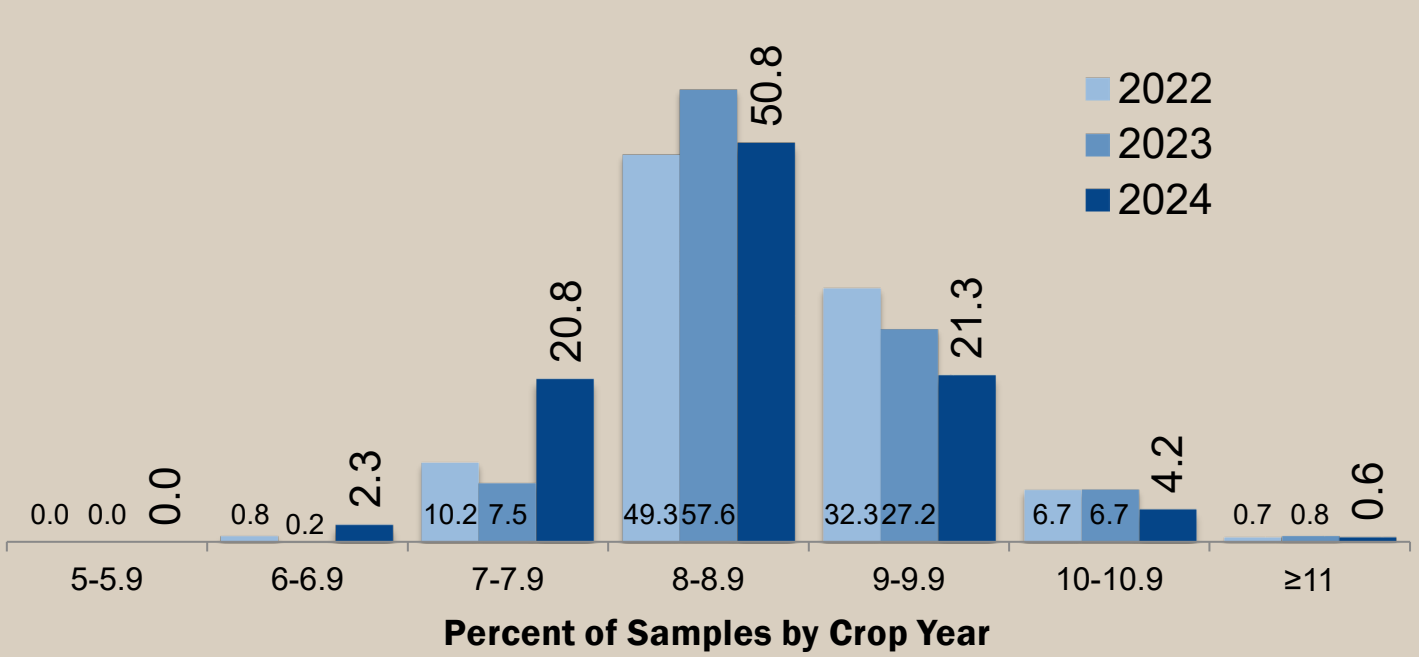
Chemical Composition

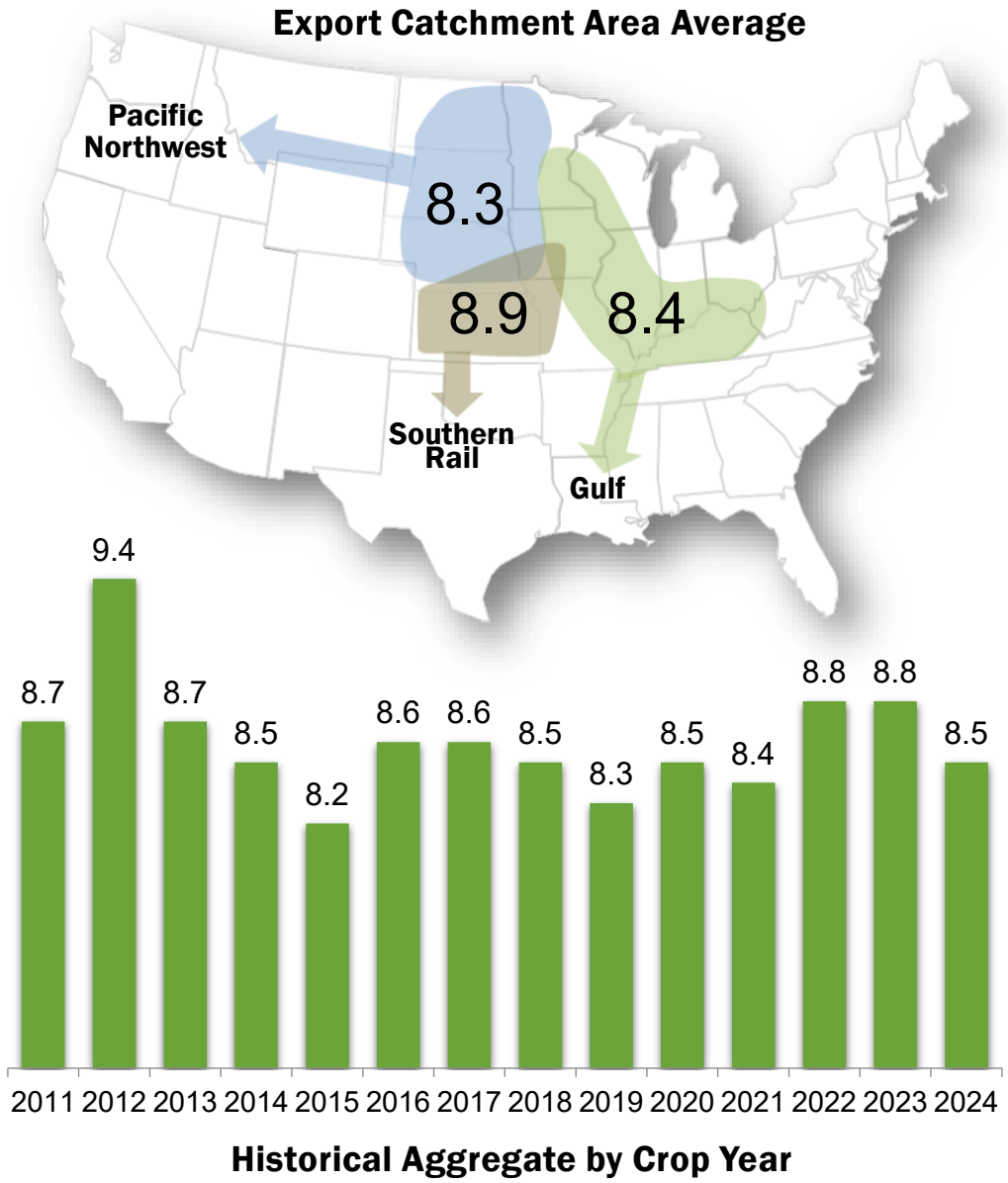
	Number of Samples	Average	Standard Deviation	Minimum	Maximum
Protein (Dry Basis %)	620	8.5	0.60	6.0	11.6
Starch (Dry Basis %)	620	72.2	0.65	69.7	74.3
Oil (Dry Basis %)	620	3.9	0.24	3.0	4.8

Protein (Dry Basis %)

U.S. Aggregate: 8.5%

- Average **same** as the 5YA

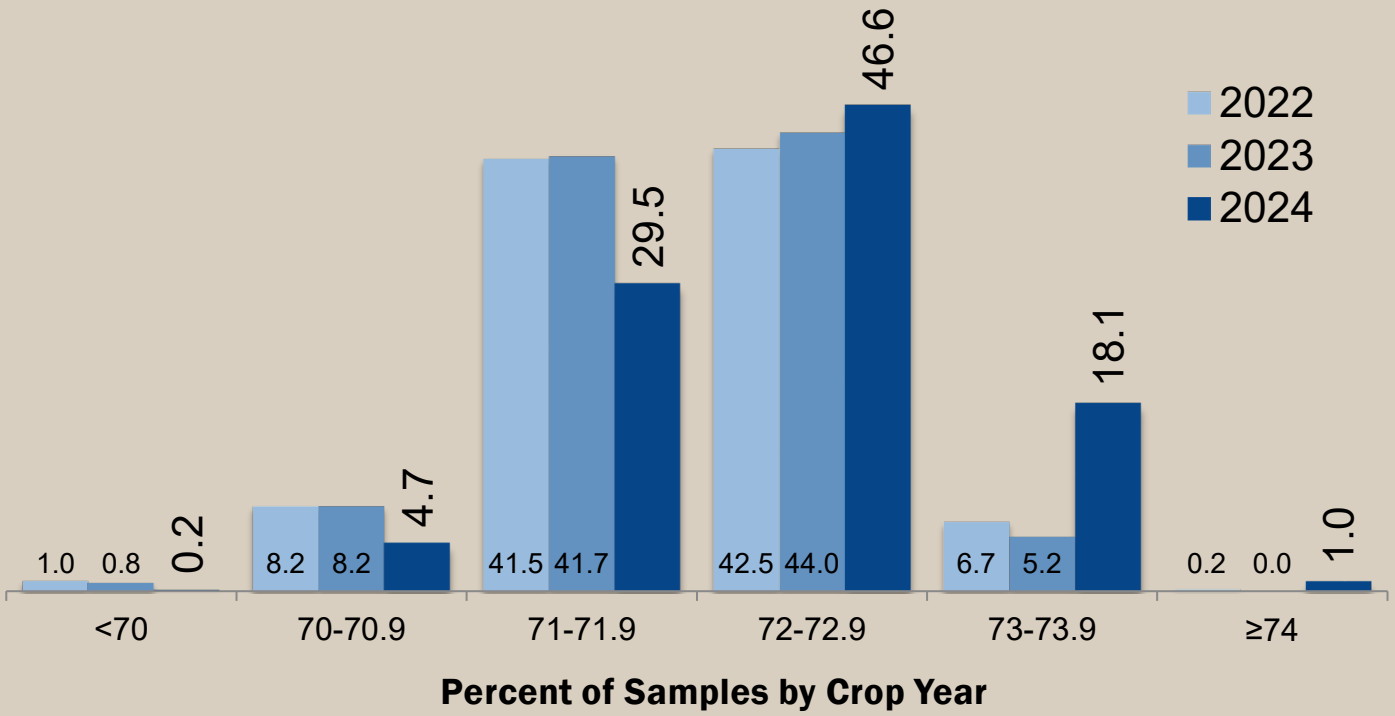




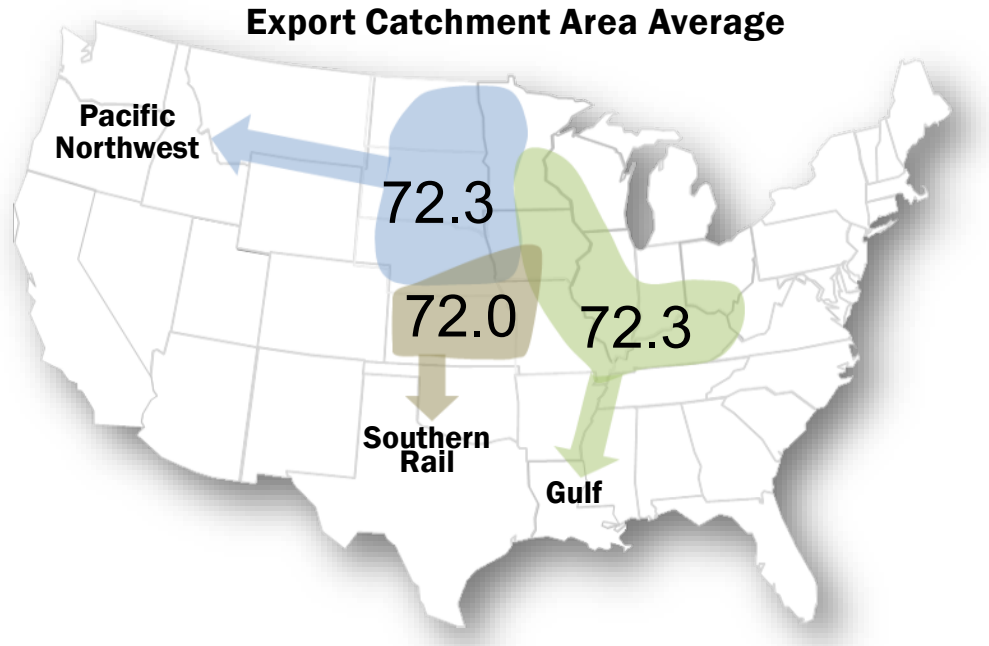
Starch (Dry Basis %)

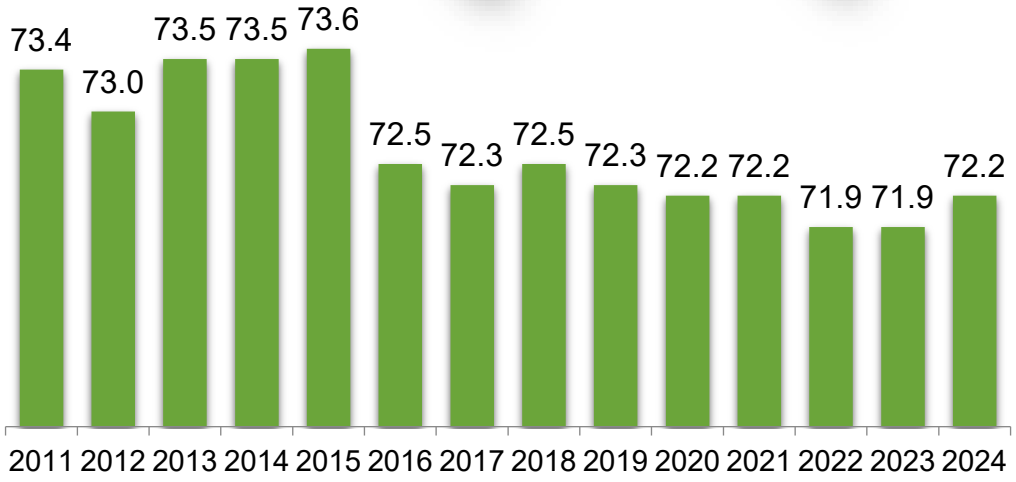
U.S. Aggregate: 72.2%

- Average **higher** than the 5YA (72.1%)
- **Gulf** ECA tends to have the highest average starch



