Quality of the United States Soybean Crop: 2022

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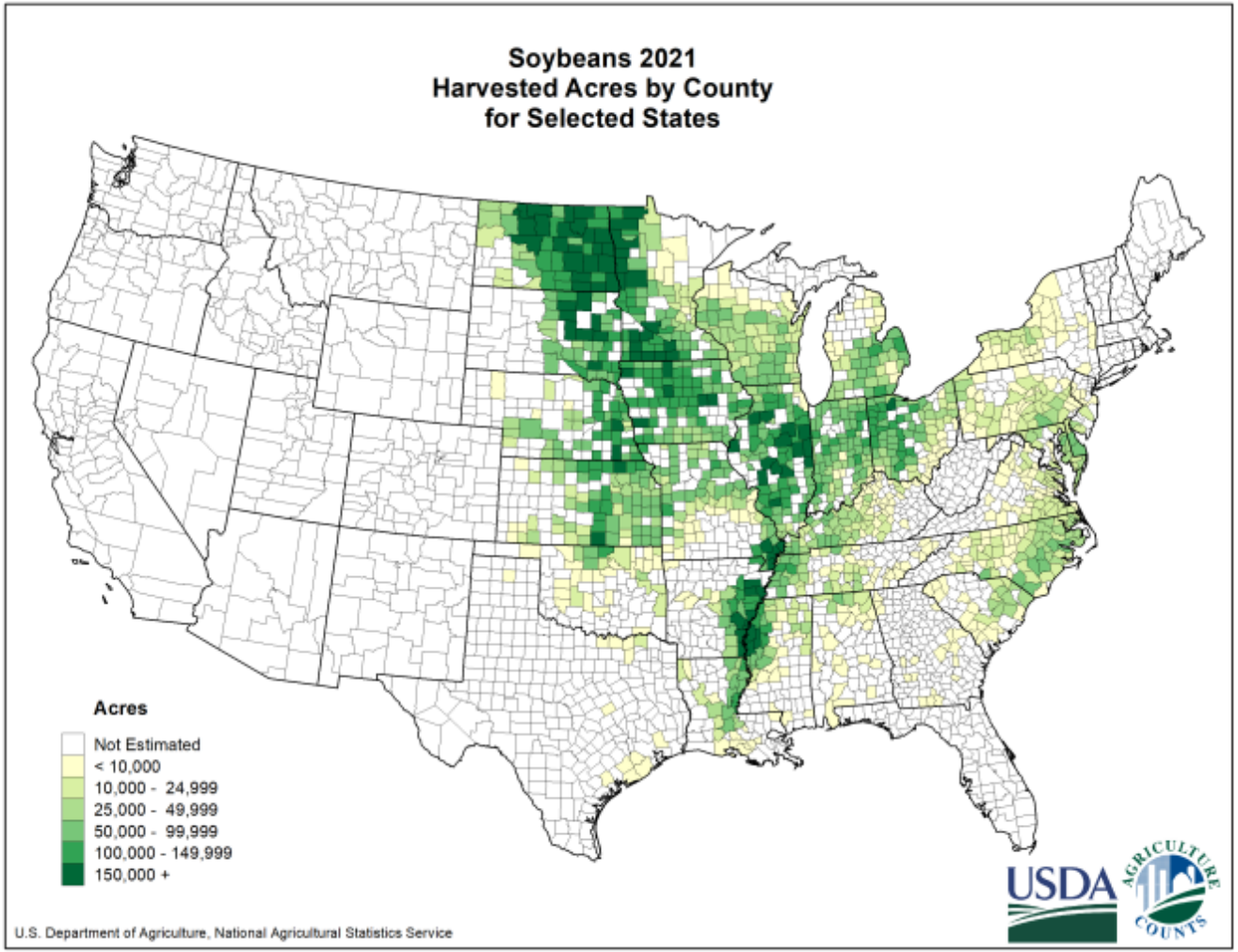
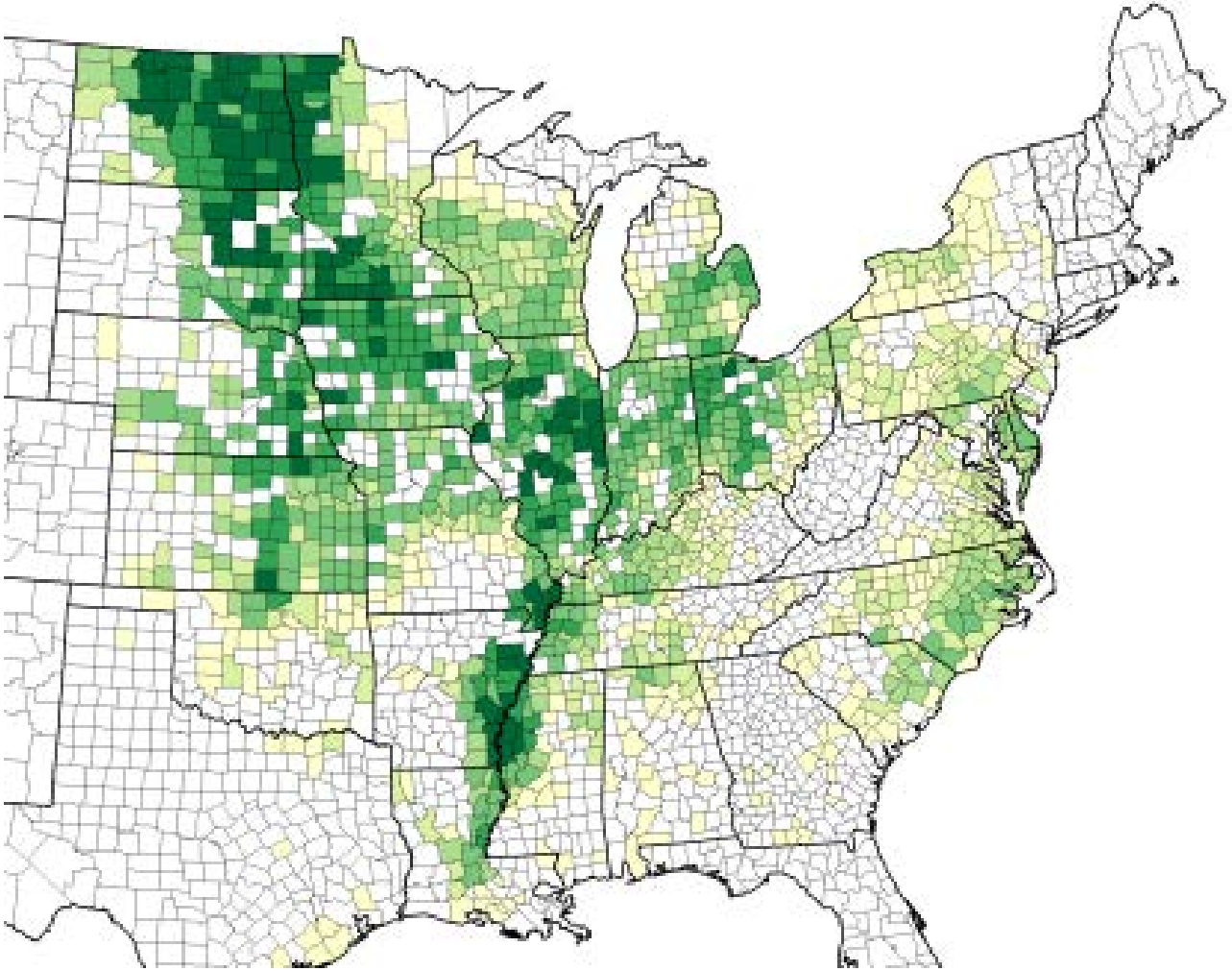
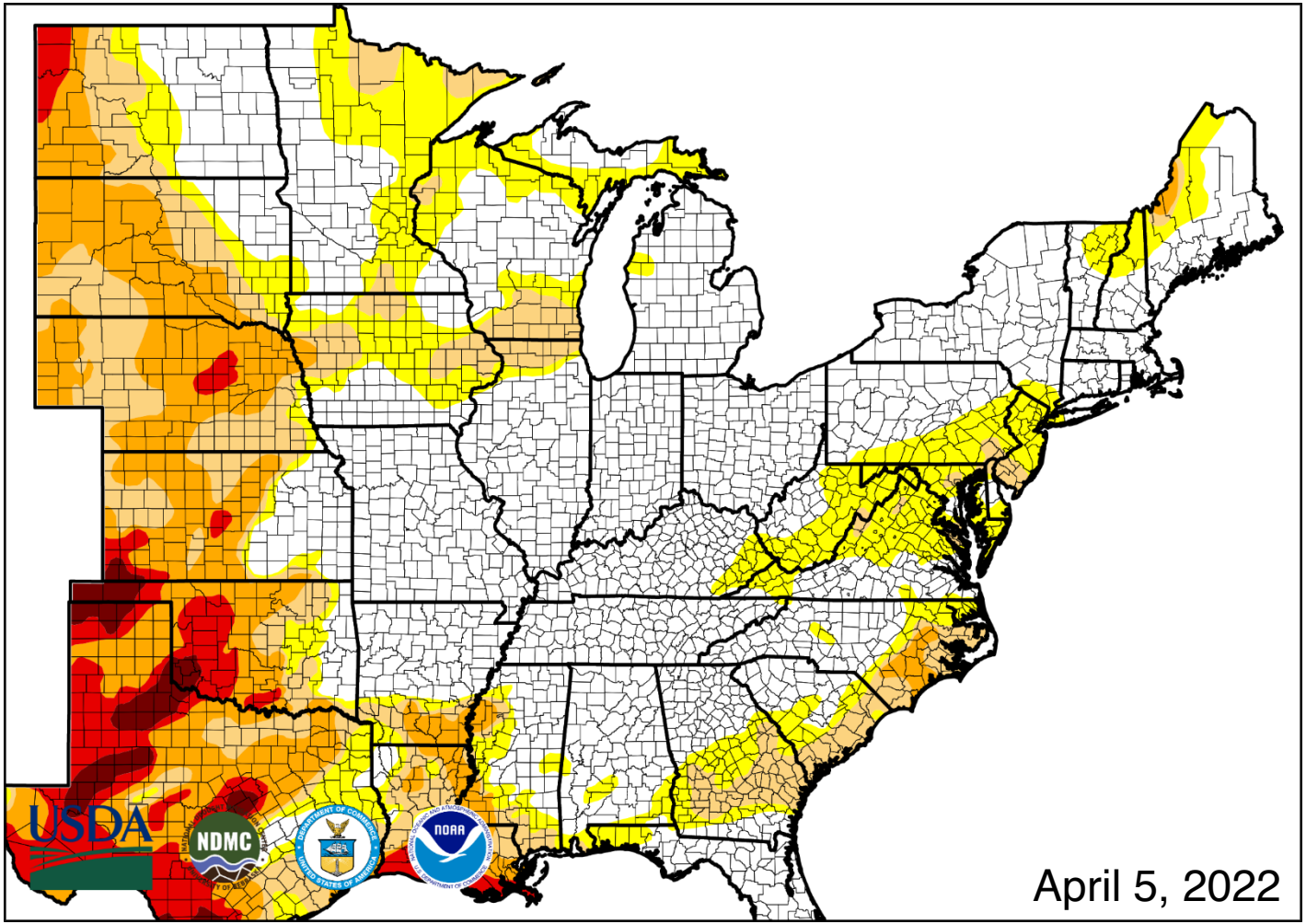
CRITICAL WEATHER EVENTS



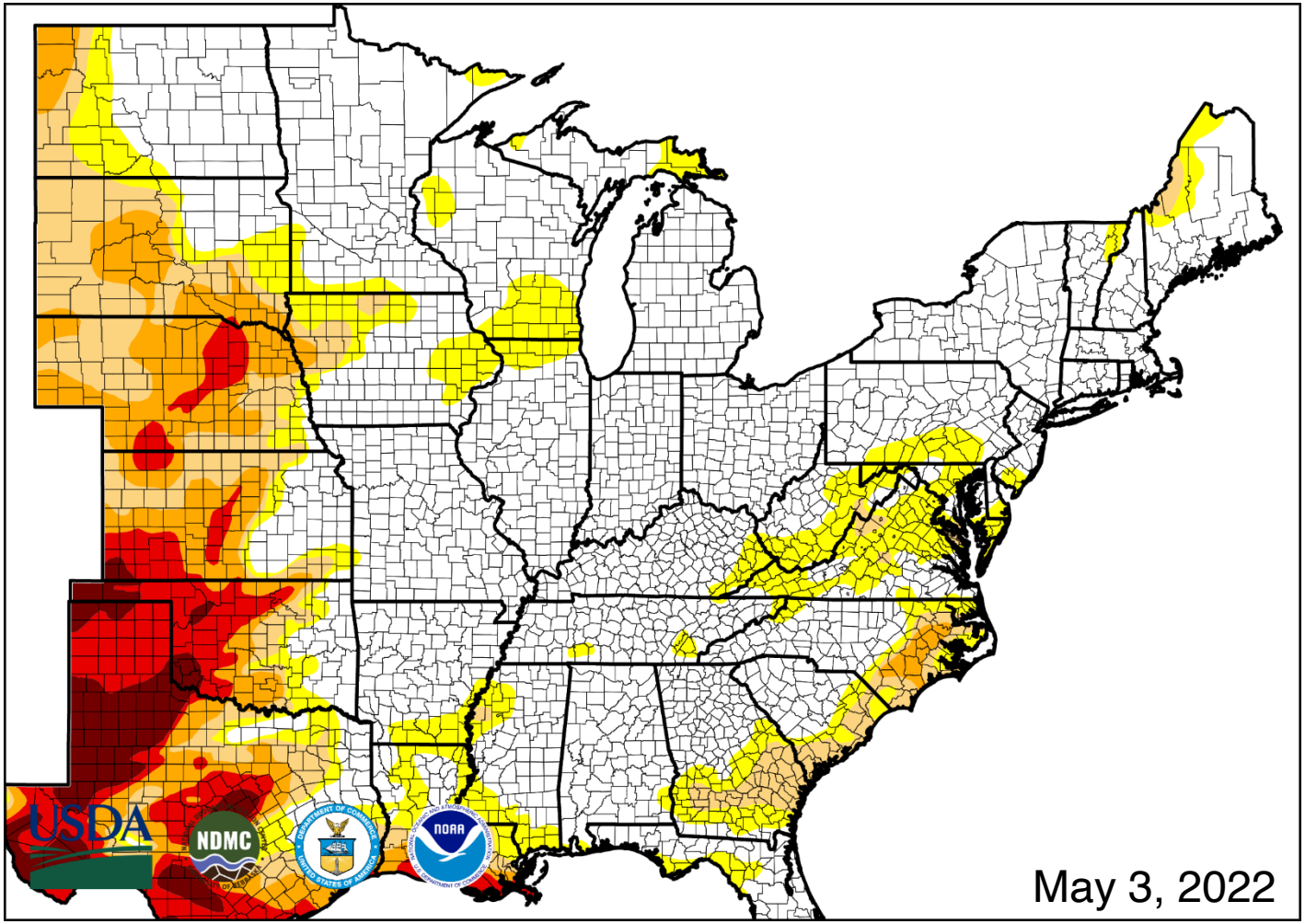
https://www.nass.usda.gov/Charts_and_Maps/Crops_County/index.php#sb



