

Watonwan River Watershed

One Watershed One Plan

Blue Earth County–Brown County–Cottonwood County–
Jackson County–Martin County–Watonwan County

Minnesota Department of Agriculture
Nitrogen and Pesticide Use

The Minnesota Department of Agriculture surveys farmers through the National Agricultural Statistics Service. The most recent nitrogen use survey was for the 2014 crop year and the most recent pesticide use survey was for the 2013 crop year.

The following nitrogen use information is from the 2014 nitrogen use report, specifically the Southwestern and West Central BMP region and South Central BMP region.

Minnesota Nitrogen Best Management Practices Regions

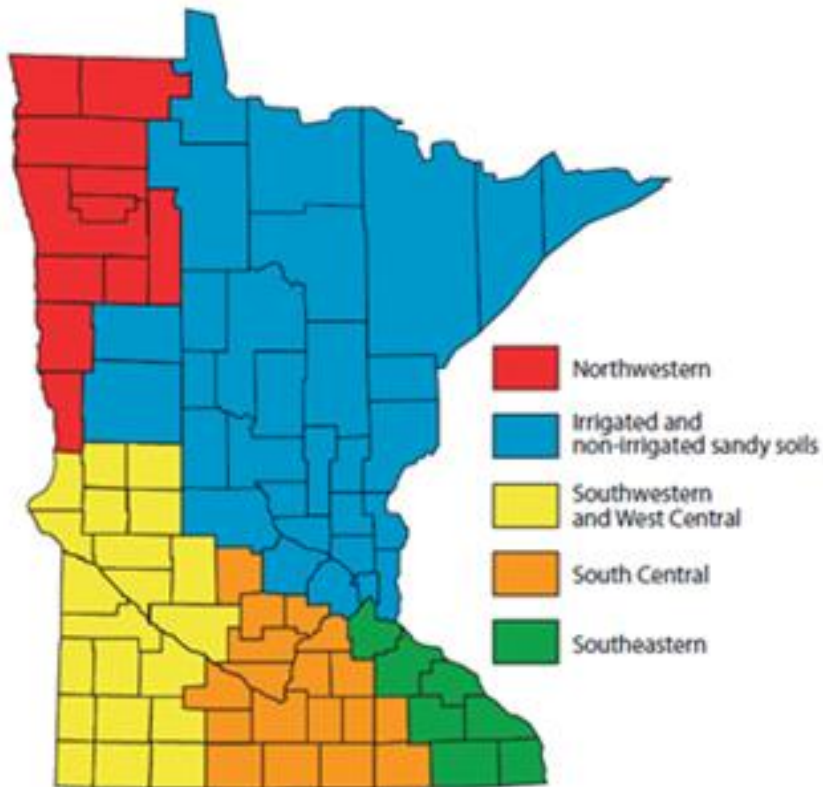


Figure 1. Minnesota nitrogen BMP Regions.

The following pesticide use information is from the 2013 pesticide use report, specifically the South Central (8) Pesticide Management area.

