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# Crop Insurance Ratings: Evolution and Mutations

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March 18, 2016

SCC-76 Pensacola, Florida

# Outline:

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- Brief program history and context – (rough order: \$9.7B premium, \$100B Liability, scored larger than commodity title, growing)
- Ratings Methodology in principle, condensed, shortened, abbreviated - key in understanding risk management implications, especially at farm-level, factors evolving, Congress tinkers....
- Price and Vol. “resets” change yearly – ‘service the car while driving’ issues, and many other moving parts –crop insurance performance in the large depends on price environment, makes it very difficult to evaluate performance



# Program History and major waypoints

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- 1938 Dust Bowl Recovery efforts included formation of FCIC
- 1980 Federal Crop Insurance Act – beginning of **ratings history** and stated intent “to replace the free disaster coverage”
  - Included subsidy of 30% against 65% yield coverage
  - Limited Participation, competing commodity title programs
- Ad hoc disaster Bills in 1988, 1989, 1992, 1993, along with other regional actions and state relief
- 1994 Federal Crop Insurance Reform Act – key was language requiring participation in crop insurance for other benefits
  - Subsidized CAT
  - Began modern product proliferation in earnest
- 1996 Repealed mandatory participation\* and created RMA



# Program History and major waypoints

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- Proliferation of products – Group Yield and Revenue, competing revenue products (CRC, RA, IP) and additional yield options
- 2000 ARPA increased subsidy, started cottage industry for product development by private sector.
- 2008 Farm Bill created additional intentional crop coverage expansions (op ed: signaled move to use of crop insurance to advance other related goals)
- 2011 Combo introduction, ratings system conversions
- 2012 TA APH Endorsement
- “Re-ratings” cover much of the 2011-2014 period
- SRA 2012 risk sharing “flattened” and split into groups



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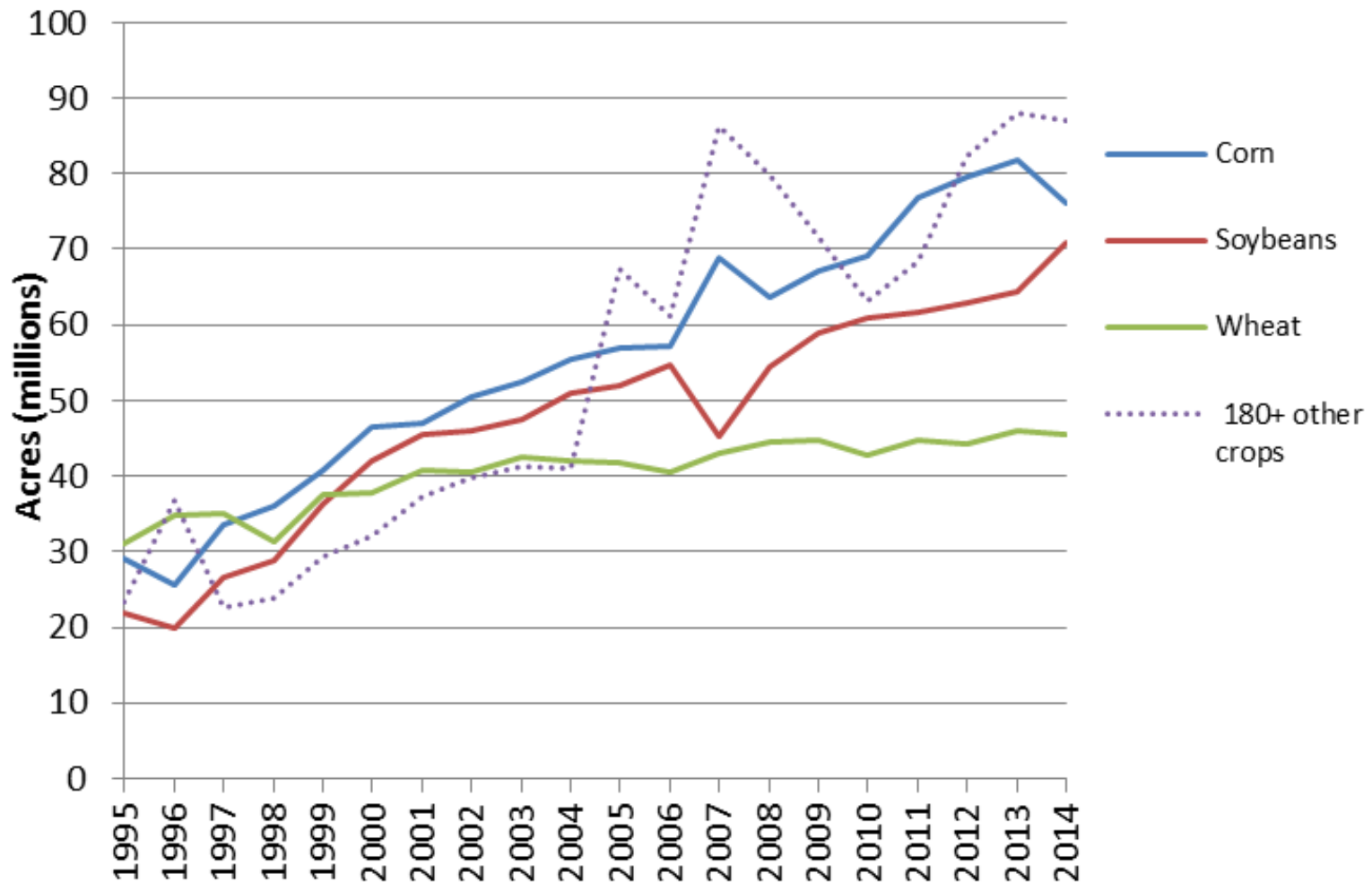
# Program History and major waypoints

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- 2014 Farm Bill Crop Insurance title largest program but has some ties to conservation in new ways and shallow loss option in SCO
- 2015 Yield Exclusion (*sigh...*) introduced, then expanded
- 2016 is 6<sup>th</sup> year of declining PP prices for C and S.....
  
- Other notable events in crop insurance history:
  - BYE Endorsement – link outside production history
  - IV usage in revenue “wrapper” on yield – (pricing not design question)
  - Subsidy rate structure changes and Enterprise unit encouragement
  - NRS Explosion to differentiate company offerings
  - Changing players at agency, company, and Re levels.