https://www.nass.usda.gov/Charts_and_Maps/Crops_County/index.php#sb



https://droughtmonitor.unl.edu/



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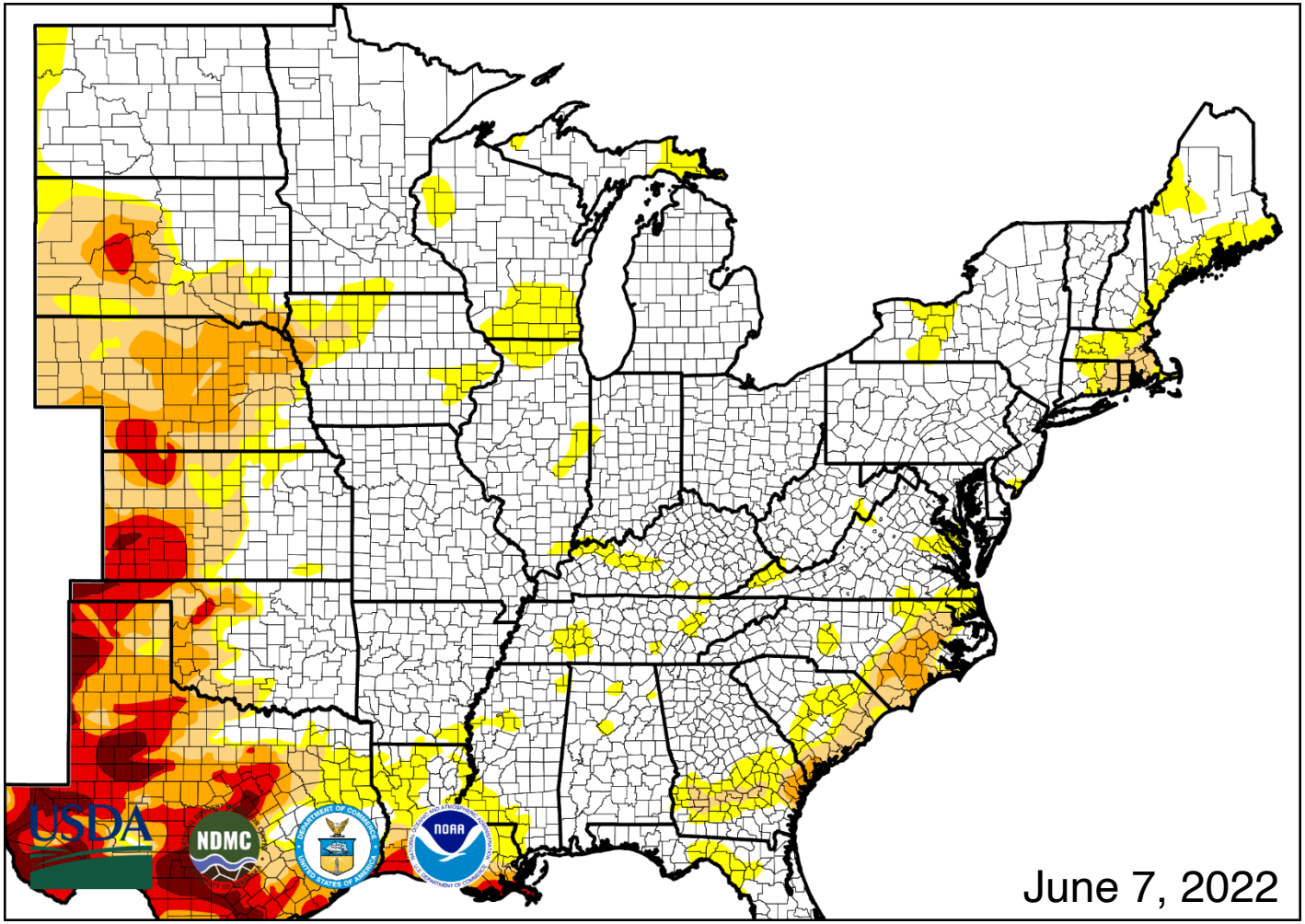

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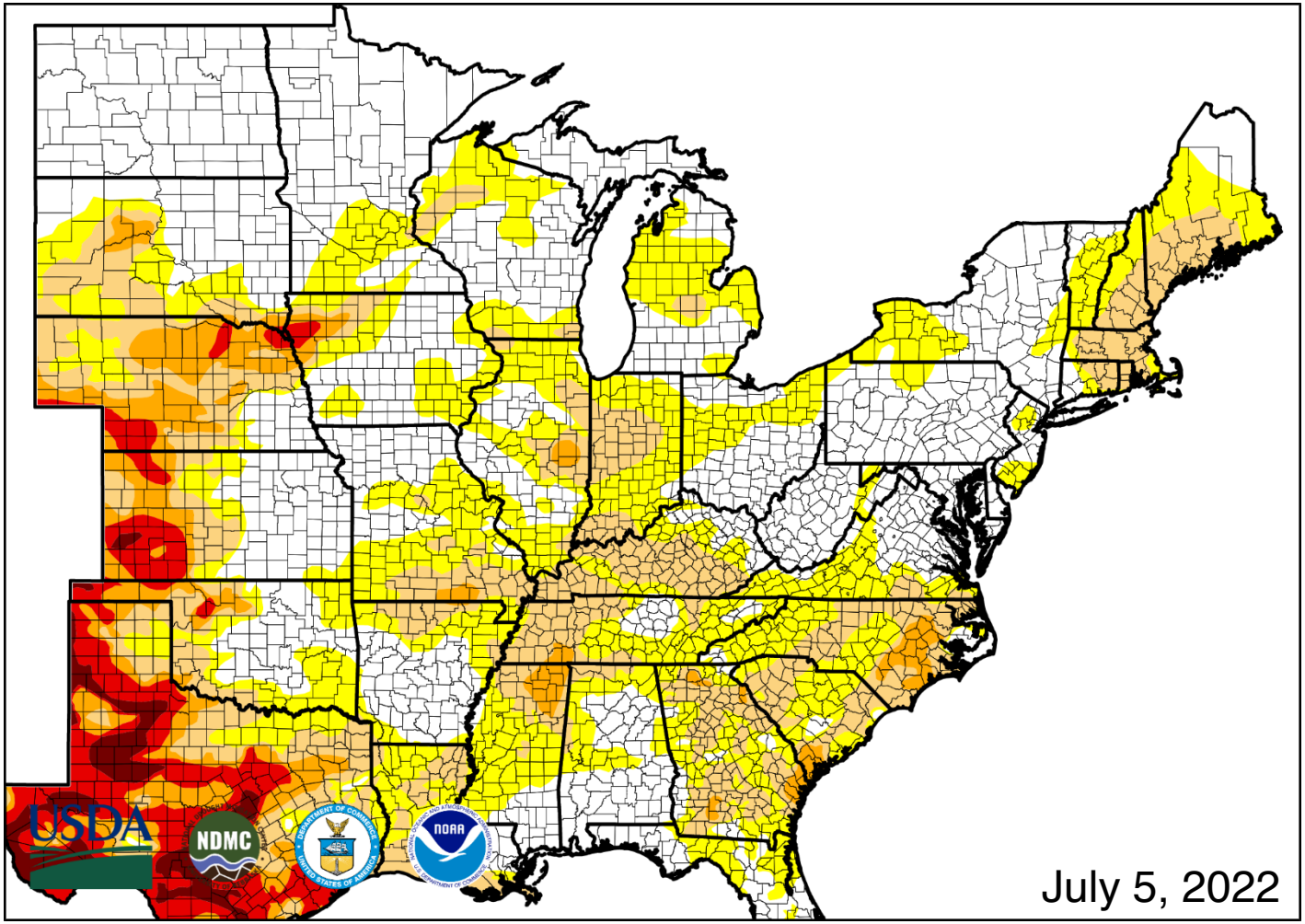

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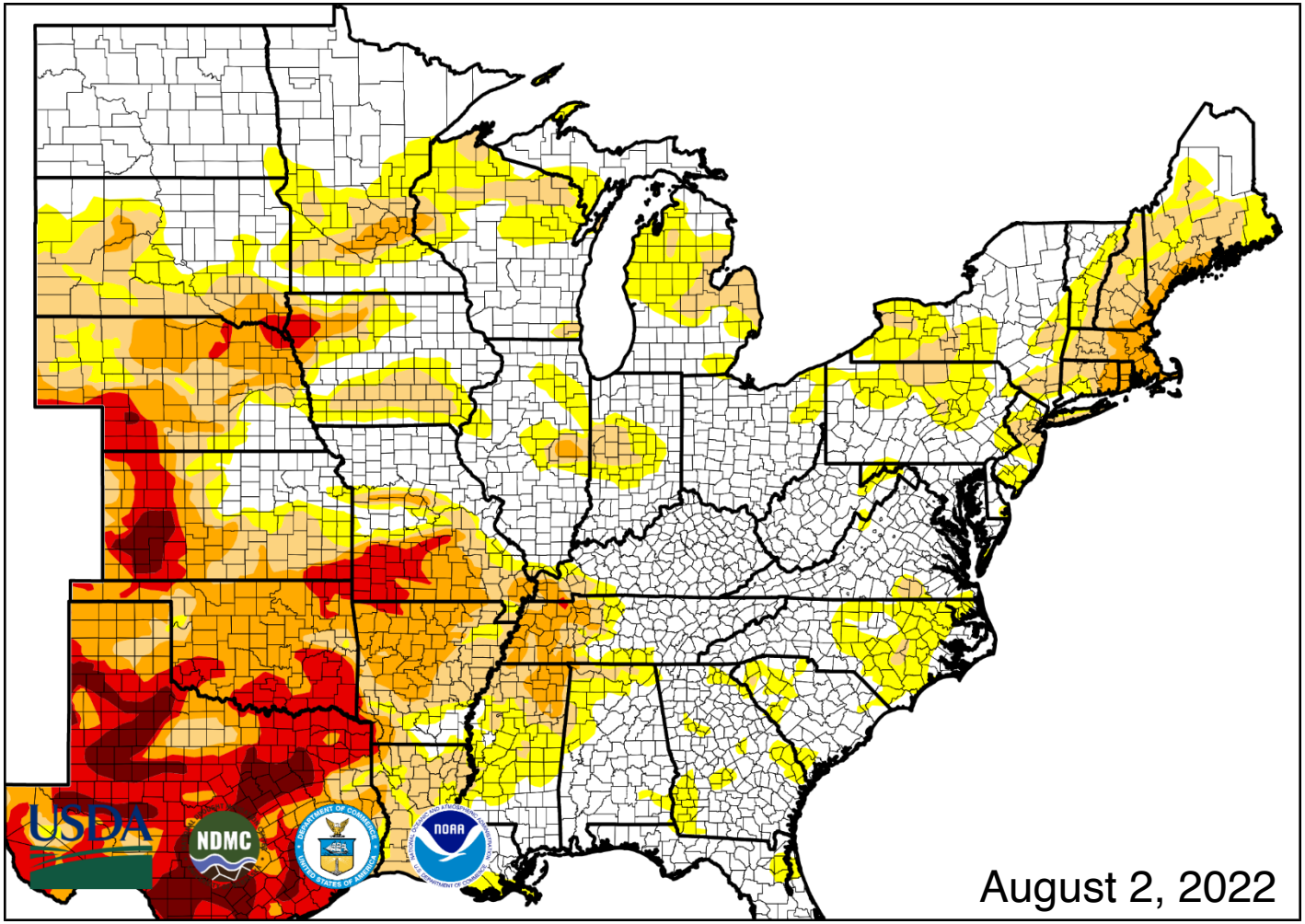