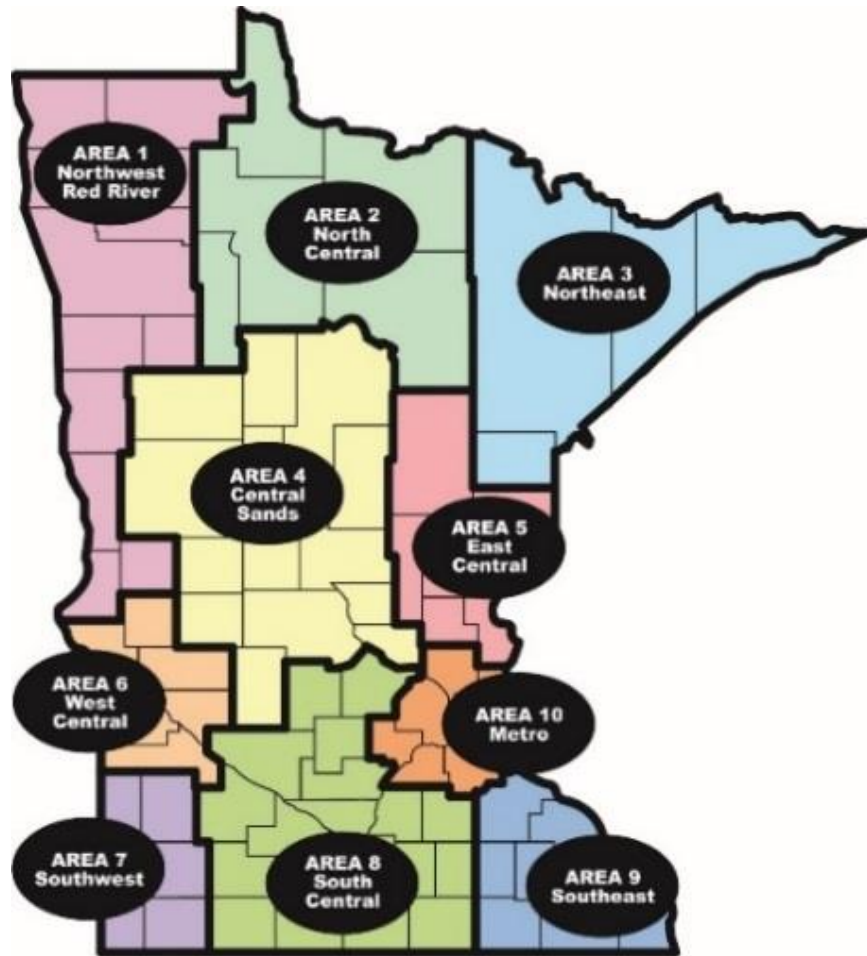


Figure 2. Minnesota pesticide BMP Regions.

Nitrogen use in the Watonwan River Watershed: 2014 Crop Year

**More than five responses are required for any individual category to be reported.
No manure fields are included in the fertilizer section.**

Fertilizer section

Figure 3 provides the distribution of nitrogen fertilizer rates in the SC BMP region for corn following soybeans; the corresponding corn yields are detailed in red if responses were five or greater.

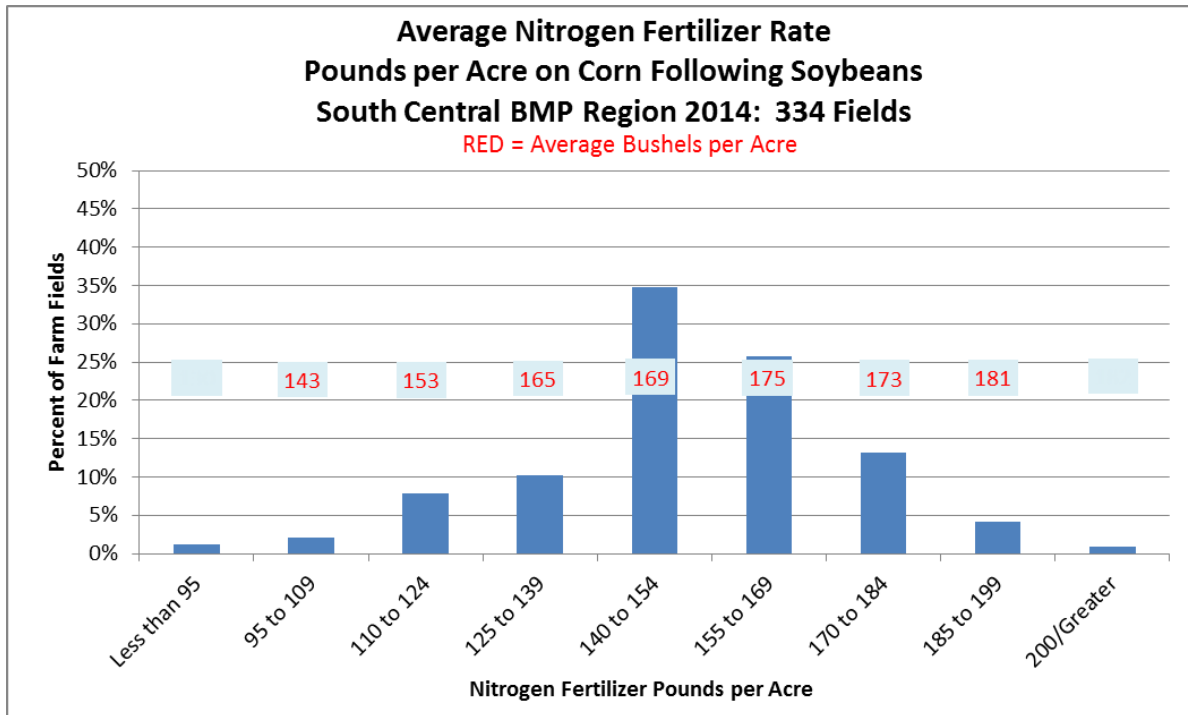


Figure 3. Average nitrogen fertilizer rates and yields on corn following soybeans in the SC BMP region for 2014: 334 fields.

Table 1. Average county nitrogen fertilizer rates and corn yields for the SC BMP region for corn following soybeans.

Average County Nitrogen Fertilizer Rates for the SC BMP Region for Corn Following Soybeans			
County	Number of Farm Fields	Average Nitrogen Rate Pounds per Acre	Average Corn Yield Bushels per Acre
Blue Earth	31	150	172
Brown	25	150	170
Martin	22	152	179
Watonwan	16	155	175

Figure 4 details the distribution of nitrogen fertilizer rates in the SW BMP region for corn following soybeans; the corresponding corn yields are detailed in red if responses were five or greater.