Percent of Samples by Crop Year



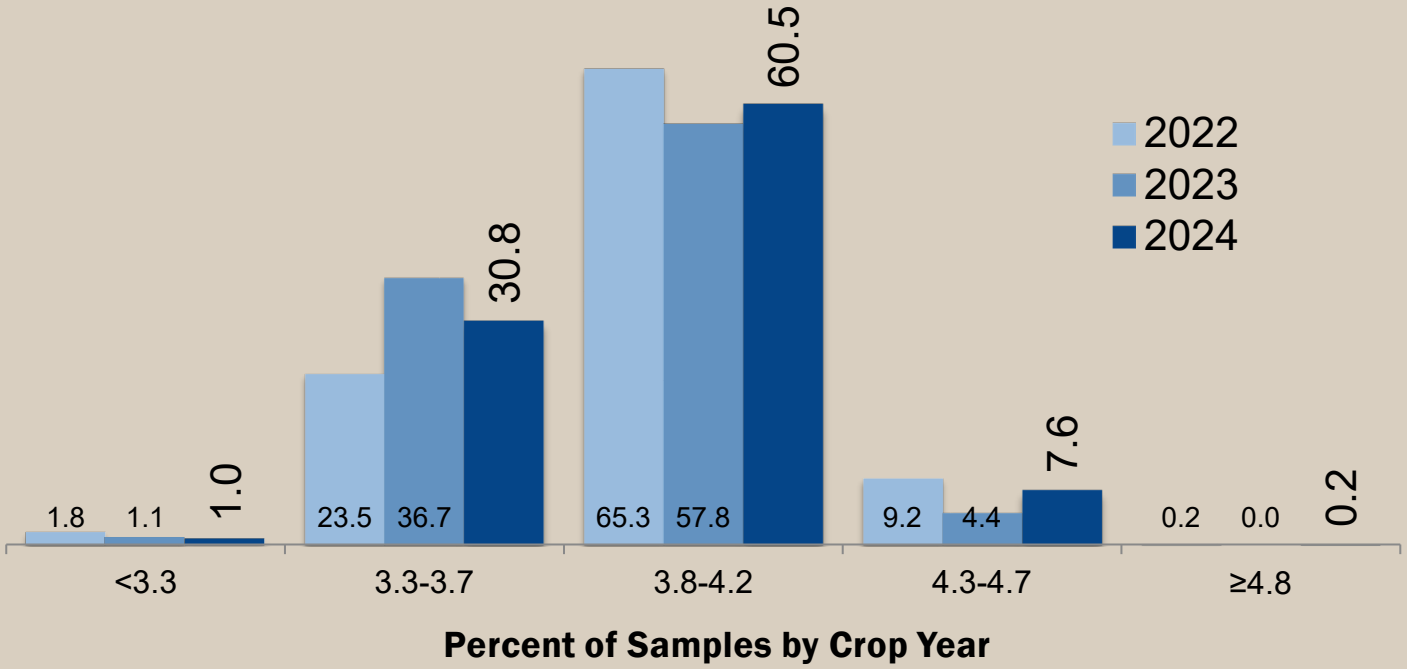


Historical Aggregate by Crop Year

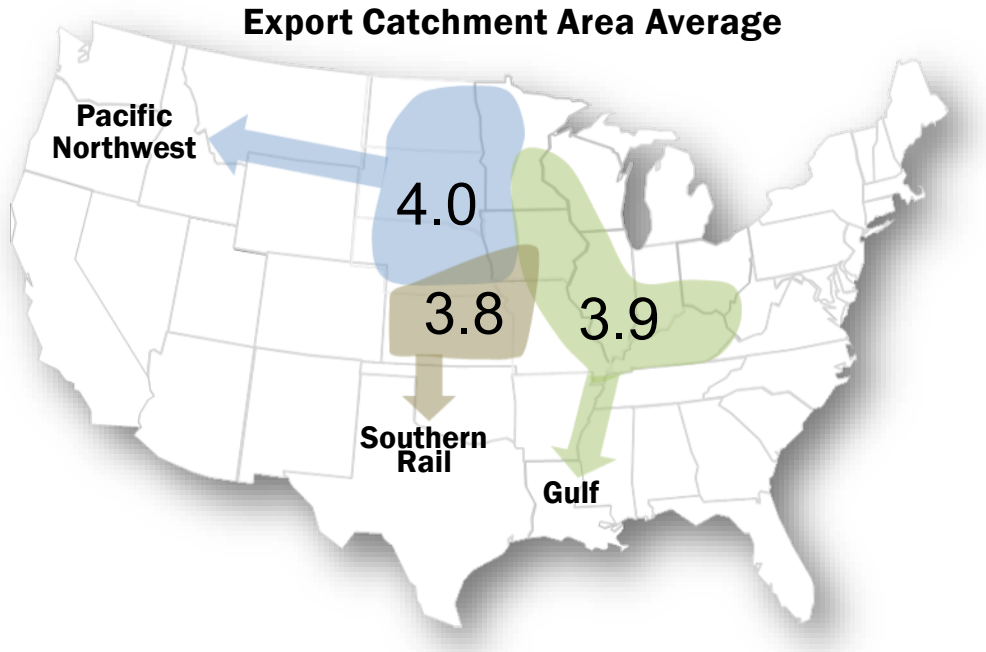
Oil (Dry Basis %)

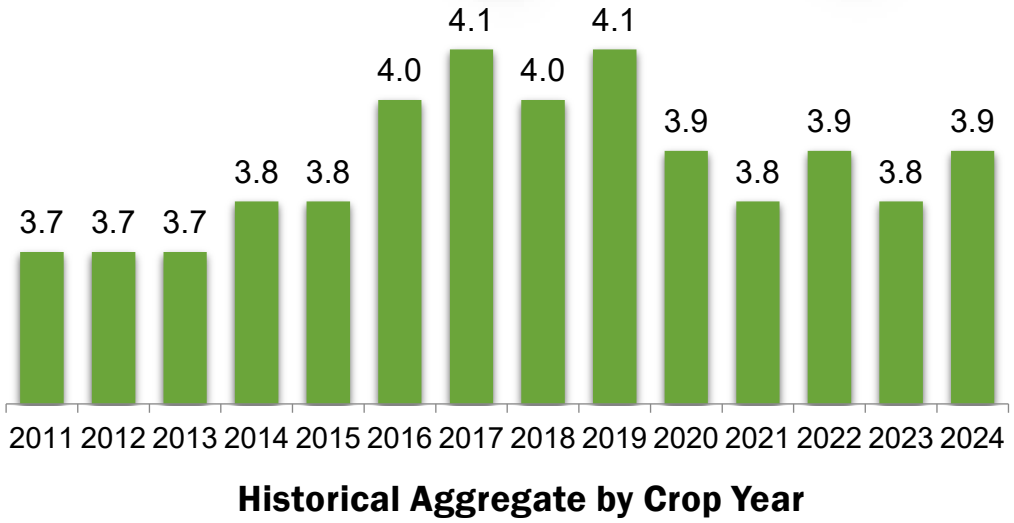
U.S. Aggregate: 3.9%

- Average **lower** than the 5YA (3.9%)*



Percent of Samples by Crop Year

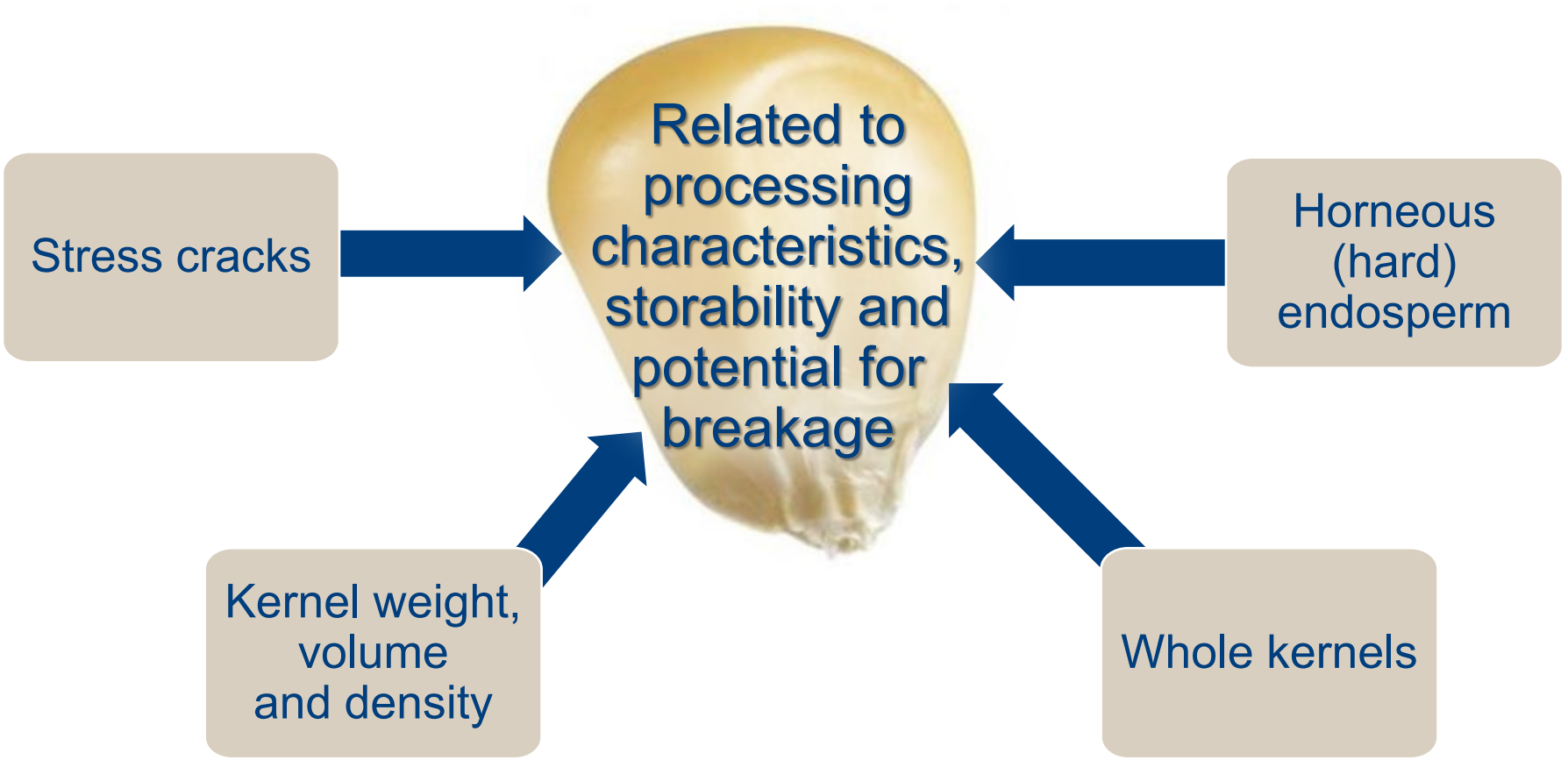




Historical Aggregate by Crop Year

Physical Factors

Physical Factors – Overview



Physical Factors

	Number of Samples	Average	Standard Deviation	Minimum	Maximum
Stress Cracks (%)	620	9.3	9.4	0	82
100-Kernel Weight (g)	182	36.66	4.33	23.60	47.20
Kernel Volume (cm^3)	182	0.29	0.03	0.19	0.37
True Density (g/cm^3)	182	1.265	0.022	1.203	1.325
Whole Kernels (%)	620	93.1	3.6	49.8	99.6
Horneous Endosperm (%)	182	85	3	77	92