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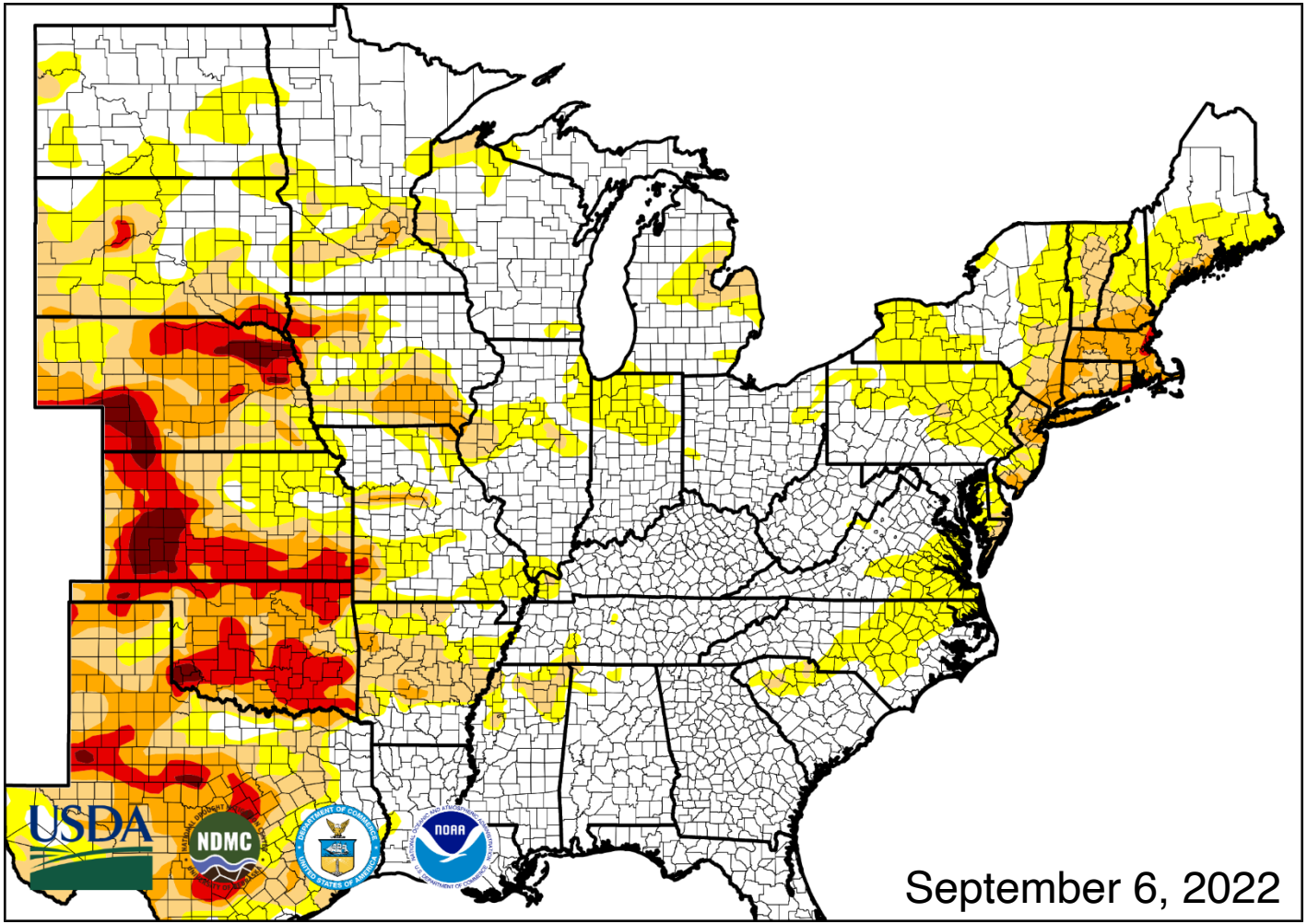

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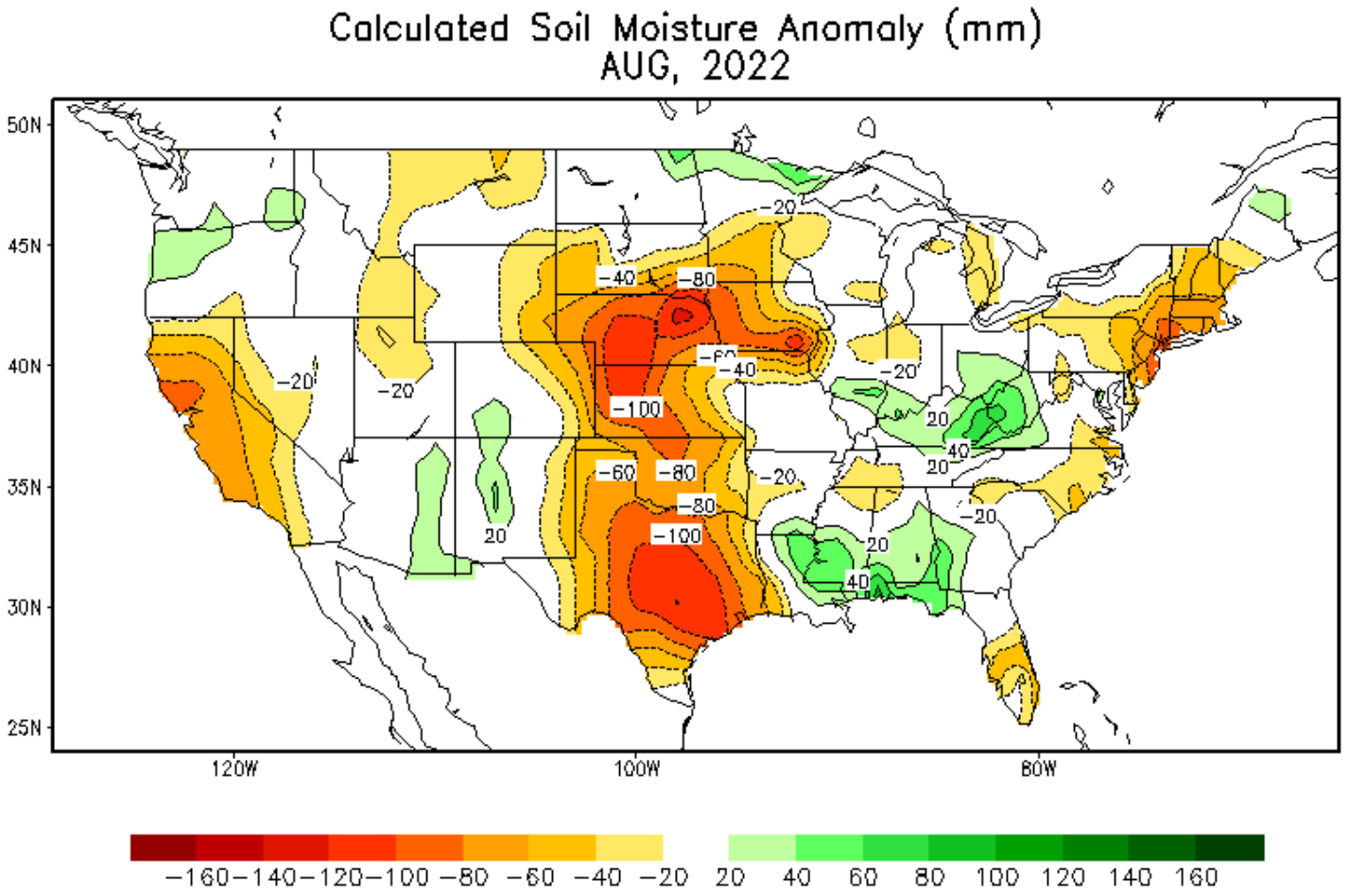


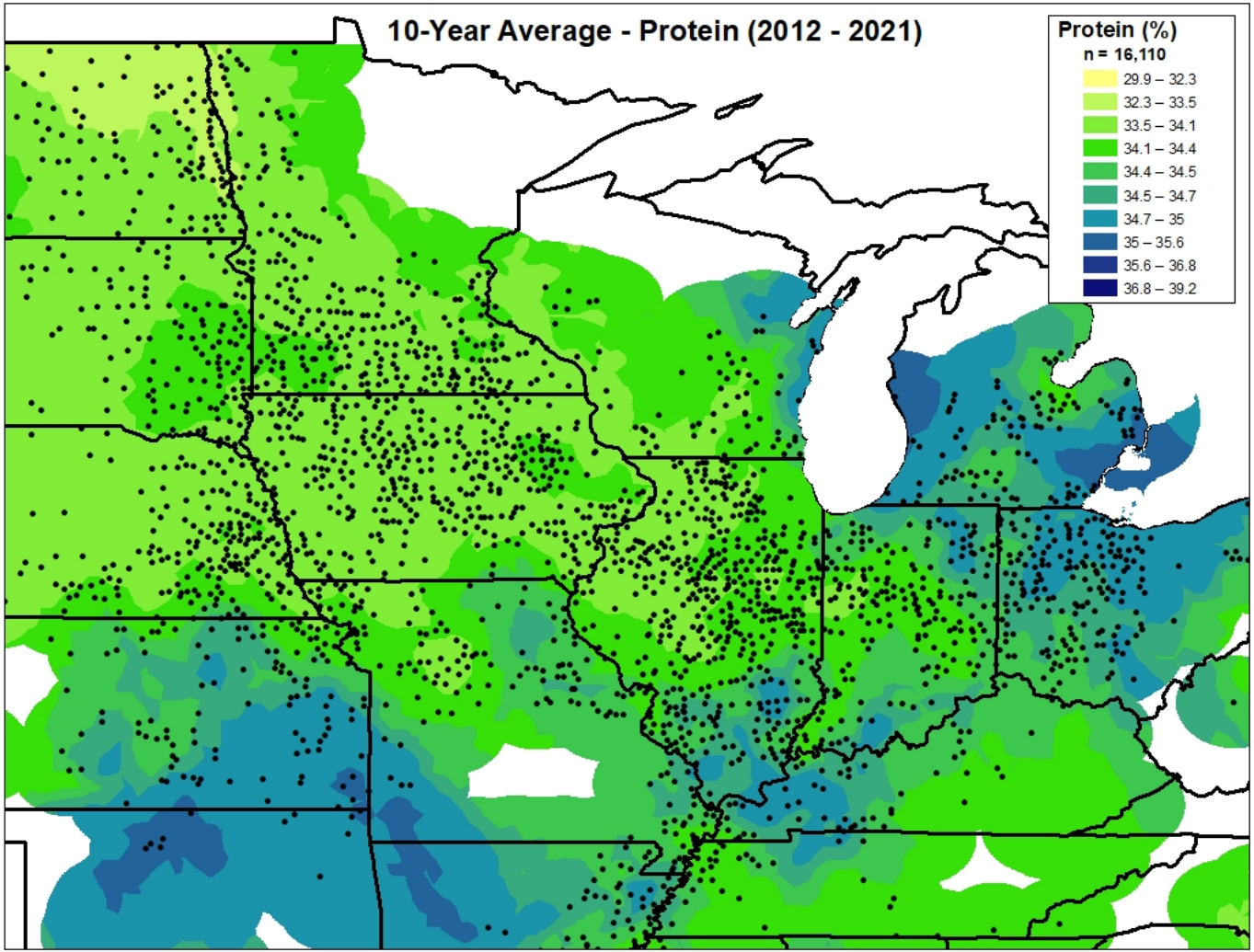
https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/US_Soil-Moisture-Monthly.php

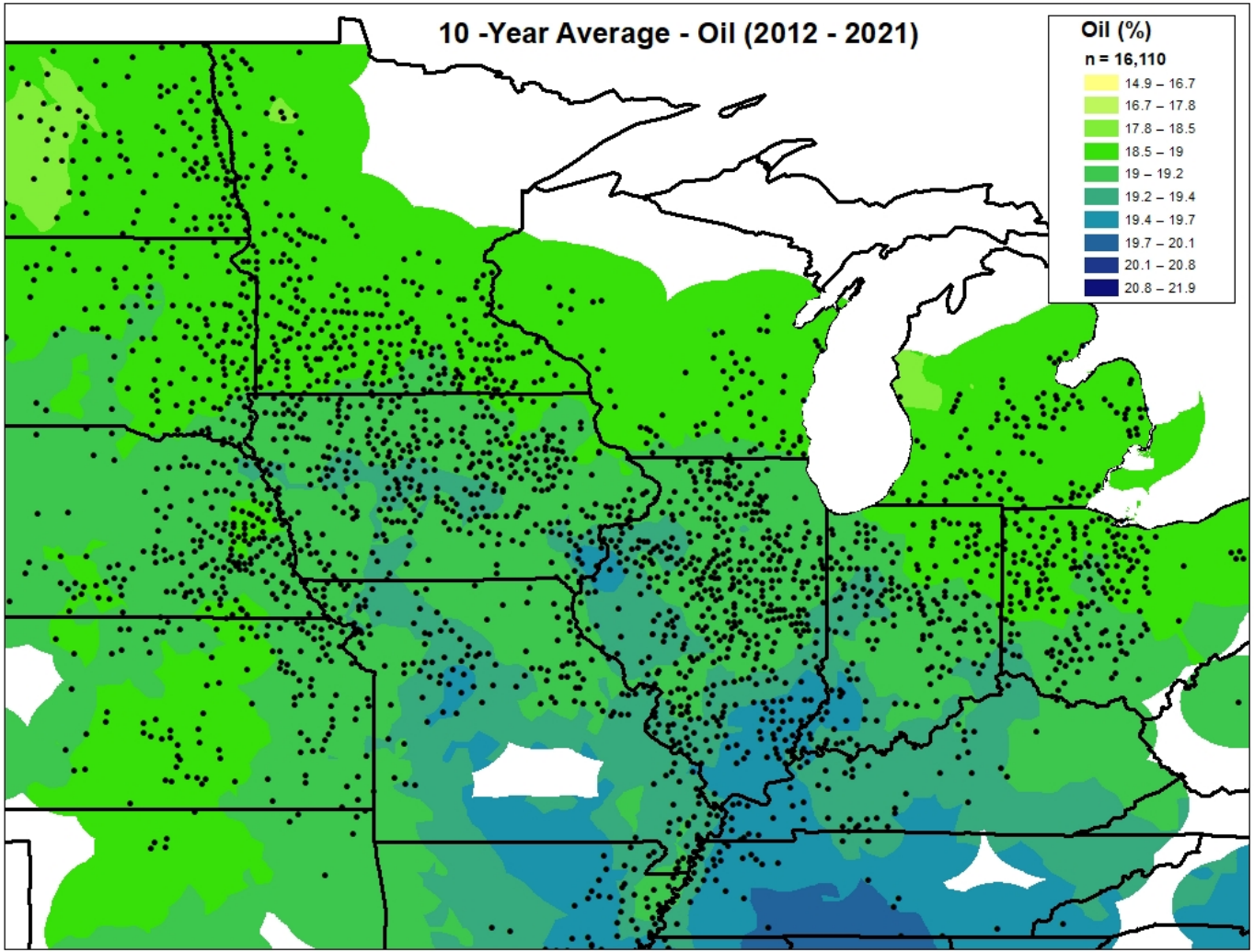
https://upload.wikimedia.org/wikipedia/commons/c/c3/Mississippiriver-new-01.png