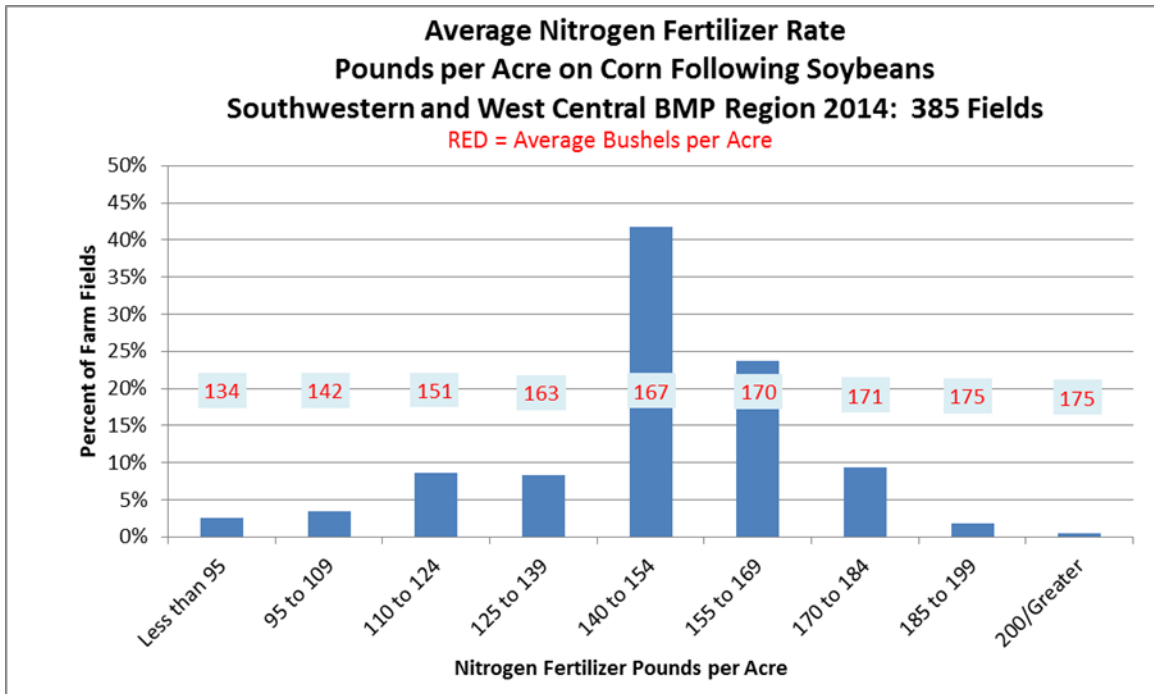


Figure 4. Average nitrogen fertilizer rates and yields on corn following soybeans in the SW BMP region for 2014: 385 fields.

Table 2. Average county nitrogen fertilizer rates and corn yields for the SW BMP region for corn following soybeans.

Average County Nitrogen Fertilizer Rates for the SW BMP Region for Corn following Soybeans			
County	Number of Farm Fields	Average Nitrogen Rate Pounds per Acre	Average Corn Yield Bushels per Acre
Cottonwood	23	148	172
Jackson	29	151	175

Figure 5 details the distribution of nitrogen fertilizer rates in the SC BMP region for corn following corn following alfalfa; the corresponding corn yields are detailed in red if responses were five or greater.