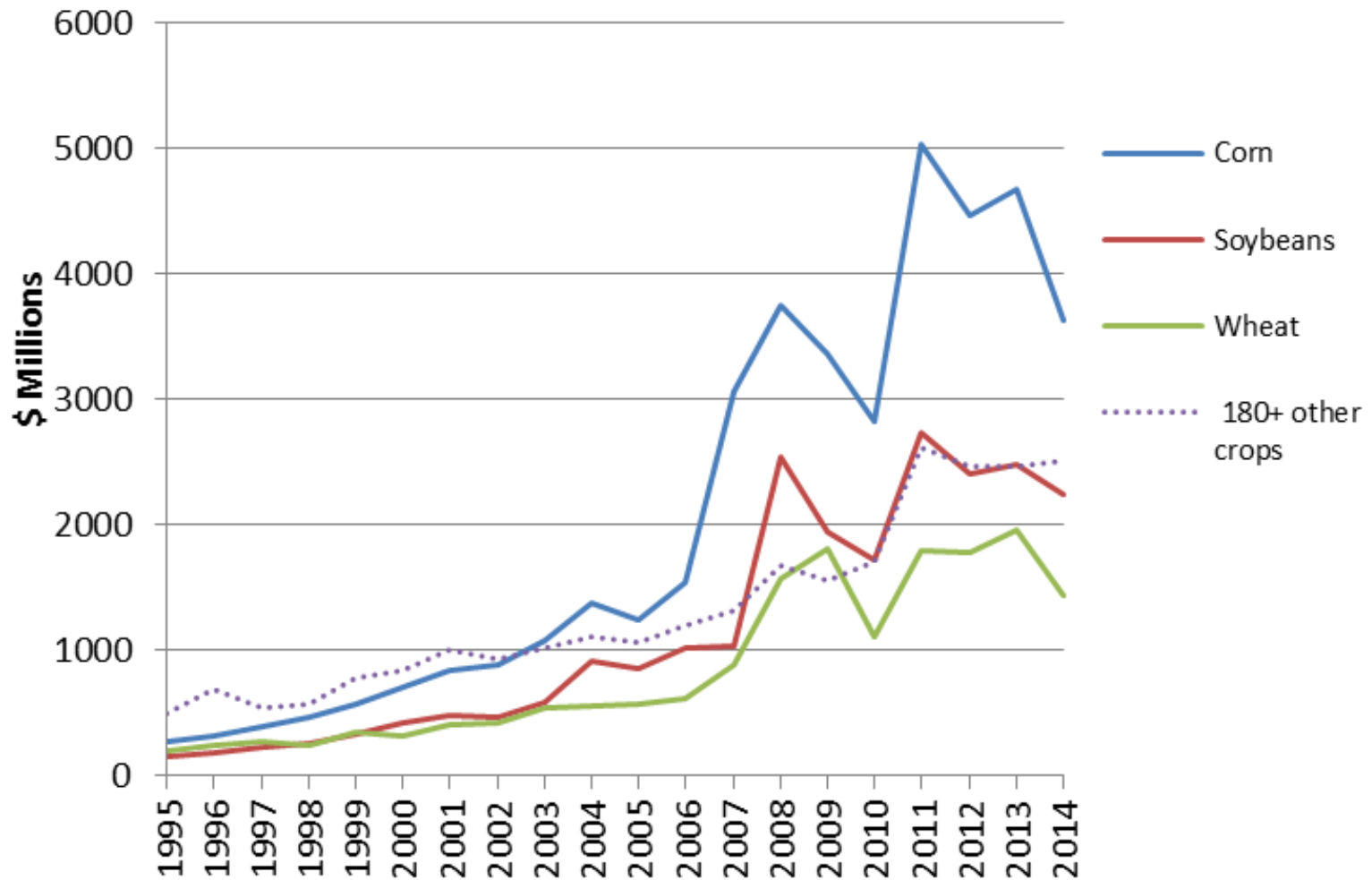


# Acres Covered by Crop:

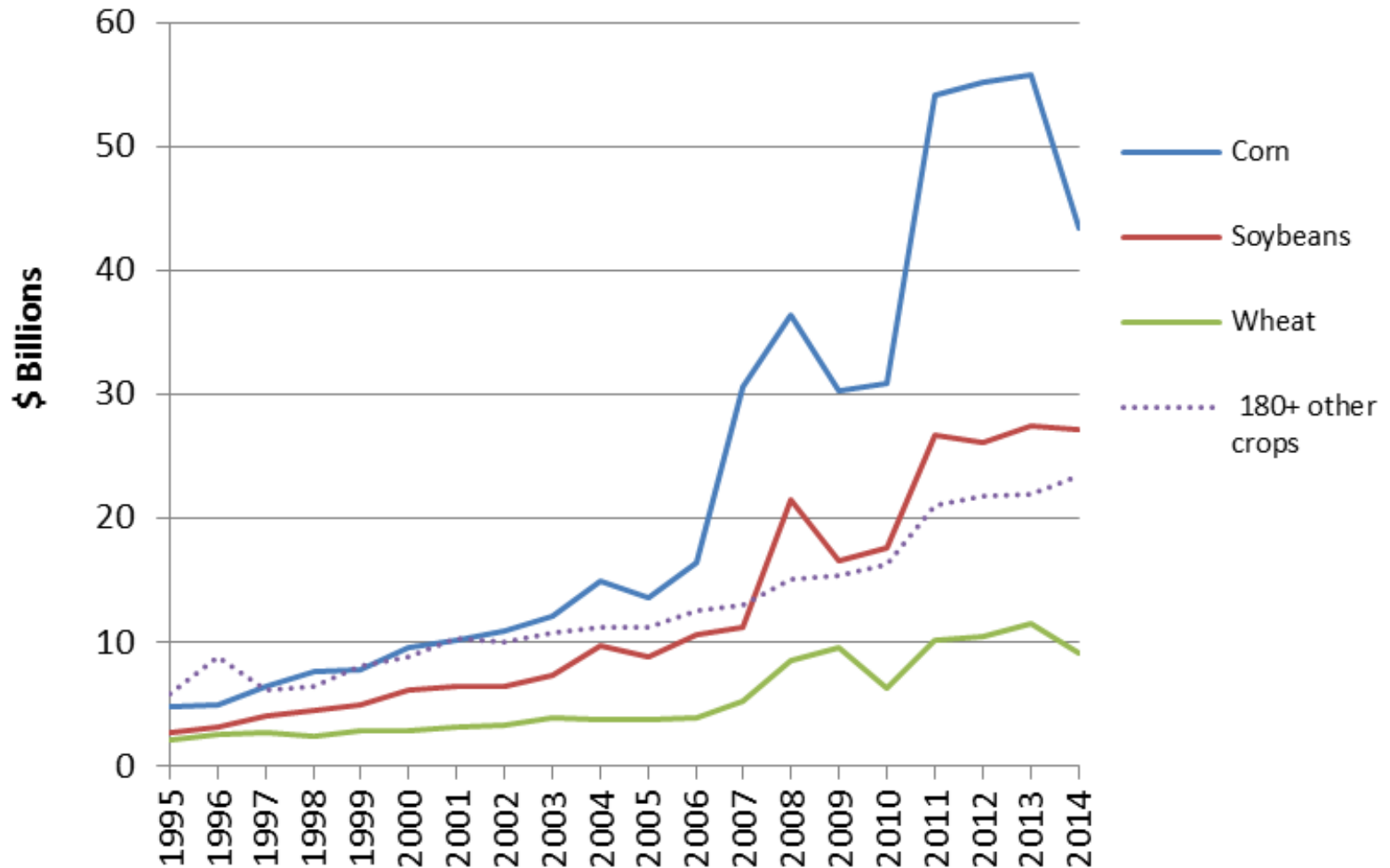




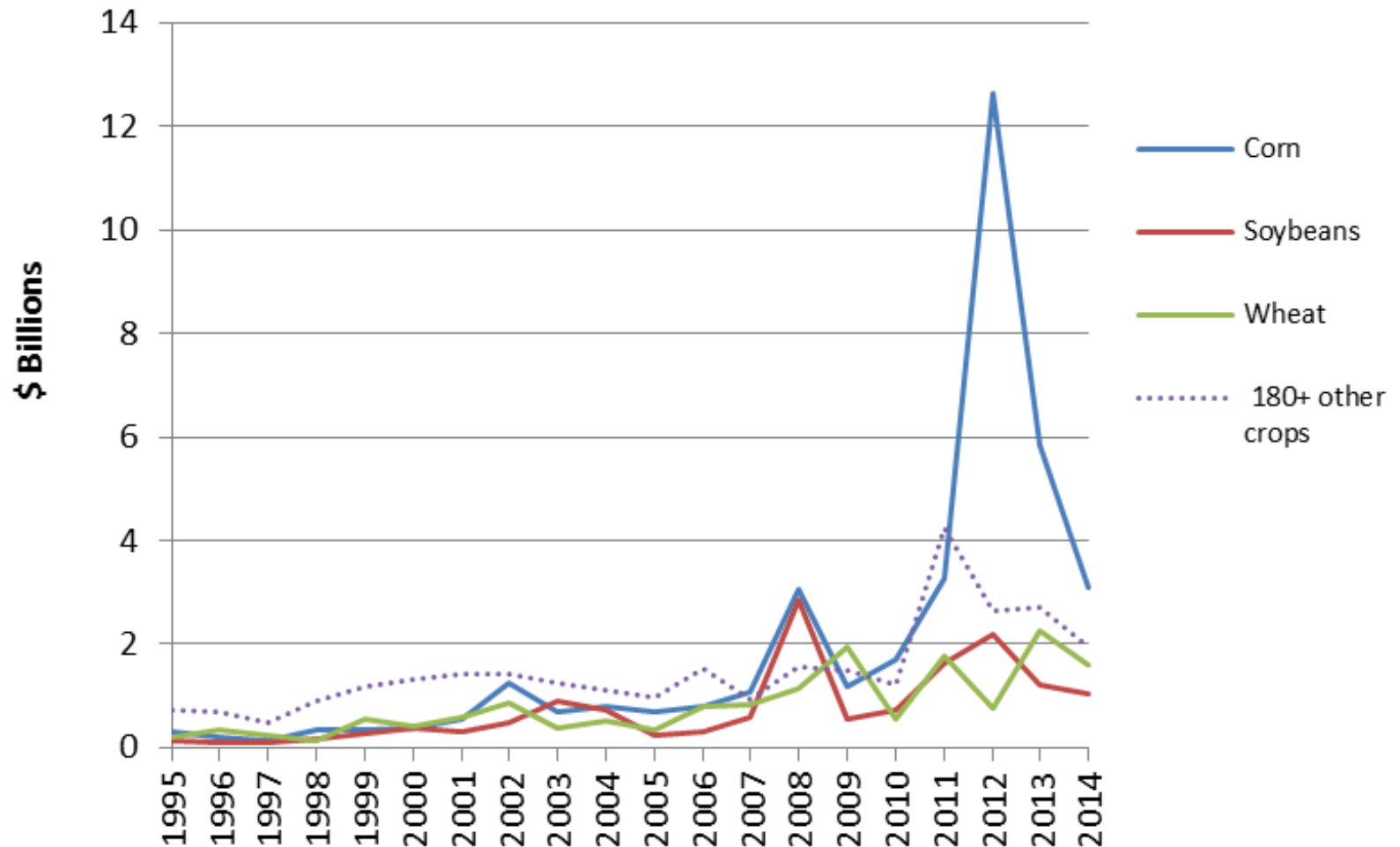