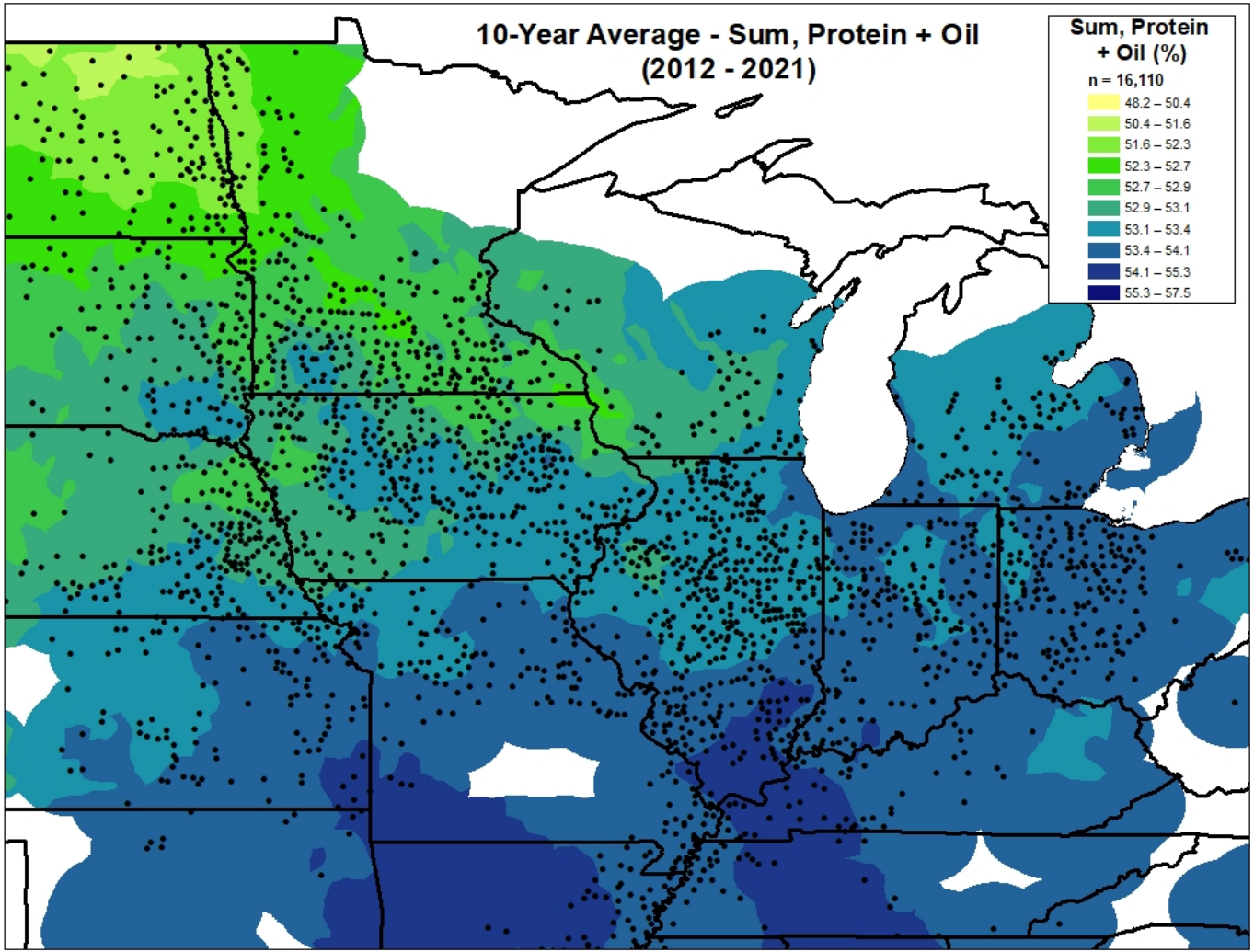
QUALITY OF THE UNITED STATES SOYBEAN CROP: 2022

University of Minnesota

HISTORICAL PROTEIN AND OIL VARIATION


10-Year Average - Protein (2012 - 2021)
Protein (%)
n = 16,110
29.9 – 32.3
32.3 – 33.5
33.5 – 34.1
34.1 – 34.4
34.4 – 34.5
34.5 – 34.7
34.7 – 35
35 – 35.6
35.6 – 36.8
36.8 – 39.2

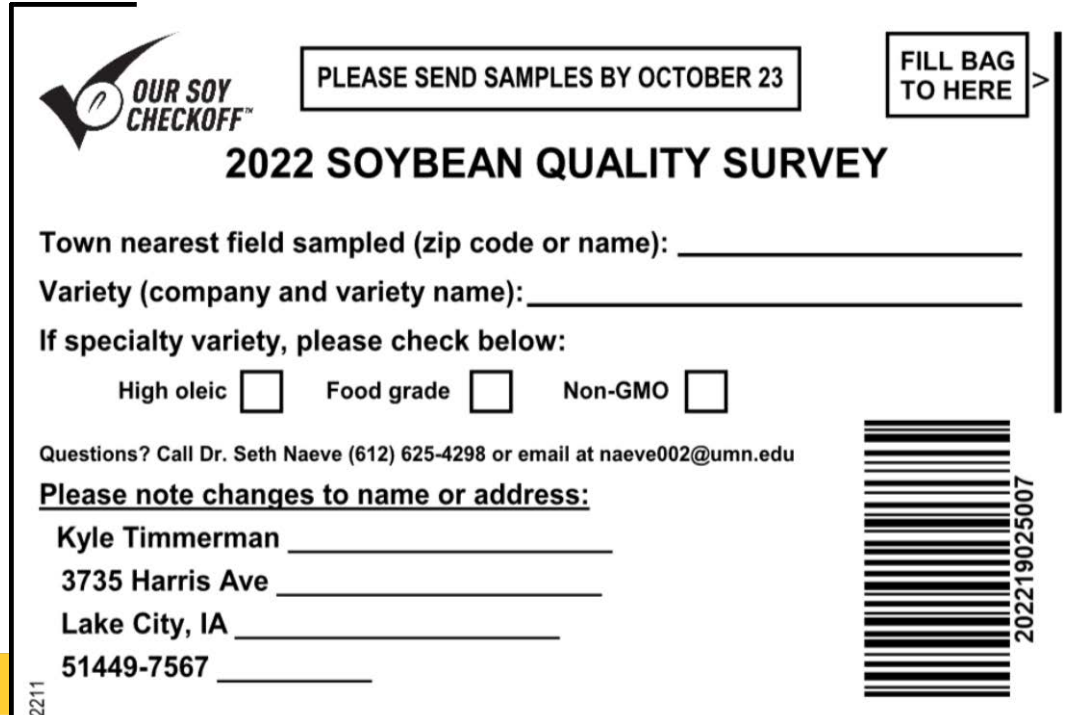

10 -Year Average - Oil (2012 - 2021)
Oil (%)
n = 16,110
14.9 – 16.7
16.7 – 17.8
17.8 – 18.5
18.5 – 19
19 – 19.2
19.2 – 19.4
19.4 – 19.7
19.7 – 20.1
20.1 – 20.8
20.8 – 21.9


10-Year Average - Sum, Protein + Oil
(2012 - 2021)
Sum, Protein + Oil (%)
n = 16,110
48.2 – 50.4
50.4 – 51.6
51.6 – 52.3
52.3 – 52.7
52.7 – 52.9
52.9 – 53.1
53.1 – 53.4
53.4 – 54.1
54.1 – 55.3
55.3 – 57.5


2022 SURVEY RESULTS
Voyager Pro
WEIGHING
UNITS
2nd UNITS
CALIBRATE
1.29835 lb
588.92 g
USSEC
2008 Food Soybean
Quality Survey
Variety (name/number and company):
Intended use:
Tofu
Natto
Miso
Other
Additional characteristics:
Special oil
Non-GMO
Organic
Field location (zip code or town, state):
Producer name or specific field identifier:
Contracting company:
Questions? Call Dr. Seth Naeve at (612) 625-4298

2022 Survey Methods

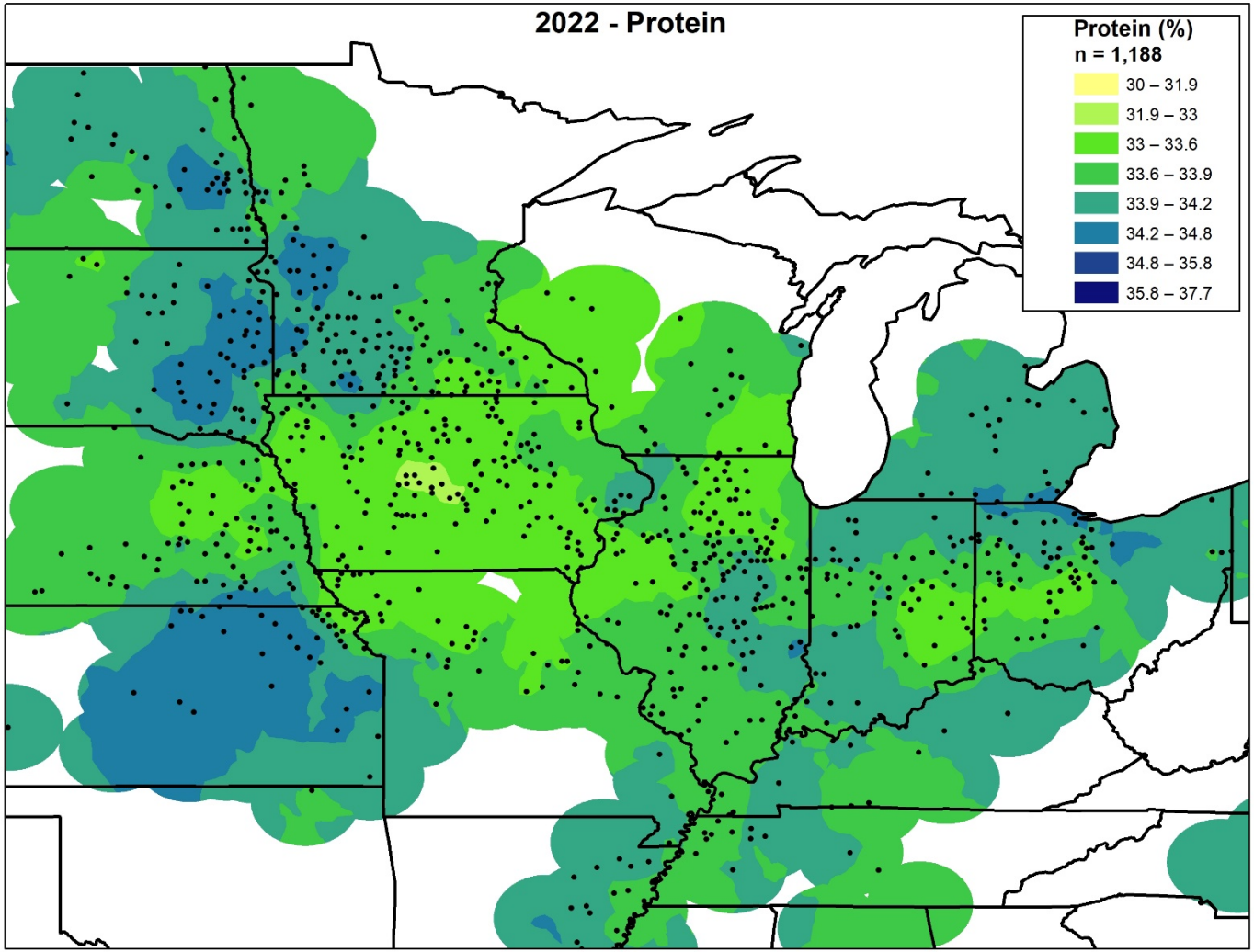
- In August, sample kits were mailed to 5,737 soybean producers based on soybean production by state
- By 25 October 2022, 1,188 samples were returned for analysis