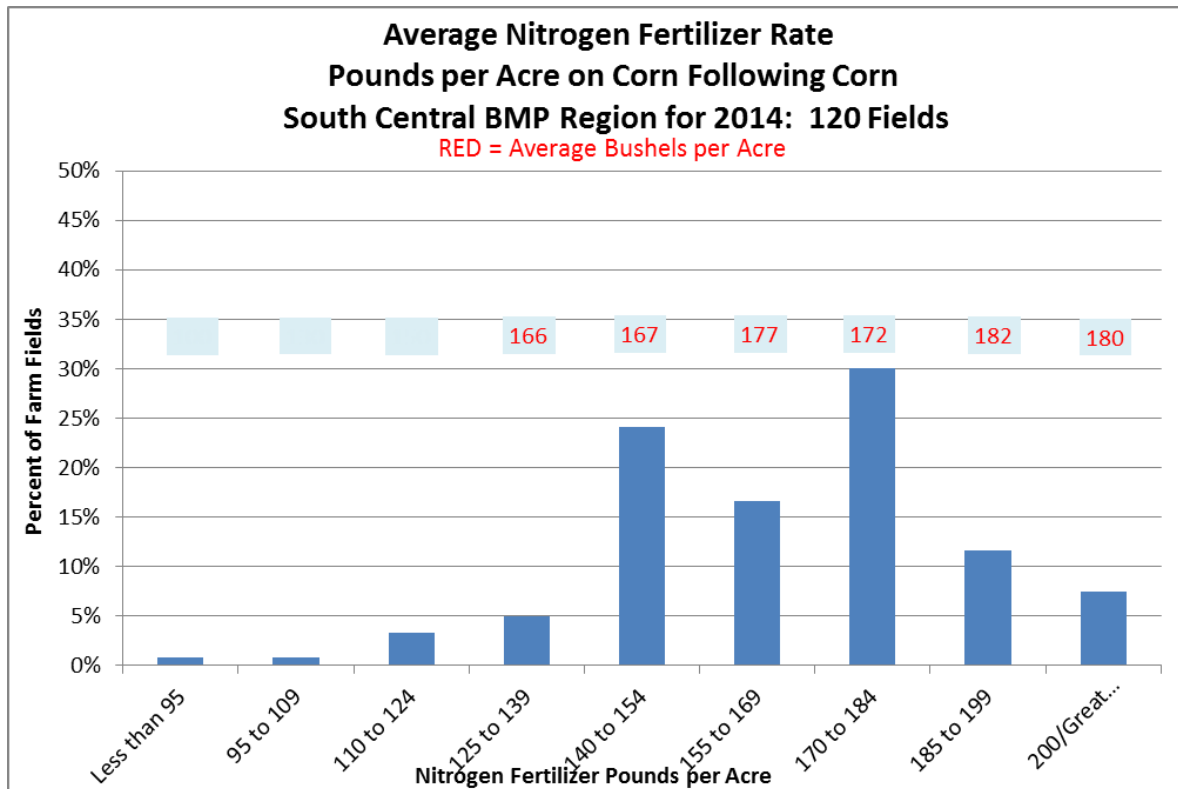


Figure 5. Average nitrogen fertilizer rates and yields on corn following corn in the SC BMP region for 2014: 120 fields.

Table 3. Average county nitrogen fertilizer rates and corn yields for the SC BMP region for corn following corn.

Average County Nitrogen Fertilizer Rates for the SC BMP Region for Corn Following Corn			
County	Number of Farm Fields	Average Nitrogen Rate Pounds per Acre	Average Corn Yield Bushels per Acre
Blue Earth	14	167	176
Brown	8	173	178
Martin	11	173	177
Watowan	**	**	**

** Less than five responses.

Figure 6 details the distribution of nitrogen fertilizer rates in the SW BMP region for corn following corn; the corresponding corn yields are detailed in red if responses were five or greater.

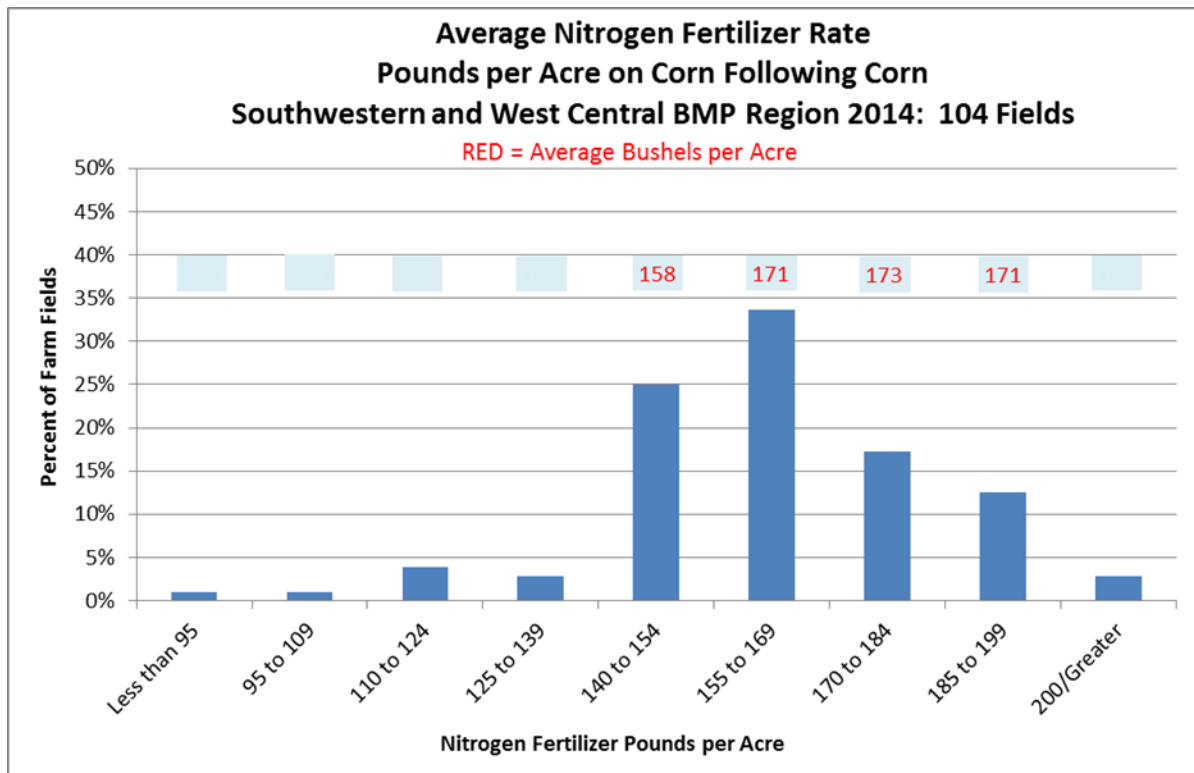


Figure 6. Average nitrogen fertilizer rates and yields on corn following soybeans in the SW BMP region for 2014: 104 fields.