# Total Premium *(tied to commodity price)*



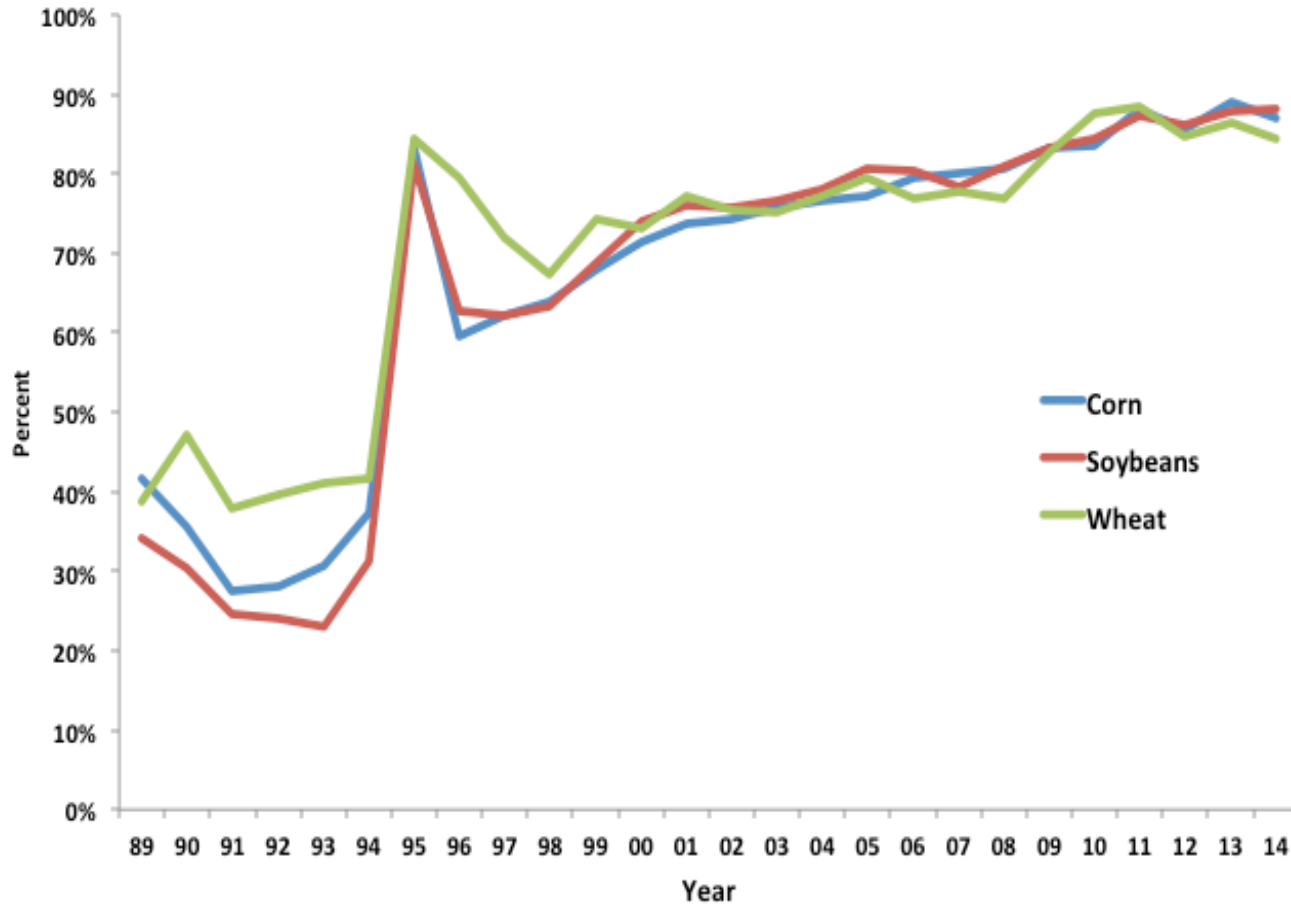
# Total Liability (amount of insurance)