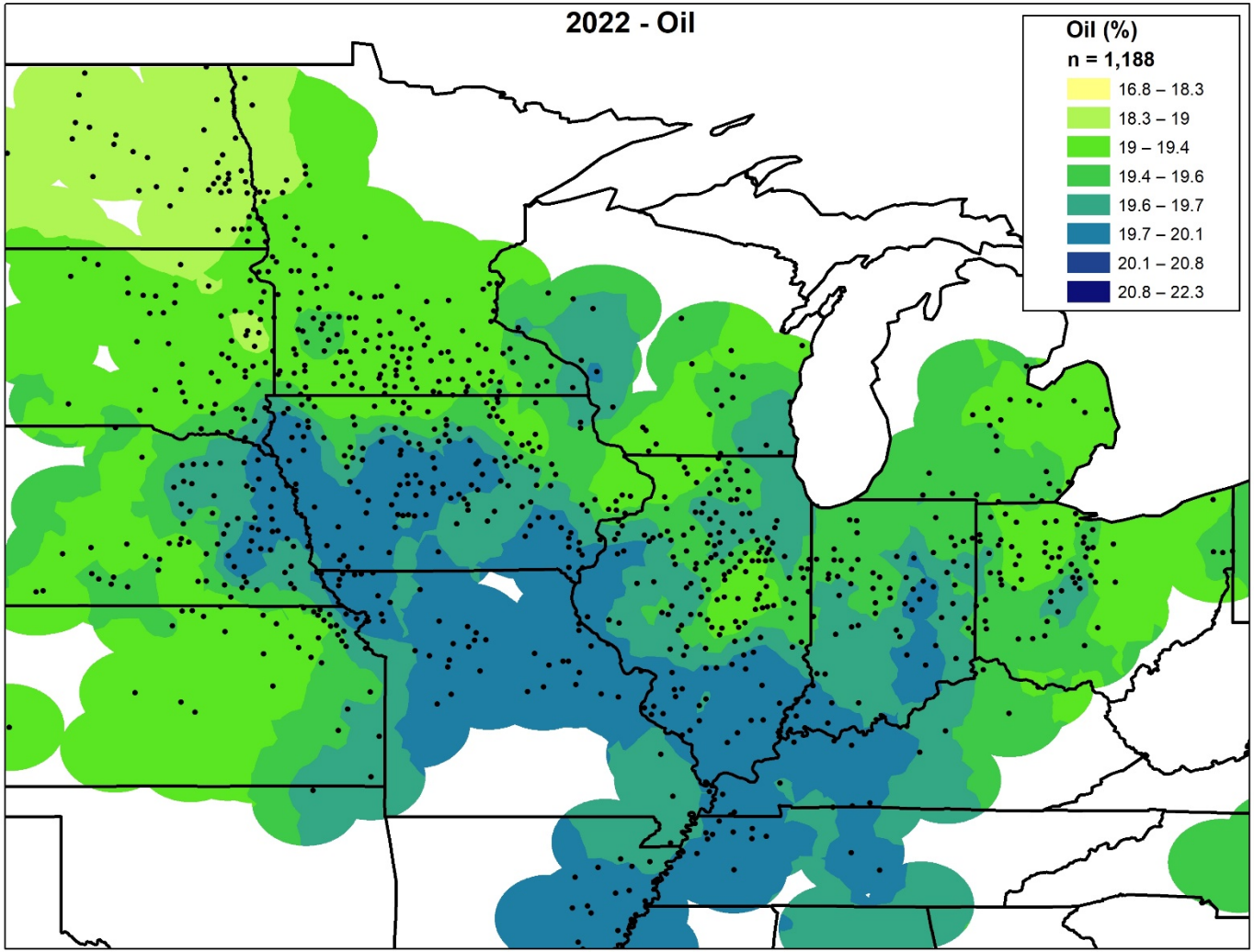


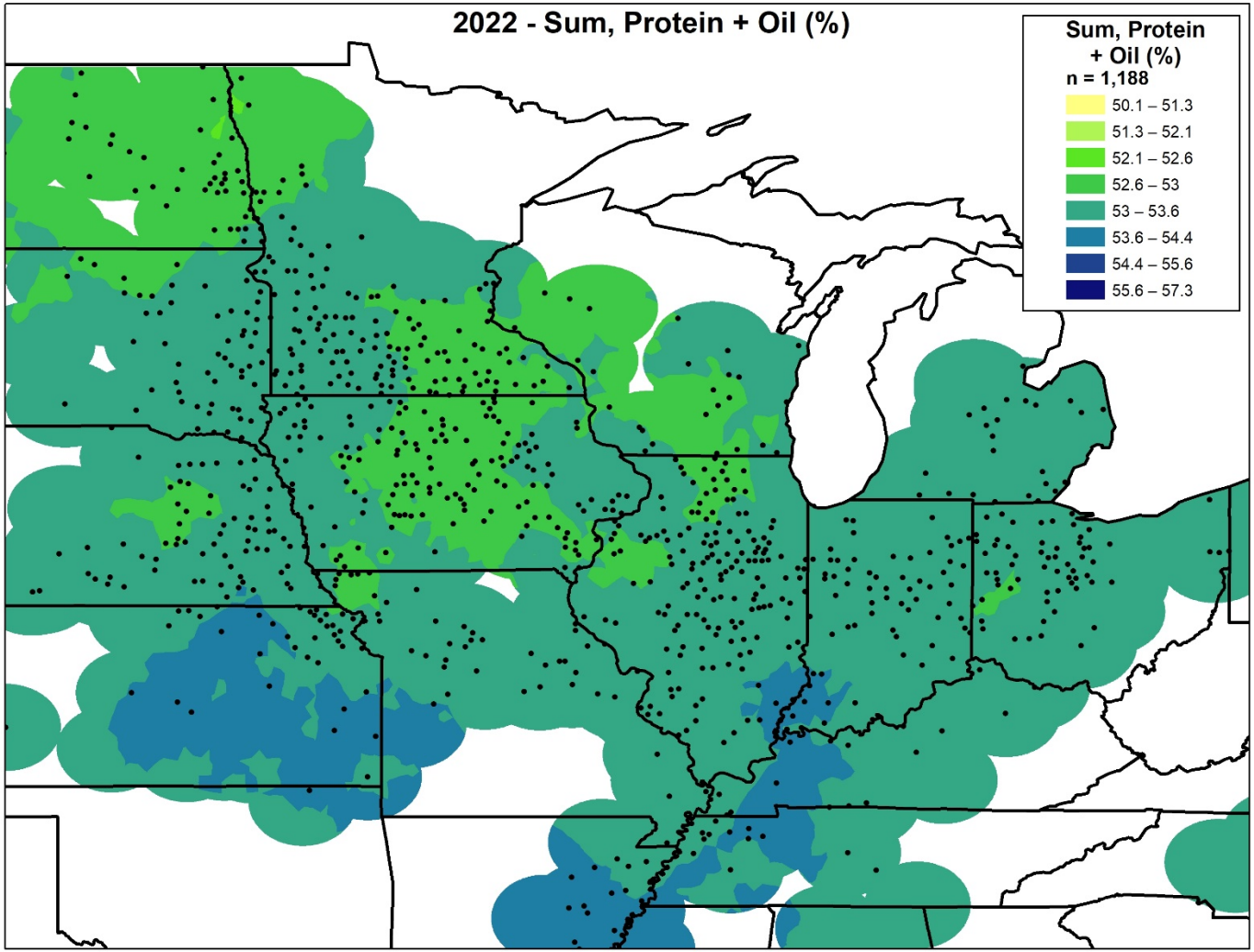
PROTEIN AND OIL

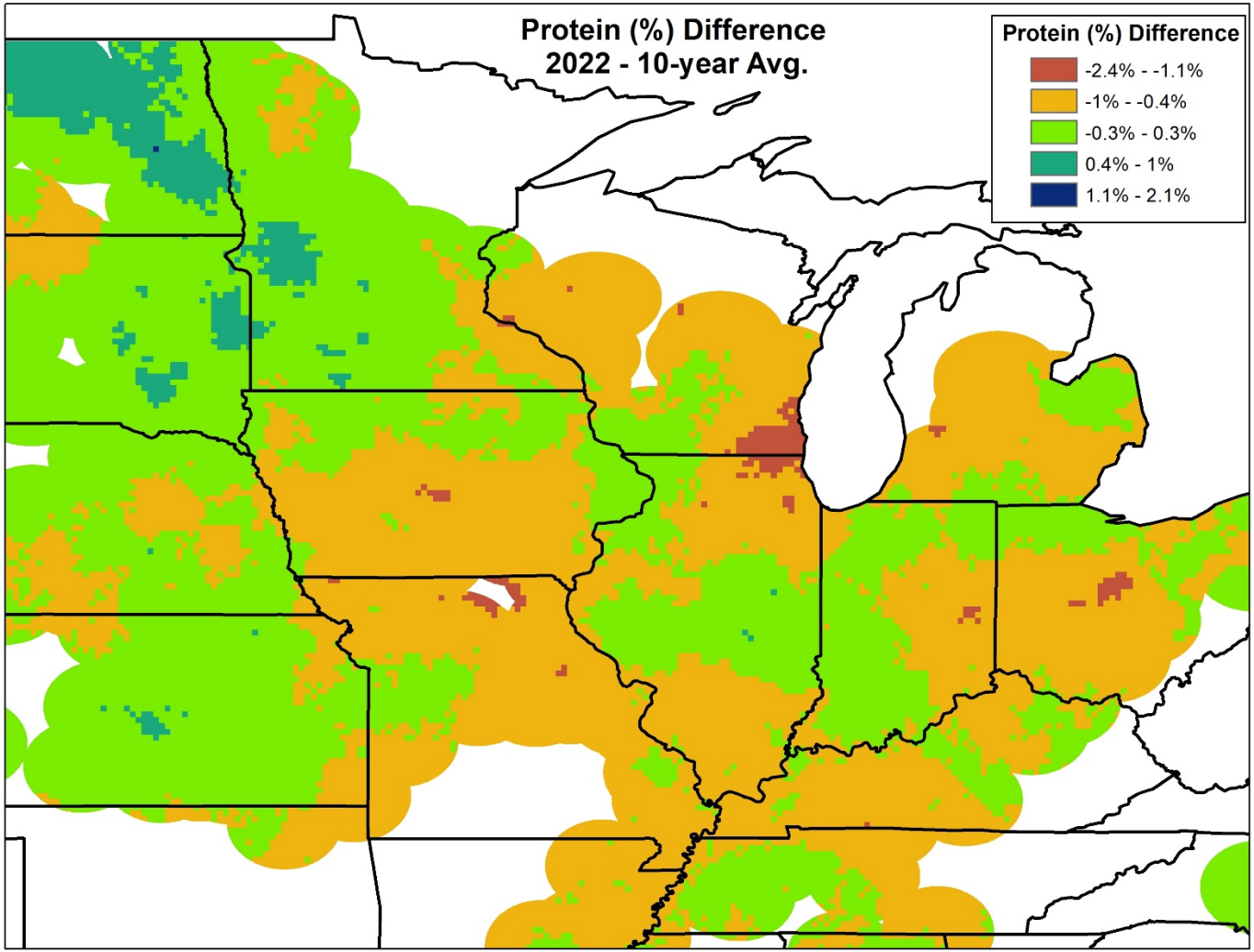
Region	Number of Samples	Protein (13%)	Change from 2021	Oil (13%)	Change from 2021	Seed Weight (g/100 seeds)
US Average	1,188	33.8		19.5		17.0
Average of 2022 Crop†		33.9	+0.4	19.5	-0.5	16.8
US 2012-2021 Average†		34.2		19.2		

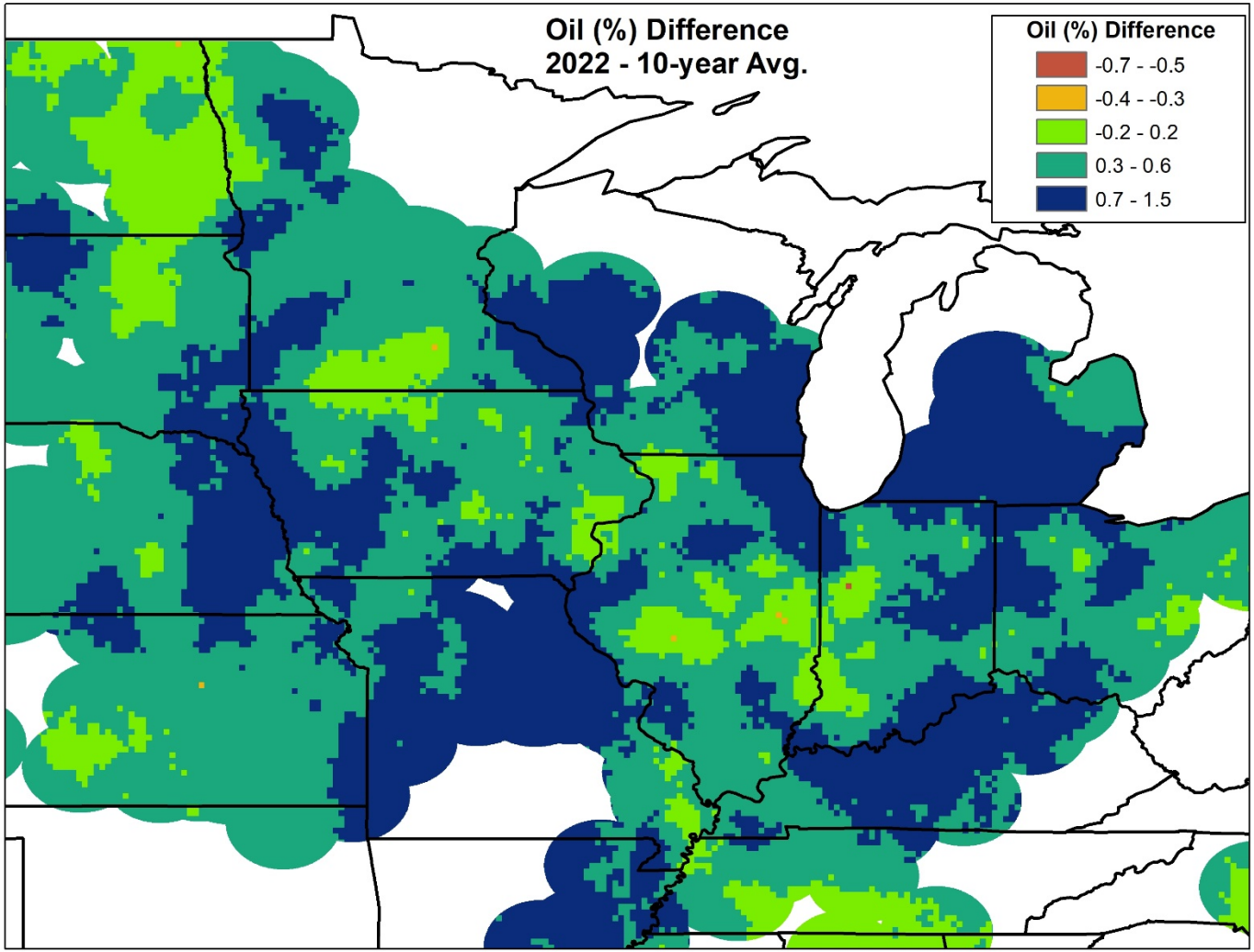
†US average values weighted based on estimated production by state, as estimated by USDA, NASS Crop Production Report (October, 2022)

