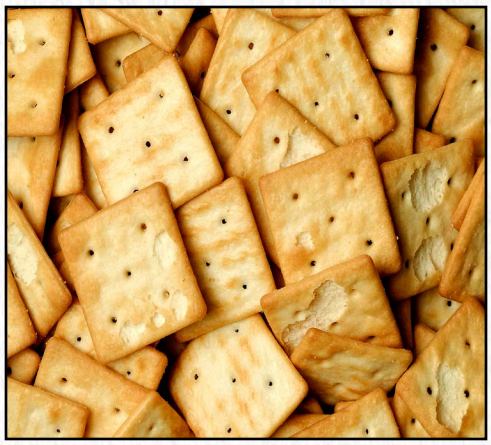
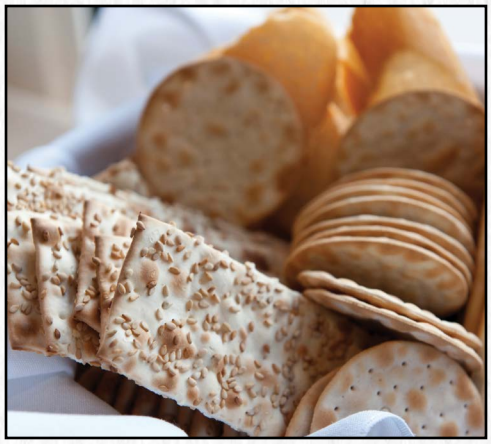


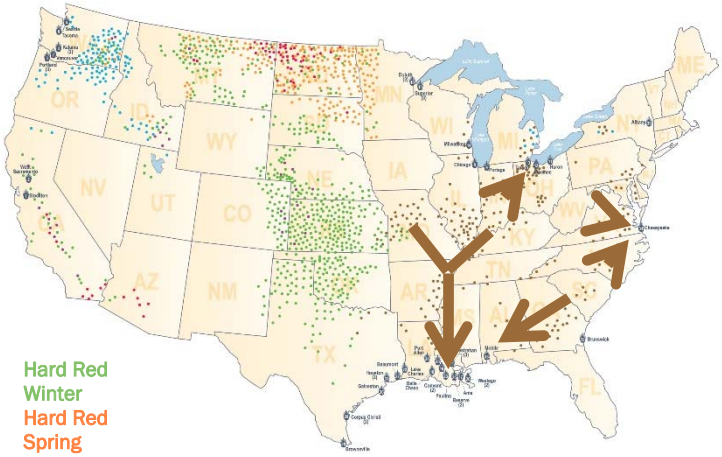

U.S. WHEAT ASSOCIATES

2018 QUALITY SURVEY

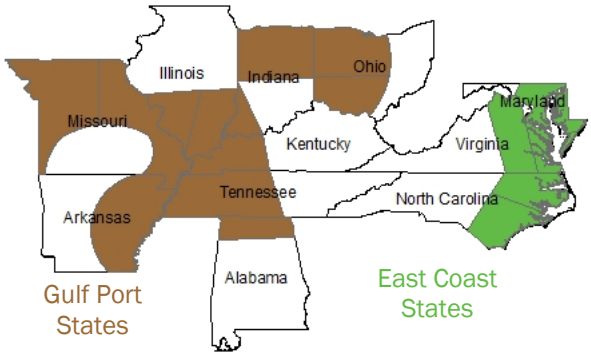
Soft Red Winter Wheat



Survey Overview



U.S. Wheat Class Production Areas



SRW States and Areas Surveyed

Weather and Harvest: Soft red winter wheat (SRW) is grown over a wide area of the eastern United States. The area seeded to SRW in fall 2017 for the 2018 harvest is estimated by USDA at 5.89 million acres (2.38 million hectares), up from 5.61 million acres (2.27 million hectares) seeded for the 2017 harvest but still well below the average SRW planted area of the past five years. The 2018 SRW production, estimated at 8.25 million metric tons (MMT), is up from 7.95 MMT in 2017 but is also well below the 5-year average. USDA estimates that the total SRW supply (excluding imports) for the 2018/19 marketing year is similar to the 2017/18 supply.

Planting was slightly slower than normal in fall 2017. However, by mid-November the percentage emergence was about equal to the 5-year average pace. The crop was in good condition by late fall with 70% rated as good or excellent, and about 90% of winter wheat rated fair to excellent in the six SRW survey states where USDA estimates wheat crop conditions. Although some of the southeastern SRW area was abnormally dry in early winter, persistent rain began in February in the Ohio River Valley and spread throughout most of the SRW survey states during the following months. The excessive moisture adversely affected quality by reducing test weight and increasing DON values in some areas. Rain delayed the SRW harvest somewhat, but once started, it progressed very rapidly and was all but complete by late July.

Survey Methods: Great Plains Analytical Laboratory, Kansas City, Mo., collected and analyzed 265 samples from elevators in 18 reporting areas across 11 states. Test weight, moisture, protein, thousand kernel weight, wheat ash, falling number and DON were determined on individual samples; the remaining tests were determined on 18 composite samples. The results were weighted by the estimated production for each reporting area and combined into "Composite Average," "East Coast" and "Gulf Port" values. Gulf Port states include Alabama, Arkansas, Illinois, Indiana, Kentucky, Missouri, Ohio, and Tennessee, and account for 81% of the 2018 SRW production in the states surveyed. East Coast states include Maryland, North Carolina and Virginia and represent the remaining 19% of production in the states surveyed. The states surveyed account for an estimated 72% of total 2018 SRW production.

Wheat and Grade Data: When analysis results are weighted by estimated state production, the average grade of all samples collected for the 2018 SRW harvest survey is U.S. No. 3. The weighted average test weight is 57.9 lb/bu (76.2 kg/hl), slightly below the 5-year average of 58.2 lb/bu (76.6 kg/hl) and below the 59.1 lb/bu (77.1 kg/hl) 2017 average. The Gulf Port average of 58.2 lb/bu is similar to the 5-year average of 58.4 lb/bu (76.8 kg/hl). The East Coast test weight average of 56.6 lb/bu (74.5 kg/hl) is below both last year and the 5-

year average. All other grade factors, dockage and moisture are similar to or lower than 2017 and 5-year average values. The Gulf Port Total Defects average of 0.8% is below the previous 5-year minimum, indicating that damaged and shrunken and broken kernels are unusually low in that portion of the crop.

The Composite average wheat protein content of 9.9% (12% moisture basis) is higher than 2017's 9.5% and the 5-year average of 9.7%. Both the Gulf Port protein average of 9.9% and East Coast average of 10.2% are above the respective 2017 and 5-year averages. The Composite average falling number of 322 seconds is similar to 2017 and above the 5-year average of 304 seconds. The Gulf Port average of 327 seconds is slightly above last year and above the 5-year average, while the East Coast average of 301 seconds is slightly below last year and below the 5-year average of 310 seconds. Fewer than 10% of samples had a falling number below 250 seconds in 2018. The Composite DON average of 0.7 ppm is above the very low 2017 value of 0.2 ppm but is below the 5-year average of 1.3 ppm. The East Coast value of 1.1 ppm is similar to the 5-year average while the Gulf Port value of 0.7 ppm is below the 5-year average. Of the samples tested for DON, 75% of the Gulf Port results and 65% of the East Coast results were less than 1.0 ppm.

Flour and Baking Data: The Composite, East Coast and Gulf Port Buhler laboratory mill flour extraction averages are below 2017 and the 5-year averages. The farinograph peak values are similar to 5-year averages, but the stability and absorption values are all below last year and the 5-year averages. The SRC values generally indicate acceptable quality for crackers; some Gulf Port areas also have acceptable SRC values for cookies. The Composite and Gulf Port alveograph L averages of 97 and 98 are higher than last year and the respective 5-year average of 89 for both, indicating good extensibility. All other alveograph averages are similar to the respective 5-year averages given the variability of alveograph analysis. The Gulf amylograph average of 614 BU indicates good quality for cakes. The Composite and Gulf Port cookie spread ratios are all higher than last year and similar to the 5-year averages, again indicating good extensibility. Average loaf volumes are also all higher than last year and the 5-year averages.

Summary: Some SRW production areas, especially in the East Coast states, experienced difficult growing conditions in 2018 with excessive moisture affecting test weight, falling number and DON values. While test weight is somewhat below the 5-year average, other grade factors are better than the 5-year averages, protein is somewhat above average, and DON is somewhat below average. Processors should find good qualities for crackers and segments of the crop with good cookie and cake qualities. With higher protein and good extensibility, the crop should also be valuable in blending for baking applications. Buyers are encouraged to review their quality specifications to ensure that their purchases meet their expectations.

About U.S. Wheat Associates: U.S. Wheat Associates (USW) is the industry's market development organization working in more than 100 countries. Its mission is to "develop, maintain, and expand international markets to enhance wheat's profitability for U.S. wheat producers and its value for their customers". USW activities are funded by producer checkoff dollars managed by 17 state wheat commissions and through cost-share USDA Foreign Agricultural Service market development programs. For more information, visit www.uswheat.org or contact your state wheat commission.

Soft Red Winter Production

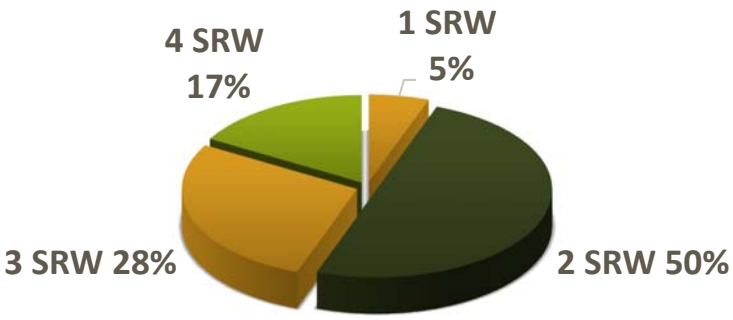
For the major producing states (million metric tons)

	2018	2017	2016	2015	2014
Alabama	0.2	0.2	0.3	0.4	0.4
Arkansas	0.2	0.2	0.2	0.4	0.7
Illinois	1.0	1.0	0.9	0.9	1.2
Indiana	0.5	0.5	0.6	0.5	0.7
Kentucky	0.6	0.6	0.9	0.9	1.0
Maryland	0.3	0.4	0.5	0.5	0.5
Michigan	0.6	0.5	0.8	0.7	0.7
Missouri	0.9	1.0	1.1	0.9	1.2
North Carolina	0.6	0.6	0.4	0.8	1.2
Ohio	1.0	0.9	1.2	0.9	1.1
Tennessee	0.5	0.5	0.7	0.7	0.9
Virginia	0.2	0.3	0.3	0.4	0.5
Wisconsin	0.4	0.3	0.5	0.4	0.4
Surveyed-States Total*	**6.0**	**6.1**	**7.0**	**7.2**	**9.3**
Thirteen-State Total	**6.8**	**6.7**	**8.0**	**7.9**	**10.0**
Total SRW Production	**8.2**	**7.9**	**9.4**	**9.8**	**12.4**

Based on USDA crop estimates as of July 12, 2018.