Table 4. Average county nitrogen fertilizer rates and corn yields for the SW BMP region for corn following corn.

Average County Nitrogen Fertilizer Rates for the SW BMP Region for Corn Following Corn			
County	Number of Farm Fields	Average Nitrogen Rate Pounds per Acre	Average Corn Yield Bushels per Acre
Cottonwood	5	156	179
Jackson	10	164	176

Figure 7 provides the distribution of nitrogen fertilizer rates in the SC BMP region for corn following corn following alfalfa; the corresponding corn yields are detailed in red if responses were five or greater.

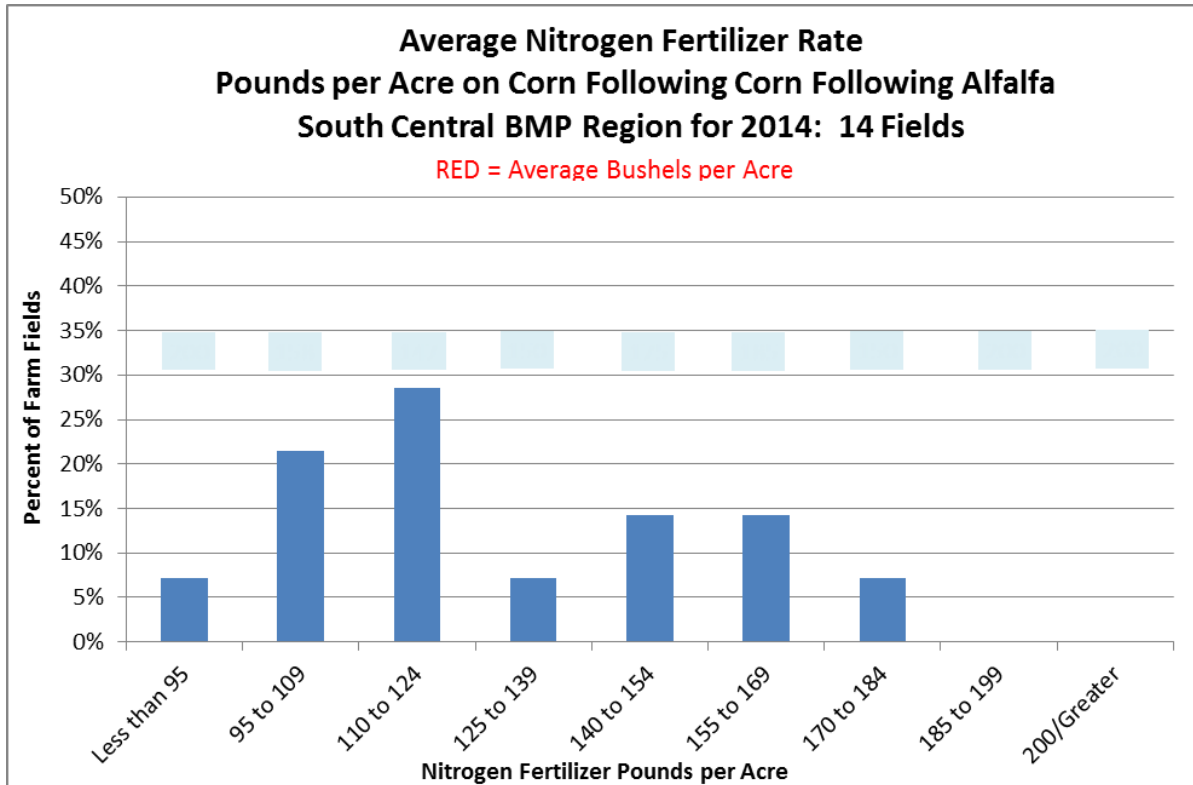


Figure 7. Average nitrogen fertilizer rates and yields on corn following corn following alfalfa in the SC BMP region for 2014: 14 fields.

No counties had five or more responses in SC BMP region.

Figure 8 details the distribution of nitrogen fertilizer rates in the SW BMP region for corn following corn following alfalfa; the corresponding corn yields are detailed in red if responses were five or greater.