Stress Cracks

Internal cracks in the horneous (hard) endosperm

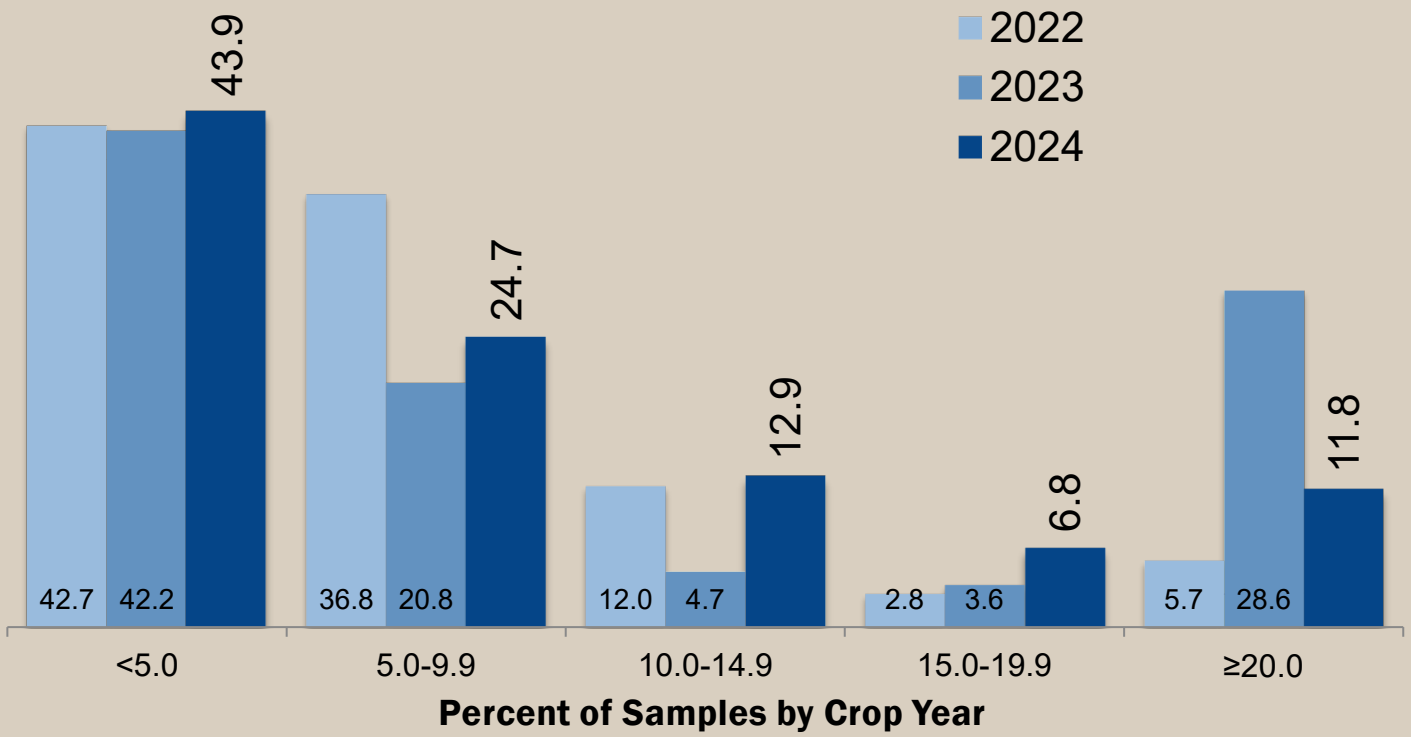
Most common cause is artificial drying

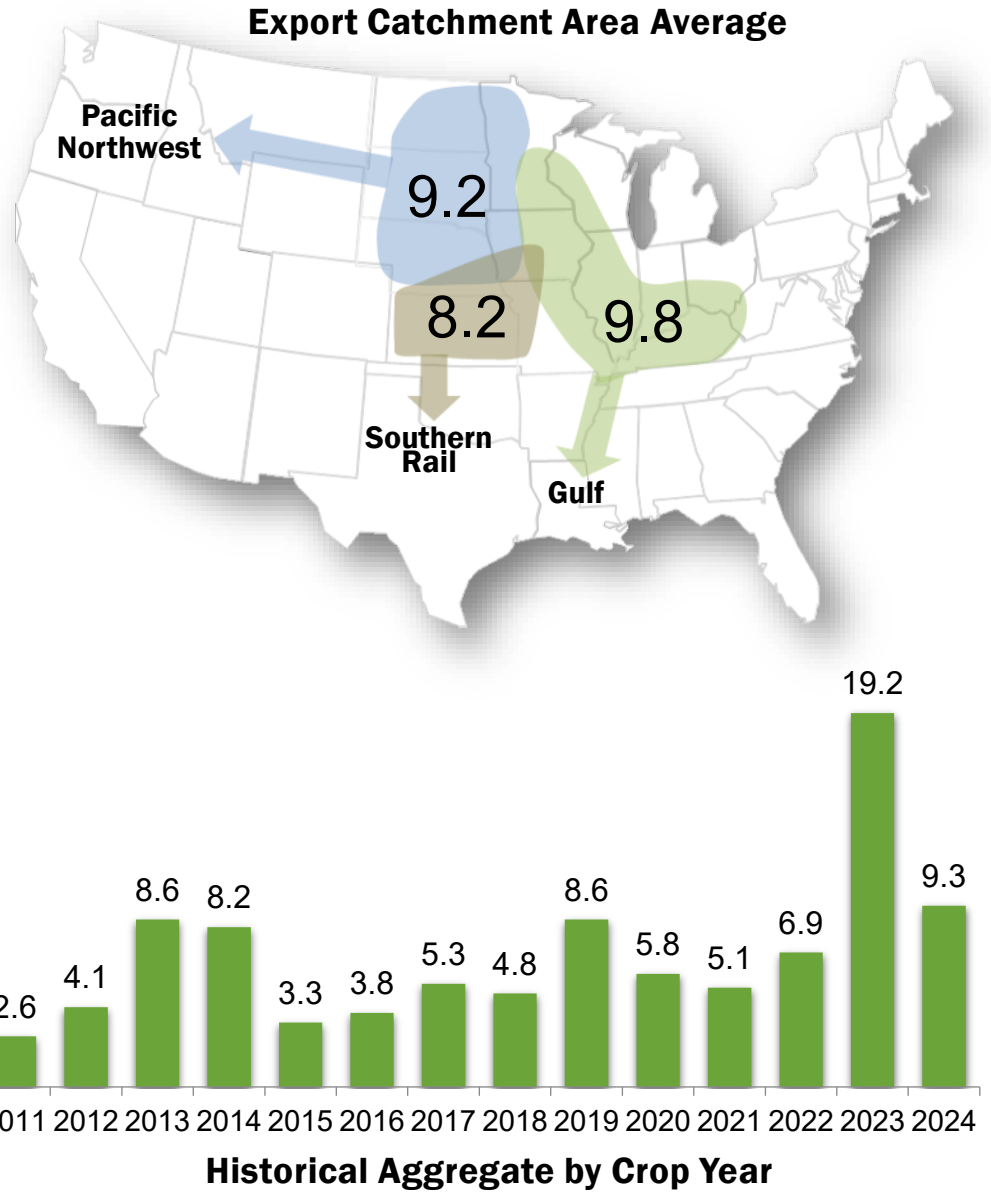
Impacts breakage susceptibility, milling and alkaline cooking

Stress Cracks (%)

U.S. Aggregate: 9.3%

- Average **similar** to the 5YA (9.1%)





Kernel Weight, Volume and Density

100-Kernel Weight
(grams)

÷

Kernel Volume
(cubic centimeters)

=

True Density
(grams per cubic centimeters)

Indicates kernel size which affects

- Drying rates
- Flaking grit yields in dry milling

Kernel volume is indicative of growing conditions and genetics

True density reflects kernel hardness

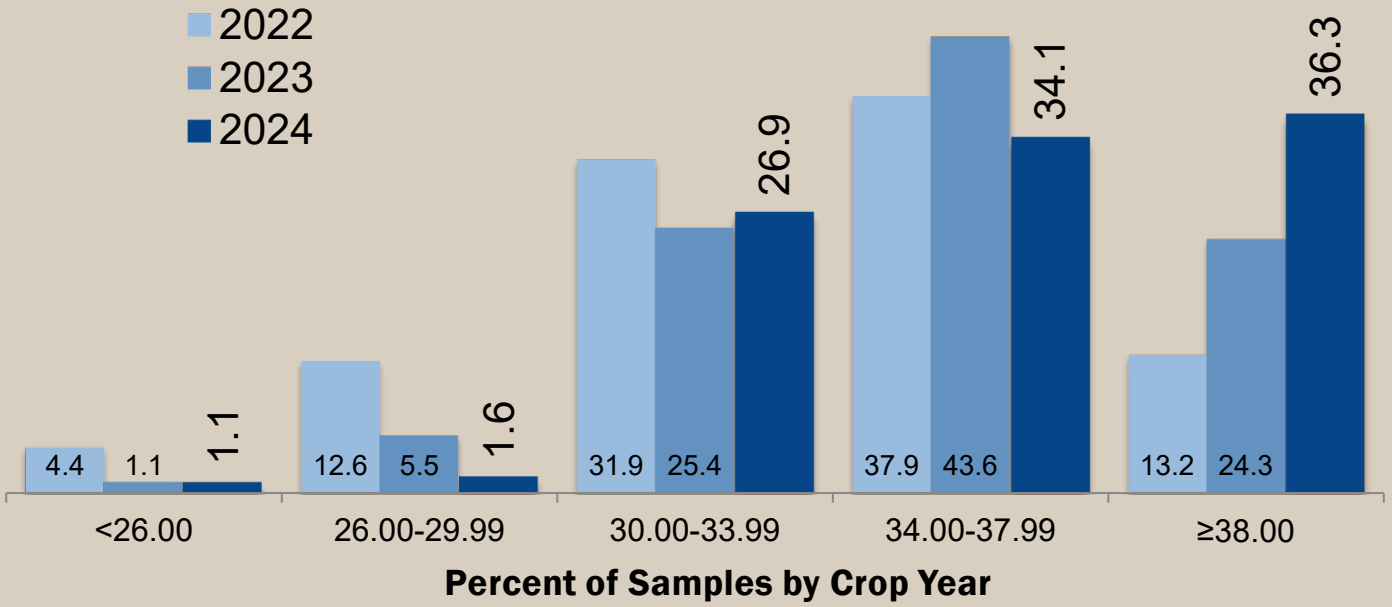
Higher density – harder kernels, less susceptible to breakage, more desirable for dry milling and alkaline processing

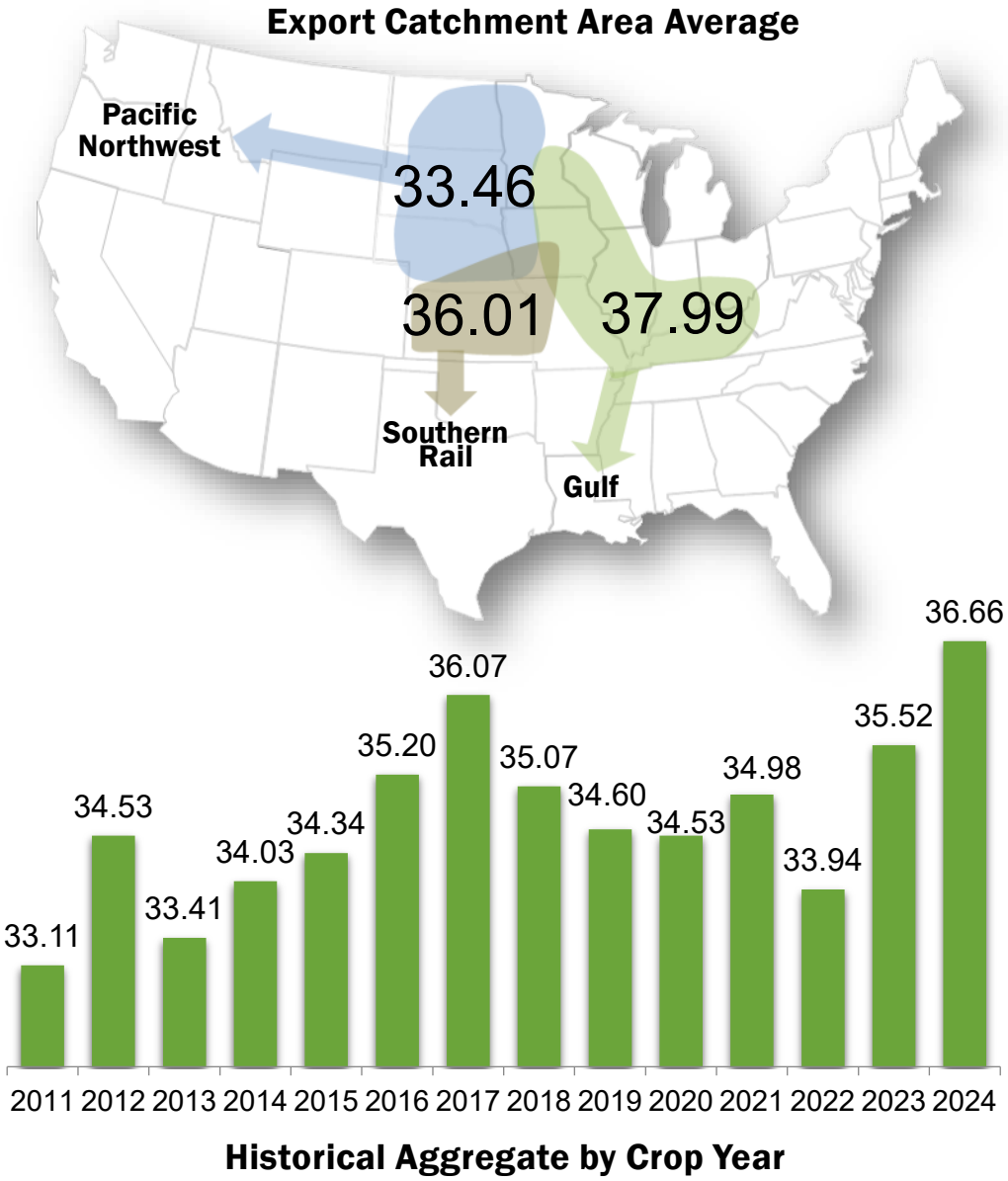
Lower density – softer kernels, less at risk for development of stress cracks if high temperature drying is employed, good for wet milling and feed use

100-Kernel Weight (grams)