**Eleven states denoted by italics were surveyed and account for 72% of estimated 2018 SRW production.*

SRW 2018 Grade Distribution



Based on 18 Composite Samples

Soft Red Winter 2018 Survey

	Composite Average			East Coast*			Gulf Ports*		
	2018	2017	5-Year	2018	2017	5-Year	2018	2017	5-Year
Wheat Grade Data									
Test Weight (lb/bu)	57.9	59.1	58.2	56.6	58.6	57.6	58.2	59.2	58.4
Test Weight (kg/hl)	76.2	77.7	76.6	74.5	77.1	75.8	76.6	77.9	76.8
Damage - Total (%)	0.5	1.1	1.7	1.3	1.6	1.7	0.4	1.0	1.7
Foreign Material (%)	0.0	0.1	0.1	0.1	0.0	0.2	0.0	0.1	0.1
Shrunken and Broken (%)	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.4	0.5
Total Defects (%)	1.1	1.6	2.4	2.0	2.1	2.4	0.8	1.5	2.4
Grade	3	2	2	3	2	3	2	2	2
Wheat Non-Grade Data									
Dockage (%)	0.4	0.4	0.5	0.3	0.4	0.5	0.4	0.3	0.5
Moisture (%)	12.8	13.0	13.0	13.1	12.9	12.8	12.7	13.0	13.0
Protein (%) 12%/0% mb	9.9/11.3	9.5/10.8	9.7/11.0	10.2/11.5	9.4/10.7	9.9/11.3	9.9/11.2	9.5/10.8	9.7/11.0
Wheat Ash (%) 14%/0% mb	1.45/1.69	1.45/1.69	1.47/1.71	1.43/1.67	1.44/1.67	1.47/1.71	1.45/1.69	1.45/1.69	1.47/1.71
1000 Kernel Weight (g)	29.9	34.0	32.6	30.8	34.1	33.1	29.7	33.9	32.5
Wheat Falling Number (sec)	322	319	304	301	305	310	327	323	302
Kernel Size (%) lg/med/sm	77/21/02	88/12/00	84/15/01	74/22/04	88/11/01	85/14/01	78/21/01	87/13/00	84/15/01
Single Kernel Hardness	17.3	23.7	21.2	15.0	21.8	18.3	17.8	24.2	21.9
Single Kernel Weight (mg)	33.2	35.7	33.8	34.0	36.4	34.2	33.0	35.5	33.7
Single Kernel Diameter (mm)	2.59	2.63	2.63	2.59	2.65	2.63	2.59	2.63	2.63
Sedimentation (cc)	11.4	12.2	12.2	11.7	11.2	12.8	11.3	12.4	12.1
DON (ppm)	0.7	0.2	1.3	1.1	0.8	1.1	0.7	0.2	1.4
Flour Data									
Lab Mill Extraction (%)	68.0	68.9	70.0	67.9	68.2	69.9	68.0	69.1	70.0
Flour Color - *L	91.0	92.2	91.8	90.7	92.2	92.1	91.1	92.2	91.7
Flour Color - *a	-2.2	-2.3	-2.6	-2.2	-2.4	-2.7	-2.2	-2.3	-2.6
Flour Color - *b	8.8	8.4	8.4	8.8	8.6	8.6	8.8	8.4	8.3
Flour Protein (%) 14%/0% mb	8.5/9.9	7.7/9.0	8.1/9.4	8.4/9.8	8.1/9.4	8.3/9.7	8.5/9.9	7.6/8.8	8.0/9.3
Flour Ash (%) 14%/0% mb	0.47/0.55	0.44/0.51	0.44/0.52	0.46/0.54	0.44/0.51	0.44/0.51	0.47/0.55	0.44/0.51	0.45/0.52
Wet Gluten (%)	23.6	21.3	21.6	23.0	22.4	22.3	23.7	21.0	21.4
Gluten Index	80.3	75.6	83.6	74.3	77.5	82.6	81.7	75.1	83.9
Falling Number (sec)	321	319	300	288	305	310	329	323	298
Amylograph (65g) (BU)	568	536	428	371	445	409	614	561	434
Starch Damage (%)	5.5	5.1	4.8	5.0	5.3	4.6	5.6	5.0	4.8
SRC: GPI	0.59	0.60	0.59	0.60	0.54	0.57	0.59	0.58	0.58
Water/50% Sucrose	57/109	63/129	56/110	56/113	69/125	58/110	57/108	61/130	56/108
5% Lactic Acid/5% Na_2CO_3	113/81	130/89	112/81	118/83	119/97	110/84	111/81	128/89	110/81
Dough Properties									
Farinograph Peak (min)	1.2	1.3	1.3	1.2	1.2	1.4	1.2	1.3	1.3
Farinograph Stability (min)	1.8	2.2	2.5	1.7	1.7	2.4	1.8	2.4	2.5
Farinograph Absorption (%)	51.9	53.2	52.9	52.6	53.6	53.3	51.7	53.1	52.8
Alveograph P (mm)	34	41	36	35	41	37	34	41	36
Alveograph L (mm)	97	89	89	93	83	90	98	90	89
Alveograph W (10-4 joules)	81	92	82	79	87	83	81	93	81
Alveograph P/L	0.35	0.46	0.40	0.38	0.49	0.41	0.34	0.45	0.40
Extensograph Area (sq cm)	48	179	NA	42	166	NA	49	183	NA
Resistance (BU)	181.5	15.7	NA	152.3	16.0	NA	188.4	15.6	NA
Extensibility (cm)	15	50	NA	16	46	NA	15	51	NA
Baking Evaluation									
Bake Grain and Texture	4.8	5.1	5.1	4.8	5.3	5.1	4.8	5.1	5.1
Bake Absorption (%)	53.7	54.9	NA	54.4	55.4	NA	53.5	54.8	NA
Loaf Volume (cc)	735	720	712	738	731	730	734	718	708
Cookie Diameter (cm)	8.7	8.7	NA	8.4	8.6	NA	8.8	8.7	NA
Cookie Spread Ratio	9.3	8.8	9.2	8.5	7.7	8.7	9.5	9.1	9.4
% Area Production	100.0%			19.0%			81.0%		

*East Coast: Maryland, Virginia, North Carolina; Gulf: Alabama, Arkansas, Illinois, Indiana, Kentucky, Missouri, Ohio, Tennessee