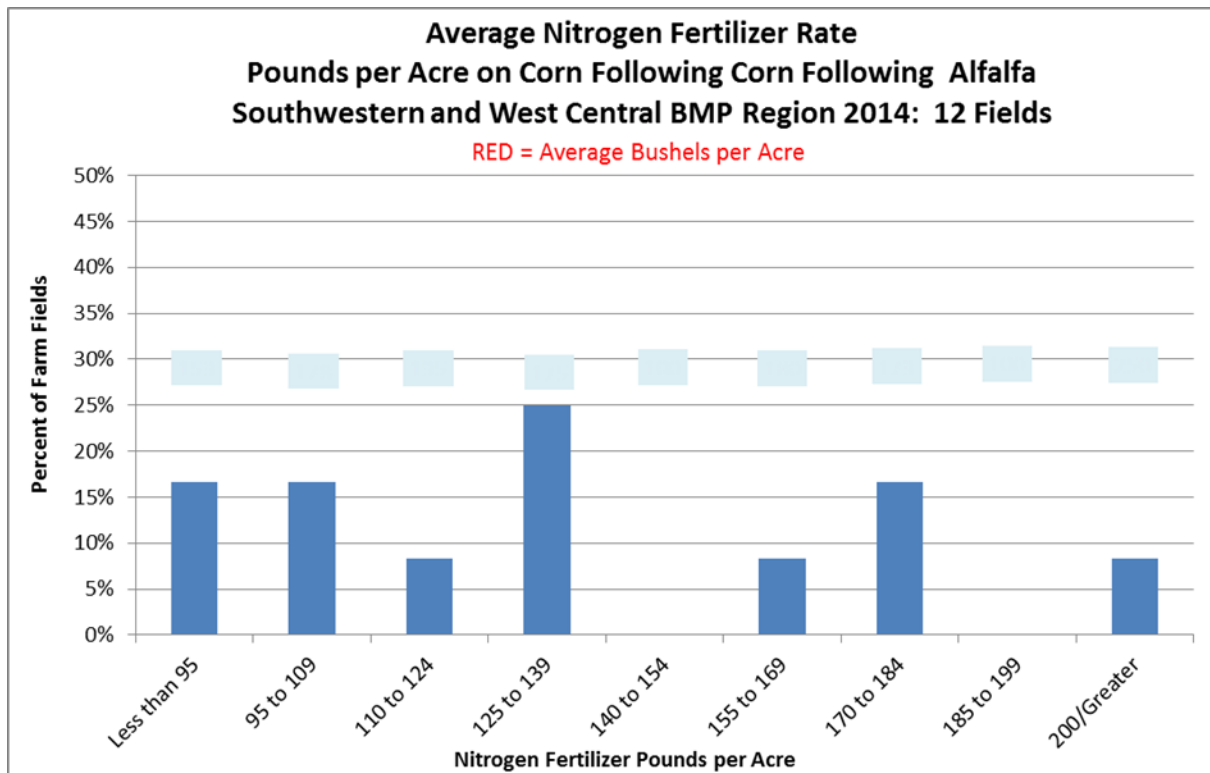


Figure 8. Average nitrogen fertilizer rates and yields on corn following corn following alfalfa in the SW BMP region for 2014: 12 fields.

No counties had five or more responses in SW BMP region.

There were less than five fields that were included in the SC BMP region for corn following alfalfa analysis.

Figure 9 details the distribution of nitrogen fertilizer rates in the SW BMP region for corn following alfalfa; the corresponding corn yields are detailed in red if responses were five or greater.