U.S. Aggregate: 36.66 grams

- **Highest** average in the report's 14-year history

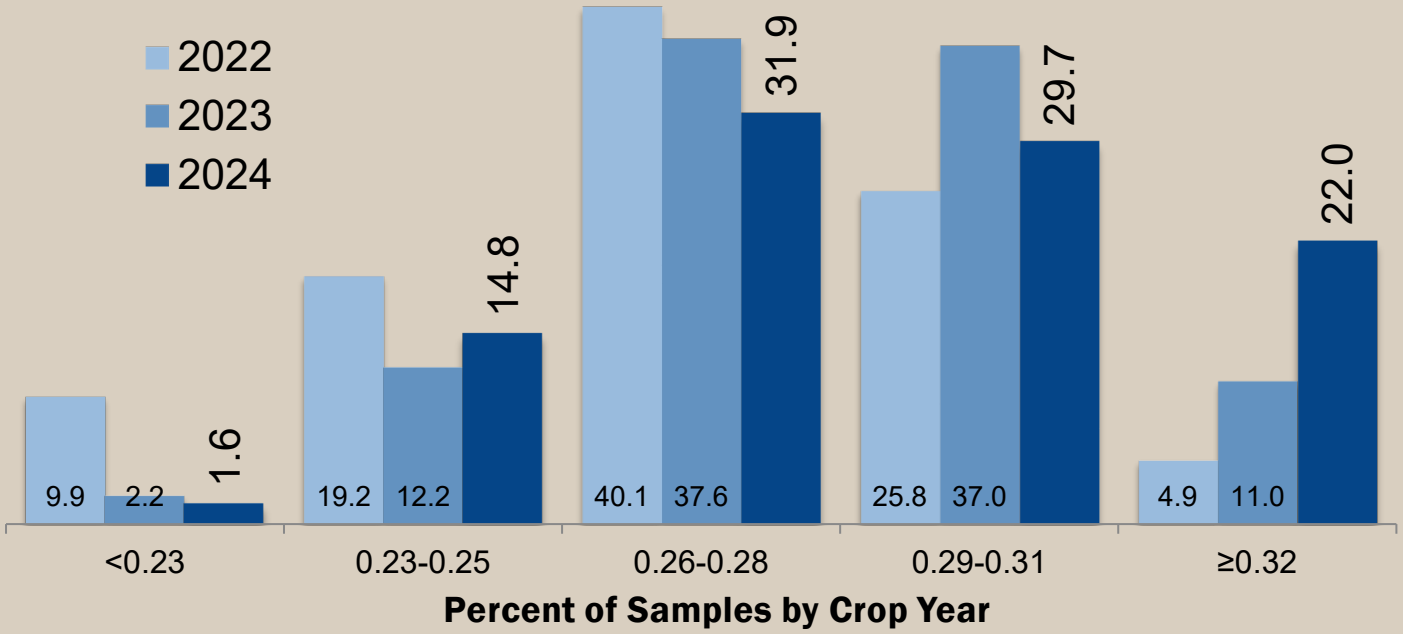


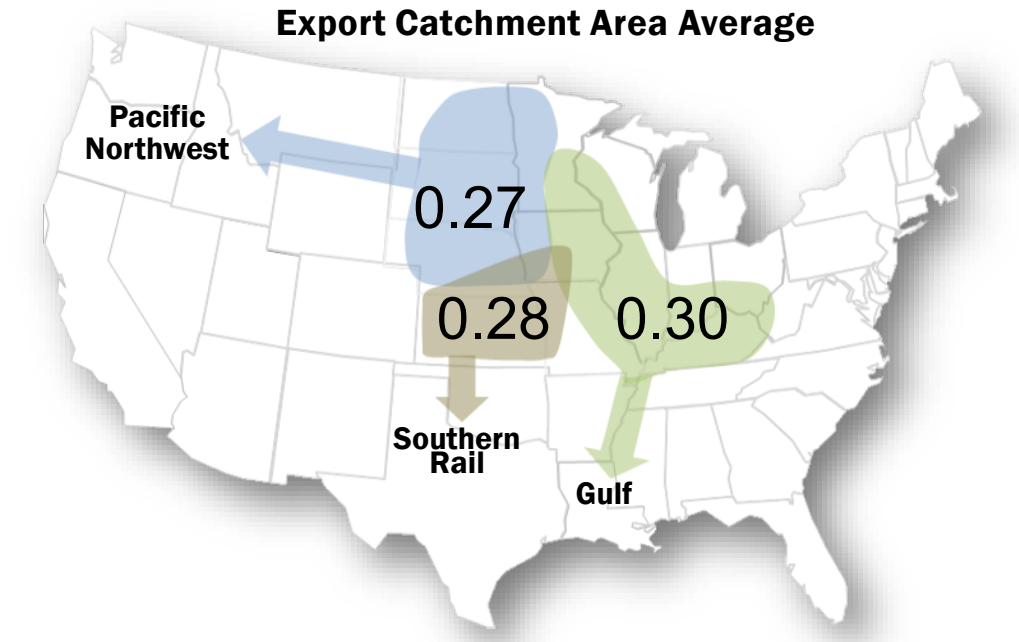


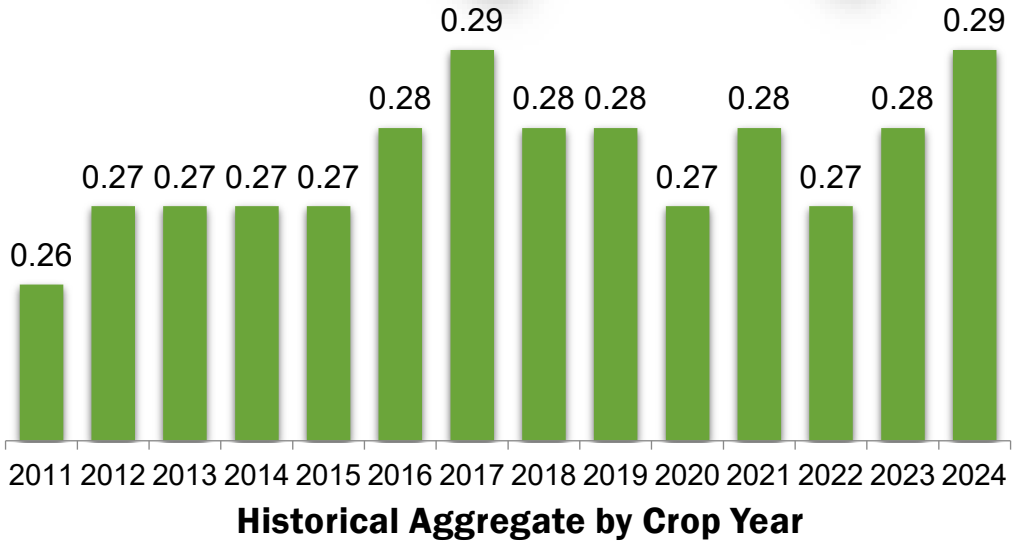
Kernel Volume (cm^3)

U.S. Aggregate: 0.29 cm^3

- Tied for the **highest** average in the report's 14-year history



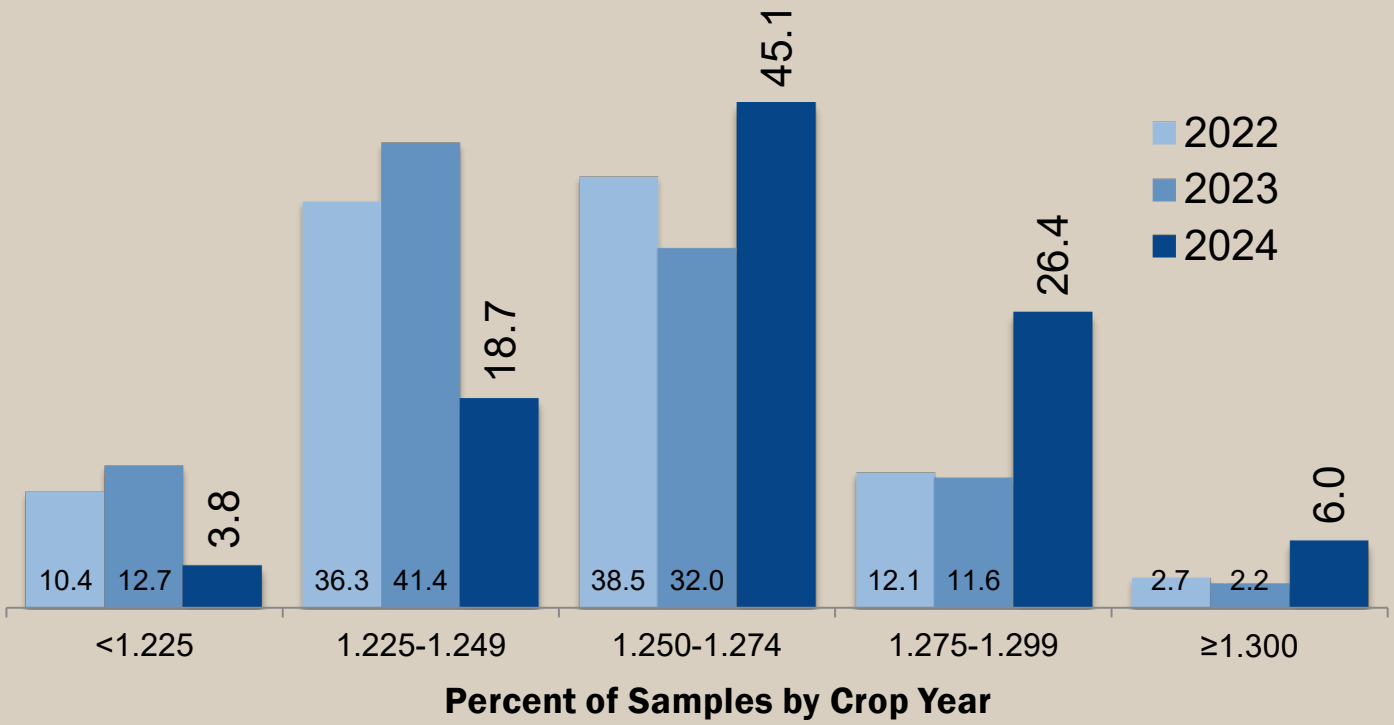


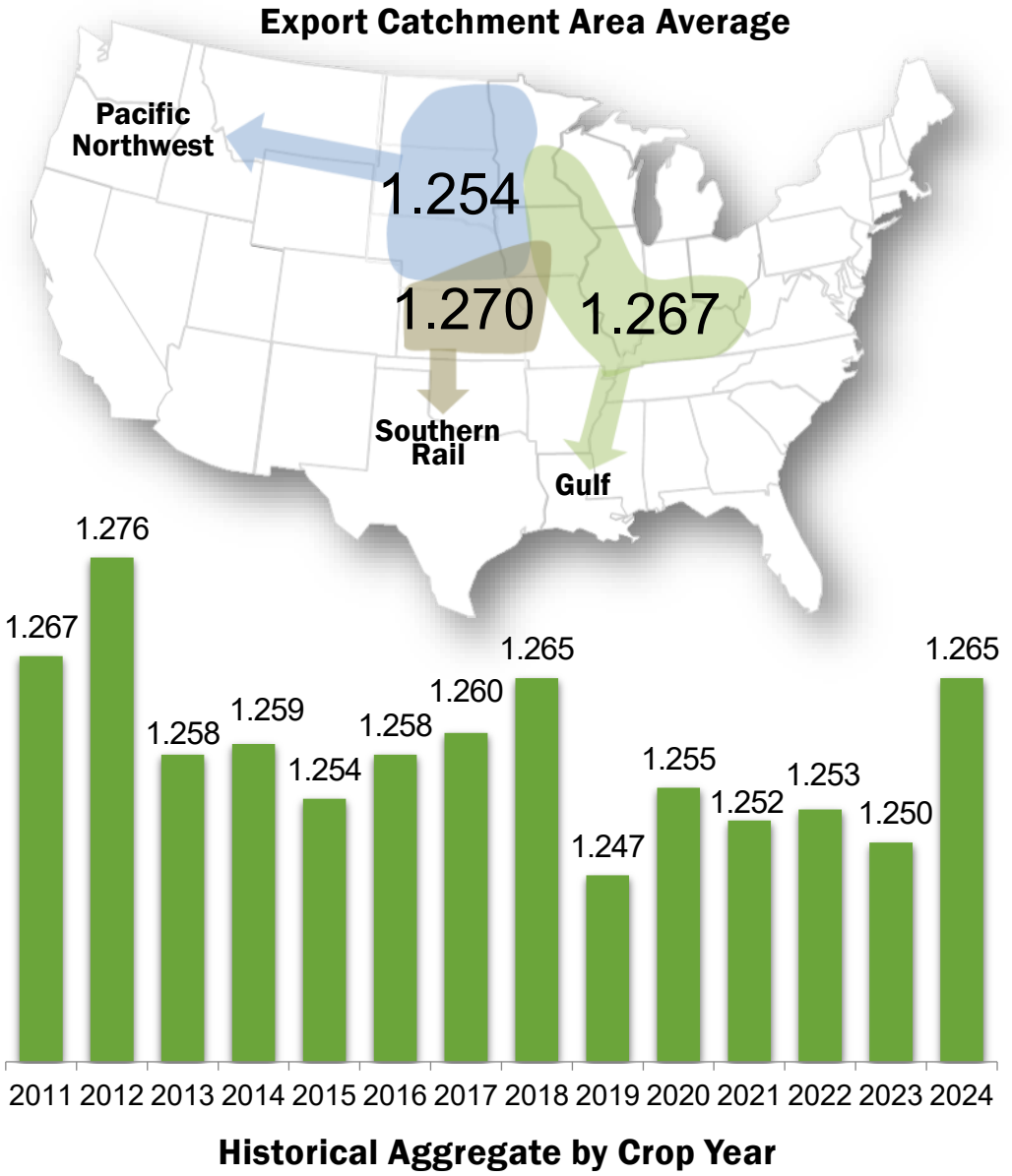


Kernel True Density (g/cm³)

U.S. Aggregate: 1.265 g/cm³

- Average **higher** than the 5YA (1.252 g/cm³)





Other Physical Properties

Whole Kernel (%)

Percentage of whole kernels of a 50-gram sample

Broken Corn in BCFM measures only kernel size, not whether it is broken or whole

< 90%	**≥ 90%**
More susceptible to storage molds and breakage	Desirable, especially for alkaline cookers

Horneous (Hard) Endosperm (%)

Measures the percent of the endosperm that is horneous or hard within a range from 70 – 100%