2018 State Summary

	Alabama	Arkansas	Illinois	Indiana	Kentucky	Missouri	Ohio	Tennessee	Maryland	North Carolina	Virginia
Sample Count	4	14	36	34	17	34	59	10	19	25	17
Wheat Grade Data - from Area Composite Samples											
Test Weight (lb/bu)	58.3	58.0	58.9	56.8	58.0	57.6	58.4	59.4	58.2	55.7	56.4
Test Weight (kg/hl)	76.7	76.4	77.5	74.8	76.4	75.8	76.9	78.2	76.6	73.3	74.3
Damage - Total (%)	0.0	2.0	0.0	0.7	0.7	0.7	0.1	0.0	0.5	1.7	1.5
Foreign Material (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.1
Shrunken and Broken (%)	0.5	0.3	0.4	0.6	0.5	0.4	0.3	0.6	0.6	0.6	0.5
Total Defects (%)	0.5	2.3	0.4	1.3	1.2	1.2	0.4	0.6	1.3	2.3	2.1
Grade	2	2	2	3	2	3	2	2	2	4	3
Wheat Non-Grade Data - from Individual Samples											
Moisture (%)	12.3	12.0	11.7	12.4	12.5	12.2	13.2	12.3	12.9	12.6	12.2
Protein (%) 12%/0% mb	9.8/11.1	10.0/11.3	10.2/11.5	10.1/11.5	9.9/11.2	10.7/12.2	9.5/10.8	10.0/11.4	10.4/11.8	10.2/11.6	10.4/11.8
Ash (%) 14%/0% mb	1.40/1.62	1.46/1.70	1.47/1.71	1.51/1.76	1.44/1.68	1.49/1.73	1.44/1.67	1.37/1.59	1.51/1.75	1.38/1.61	1.46/1.70
1000 Kernel Weight (g)	35.4	31.7	26.1	27.5	29.7	29.2	31.5	32.9	30.9	31.0	30.4
Wheat Falling Number (sec)	331	342	343	300	337	340	301	335	307	296	303
DON (ppm)	0.3	0.2	1.0	0.8	0.8	0.3	0.9	0.3	2.6	0.5	0.5
Wheat Non-Grade Data - from Area Composite Samples											
Dockage (%)	0.3	0.3	0.2	0.3	0.5	0.3	0.5	0.7	0.4	0.4	0.1
Moisture (Lab) (%)	12.4	11.9	12.2	12.8	12.4	12.9	13.4	12.6	13.6	12.9	12.5
Protein (Lab) (%)	9.9	9.5	10.0	9.9	10.1	10.5	9.4	9.4	10.3	10.1	10.2
Kernel Size (%) lg/med/sm	88/12/00	78/21/01	68/30/02	73/25/02	76/22/02	79/20/01	83/16/01	84/15/01	81/18/01	68/25/07	79/20/01
Single Kernel Hardness	19.8	20.0	15.8	16.6	20.0	13.5	22.1	18.5	16.6	16.0	10.3
Single Kernel Weight (mg)	35.4	34.7	28.5	32.0	34.5	35.5	33.5	34.4	36.7	32.0	35.0
Single Kernel Diameter (mm)	2.62	2.66	2.43	2.54	2.63	2.69	2.60	2.64	2.72	2.52	2.60
Sedimentation (cc)	10.0	10.0	11.0	10.4	12.0	12.7	11.7	10.0	11.8	10.8	13.6
DON (ppm)	0.2	0.2	0.9	1.1	0.6	0.7	1.1	0.6	1.7	0.4	0.5
Flour Data											
Lab Mill Extraction (%)	68.0	67.6	67.1	67.2	68.2	68.3	68.3	69.4	68.2	67.8	67.8
Flour Color - *L	92.0	91.6	91.1	90.7	91.3	90.7	90.9	91.3	90.9	90.9	90.2
Flour Color - *a	-2.1	-2.2	-2.2	-2.3	-2.1	-2.1	-2.3	-2.2	-2.1	-2.3	-2.1
Flour Color - *b	8.2	8.3	8.8	9.2	8.5	8.7	9.1	8.5	8.7	9.1	8.3
Flour Protein (%) 14%/0% mb	8.0/9.3	8.4/9.7	8.7/10.1	8.4/9.8	8.0/9.3	9.2/10.7	8.2/9.5	8.6/10.0	8.3/9.6	8.2/9.5	9.0/10.4
Flour Ash (%) 14%/0% mb	0.42/0.48	0.48/0.56	0.47/0.55	0.46/0.54	0.46/0.54	0.49/0.56	0.48/0.56	0.50/0.58	0.45/0.52	0.45/0.52	0.51/0.59
Wet Gluten (%)	19.8	13.9	25.0	24.4	21.7	27.4	22.6	23.4	24.6	20.9	25.6
Gluten Index	97.9	99.0	92.9	70.2	90.4	74.4	67.0	87.9	78.0	68.8	82.1
Falling Number (sec)	313	353	321	314	335	334	327	348	301	265	323
Amylograph (65g) (BU)	612	811	731	434	735	588	405	806	404	330	423
Starch Damage (%)	5.8	6.2	5.5	4.3	5.8	5.5	6.9	4.2	4.8	4.9	5.7
SRC: GPI	0.65	0.59	0.61	0.58	0.60	0.59	0.57	0.54	0.59	0.59	0.66
Water	65	55	56	54	50	58	58	62	59	55	54
50% Sucrose	99	106	109	111	96	110	112	114	118	112	110
5% Lactic Acid	117	113	113	111	105	112	109	113	120	115	124
5% Na2CO3	80	87	78	81	78	80	79	94	84	84	78
Dough Properties											
Farinograph Peak (min)	1.5	1.5	1.2	1.2	1.0	1.1	1.4	1.2	1.2	1.2	1.4
Farinograph Stability (min)	1.6	2.0	2.1	1.8	1.5	2.0	1.8	1.6	1.5	1.7	1.8
Farinograph Absorption (%)	52.7	51.0	52.4	51.4	50.4	52.3	52.0	50.2	54.5	51.9	51.7
Alveograph P (mm)	36	34	37	31	29	32	37	29	49	29	29
Alveograph L (mm)	93	81	97	89	101	107	91	113	90	86	111
Alveograph W (10-4 joules)	86	77	91	66	79	75	81	86	104	65	77
Alveograph P/L	0.39	0.42	0.38	0.35	0.29	0.30	0.41	0.26	0.54	0.34	0.26
Extensograph Area (sq cm)	52	52	52	42	52	47	43	60	37	43	49
Resistance (BU)	212	226	201	158	205	175	154	241	134	155	172
Extensibility (cm)	14.7	13.8	15.2	15.4	14.5	15.7	16.0	14.4	15.7	15.9	16.0
Baking Evaluation											
Bake Grain and Texture	4.5	4.0	4.7	4.5	4.5	5.2	5.4	4.0	5.2	4.5	4.8
Bake Absorption (%)	54.0	53.0	54.1	53.0	52.0	54.4	53.8	52.0	56.1	53.7	53.6
Loaf Volume (cc)	680	715	777	738	715	763	732	650	775	711	750
Cookie Diameter (cm)	8.6	8.8	9.0	8.7	8.7	8.9	8.7	9.1	8.8	8.1	8.6
Cookie Spread Ratio	9.5	9.2	10.0	9.2	9.4	9.9	9.7	8.2	9.0	7.8	9.5