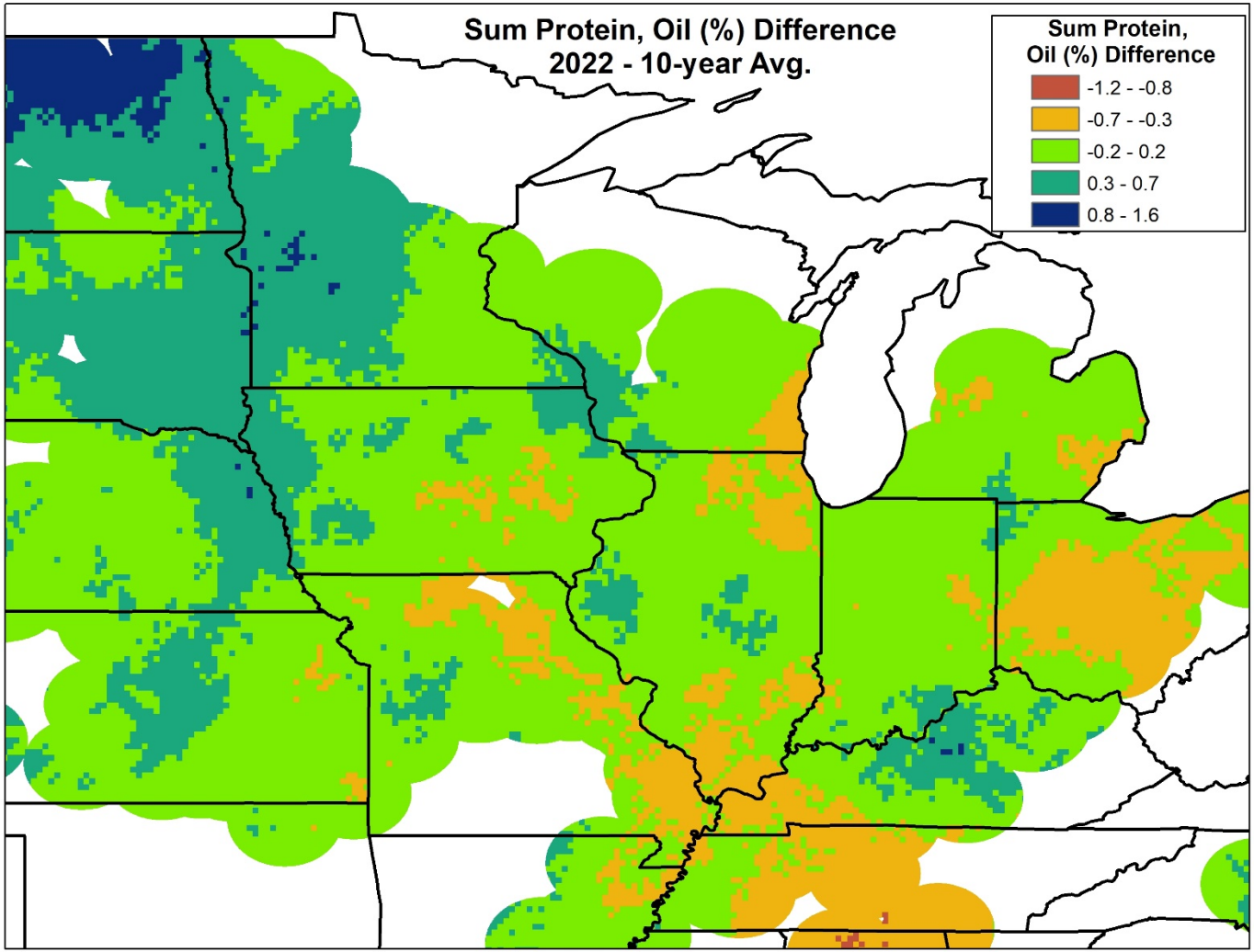

2022 - Protein
Protein (%)
n = 1,188
30 – 31.9
31.9 – 33
33 – 33.6
33.6 – 33.9
33.9 – 34.2
34.2 – 34.8
34.8 – 35.8
35.8 – 37.7


2022 - Oil
Oil (%)
n = 1,188
16.8 – 18.3
18.3 – 19
19 – 19.4
19.4 – 19.6
19.6 – 19.7
19.7 – 20.1
20.1 – 20.8
20.8 – 22.3

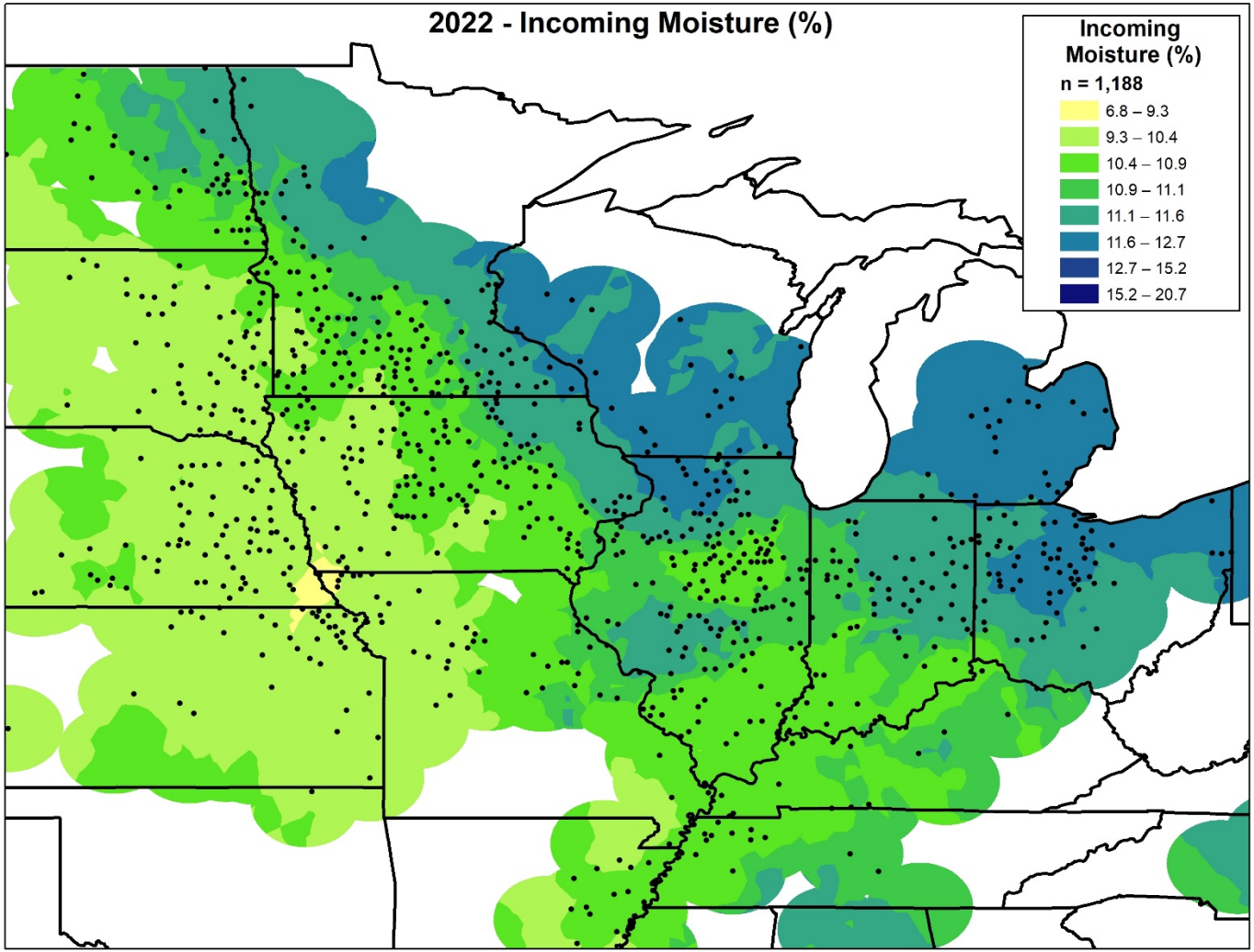

2022 - Sum, Protein + Oil (%)
Sum, Protein + Oil (%)
n = 1,188
50.1 – 51.3
51.3 – 52.1
52.1 – 52.6
52.6 – 53
53 – 53.6
53.6 – 54.4
54.4 – 55.6
55.6 – 57.3

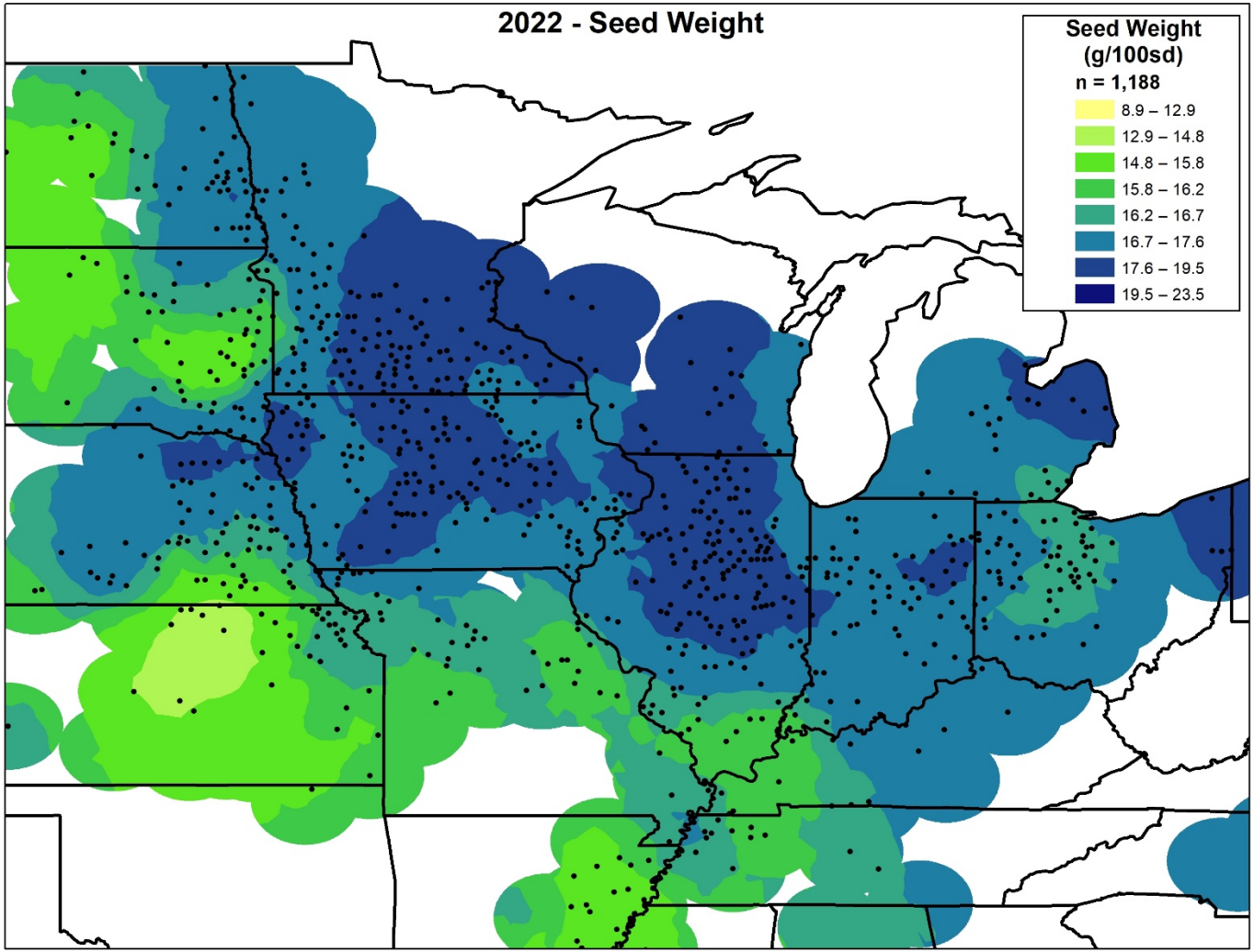

Protein (%) Difference
2022 - 10-year Avg.
Protein (%) Difference
-2.4% - -1.1%
-1% - -0.4%
-0.3% - 0.3%
0.4% - 1%
1.1% - 2.1%