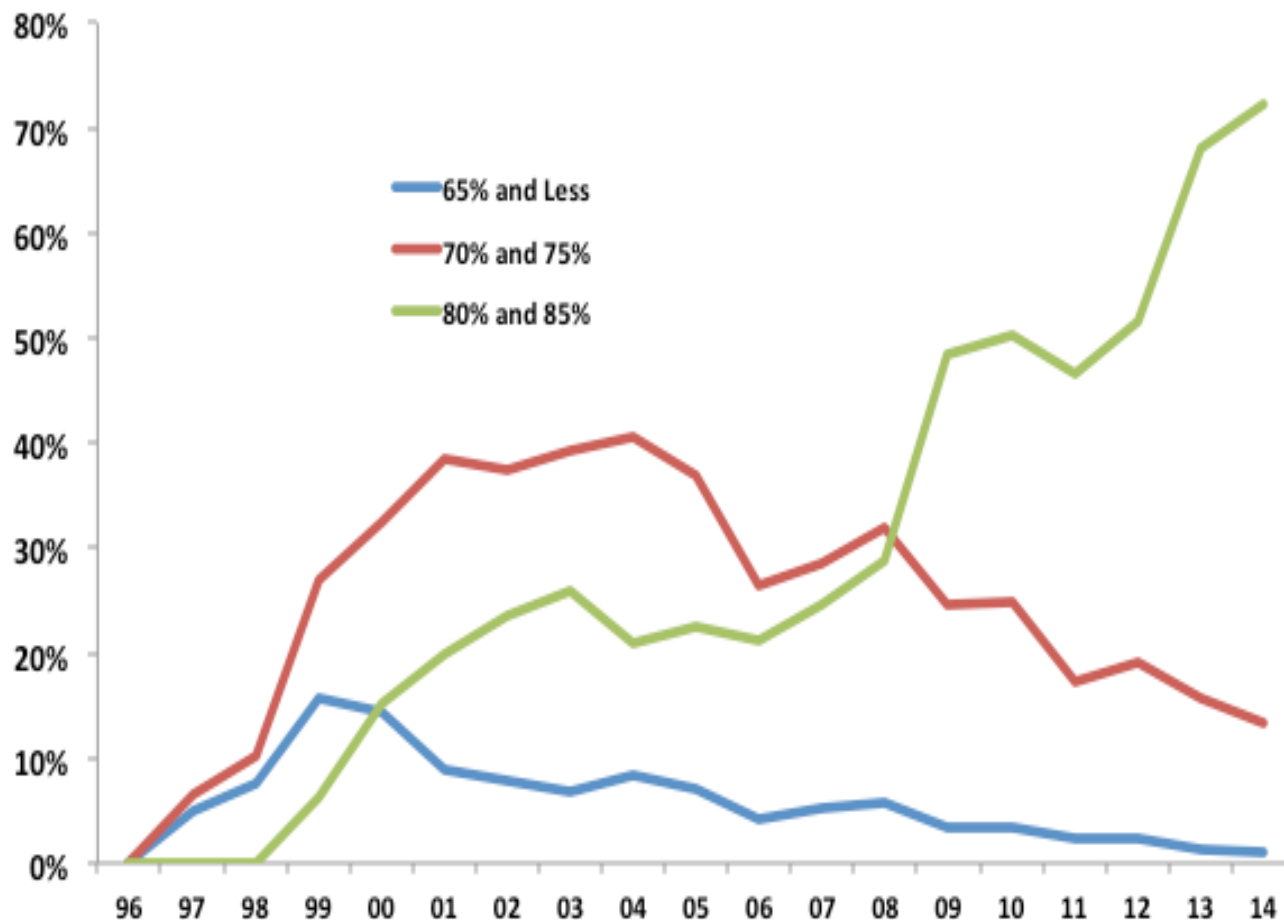
# Total Payments by crop through time



# Percent Acres Insured, U.S.



# Farm-Level Revenue Products, Illinois, Corn, Percent of Insured Acres



# Rating System (Overly)Simplified

- Based on a Loss Cost Ratio (LCR) system initiated in 1980s for a single product (65% yield) fixed indemnity-price policy.
- Idea – each year<sub>t</sub> :  $Losses/liability = rate_t$   
then  $ave(rates) \times liability = premiums$ . Over time,  
 $premiums$  should equal  $losses$ . **Loss ratio target = 1**
- Main rate components: farmer risk relative to county, reference yield, exponent, coverage level differential, and loads for CAT, PP, RP, and QA; and price level, vol. & deviates (correlation) for RP related.
- Subsidized to encourage broad participation, no ad hoc



# Crop Insurance Subsidy Rates

Crop Insurance Risk Management Subsidies			
Coverage Level	Basic And Optional	Enterprise	SCO
50%	0.67	0.80	0.65
55%	0.64	0.80	0.65
60%	0.65	0.80	0.65
65%	0.59	0.80	0.65
70%	0.59	0.80	0.65
75%	0.55	0.77	0.65
80%	0.48	0.68	0.65
85%	0.38	0.53	0.65

- Enterprise Unit Subsidy increase to encourage all-crop at a time coverage.
- Reduction in rate by coverage partly to create similar dollar value of coverage per acre
- May incent buy down for basic and optional and combine with SCO, but less risk protection in most cases – not good idea to just compare subsidy, and LR <> 1.