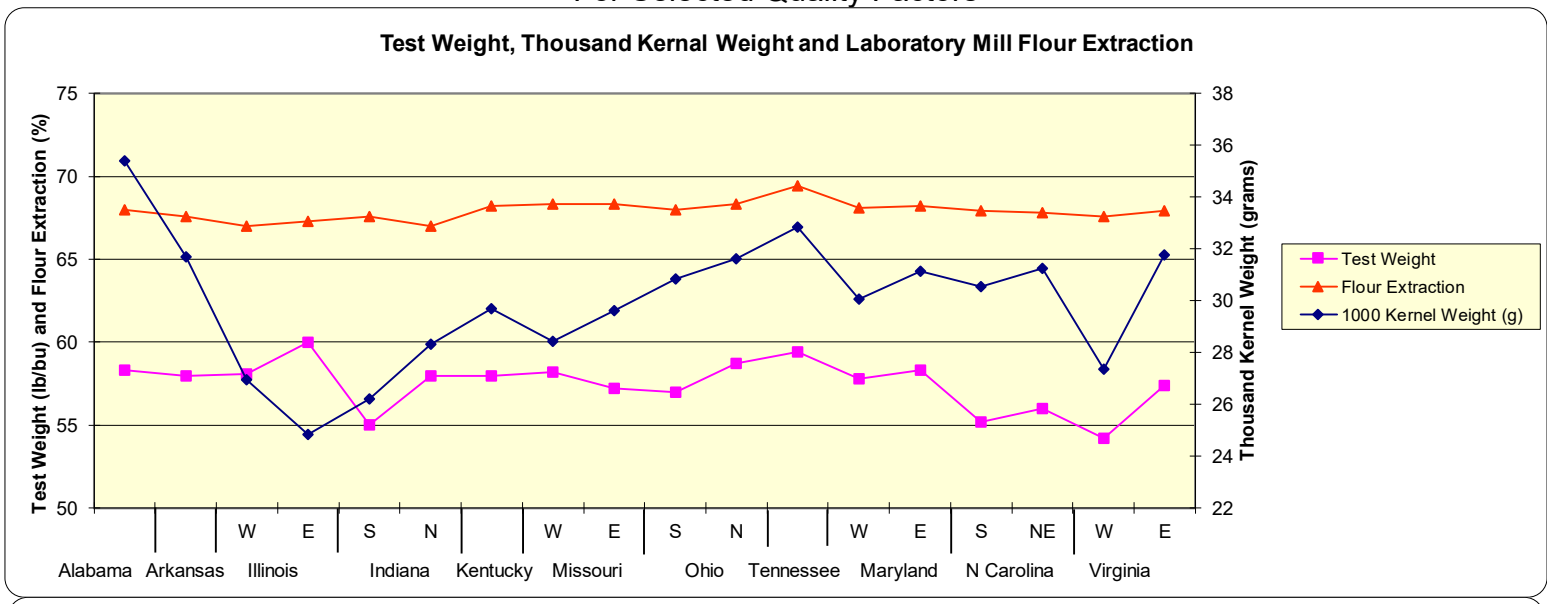
Soft Red Winter 2018 Survey

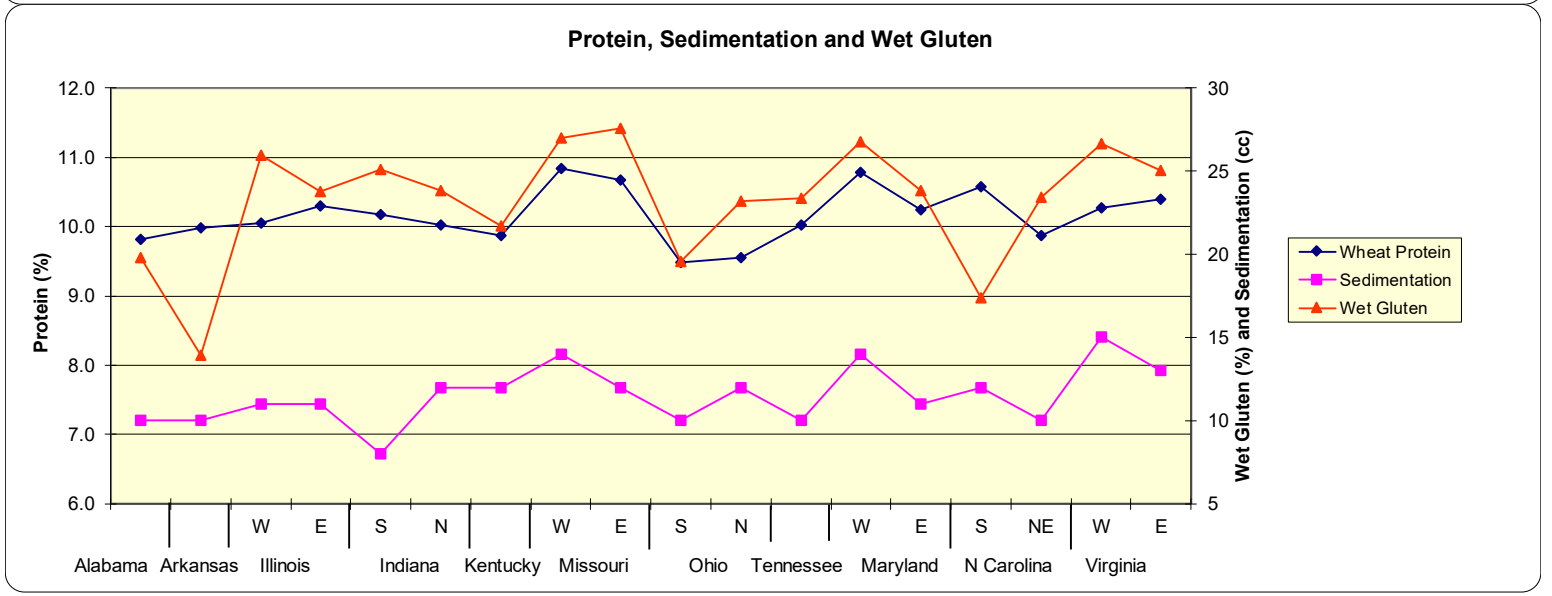
	Alabama	Arkansas	Illinois		Indiana		Kentucky	Missouri		Ohio		Tennessee	Maryland		North Carolina		Virginia	
			W	E	S	N		W	E	S	N		W	E	S	NE	W	E
Sample Count	4	14	24	12	14	16	17	15	19	13	46	10	5	14	12	13	3	14
Wheat Grade Data - from Area Composite Samples																		
Test Weight (lb/bu)	58.3	58.0	58.1	60.0	55.0	58.0	58.0	58.2	57.2	57.0	58.7	59.4	57.8	58.3	55.2	56.0	54.2	57.4
Test Weight (kg/hl)	76.7	76.4	76.5	78.9	72.5	76.4	76.4	76.6	75.3	75.1	77.3	78.2	76.1	76.7	72.7	73.8	71.4	75.6
Damage - Total (%)	0.0	2.0	0.0	0.0	0.7	0.7	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.7	3.0	0.7	2.0	1.3
Foreign Material (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0
Shrunken and Broken (%)	0.5	0.3	0.4	0.5	0.8	0.4	0.5	0.5	0.4	0.4	0.3	0.6	0.4	0.7	0.6	0.6	0.7	0.4
Total Defects (%)	0.5	2.3	0.4	0.5	1.5	1.1	1.2	1.5	1.1	1.1	0.3	0.6	0.4	1.7	3.6	1.3	3.0	1.7
Grade	2	2	2	1	4	2	2	2	3	3	2	2	3	2	4	3	4	3
Wheat Non-Grade Data - from Individual Samples																		
Moisture (%)	12.3	12.0	11.7	11.7	12.2	12.6	12.5	12.0	12.3	13.9	13.1	12.3	12.4	13.1	12.7	12.6	11.8	12.4
Protein (%) 12% mb	9.8	10.0	10.1	10.3	10.2	10.0	9.9	10.8	10.7	9.5	9.5	10.0	10.8	10.3	10.6	9.9	10.3	10.4
Ash (%) 14% mb	1.40	1.46	1.47	1.47	1.49	1.53	1.44	1.49	1.48	1.32	1.46	1.37	1.54	1.49	1.34	1.41	1.53	1.43
1000 Kernel Weight (g)	35.4	31.7	27.0	24.9	26.2	28.3	29.7	28.4	29.6	30.8	31.6	32.9	30.1	31.1	30.5	31.3	27.4	31.8
Wheat Falling Number (sec)	331	342	348	335	310	294	337	342	338	275	306	335	287	314	303	291	293	308
DON (ppm)	0.3	0.2	1.5	0.3	1.6	0.3	0.8	0.4	0.3	1.2	0.8	0.3	3.8	2.2	0.2	0.6	0.2	0.6
Wheat Non-Grade Data - from Area Composite Samples																		
Dockage (%)	0.3	0.3	0.1	0.4	0.2	0.3	0.5	0.2	0.3	0.4	0.5	0.7	0.2	0.5	0.7	0.1	0.1	0.1
Moisture (%)	12.4	11.9	11.8	12.9	12.3	13.2	12.4	12.3	13.2	13.4	13.5	12.6	13.9	13.6	12.8	13.0	12.6	12.5
Protein (%) 12% mb	9.9	9.5	9.9	10.2	10.2	9.6	10.1	10.8	10.3	9.1	9.5	9.4	11.1	10.0	10.4	9.9	10.4	10.1
Kernel Size Large (Over 7) (%	87	79	71	65	68	77	76	74	82	79	84	84	80	81	76	63	73	81
Kernel Size Medium (Over 9) (	12	21	28	33	27	23	22	25	17	20	16	15	19	18	20	28	25	18
Kernel Size Small (Thru 9) (%)	0	1	1	2	5	1	2	1	1	1	0	1	1	1	3	9	2	1
Single Kernel Hardness	19.8	20.0	17.4	13.7	10.5	20.6	20.0	16.1	12.0	18.6	22.8	18.5	18.1	16.1	16.1	15.9	3.5	13.5
Single Kernel Weight (mg)	35.4	34.7	29.3	27.5	34.5	30.3	34.5	34.2	36.3	35.4	33.1	34.4	37.7	36.3	32.4	31.7	37.3	33.9
Single Kernel Diameter (mm)	2.62	2.66	2.44	2.42	2.63	2.48	2.63	2.65	2.71	2.74	2.57	2.64	2.77	2.70	2.53	2.51	2.68	2.56
Sedimentation (cc)	10	10	11	11	8	12	12	14	12	10	12	10	14	11	12	10	15	13
DON (ppm)	0.2	0.2	1.3	0.3	1.9	0.6	0.6	0.4	0.9	1.2	1.1	0.6	2.9	1.3	0.2	0.5	0.4	0.6
Flour Data																		
Lab Mill Extraction (%)	68.0	67.6	67.0	67.3	67.6	67.0	68.2	68.3	68.3	68.0	68.3	69.4	68.1	68.2	67.9	67.8	67.6	67.9
Flour Color - *L	92.0	91.6	91.1	91.1	90.4	90.9	91.3	90.7	90.7	90.3	91.0	91.3	90.8	90.9	91.0	90.8	90.6	90.0
Flour Color - *a	-2.1	-2.2	-2.2	-2.3	-2.2	-2.3	-2.1	-2.2	-2.1	-2.0	-2.3	-2.2	-2.1	-2.1	-2.4	-2.2	-2.2	-2.1
Flour Color - *b	8.2	8.3	8.8	8.9	9.0	9.4	8.5	8.7	8.7	8.6	9.2	8.5	8.8	8.6	10.0	8.4	8.8	8.1
Flour Protein (%) 14% mb	8.0	8.4	8.9	8.4	8.3	8.5	8.0	9.3	9.2	8.1	8.2	8.6	8.7	8.1	8.5	8.0	8.4	9.2
Flour Ash (%) 14% mb	0.42	0.48	0.49	0.45	0.45	0.47	0.46	0.46	0.50	0.47	0.49	0.50	0.46	0.45	0.44	0.45	0.46	0.53
Wet Gluten (%)	19.8	13.9	26.0	23.8	25.1	23.9	21.7	27.0	27.6	19.6	23.2	23.4	26.8	23.9	17.4	23.4	26.7	25.0
Gluten Index	97.9	99.0	92.1	93.9	72.2	68.8	90.4	81.0	70.4	88.2	62.9	87.9	51.3	87.9	97.6	47.6	63.8	90.6
Falling Number (sec)	313	353	320	322	300	323	335	347	326	324	327	348	278	309	278	256	272	347
Amylograph (65g) (BU)	612	811	694	782	436	433	735	667	541	384	409	806	341	428	384	290	344	460
Starch Damage (%)	5.8	6.2	7.4	3.0	3.8	4.6	5.8	3.8	6.6	6.2	7.0	4.2	4.6	4.9	4.9	4.9	5.3	5.8
SRC: GPI	0.65	0.59	0.61	0.61	0.57	0.59	0.60	0.61	0.58	0.52	0.58	0.54	0.61	0.58	0.59	0.58	0.62	0.68
Water	65	55	55	56	56	53	50	57	58	71	56	62	61	58	54	56	55	53
50% Sucrose	99	106	108	111	110	112	96	105	113	122	110	114	115	120	111	113	117	107
5% Lactic Acid	117	113	112	115	110	112	105	111	113	113	109	113	123	119	119	113	123	125
5% Na2CO3	80	87	77	79	85	79	78	78	82	97	76	94	87	83	89	80	80	77
Dough Properties																		
Farinograph Peak (min)	1.5	1.5	1.3	1.0	1.0	1.3	1.0	1.0	1.2	1.3	1.4	1.2	1.8	1.0	1.2	1.2	1.1	1.5
Farinograph Stability (min)	1.6	2.0	2.6	1.3	1.5	2.0	1.5	2.3	1.8	1.8	1.8	1.6	2.1	1.3	1.8	1.6	1.5	1.9
Farinograph Absorption (%)	52.7	51.0	51.4	53.7	51.2	51.5	50.4	53.2	51.8	51.0	52.2	50.2	55.5	54.1	52.5	51.5	53.1	51.0
Alveograph P (mm)	36	34	34	40	30	32	29	38	29	38	37	29	45	50	34	26	30	29
Alveograph L (mm)	93	81	104	88	82	94	101	106	107	96	90	113	102	86	87	86	99	117
Alveograph W (10-4 joules)	86	77	89	93	61	70	79	85	69	87	80	86	100	106	74	59	69	81
Alveograph P/L	0.39	0.42	0.33	0.45	0.37	0.34	0.29	0.36	0.27	0.40	0.41	0.26	0.44	0.58	0.39	0.30	0.30	0.25
Extenso Resistance (BU)	212	226	238	151	151	162	205	154	187	175	150	241	116	141	156	154	128	193
Extenso Extensibility (cm)	14.7	13.8	14.6	16.0	14.7	15.9	14.5	16.6	15.2	14.8	16.2	14.4	16.2	15.5	16.0	15.8	17.3	15.4
Extenso Area (sq cm)	52	52	60	42	37	45	52	44	48	42	43	60	32	39	45	41	39	53
Baking Evaluation																		
Bake Grain and Texture	4.5	4.0	4.5	5.0	4.5	4.5	4.5	5.5	5.0	5.0	5.5	4.0	4.5	5.5	4.5	4.5	4.5	5.0
Bake Absorption (%)	54.0	53.0	53.5	55.0	53.0	53.0	52.0	55.0	54.0	53.0	54.0	52.0	56.5	56.0	54.0	53.4	55.0	53.0
Loaf Volume (cc)	680	715	775	780	750	730	715	760	765	640	750	650	775	775	705	715	750	750
Cookie Diameter (cm)	8.6	8.8	8.8	9.2	8.7	8.7	8.7	8.8	9.0	9.0	8.6	9.1	8.5	8.9	8.7	7.6	8.6	8.6
Cookie Spread Ratio	9.5	9.2	9.8	10.2	9.4	9.1	9.4	9.8	10.0	10.0	9.6	8.2	8.2	9.3	9.2	6.9	10.2	9.3

N-North, S-South, E-East, W-West, NE-Northeast; Lg-Large, Med-Medium, Sm-Small; mb-moisture basis; NA-Not Available