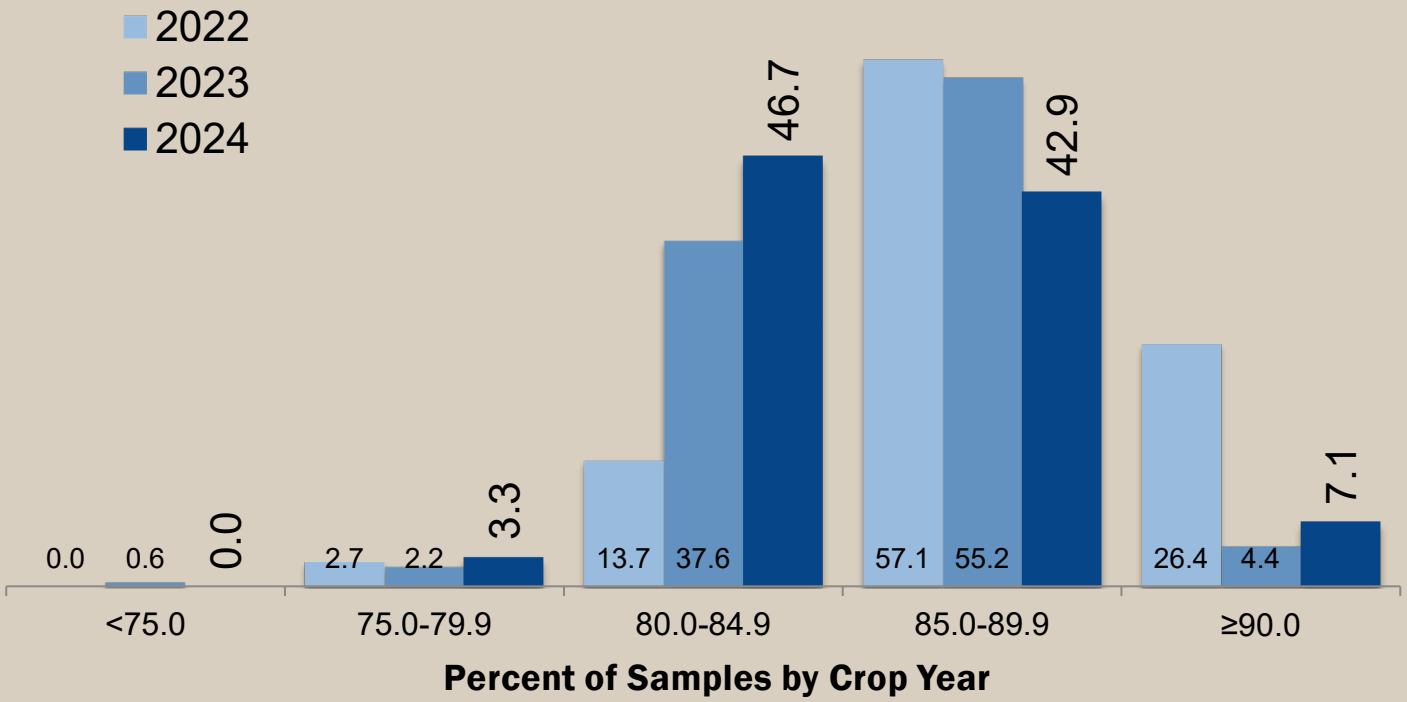
The higher the value, the harder the corn kernel

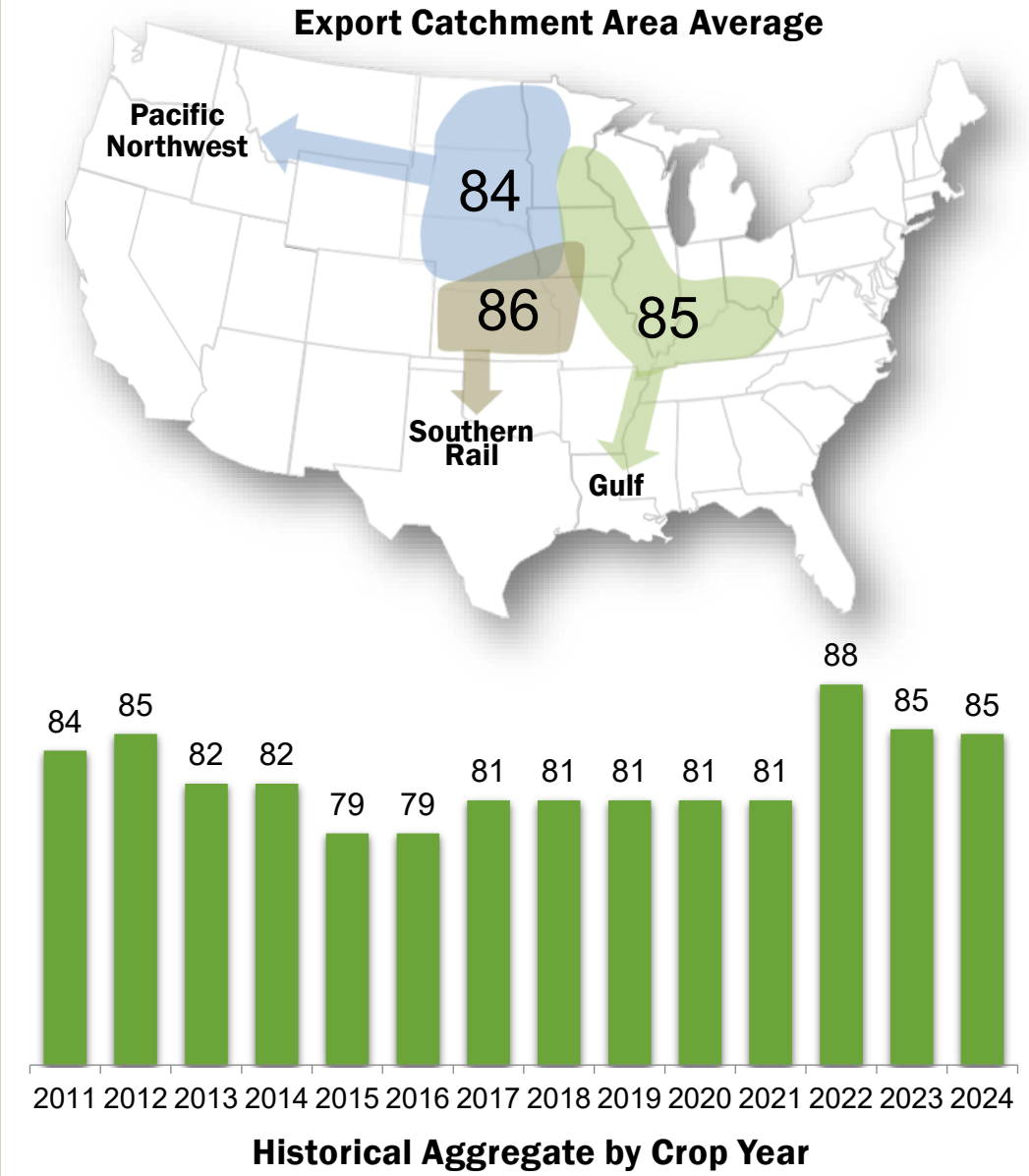
≤ 85%	**> 85%**
Good for wet millers and feeders	Good for dry millers and alkaline cookers

Horneous (Hard) Endosperm (%)

U.S. Aggregate: 85%

- Average **higher** than the 5YA (83%)





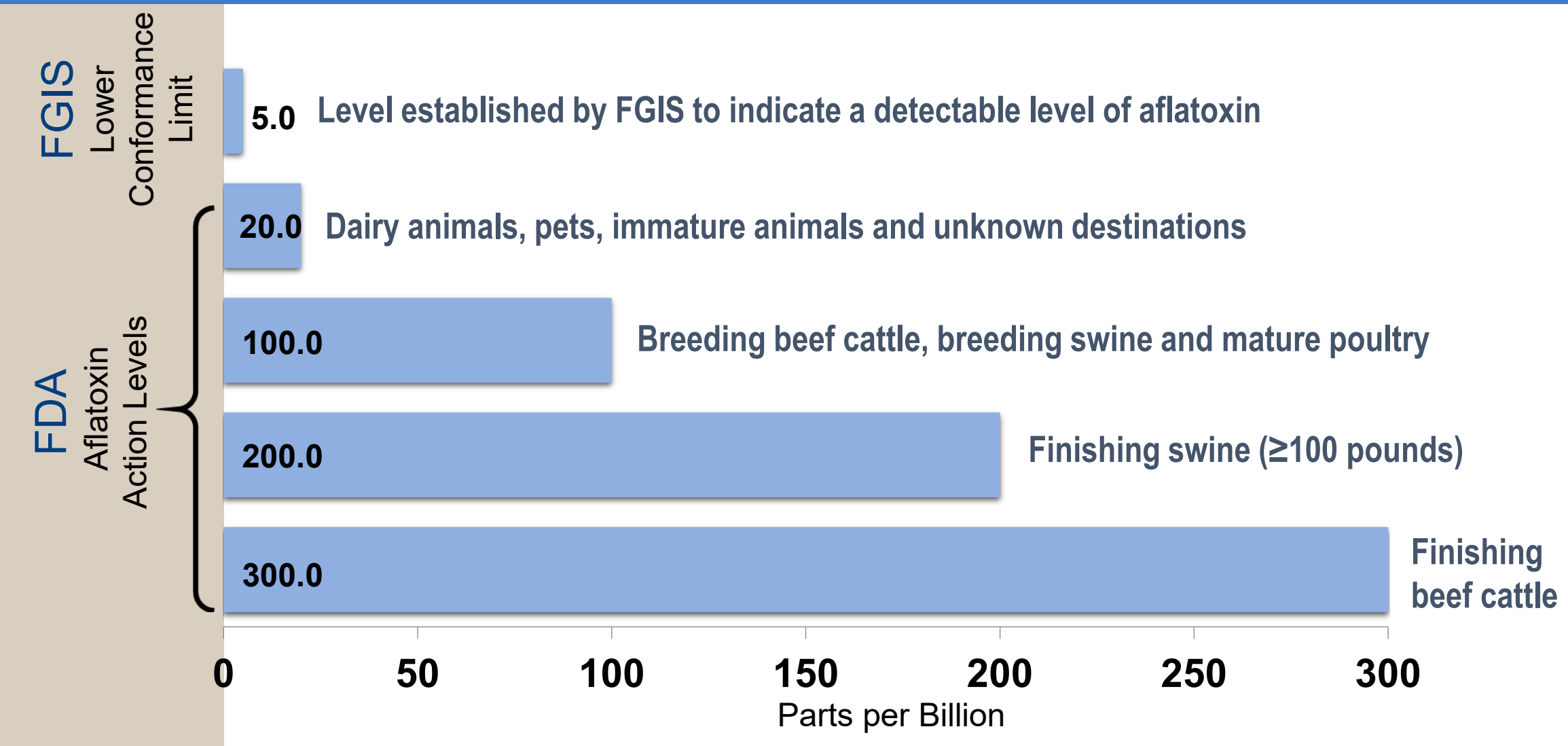
Mycotoxins

Aflatoxin,
Deoxynivalenol (DON or Vomitoxin)
Fumonisin
Ochratoxin A
Trichothecenes (T-2)
and Zearalenone

Mycotoxin Testing

- *Corn Harvest Quality Report* shows **ONLY** the frequency of detection in harvest samples
- *Corn Harvest Quality Report* does **NOT** predict the presence or levels of mycotoxins in U.S. corn exports
- **Targeting a minimum of 25%** of collected samples, the same as in 2023 and 2022 (Target of 180 samples)
- The *Corn Harvest Quality Report* contains the results from 180 samples.

Key Aflatoxin Levels (ppb)

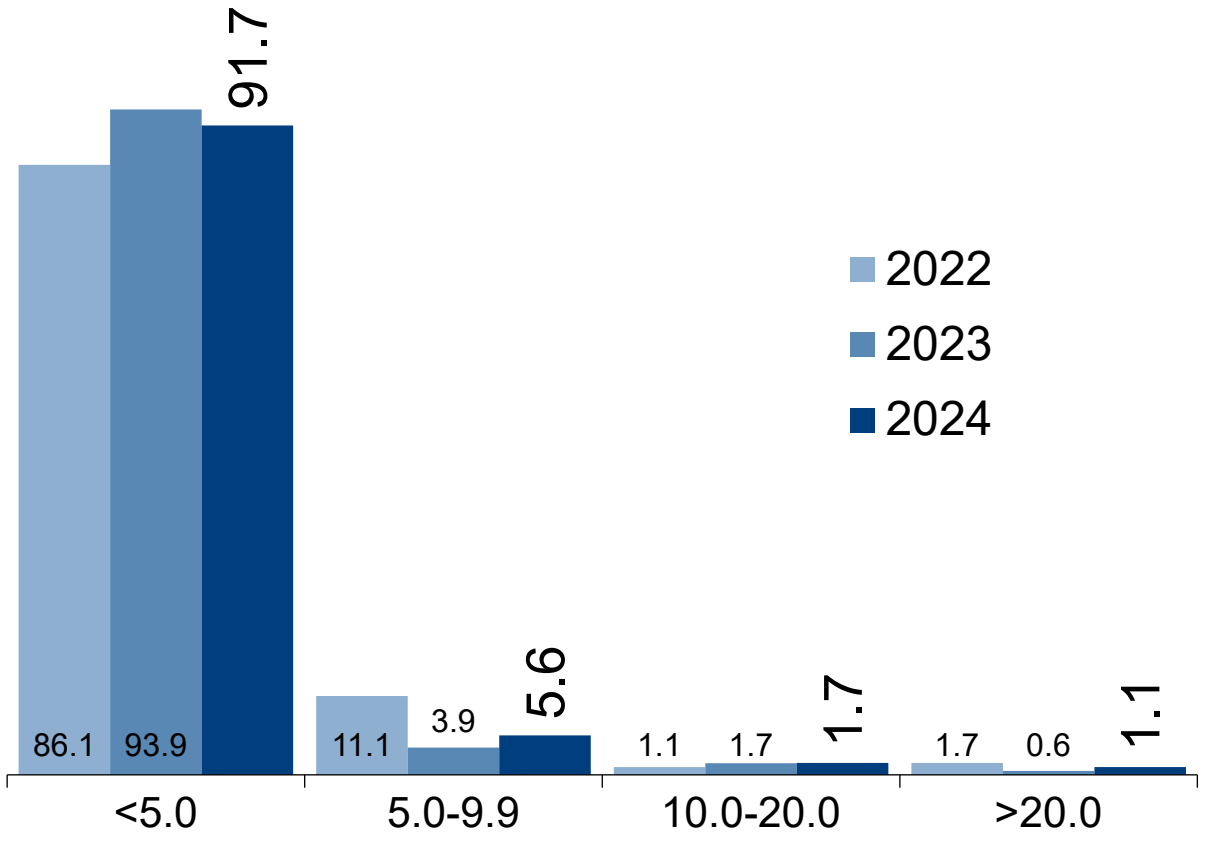


Aflatoxin Testing Results (ppb)