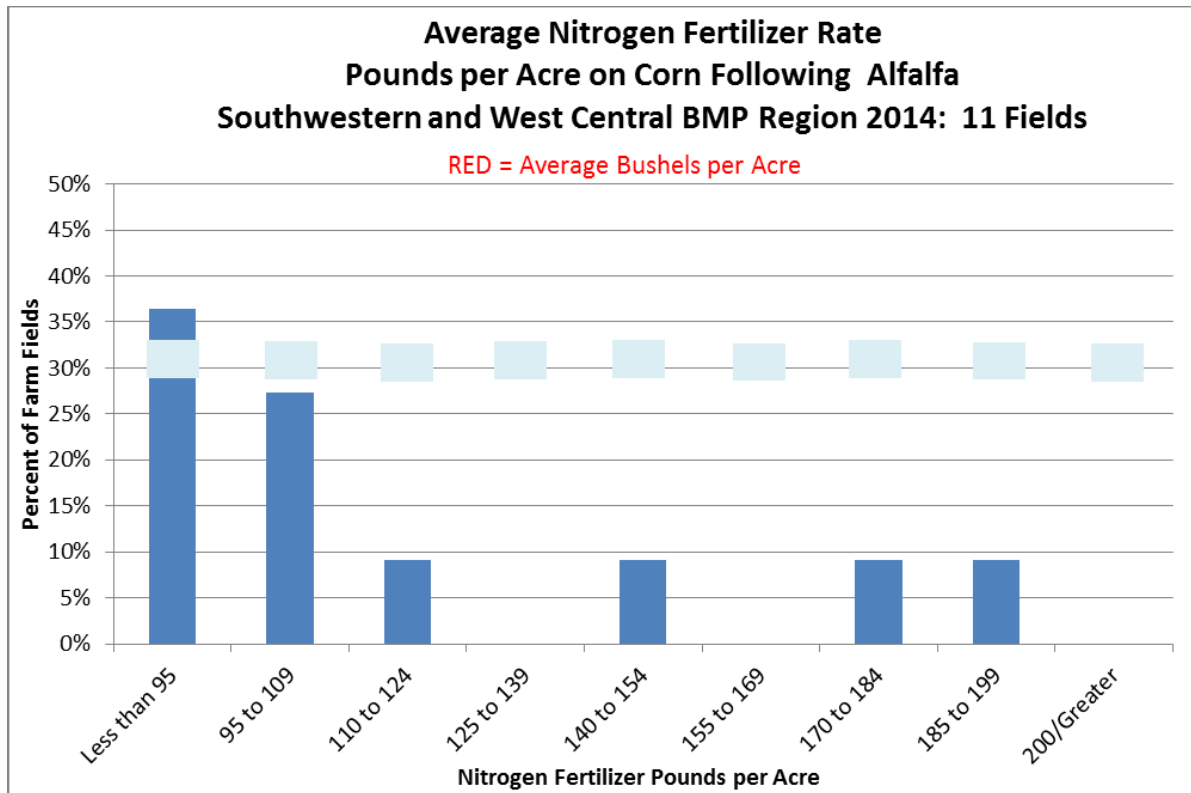


Figure 9. Average nitrogen fertilizer rates and yields on corn following alfalfa in the SW BMP region for 2014: 11 fields.

No counties had five or more responses in the SW BMP region.

Manure section

Table 5 details the percentage of respondents on if the farmer knew the amount of nitrogen that is in the manure applied for the 2014 corn crop.

Table 5. The farmers' knowledge of nitrogen content of manure being applied for the 2014 corn crop.

BMP Region	Knowledge of the Actual Amount of Nitrogen Applied	Percentage of Respondents
Southwestern and West Central	Yes	37
Southwestern and West Central	No	63
South Central	Yes	38
South Central	No	62

§ Percent was calculated using only those respondents who answered yes or no to the question.

Table 6 details the nitrogen rates and corn yields in Southwestern and West Central BMP regions on corn following various crops. These are corn fields applied with manure and commercial nitrogen fertilizer.

Table 6. Average amount of nitrogen applied from manure and commercial nitrogen fertilizer and corresponding corn yields to previous crops by BMP region.

BMP Region	Previous Crop	Average Nitrogen Rate From Manure And Commercial Fertilizer Pounds per Acre	Average Corn Yield Bushels per Acre
Southwestern and West Central	Soybeans	177	182
Southwestern and West Central	Corn	178	182
Southwestern and West Central	Corn/Alfalfa	**	**
Southwestern and West Central	Other	**	**
South Central	Soybeans	186	179
South Central	Corn	190	181
South Central	Corn/Alfalfa	**	**
South Central	Small Grains	**	**
South Central	Other	**	**

** Less than five responses.

Table 7 details the total amount of nitrogen applied to fields from both manure and commercial nitrogen.

Table 7. Average amount of nitrogen applied to fields from both commercial fertilizer and manure.

BMP Region	Main Source of Manure	Average Nitrogen Rate From Manure And Commercial Fertilizer Pounds per Acre
South Western and West Central	All	180
South Western and West Central	Dairy	159
South Western and West Central	Beef	198
South Western and West Central	Hog	179
South Western and West Central	Poultry	**
South Western and West Central	Other	**
South Central	All	188
South Central	Dairy	178
South Central	Beef	185
South Central	Hog	**
South Central	Poultry	208
South Central	Other	180

** Less than five responses.

Pesticide Section

Table 8 details the rates and active ingredients from pesticides applied to corn in Pesticide Management Area (PMA) 8.

Table 8. Pesticide applications and rates for corn – PMA 8

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Acetochlor	37	1.0	1.25	1.26	65,349
Atrazine	9	1.0	0.52	0.52	6,536
Clopyralid	20	1.0	0.07	0.07	2,055
Dicamba	5	1.0	0.15	0.15	1,081
Diflufenzopyr	5	1.0	0.06	0.06	419
Dimethenamid-p	9	1.0	0.61	0.61	8,193
Flumetsulam	20	1.0	0.03	0.03	835
Glufosinate-ammonium	1	1.0	0.37	0.37	302
Glyphosate	80	1.2	0.93	1.10	123,781
Mesotrione	19	1.0	0.08	0.08	2,053
Nicosulfuron	1	1.0	0.30	0.30	360
Rimsulfuron	1	1.0	0.13	0.13	184
S-metolachlor	14	1.0	0.86	0.87	17,242
Saflufenacil	4	1.0	0.07	0.07	427
Tembotrione	4	1.0	0.08	0.08	379
Topramezone	3	1.0	0.02	0.02	63
Insecticides					
Bifenthrin	11	1.1	0.06	0.07	1,032
Chlorpyrifos	1	1.0	0.40	0.40	696
Cyfluthrin	4	1.0	0.01	0.01	37
Lambda-cyhalothrin	1	1.0	0.02	0.02	18
Phostebupirim	4	1.0	0.13	0.13	742
Tefluthrin	3	1.7	0.11	0.19	931
Fungicides					
Azoxystrobin	1	1.0	0.08	0.08	89
Fluxapyroxad	2	1.0	0.67	0.67	1,488
Metconazole	2	1.1	0.03	0.04	103
Propiconazole	3	1.2	0.04	0.04	198
Prothioconazole	2	1.0	0.09	0.09	212
Pyraclostrobin	8	1.0	0.33	0.33	3,850
Tebuconazole	2	1.0	0.09	0.09	212