Comparisons of 2018 Results

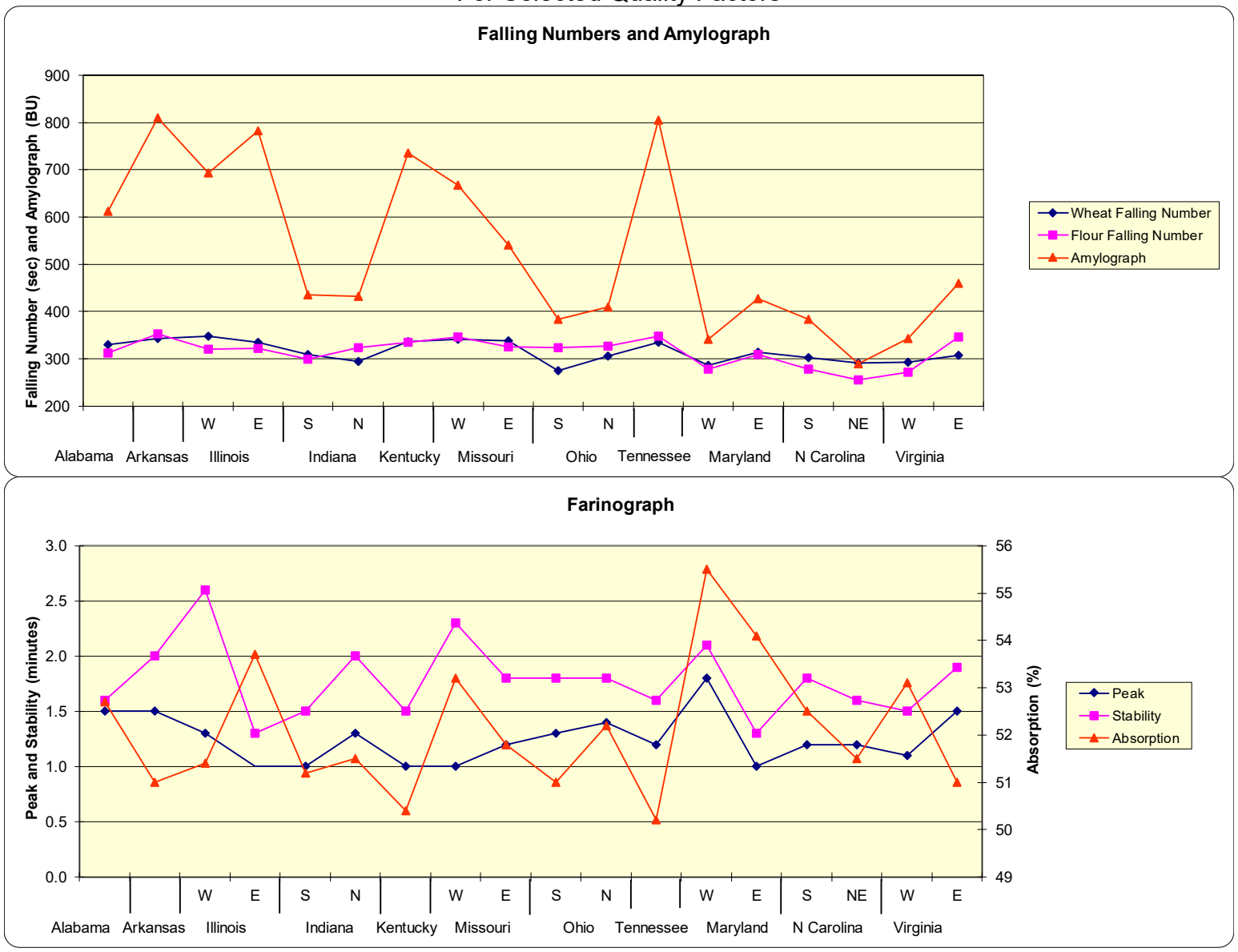
For Selected Quality Factors





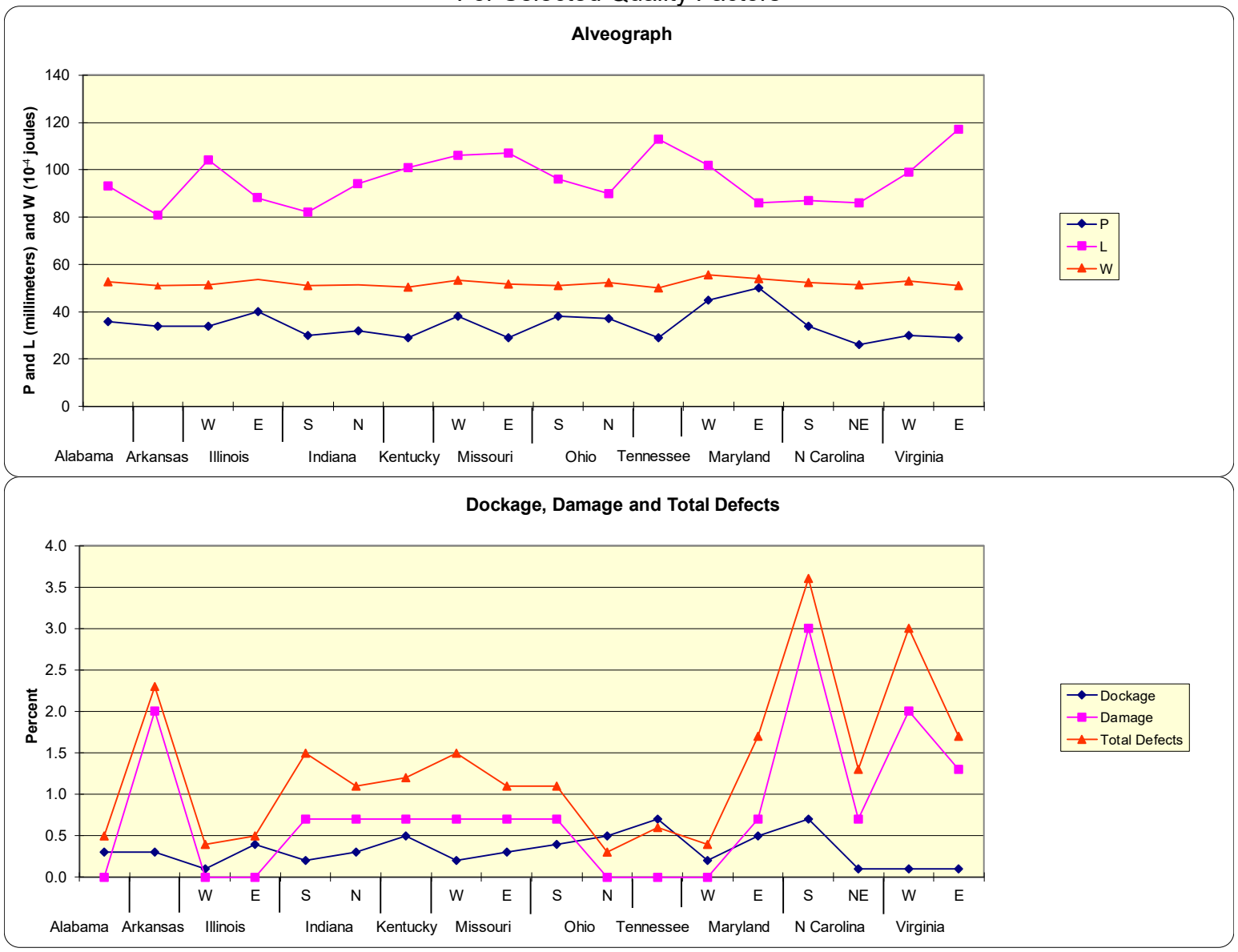
Comparisons of 2018 Results

For Selected Quality Factors



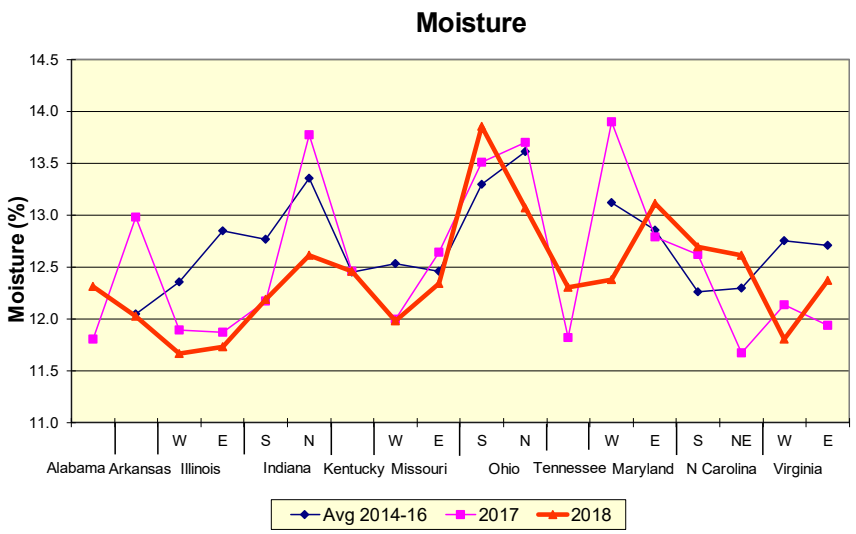
Comparisons of 2018 Results

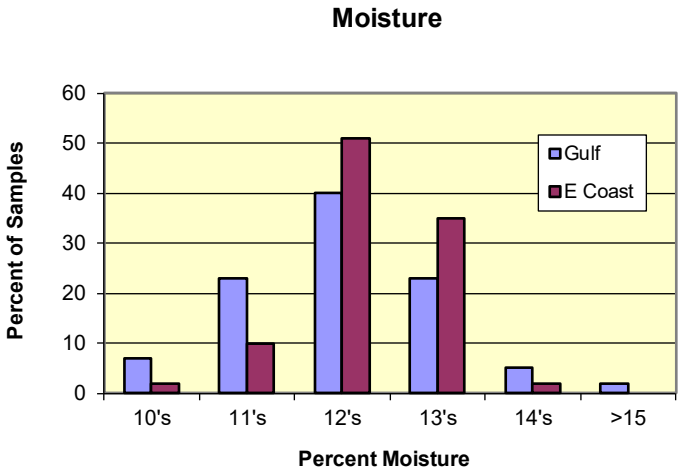
For Selected Quality Factors

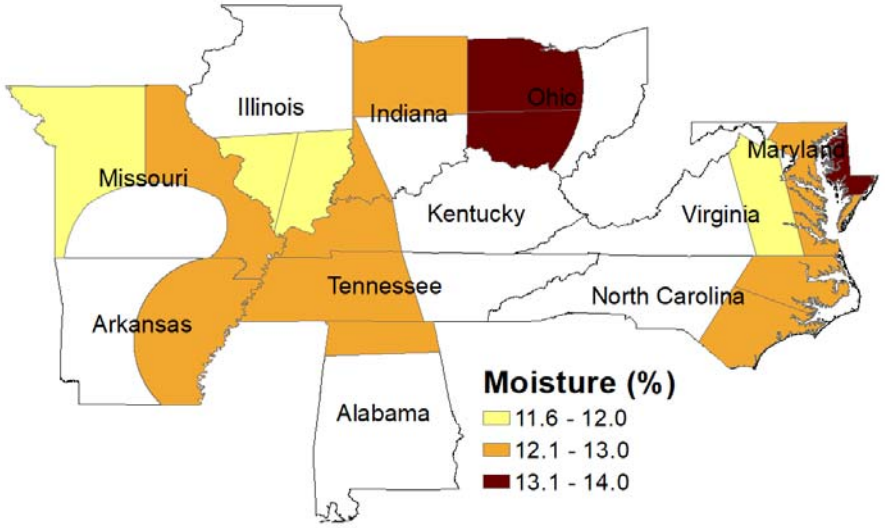


Distribution of 2018 Results and Comparisons with Previous Years

For Selected Quality Factors

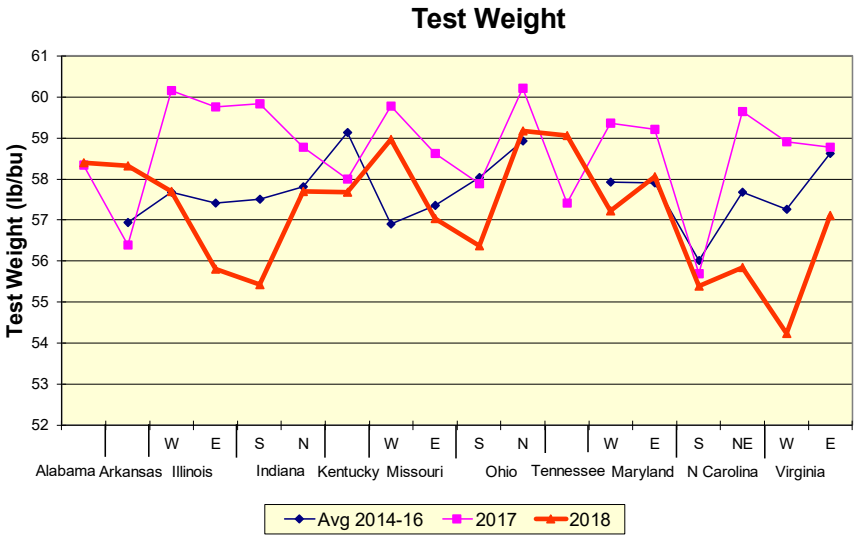