# Ratings System Explained in a Nutshell

I THINK YOU SHOULD BE MORE SPECIFIC HERE IN STEP TWO





# Ratings system – based on loss cost idea

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- Recall Basic Idea:

$$\textit{Loss ratio} = \frac{\textit{Insurance payments}}{\textit{Total premiums}}$$

- Loss Ratio Should be equal to 1.0 if rates are correct, rates correct if losses correctly converted to rates.
- Should have no discernible patterns across geography or crops



# Historic Crop Insurance Performance by Crop

	----- (\$ millions) -----			
	Premium	Subsidy	Payments	Loss Ratio
CORN	41,709	23,450	39,790	<b>95.4%</b>
SOYBEANS	23,589	13,358	15,609	<b>66.2%</b>
WHEAT	17,872	10,163	17,581	<b>98.4%</b>
COTTON	8,947	5,263	11,638	<b>130.1%</b>
GRAIN SORGHUM	2,357	1,366	2,825	<b>119.8%</b>
POTATOES	1,169	643	991	<b>84.8%</b>
PEANUTS	1,083	515	1,458	<b>134.7%</b>
DRY BEANS	993	538	906	<b>91.2%</b>
SUNFLOWERS	966	572	1,231	<b>127.5%</b>
SUGAR BEETS	800	406	696	<b>87.0%</b>
RICE	568	328	720	<b>126.9%</b>
All Others	6,665	5,029	5,949	<b>89.3%</b>
Total Program	106,718	61,632	99,396	<b>93.1%</b>

1995-2014 (source: RMA SOB data, UI Calculations)

(sorted by premium)



# Historic Crop Insurance Performance by Crop

## Top 10 crops, states >\$1B Premium 1995-2014

State	Total Premium	Loss Ratio
TX	9,405,627,314	137.6%
OK	1,936,948,864	135.2%
GA	1,734,517,662	106.4%
MO	3,341,668,509	104.0%
MS	1,231,677,511	102.5%
CO	1,997,416,442	101.9%
KY	1,061,203,693	101.1%
KS	7,546,250,556	100.9%
AR	1,052,190,640	100.5%

State	Total Premium	Loss Ratio
WI	2,314,347,064	94.3%
IA	9,375,374,140	91.1%
IL	8,326,593,620	90.1%
ND	8,712,015,635	89.9%
IN	4,514,121,291	86.9%
NC	1,498,224,875	80.7%
SD	6,751,423,785	80.7%
MT	1,689,641,648	77.3%
MN	8,271,368,674	75.4%
NE	7,019,102,680	73.8%
MI	1,634,398,581	68.2%
OH	3,030,794,865	67.7%

- important implications for effective subsidy rates, and for fund allocation decisions if  $LR < > 1$ .



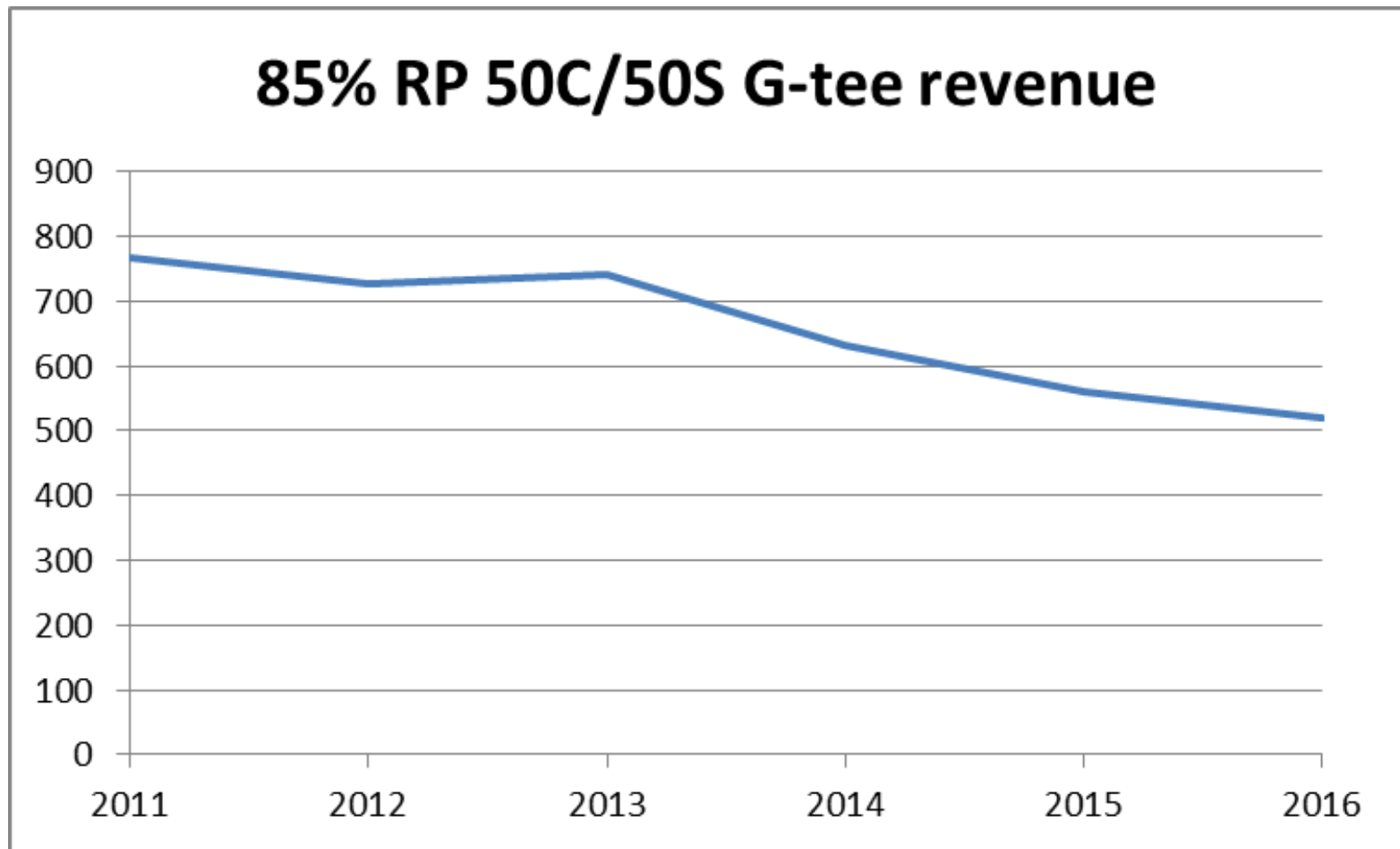
# Projected and Harvest Prices

## *(Midwest States)*

	2011	2012	2013	2014	2015	2016
Corn						
Projected Price	6.01	5.68	<b>5.65</b>	<b>4.62</b>	<b>4.15</b>	<b>\$3.86</b>
Harvest Price	<b>6.32</b>	<b>7.5</b>	4.39	3.49	3.82	
Soybeans						
Projected Price	<b>13.49</b>	12.55	12.87	<b>11.36</b>	<b>9.74</b>	<b>\$8.85</b>
Harvest Price	12.14	<b>15.39</b>	12.87	9.65	8.91	



# Substantial Decline in Guarantees



# How to assess the impact on Risk management in a given location for a specific farm?

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- See *farmdoc* insurance payment evaluator in Corn Belt
- Developed a ratings tabulation “tool” for county-level analyses, and aggregation into states/crops.
  - Degree of risk reduction depends on net cost of insurance and counter-cyclicity of payments
- Replicated premium quoting system across previous five years.
  - Farm-level evaluation of RMA rated products
- Examples for a case county (quickly) then maps of all county results.