Percentage of samples with **no detectable** levels of aflatoxin in 2024 was 91.7%

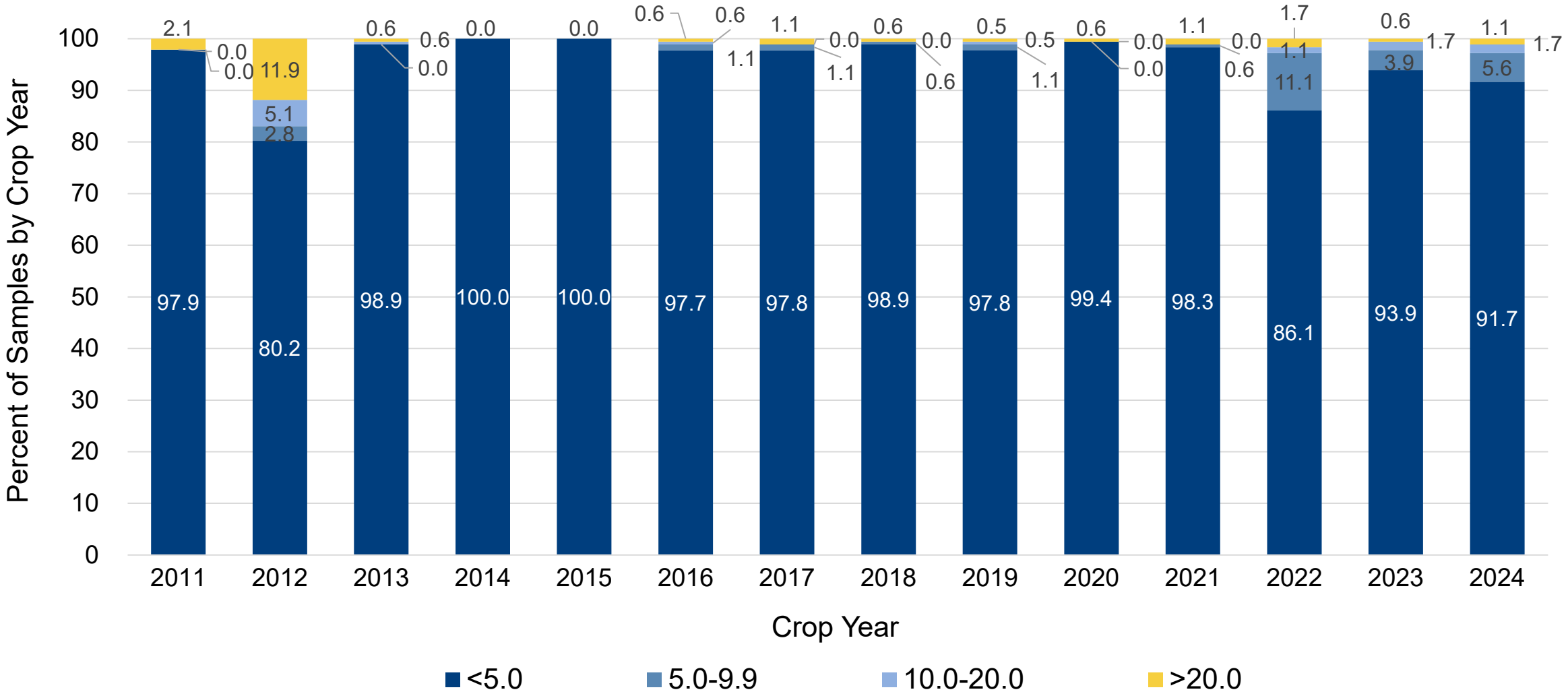
98.9% of samples tested below the FDA action level of 20.0 ppb

Growing season conditions not conducive to aflatoxin development in most areas

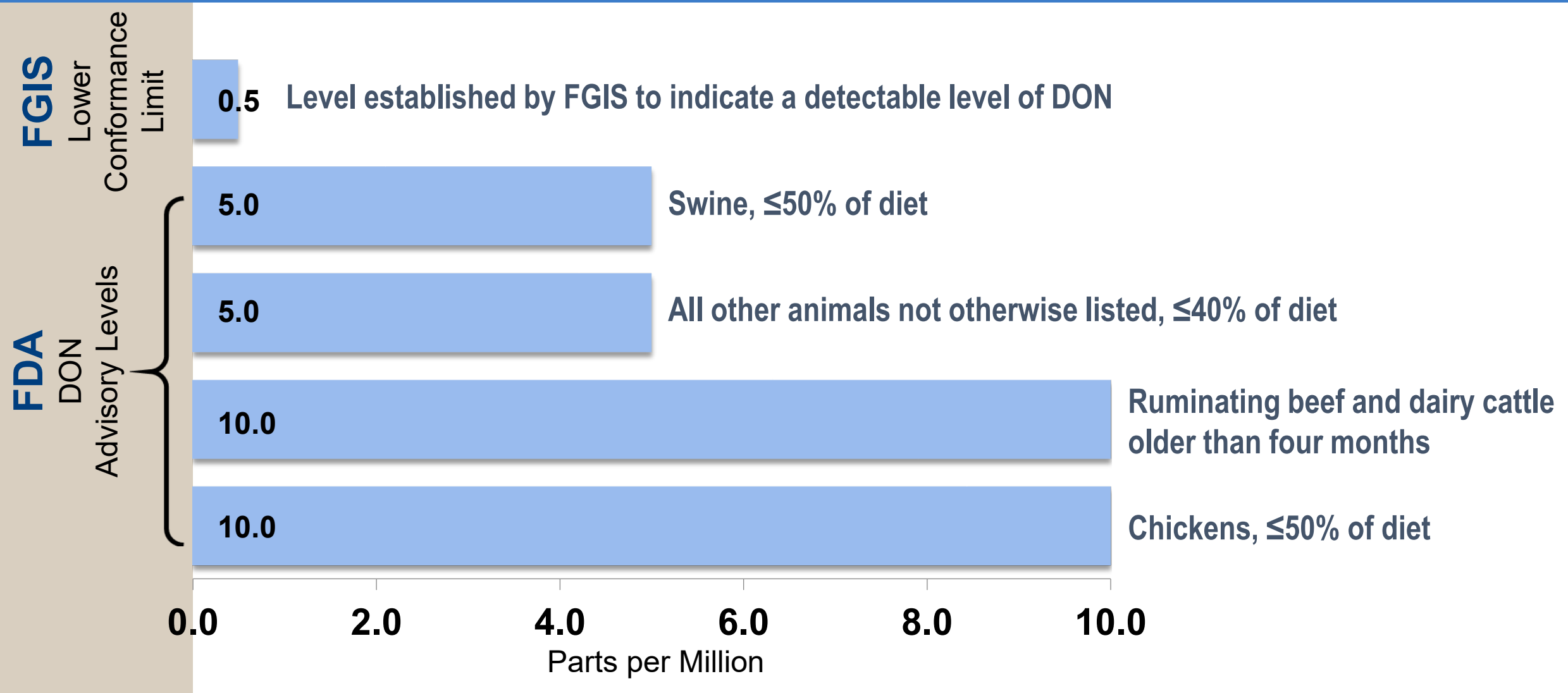


Percent of Samples by Crop Year

Aflatoxin Testing Results (ppb)



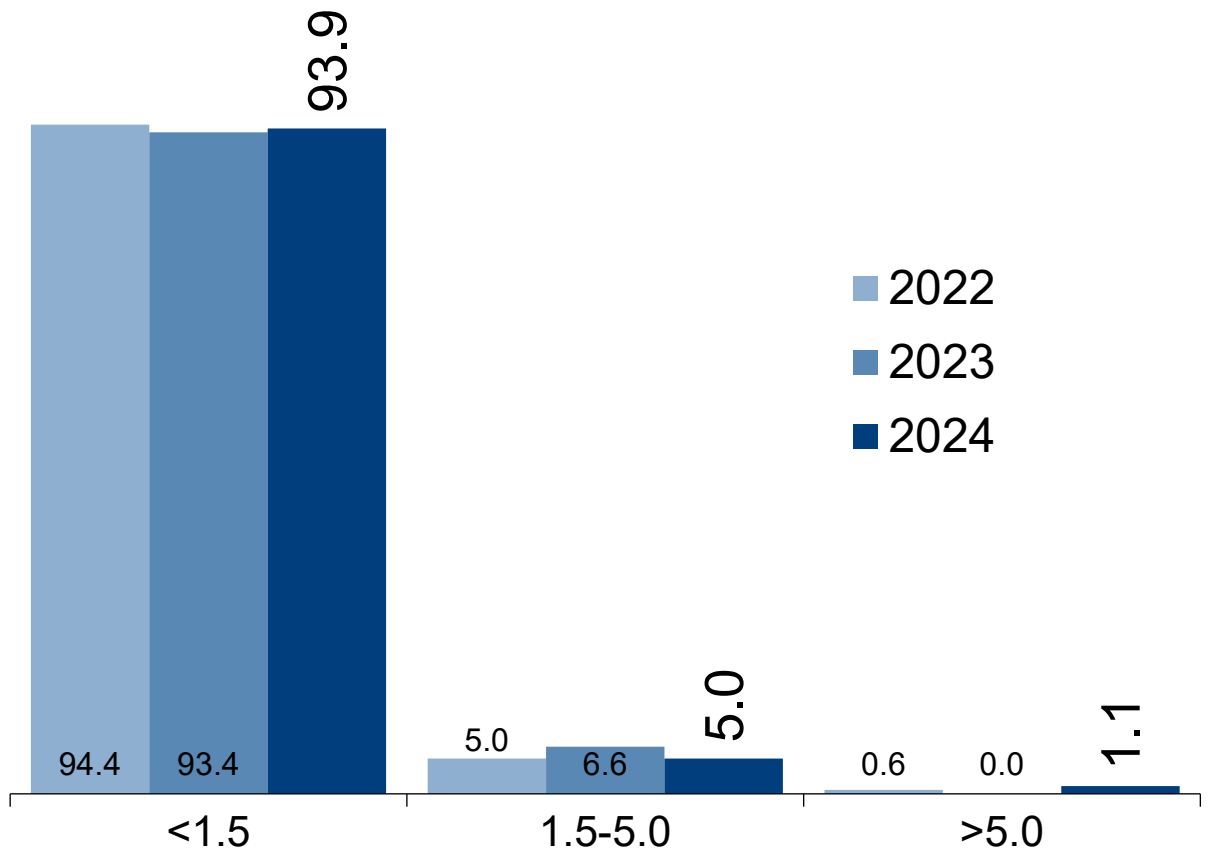
Key DON Levels (ppm)



DON (Vomitoxin) Testing Results (ppm)

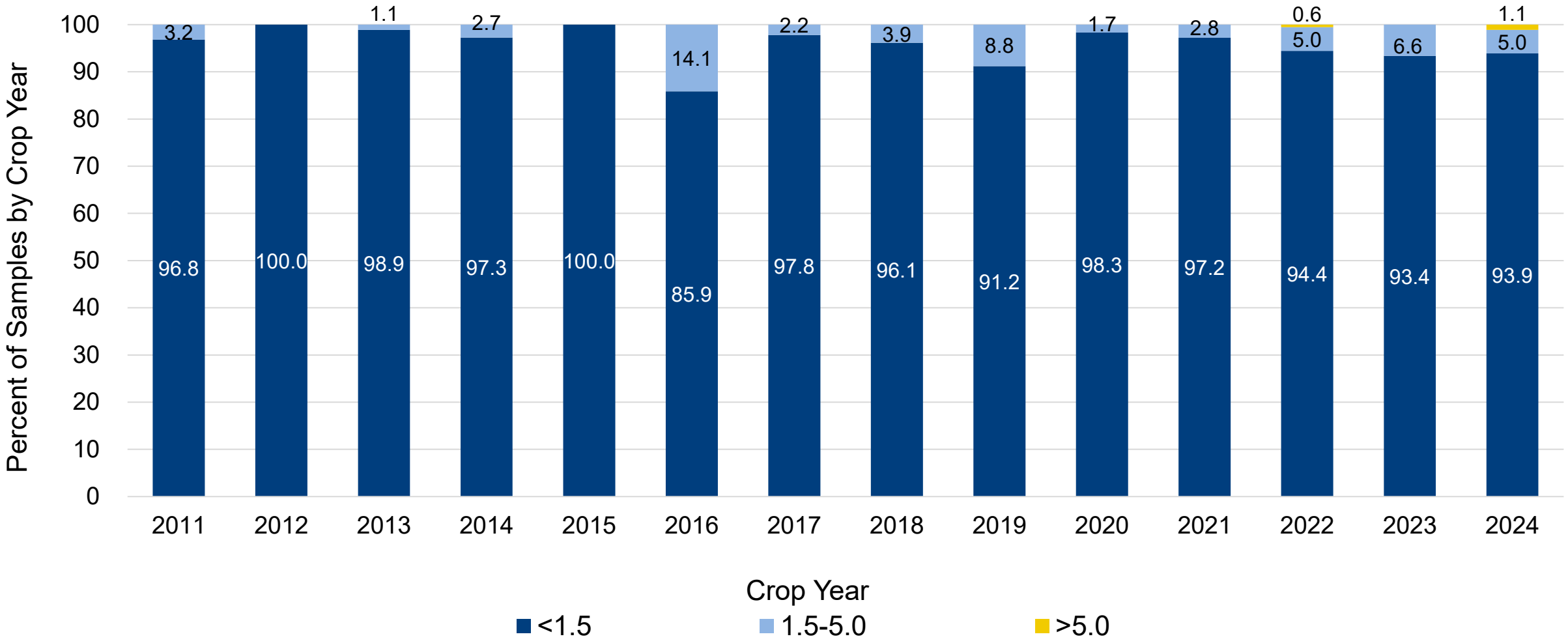
Percentage of samples below 1.5 ppm (93.9%) **similar** to 2023 and 2022.