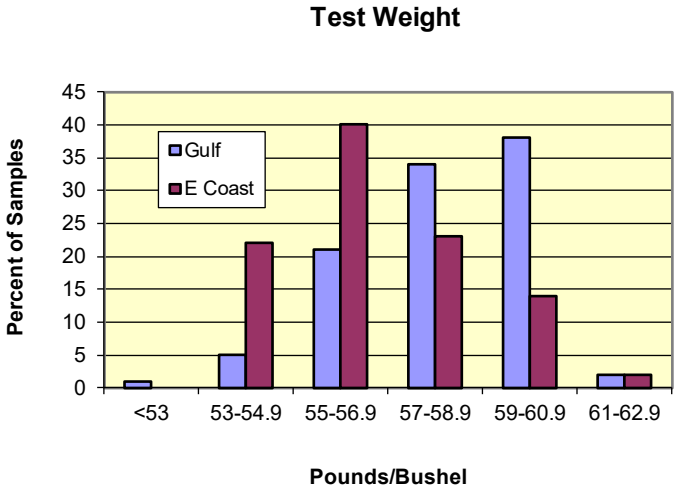


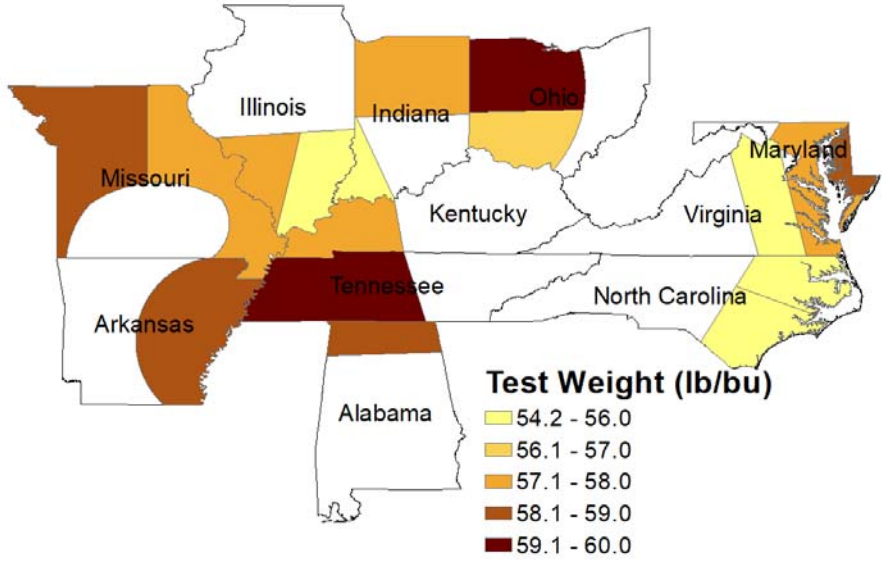


Distribution of 2018 Results and Comparisons with Previous Years

For Selected Quality Factors

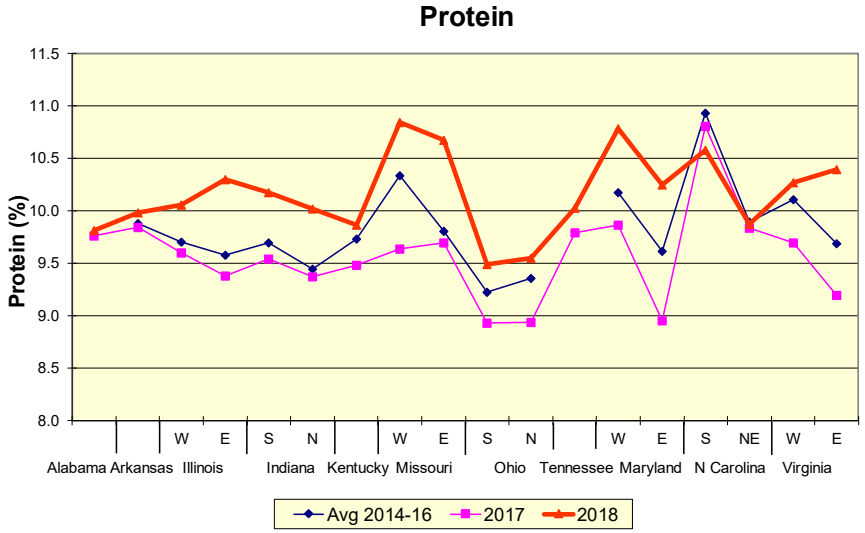


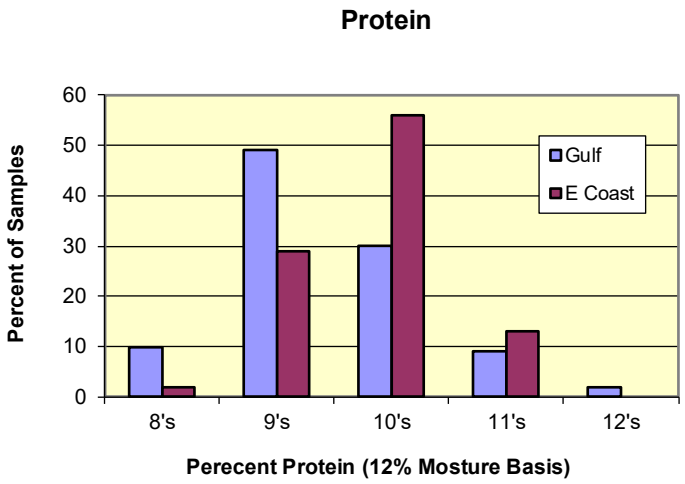


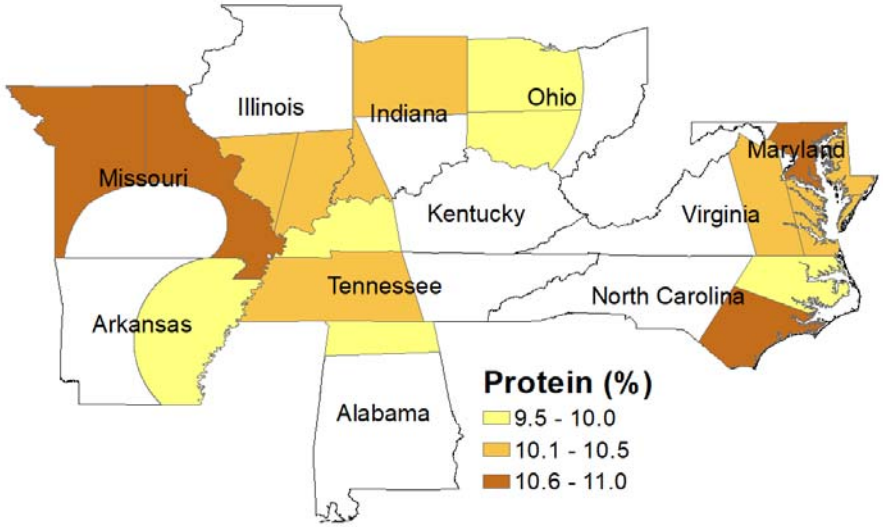


Distribution of 2018 Results and Comparisons with Previous Years

For Selected Quality Factors

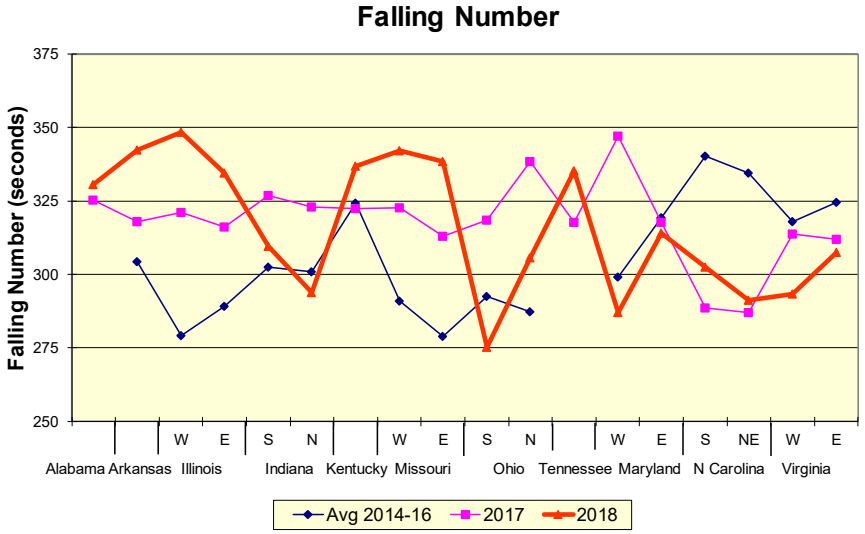


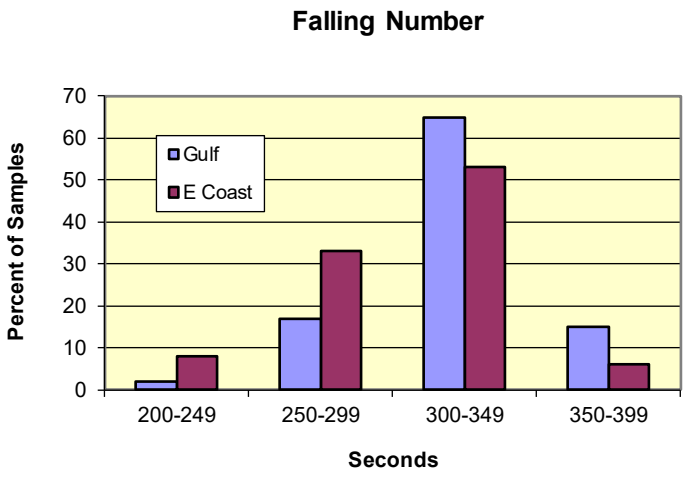