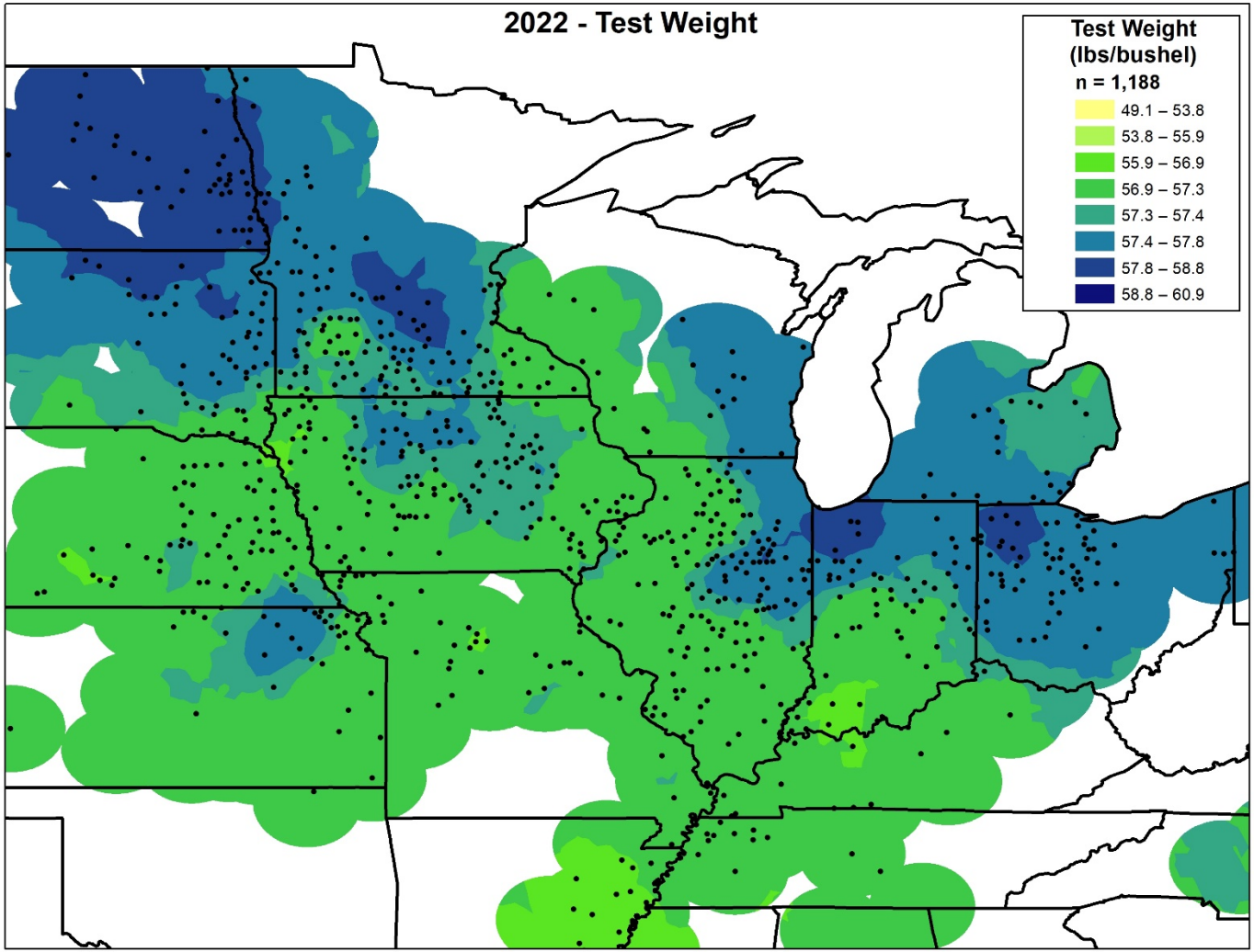

Oil (%) Difference
2022 - 10-year Avg.
Oil (%) Difference
-0.7 - -0.5
-0.4 - -0.3
-0.2 - 0.2
0.3 - 0.6
0.7 - 1.5


Sum Protein, Oil (%) Difference
2022 - 10-year Avg.
Sum Protein,
Oil (%) Difference
-1.2 - -0.8
-0.7 - -0.3
-0.2 - 0.2
0.3 - 0.7
0.8 - 1.6


PHYSICAL CHARACTERISTICS


2022 - Incoming Moisture (%)
Incoming Moisture (%)
n = 1,188
6.8 – 9.3
9.3 – 10.4
10.4 – 10.9
10.9 – 11.1
11.1 – 11.6
11.6 – 12.7
12.7 – 15.2
15.2 – 20.7


2022 - Seed Weight
Seed Weight (g/100sd)
n = 1,188
8.9 – 12.9
12.9 – 14.8
14.8 – 15.8
15.8 – 16.2
16.2 – 16.7
16.7 – 17.6
17.6 – 19.5
19.5 – 23.5


2022 - Test Weight
Test Weight
(lbs/bushel)
n = 1,188
49.1 – 53.8
53.8 – 55.9
55.9 – 56.9
56.9 – 57.3
57.3 – 57.4
57.4 – 57.8
57.8 – 58.8
58.8 – 60.9

BETTER MEASURES OF QUALITY: AMINO ACIDS

AMINO ACIDS ARE THE BUILDING BLOCKS OF PROTEINS IN LIVING ORGANISMS. THERE ARE OVER 500 AMINO ACIDS FOUND IN NATURE - HOWEVER, THE HUMAN GENETIC CODE ONLY DIRECTLY ENCODES 20. 'ESSENTIAL' AMINO ACIDS MUST BE EATEN FOR THE DIET. NON-ESSENTIAL AMINO ACIDS CAN BE SYNTHESISED IN THE BODY.