# County case farms, by crop, unit, & acreage

(McLean County, Illinois shown)

Case Farm Info

Est Premiums

Avg Payments

Freq Payment

Net Cost of Insurance

Avg Gross Rev

Target Probability

Value at Risk Information

## Case Farm Information

			Farm Yield (bu/acre)	County Yield (bu/acre)
Farm Average Yield	182.60 bu/acre	30% of years yields below:	164.64	168.97
Farm Std Dev of Yield	37.25 bu/acre	20% of years yields below:	151.58	158.34
County Average Yield	182.60 bu/acre	10% of years yields below:	132.80	142.72
County Std Dev of Yield	29.80 bu/acre	5% of years yields below:	116.98	129.18
Average Futures Price	3.75 /bu	Farm Trend-Adjusted APH	183.00 bu/acre	
Std Dev of Price	0.73 /bu	County TA Rate	1.88 bu/acre/year	
Avg Harvest Cash Basis	0.35 /bu	Farm APH (ref)	174.00 bu/acre	
Avg Gross Crop Rev	610.46 /acre			

<http://farmdoc.illinois.edu/cropins/payment-evaluator.html>

[www.farmdoc.illinois.edu](http://www.farmdoc.illinois.edu)



# Partial Insurance Quote

Case Farm Info

Est Premiums

Avg Payments

Freq Payment

Net Cost of Insurance

Avg Cross Rev

Target Probability

Value at Risk Information

## Estimated Premiums, \$/acre

Coverage Election	YP	RP-HPE	RP	AYP	ARP-HPE	ARP
50%	\$0.56	\$0.57	\$0.70			
55%	\$0.86	\$0.79	\$1.11			
60%	\$1.22	\$1.02	\$1.69			
65%	\$2.07	\$1.64	\$3.01			
70%	\$2.75	\$2.23	\$4.28	\$13.57	\$8.54	\$15.36
75%	\$3.83	\$3.18	\$6.68	\$17.95	\$13.51	\$23.44
80%	\$5.52	\$4.99	\$10.81	\$25.06	\$19.89	\$32.70
85%	\$8.30	\$8.57	\$18.38	\$31.40	\$28.89	\$47.37
90%				\$40.24	\$40.84	\$63.39

The table above contains per acre farmer paid premiums for available crop insurance products in this county. Actual per acre costs will depend on final price and volatility factors established by RMA, and on the farm's own APH, Trend--Adjusted APH, and acres. These are estimates only. A qualified insurance agent should be consulted for final premiums. Entries of zero/Not Avail. indicates an insurance combination not offered or unable to be calculated.





# Case Farm Payments

Case Farm Info

Est Premiums

Avg Payments

Freq Payment

Net Cost of Insurance

Avg Gross Rev

Target Probability

Value at Risk Information

## Avg Ins Payments

Coverage Election	YP	RP-HPE	RP	AYP	ARP-HPE	ARP
50%	\$0.55	\$0.47	\$0.83			
55%	\$1.08	\$1.03	\$1.69			
60%	\$1.96	\$2.18	\$3.38			
65%	\$3.40	\$4.15	\$6.14			
70%	\$5.72	\$7.33	\$10.53	\$8.59	\$9.05	\$15.85
75%	\$9.19	\$12.22	\$16.96	\$13.68	\$17.08	\$27.06
80%	\$14.23	\$19.26	\$26.15	\$21.06	\$29.54	\$43.86
85%	\$21.20	\$29.07	\$38.86	\$31.37	\$46.51	\$66.35
90%				\$45.24	\$68.10	\$94.31

The table above contains average annual per acre indemnity payments. For example, an entry of \$7.50 would indicate that the product would pay \$7.50 per acre per year with some years being greater, some years being zero, but averaging \$7.50 per acre per year through time.