98.9% of samples did not exceed the FDA advisory level for DON of 5.0 ppm

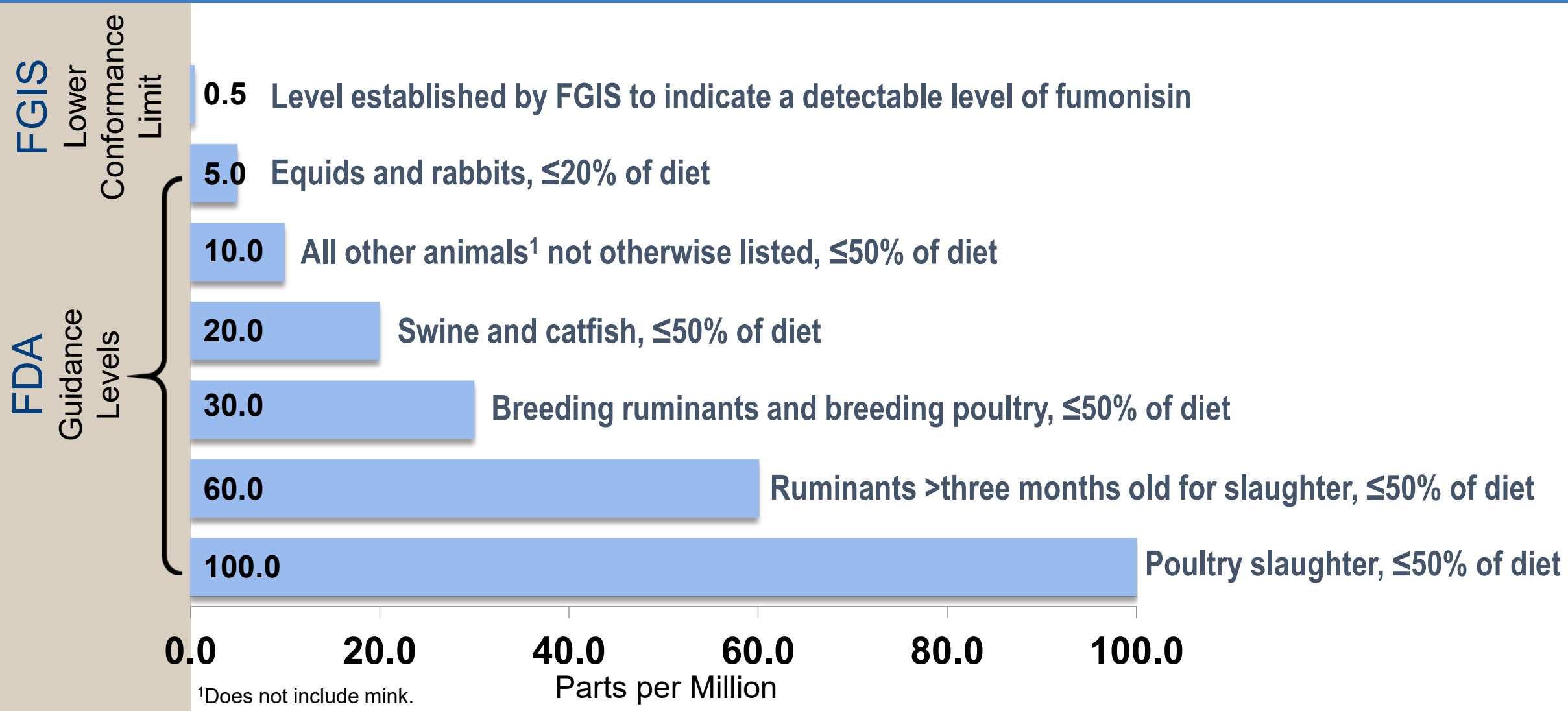


Percent of Samples by Crop Year

DON (Vomitoxin) Testing Results (ppm)

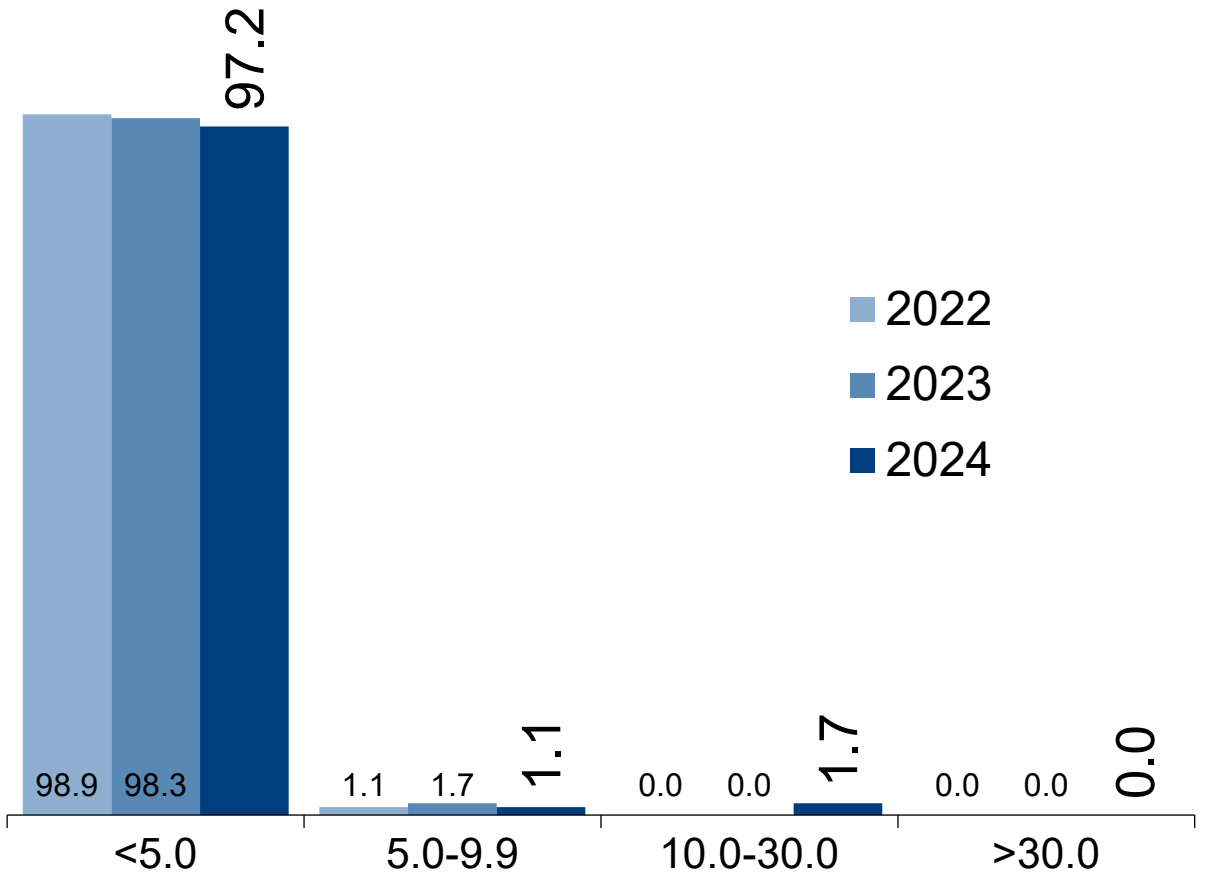


Key Fumonisin Levels (ppm)



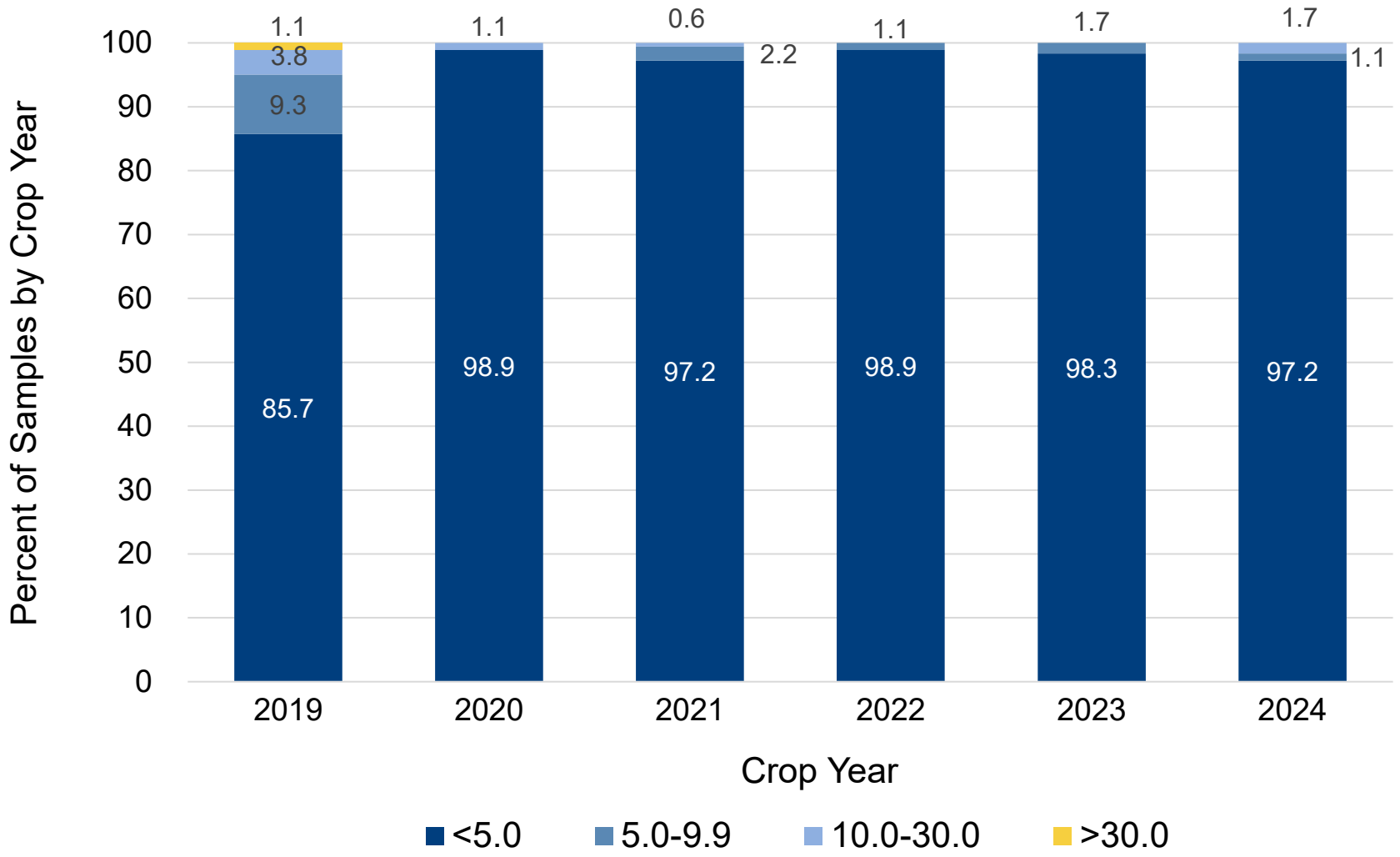
Fumonisin Testing Results (ppm)

Percentage of samples below 5.0 ppm (97.2%) **slightly lower** than 2023 and 2022