¹ Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this area. Data in this table and the selection of survey participants was not statistically “weighted” in any fashion. Thus, inappropriate extrapolation of the data may over- or underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Bromoxynil, Cloransulam, Flumioxazin, Fluroxypyr, Fluthiacet-methyl, Pendimethalin, Primisulfuron, Sethoxydim , and Triencarbazone-methyl.

Insecticides applied but not published included the following: Gamma-cyhalothrin and Terbufos.

Fungicides applied but not published included the following: Trifloxystrobin.

Table 9 details the rates and active ingredients from pesticides applied to soybeans in PMA 8.

Table 9. Pesticide applications and rates for soybean – PMA 8

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Per Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre (a.i.)</i>	<i>Pounds per Acre (a.i.)</i>	<i>Total Pounds (a.i.)</i>
Herbicides					
Clethodim	3	1.2	0.05	0.07	210
Cloransulam	13	1.0	0.02	0.02	304
Dimethenamid-p	2	1.0	0.36	0.36	765
Fluazifop	2	1.1	0.09	0.10	220
Flumioxazin	2	1.0	0.13	0.13	301
Fluthiacet-methyl	3	1.0	0.00	0.00	15
Fomesafen	8	1.0	0.18	0.18	1,390
Glufosinate-ammonium	1	1.5	0.36	0.54	549
Glyphosate	92	1.6	0.97	1.52	140,498
Imazethapyr	4	1.0	0.05	0.05	228
Lactofen	2	1.0	0.14	0.14	230
Metribuzin	2	1.0	0.29	0.29	439
S-metolachlor	3	1.0	0.91	0.91	2,683
Saflufenacil	3	1.0	0.03	0.03	101
Sulfentrazone	14	1.0	0.18	0.18	2,546
Thifensulfuron	1	1.0	0.01	0.01	4
Trifluralin	1	1.0	0.50	0.50	310
Insecticides					
Beta-cyfluthrin	3	1.0	0.02	0.02	61
Bifenthrin	9	1.0	0.06	0.06	595
Chlorpyrifos	18	1.0	0.46	0.46	8,191
Esfenvalerate	2	1.0	0.04	0.04	85
Gamma-cyhalothrin	4	1.0	0.01	0.01	36
Imidacloprid	3	1.0	0.05	0.05	123
Lambda-cyhalothrin	19	1.0	0.02	0.02	420
Thiamethoxam	1	1.0	0.03	0.03	30
Zeta-cypermethrin	4	1.0	0.02	0.02	63
Fungicides					
Azoxystrobin	4	1.0	0.11	0.11	512
Propiconazole	4	1.0	0.05	0.05	167
Pyraclostrobin	9	1.0	0.12	0.12	1,111
Tetraconazole	1	1.0	0.06	0.06	72
Trifloxystrobin	3	1.0	0.04	0.04	129

¹ Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this area. Data in this table and the selection of survey participants was not statistically “weighted” in any fashion. Thus, inappropriate extrapolation of the data may over- or underestimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: Acetochlor, Bentazon, Chlorimuron, Dicamba, Fenoxaprop, Flufenacet, Flumiclorac, Imazamox, Pendimethalin, and Phenmedipham.
Fungicides applied but not published included the following: Chlorothalonil and Fluoxastrobin.

Table 10 details the rates and active ingredients from pesticides applied to hay in PMA 8.

Table 10. Pesticide applications and rates for hay – PMA 8

Agricultural Chemical (a.i.)	Surveyed Area Applied	Average Applications	Average Rate Per Application	Average Rate Per Crop Year	Total Applied Crop Year¹
	<i>Percent</i>	<i>Number</i>	<i>Pounds per Acre</i>	<i>Pounds per Acre</i>	<i>Total Pounds</i>
Insecticides			<i>(a.i.)</i>	<i>(a.i.)</i>	<i>(a.i.)</i>
Chlorpyrifos	2	1.0	0.33	0.33	57
Lambda-cyhalothrin	10	1.0	0.03	0.03	25

¹ Data in this column is calculated from “raw” data and represents the total pounds of active ingredient applied to the indicated crop(s) in 2013 by survey participants in this area. Data in this table and the selection of survey participants was not statistically “weighted” in any fashion. Thus, inappropriate extrapolation of the data may over- or under-estimate the total pounds of a.i. used at the state, area or sub-area levels.

Herbicides applied but not published included the following: 2,4-D, Aminopyralid, Clopyralid, and Imazamox.

Insecticides applied but not published included the following: Gamma-cyhalothrin.

Fungicides applied but not published included the following: Pyraclostrobin.