# Net Cost of Insurance

Case Farm Info

Est Premiums

Avg Payments

Freq Payment

Net Cost of Insurance

Avg Cross Rev

Target Probability

Value at Risk Information

## Estimated Net Average Cost of Insurance

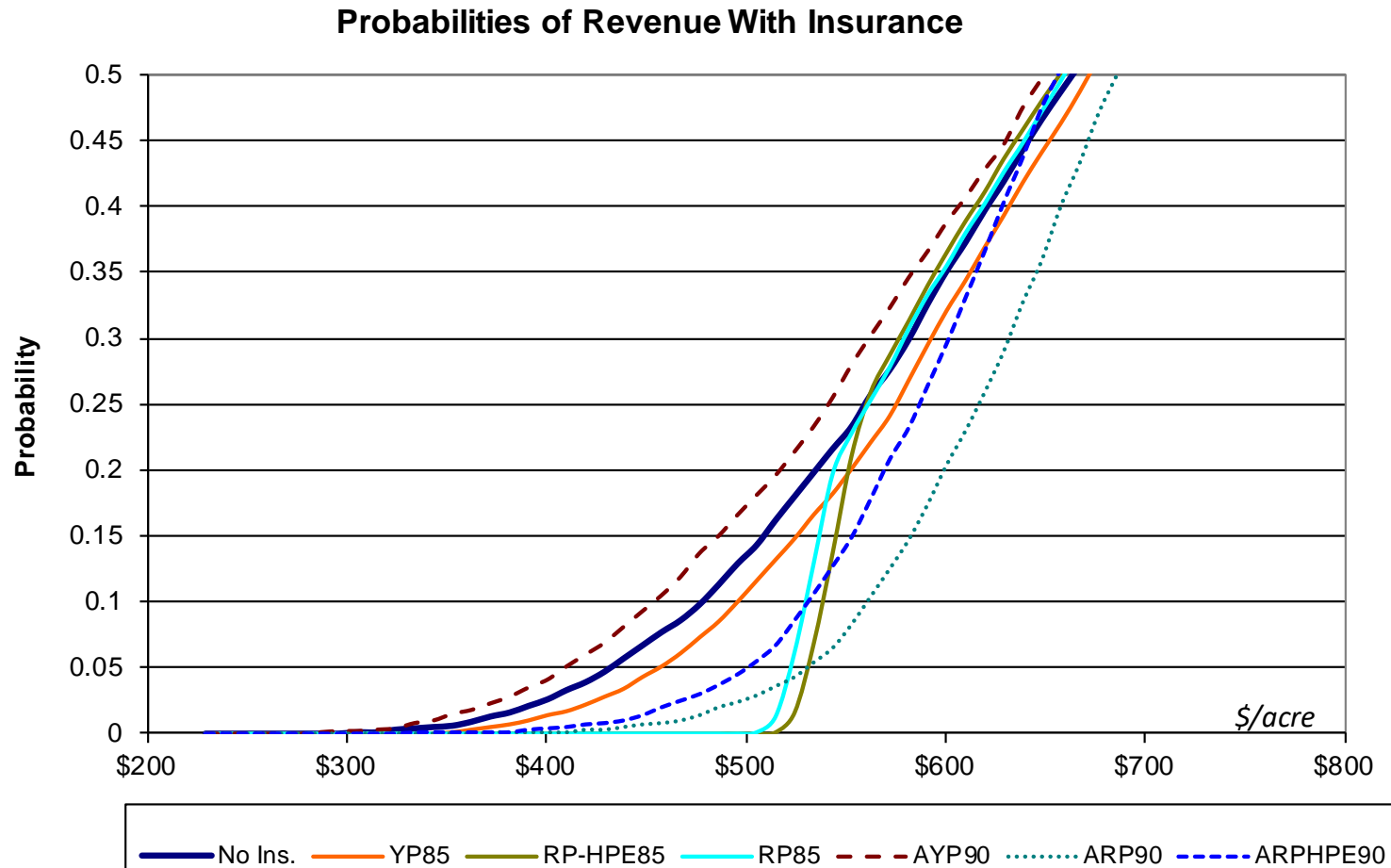
Coverage Election	YP	RP-HPE	RP	AYP	ARP-HPE	ARP
50%	\$0.01	\$0.10	\$-0.13			
55%	\$-0.22	\$-0.24	\$-0.58			
60%	\$-0.74	\$-1.16	\$-1.69			
65%	\$-1.33	\$-2.51	\$-3.13			
70%	\$-2.97	\$-5.10	\$-6.25	\$4.98	\$-0.51	\$-0.49
75%	\$-5.36	\$-9.04	\$-10.28	\$4.27	\$-3.57	\$-3.62
80%	\$-8.71	\$-14.27	\$-15.34	\$4.00	\$-9.65	\$-11.16
85%	\$-12.90	\$-20.50	\$-20.48	\$0.03	\$-17.62	\$-18.98
90%				\$-5.00	\$-27.26	\$-30.92

The table above contains long run average net costs of insurance by product and election level. Net cost is defined as farmer-paid premium less average payment recieved. A negative value indicates that the product pays back more on average than the farmer-paid premium for the case farm considered.



# Risk Reduction Summary

McLean Co. Illinois -- Corn Enterprise Unit



# Ratings Evaluation – necessarily county-based, controlled for time.

Premium Impacts from ratings component changes					Champaign County, Illinois	
	Insurance Year					% Change
	2011	2012	2013	2014	2015	2011 - 2015
Coverage	YP - Optional Units					
65%	4.59	3.78	2.70	2.91	2.91	-36.60%
75%	9.26	7.64	5.28	5.70	3.84	-58.53%
85%	21.35	17.61	12.19	13.16	8.51	-60.14%
	YP - Enterprise Units					
65%	2.05	1.30	0.93	1.00	0.76	-62.93%
75%	4.22	2.87	1.99	2.15	1.35	-68.01%
85%	14.02	10.20	7.06	7.62	3.94	-71.90%
	RP - Optional Units					
65%	6.00	5.01	3.68	3.94	2.64	-56.00%
75%	12.35	10.48	7.76	8.27	5.38	-56.44%
85%	28.79	24.82	19.03	20.08	12.73	-55.78%
	RP - Enterprise Units					
65%	1.56	1.09	0.88	0.99	0.77	-50.64%
75%	3.01	2.35	1.98	2.18	1.40	-53.49%
85%	10.23	8.86	7.91	8.54	4.43	-56.70%

Standardized on PP of 4.15 and vol factor of 0.21



# Sources of Premium Change

(controlling PP and Vol Factor changes)

## Insurance factors

McLean Illinois	Ref	Ref		Fixed
Year	Yield	Rate	Exponent	Rate
2011	157	0.0120	-2.4280	0.0080
2012	157	0.0100	-2.4280	0.0070
2013	159	0.0080	-2.1820	0.0060
2014	175	0.0080	-1.3150	0.0040
2015	177	0.0080	-1.3150	0.0040
2016	182	0.0080	-1.258	0.0040



# Sources of Premium Change

(controlling PP and Vol Factor changes)

<i>liability</i>	517.24	Base rate premium impacts	
<i>Coverage</i>	0.85	Ref	Fixed
Year		Rate	Rate
2011		6.207	4.138
2012		5.172	3.621
2013		4.138	3.103
2014		4.138	2.069
2015		4.138	2.069
2016		4.138	2.069
Difference			
2016-2011		-2.069	-2.069