Percent of Samples by Crop Year

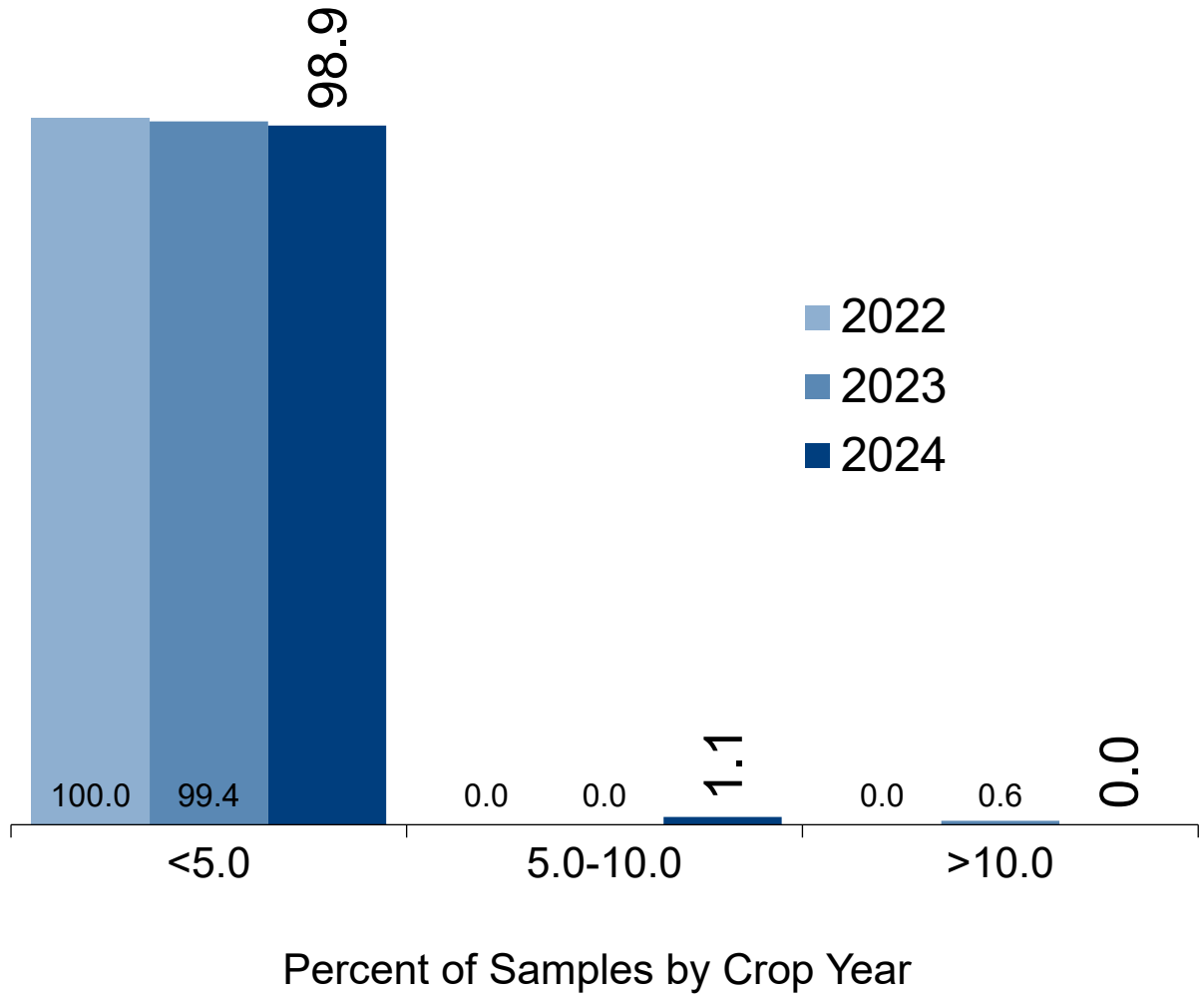
Fumonisin Testing Results (ppm)



Ochratoxin A Testing Results (ppb)

Fifth year of Ochratoxin A testing

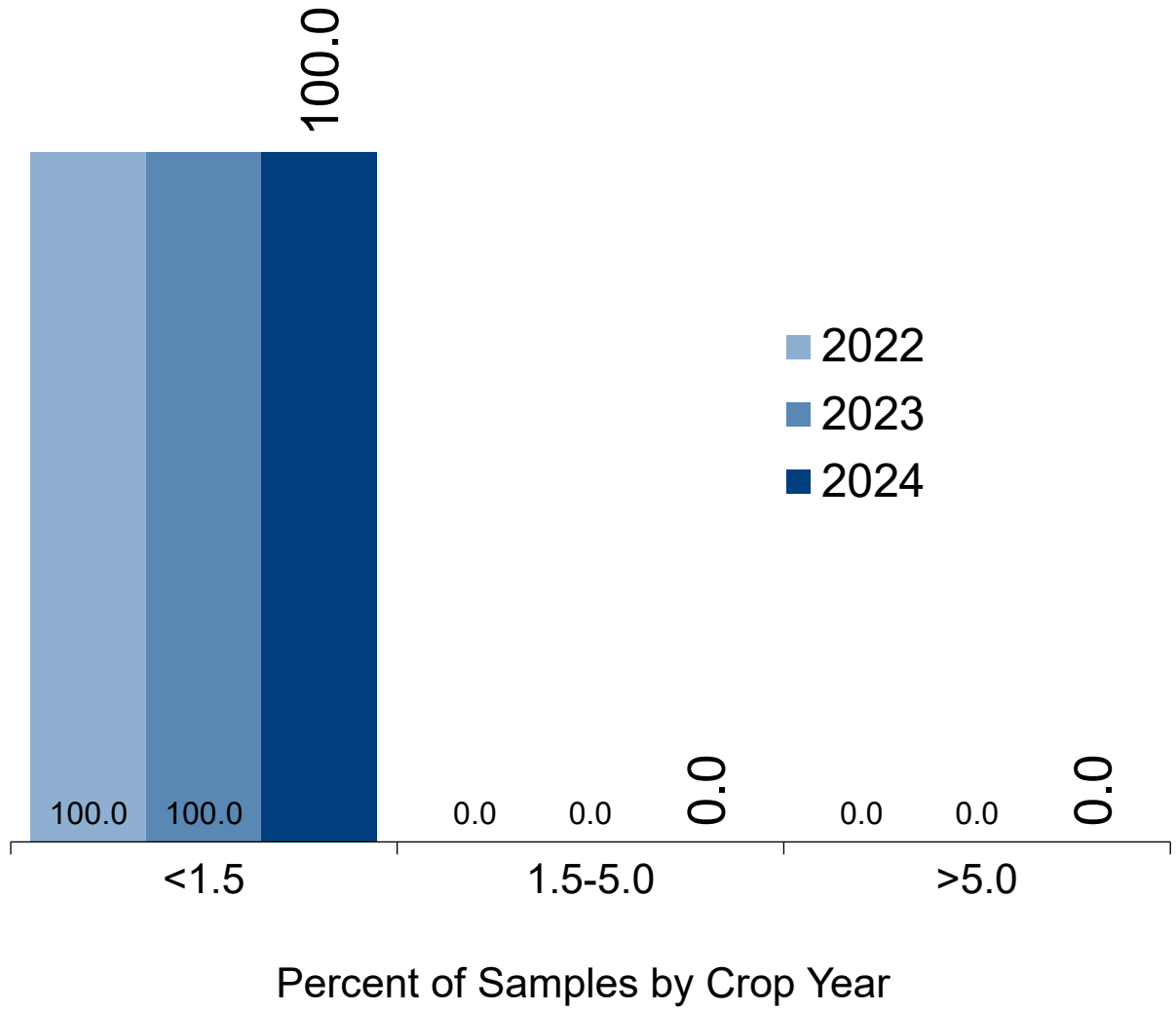
98.9% of samples below 5.0 ppb (European Commission's established maximum level for Ochratoxin A in raw cereals.)



T-2 Testing Results (ppm)

Fifth year of T-2 testing

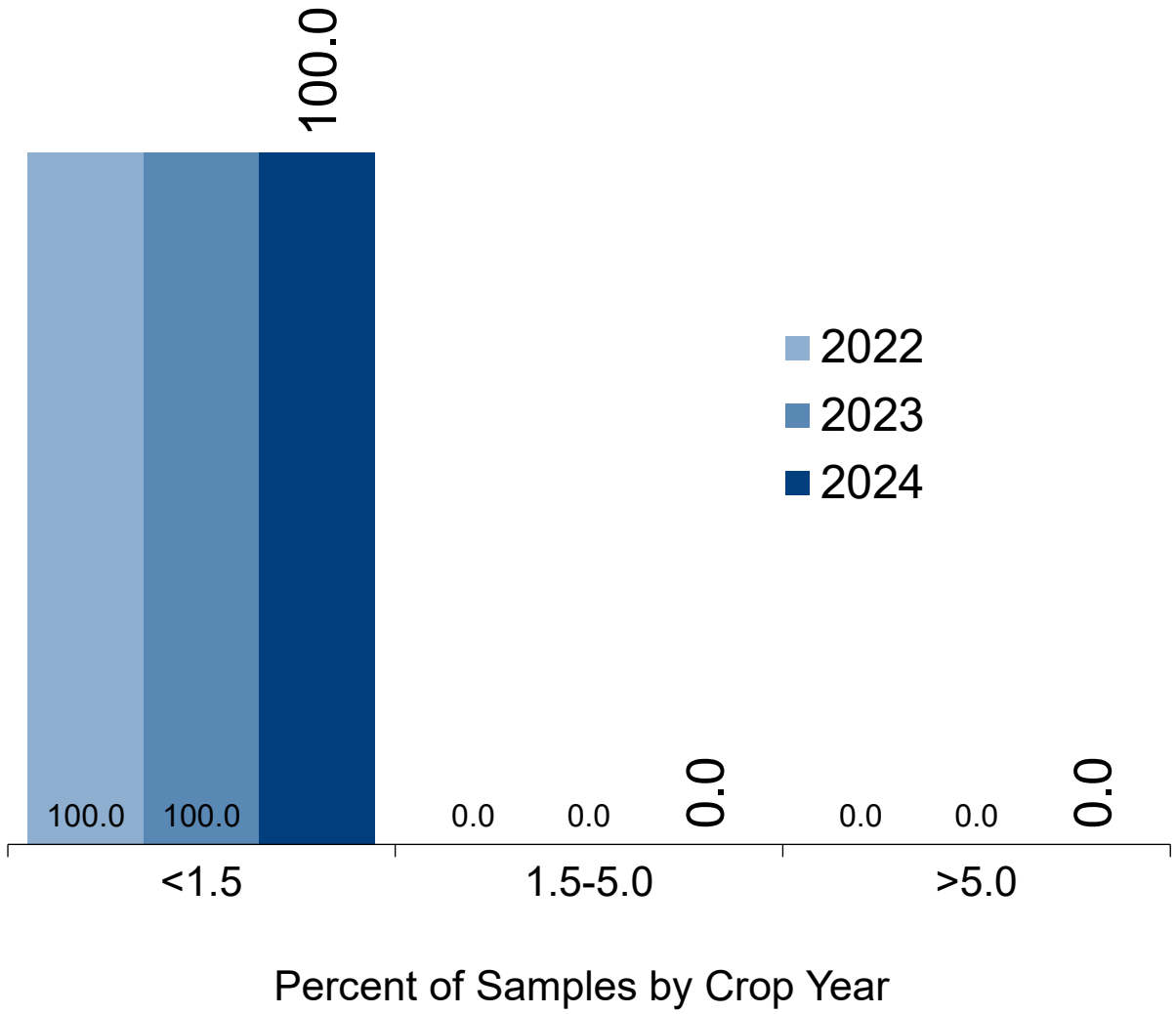
100% of samples
below 1.5 ppm



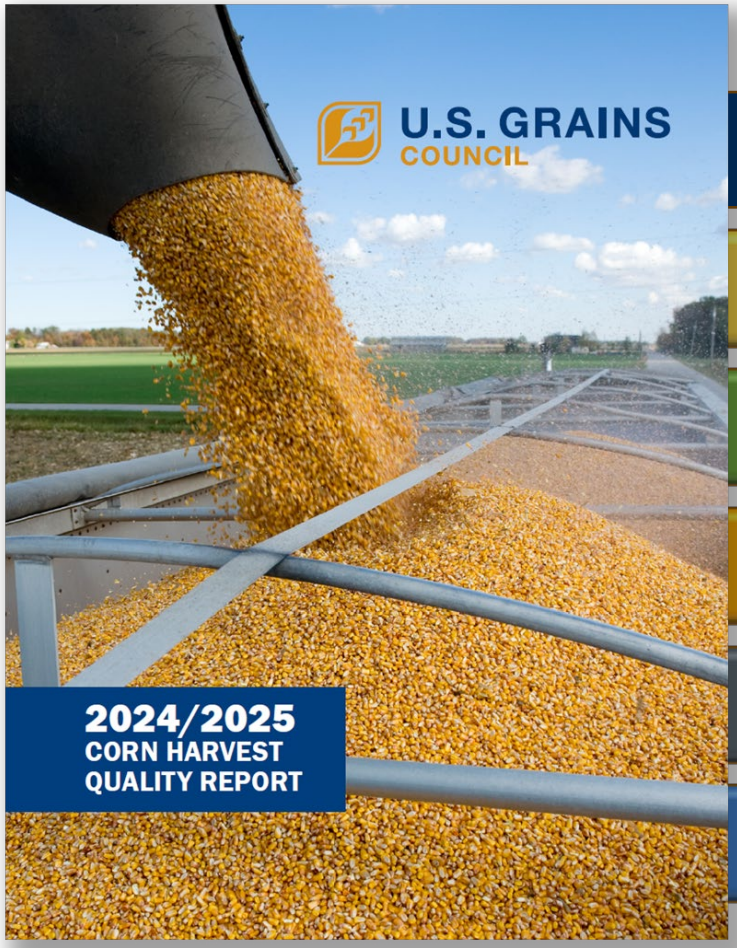
Zearalenone Testing Results (ppm)

Fifth year of Zearalenone testing

100% of samples below 1.5 ppm



Other Components of the Report



- Quality Test Results
- Crop and Weather Conditions
- U.S. Corn Production, Usage and Outlook
- Survey and Statistical Analysis Methods
- Testing Analysis Methods
- Historical Perspective

Harvest Report: Conclusions

- 2024 harvest samples were, on average, good with **89.2%** of samples grading No. 1 or better, compared to **88.0%** in 2023 and **81.5%** in 2022.
- Averages for **Test Weight, 100-Kernel Weight, and Kernel Volume** were all the highest or tied for the highest values observed in the report's 14-year history, reflecting growing and harvesting conditions.
- **BCFM** and **Total Damage** were lower than the 5YA.
- Average **Moisture** tied 2012 for the lowest average in the history of the report.
- The growing season was not conducive to mycotoxin development in most areas.

Building a Tradition

Thank You!

U.S. GRAINS COUNCIL