Chart Key: ALIPHATIC · AROMATIC · ACIDIC · BASIC · HYDROXYLIC · SULPHUR CONTAINING · AMIDIC · NON-ESSENTIAL · ESSENTIAL

Chemical Structure — single letter code

NAME (A) — three letter code — DNA codons

ALANINE (A) — *Ala* — GCT, GCC, GCA, GCG

GLYCINE (G) — *Gly* — GGT, GGC, GGA, GGG

ISOLEUCINE (I) — *Ile* — ATT, ATC, ATA

LEUCINE (L) — *Leu* — CTT, CTC, CTA, CTG, TTA, TTG

PROLINE (P) — *Pro* — CCT, CCC, CCA, CCG

VALINE (V) — *Val* — GTT, GTC, GTA, GTG

PHENYLALANINE (F) — *Phe* — TTT, TTC

TRYPTOPHAN (W) — *Trp* — TGG

TYROSINE (Y) — *Tyr* — TAT, TAC

ASPARTIC ACID (D) — *Asp* — GAT, GAC

GLUTAMIC ACID (E) — *Glu* — GAA, GAG

ARGININE (R) — *Arg* — CGT, CGC, CGA, CGG, AGA, AGG

HISTIDINE (H) — *His* — CAT, CAC

LYSINE (K) — *Lys* — AAA, AAG

SERINE (S) — *Ser* — TCT, TCC, TCA, TCG, AGT, AGC

THREONINE (T) — *Thr* — ACT, ACC, ACA, ACG

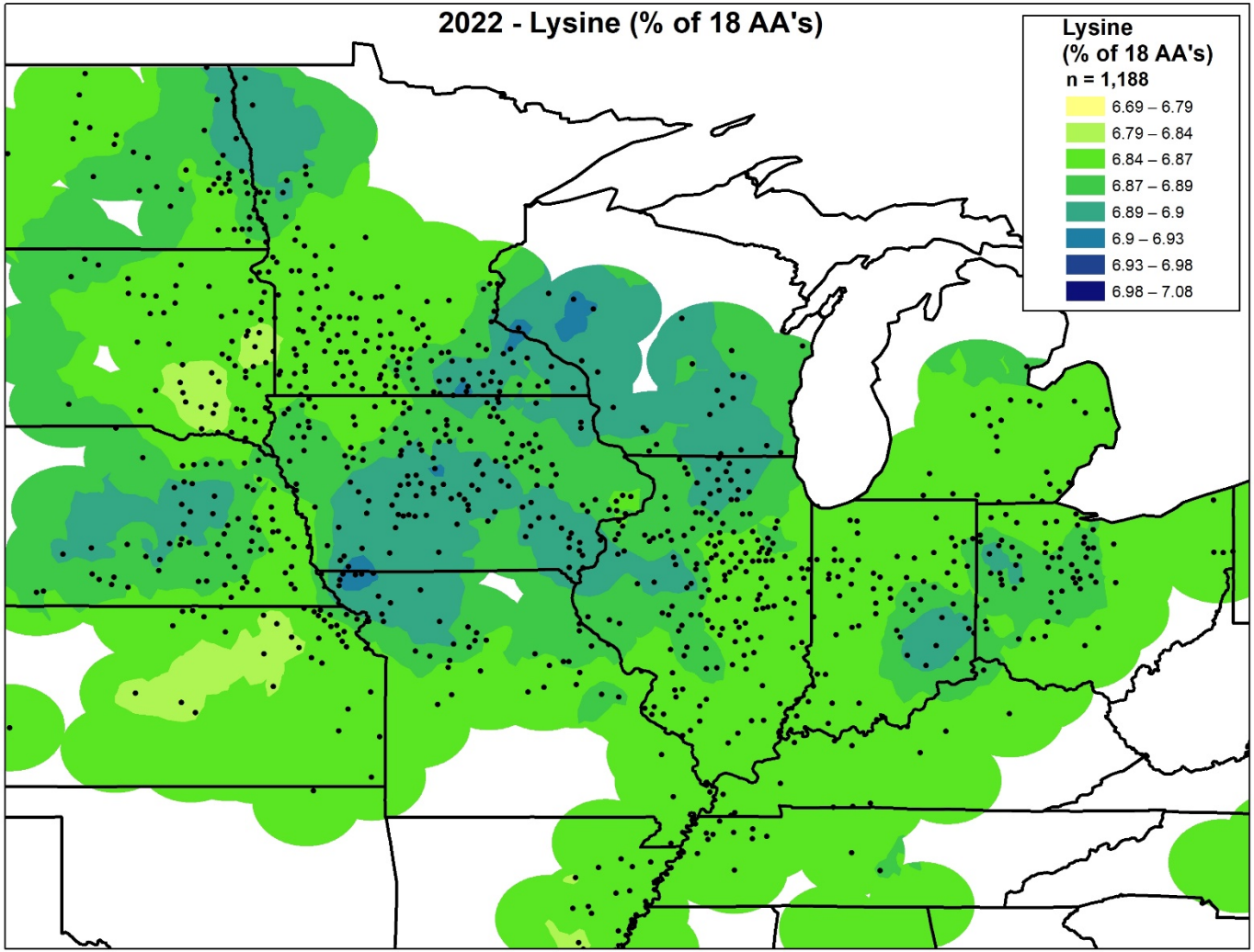
CYSTEINE (C) — *Cys* — TGT, TGC

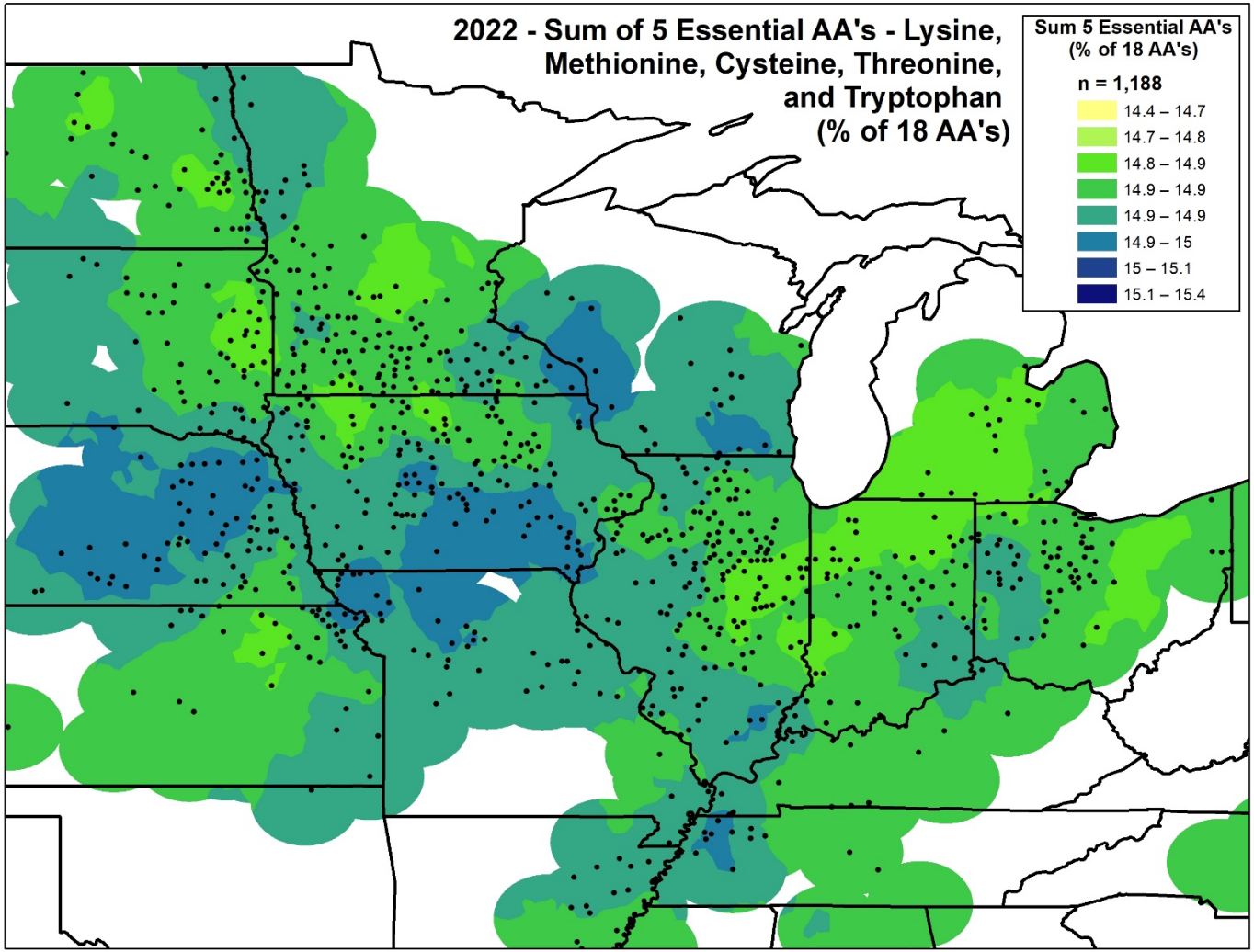
METHIONINE (M) — *Met* — ATG

ASPARAGINE (N) — *Asn* — AAT, AAC

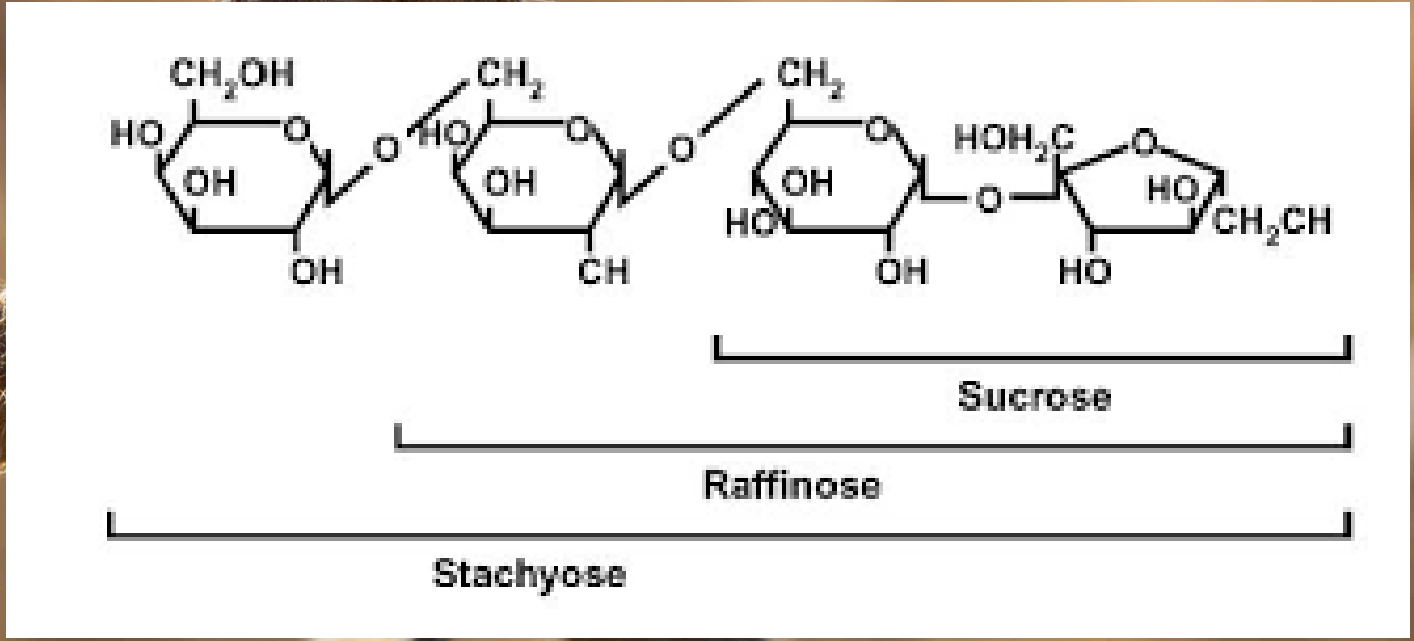
GLUTAMINE (Q) — *Gln* — CAA, CAG

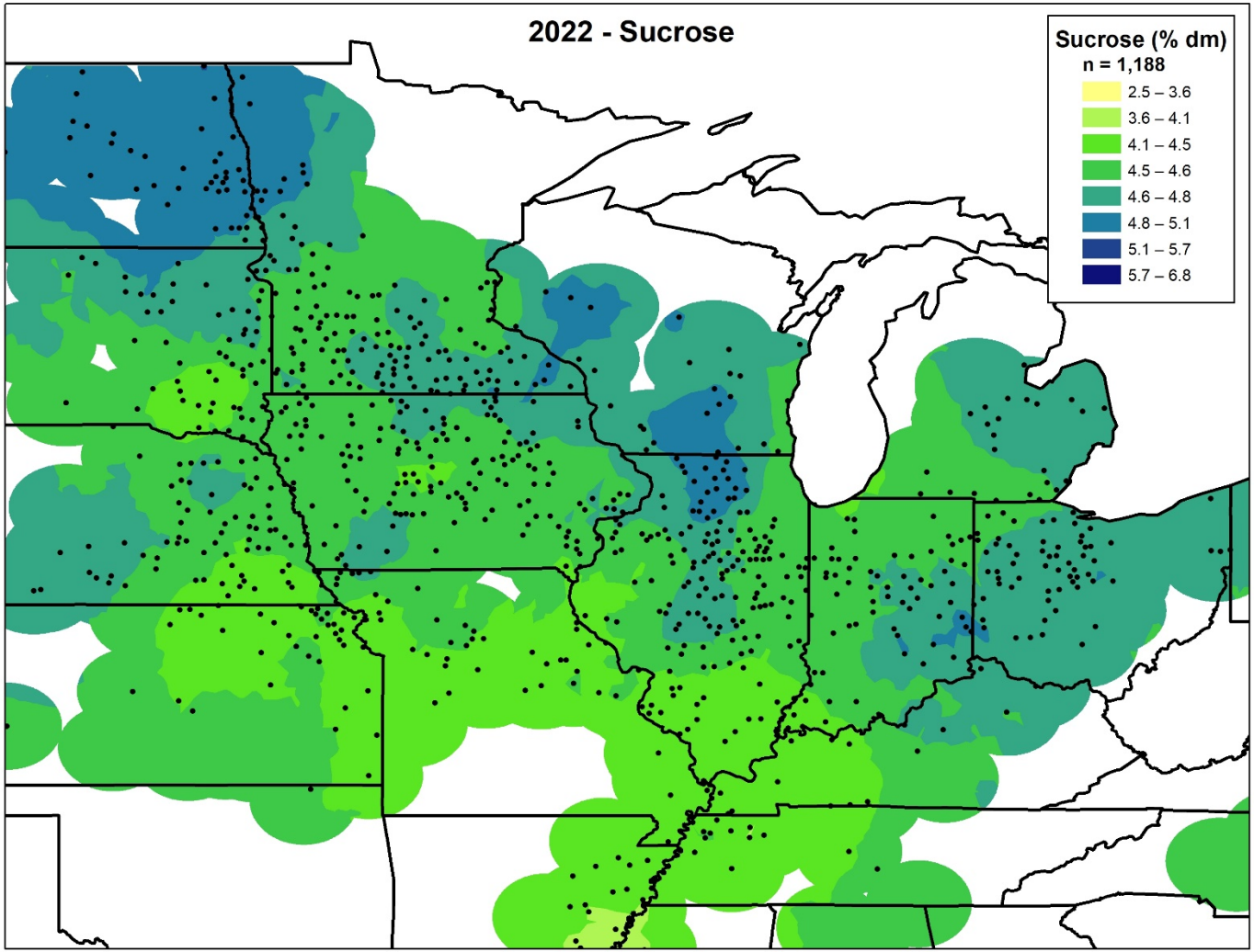
Note: This chart only shows those amino acids for which the human genetic code directly codes for. Selenocysteine is often referred to as the 21st amino acid, but is encoded in a special manner. In some cases, distinguishing between asparagine/aspartic acid and glutamine/glutamic acid is difficult. In these cases, the codes asx (B) and glx (Z) are respectively used.

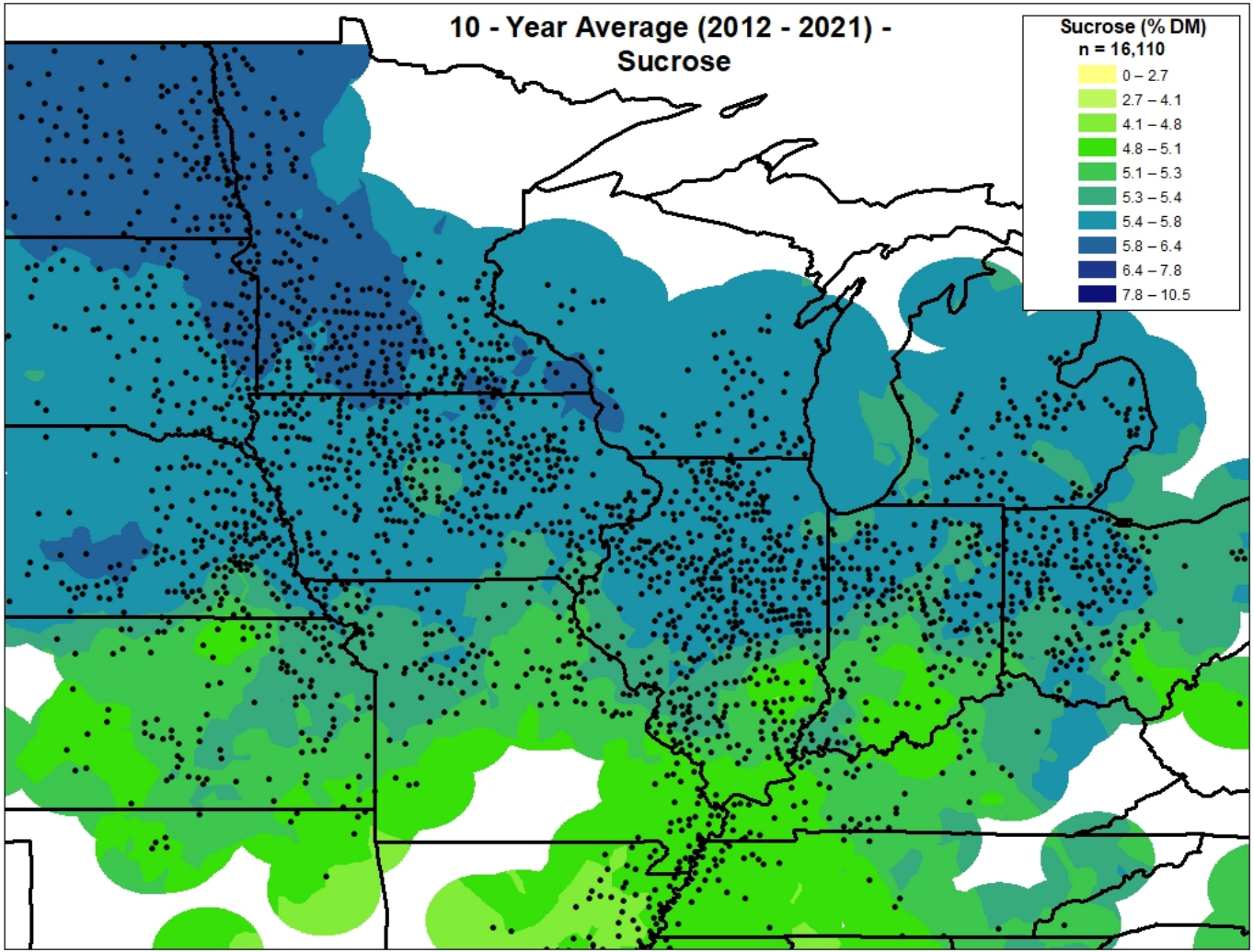

2022 - Lysine (% of 18 AA's)
Lysine
(% of 18 AA's)
n = 1,188
6.69 – 6.79
6.79 – 6.84
6.84 – 6.87
6.87 – 6.89
6.89 – 6.9
6.9 – 6.93
6.93 – 6.98
6.98 – 7.08


2022 - Sum of 5 Essential AA's - Lysine, Methionine, Cysteine, Threonine, and Tryptophan (% of 18 AA's)
Sum 5 Essential AA's (% of 18 AA's)
n = 1,188
14.4 – 14.7
14.7 – 14.8
14.8 – 14.9
14.9 – 14.9
14.9 – 14.9
14.9 – 15
15 – 15.1
15.1 – 15.4

BETTER MEASURES OF QUALITY: SOLUBLE SUGARS




2022 - Sucrose
Sucrose (% dm)
n = 1,188
2.5 – 3.6
3.6 – 4.1
4.1 – 4.5
4.5 – 4.6
4.6 – 4.8
4.8 – 5.1
5.1 – 5.7
5.7 – 6.8


10 - Year Average (2012 - 2021) -
Sucrose
Sucrose (% DM)
n = 16,110
0 – 2.7
2.7 – 4.1
4.1 – 4.8
4.8 – 5.1
5.1 – 5.3
5.3 – 5.4
5.4 – 5.8
5.8 – 6.4
6.4 – 7.8
7.8 – 10.5


2022 FOOD SOYBEAN SURVEY

Tested Attributes and Characteristics

- Protein
- Oil
- Hilum color
- Seed size
- Sucrose
- Oligosaccharides
- Total free sugars
- Amino acid profile
- Total carbohydrates
- Fatty acid profile (high oleic)
- Total isoflavones
- Soymilk and tofu yields
- 11S/7S ratio

Specialty Soy Database

- Annual program
- Developed in conjunction with US industry and international buyers
- Catalogue of commonly contracted US soyfood beans (120+ varieties)
- Includes information pertaining to:
  - Production year, commercial variety name, GM/non-GMO/Organic, maturity group, state or area grown, soybean seed type (tofu, soymilk, natto, miso, indeterminate, etc.), and a photo of each variety

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