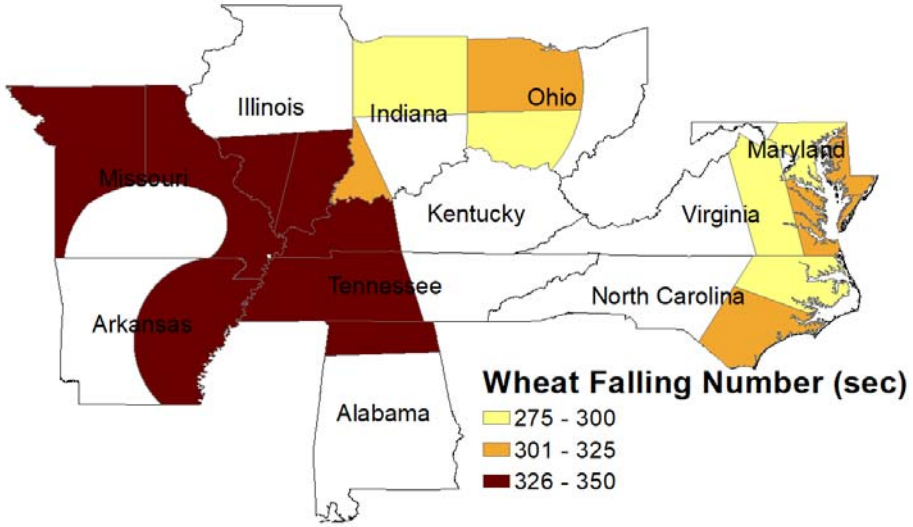


Distribution of 2018 Results and Comparisons with Previous Years

For Selected Quality Factors

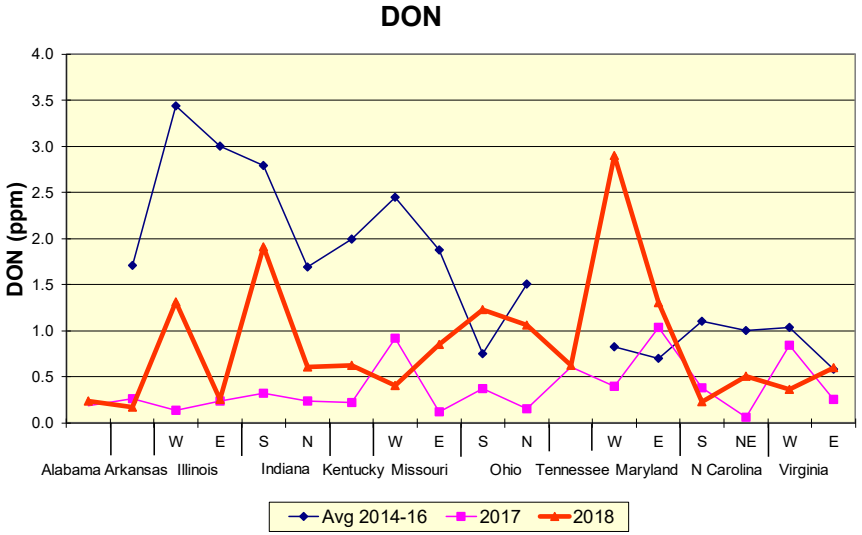


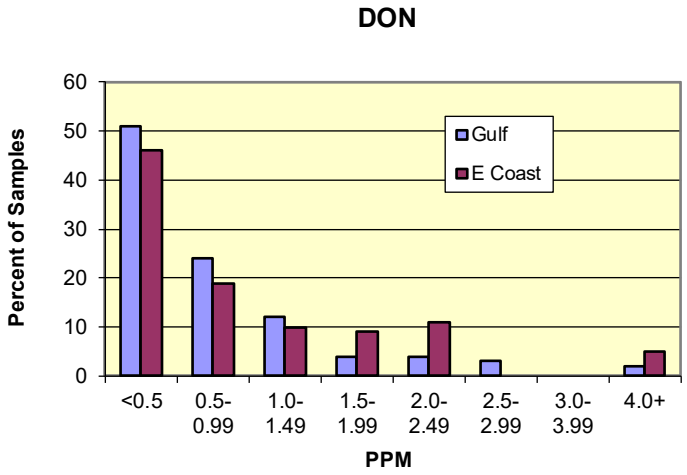


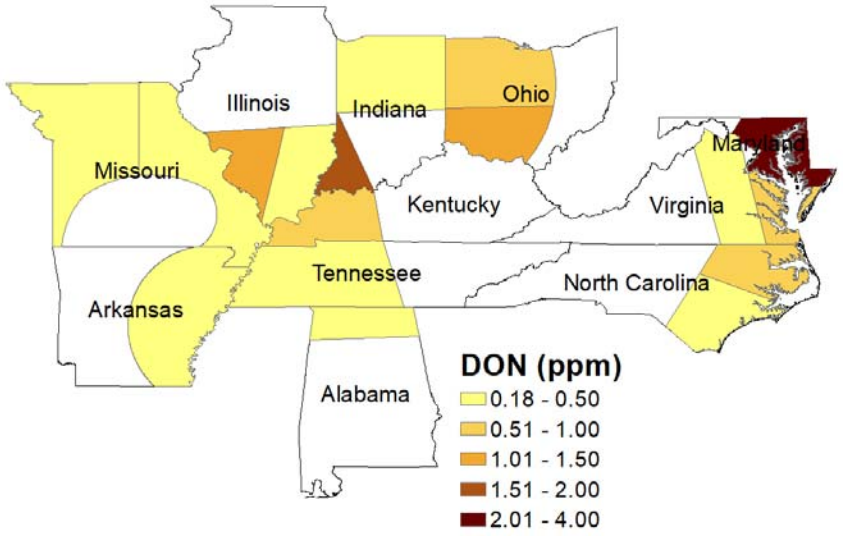


Distribution of 2018 Results and Comparisons with Previous Years

For Selected Quality Factors

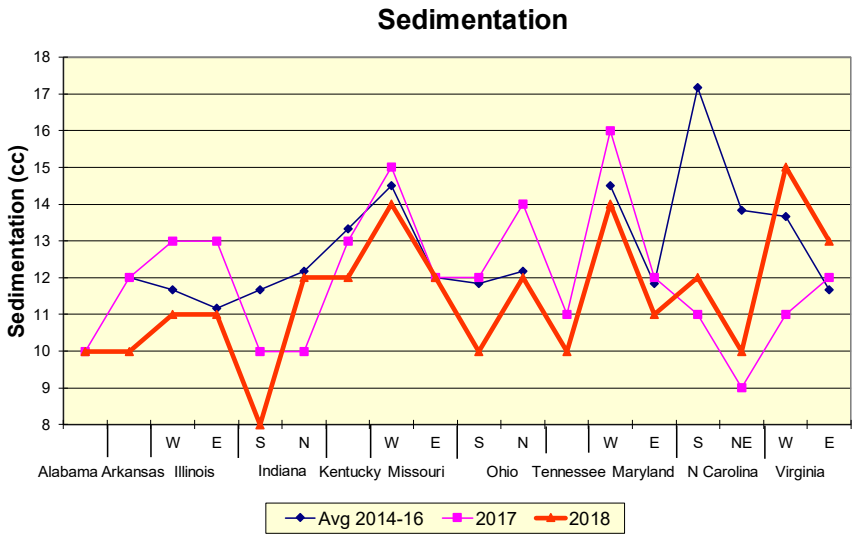


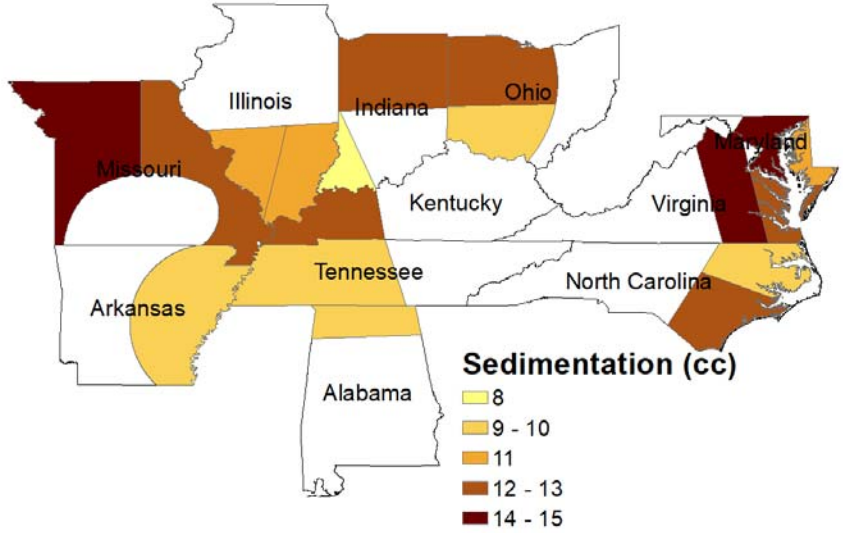


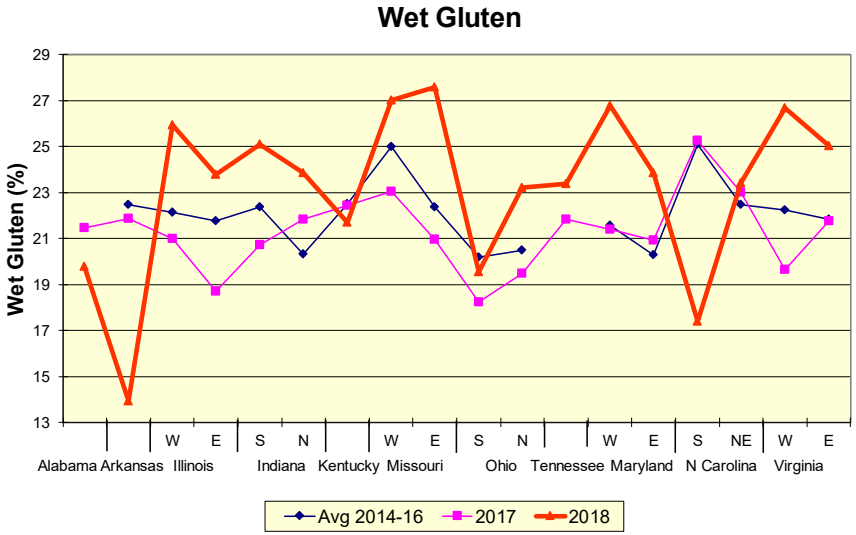


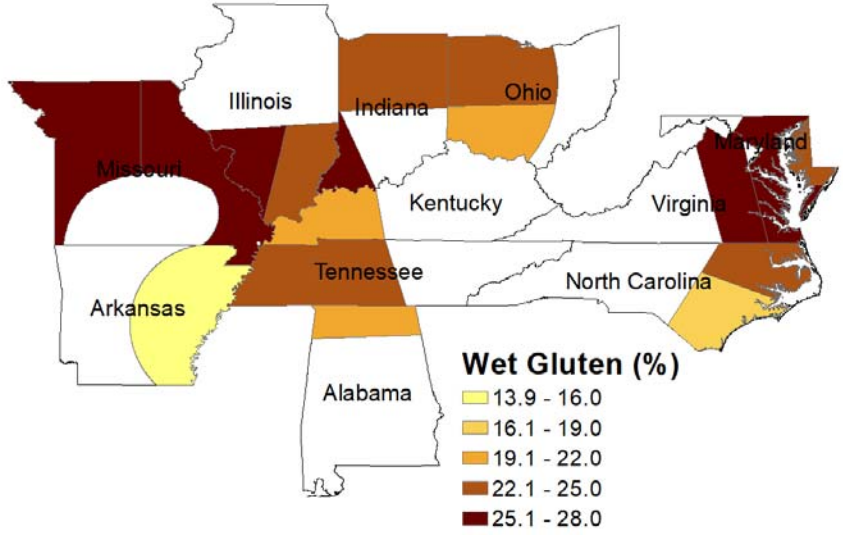
Distribution of 2018 Results and Comparisons with Previous Years

For Selected Quality Factors









Distribution of 2018 Results and Comparisons with Previous Years

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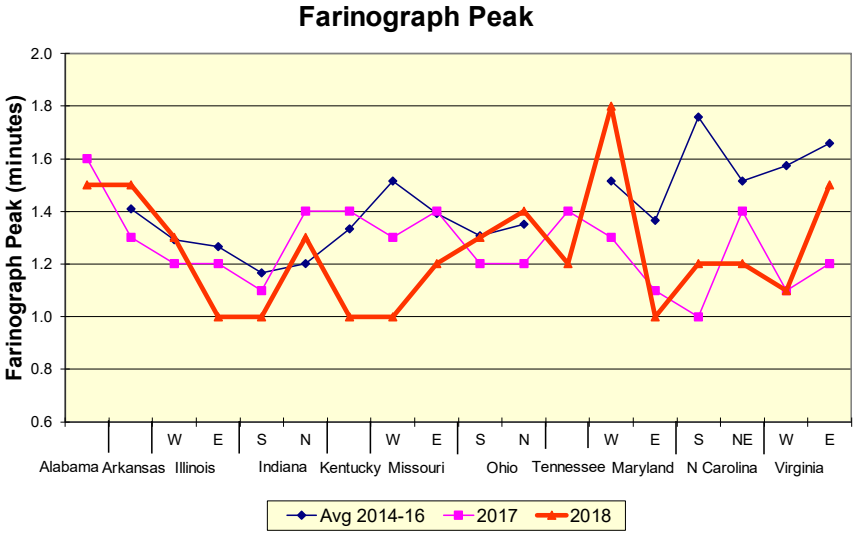

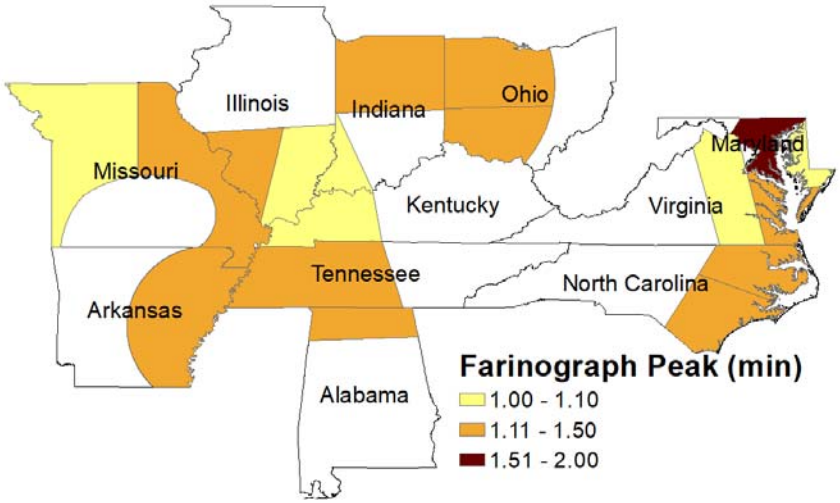

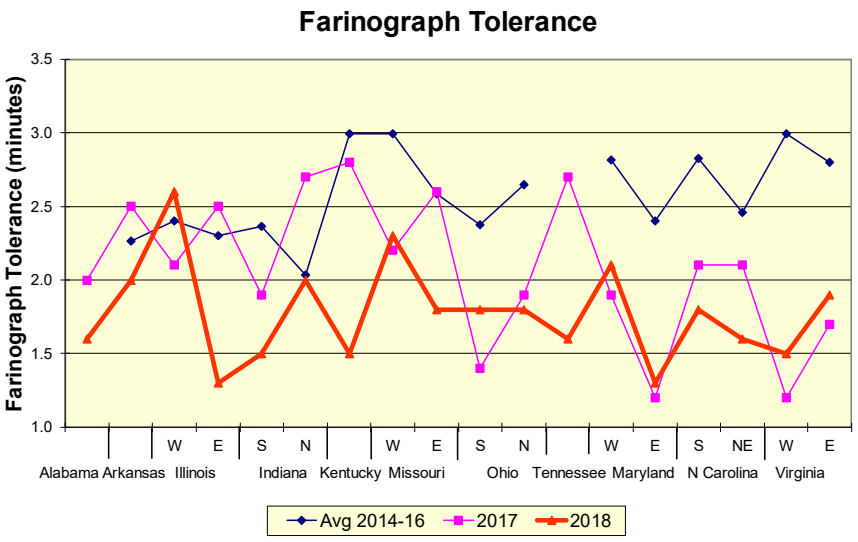

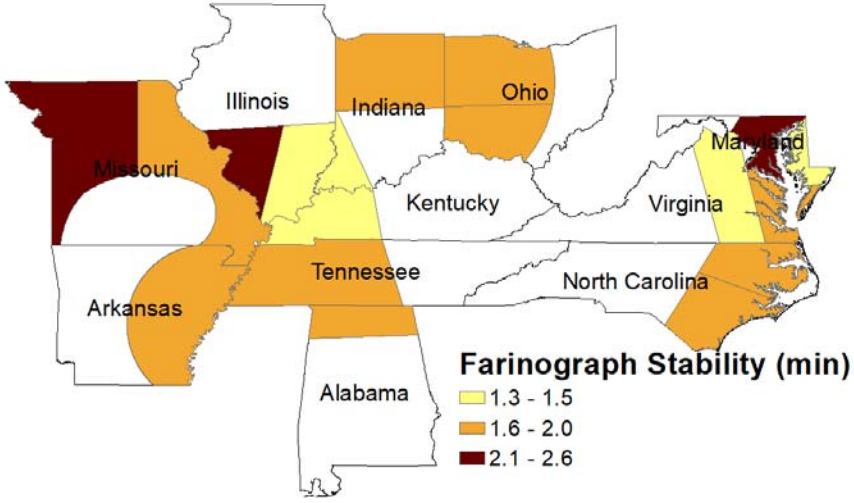

Distribution of 2018 Results and Comparisons with Previous Years

For Selected Quality Factors