# Ratings Summary

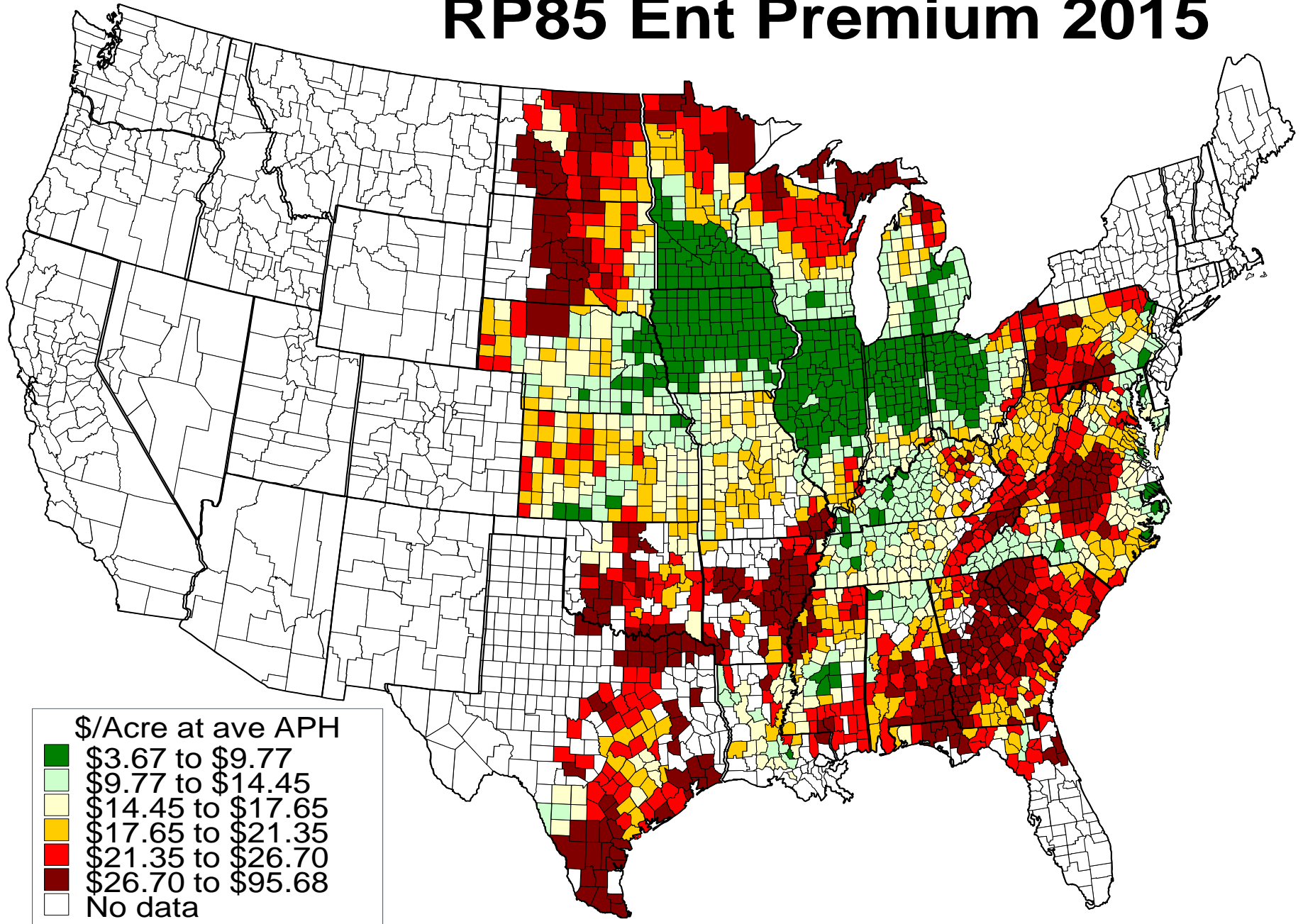
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	<i>Champaign, Illinois</i>
<b>Summary Effects:</b>	<i>(\$/Acre)</i>
At RP 80%, base impact, 2011-2015	-1.53
Farmer Impact after subsidy	-0.74
Actual change in RP 80% farmer paid	-5.80
Impact of Exponent, ref yield and other changes	-5.06
Base Liability/acre	\$547.8
Ave APH	173.4
Ratio of APH to Ref Yield 2013	1.05
Impact of Exponent Change on rate	4.14%

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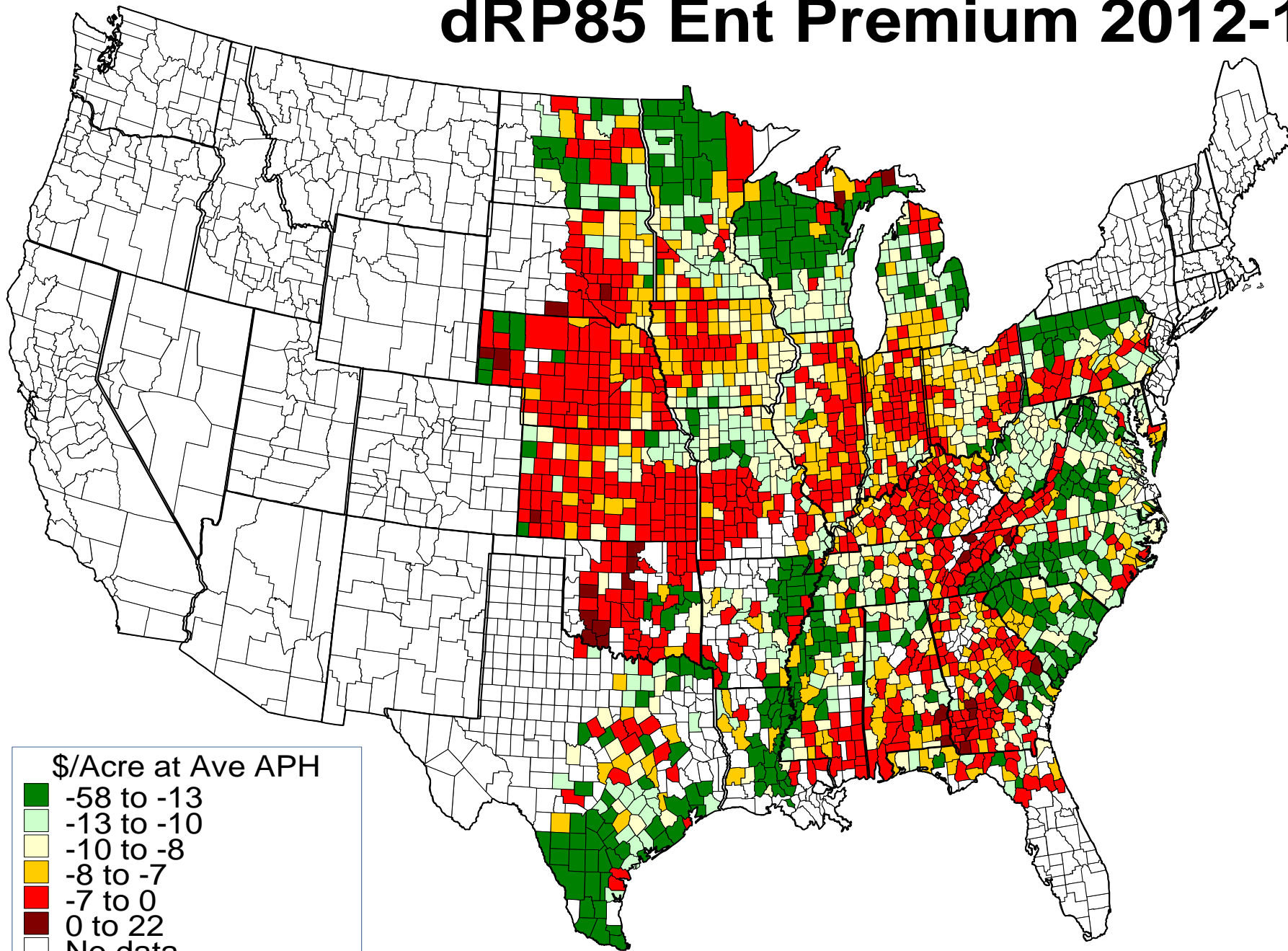


# RP85 Ent Premium 2015





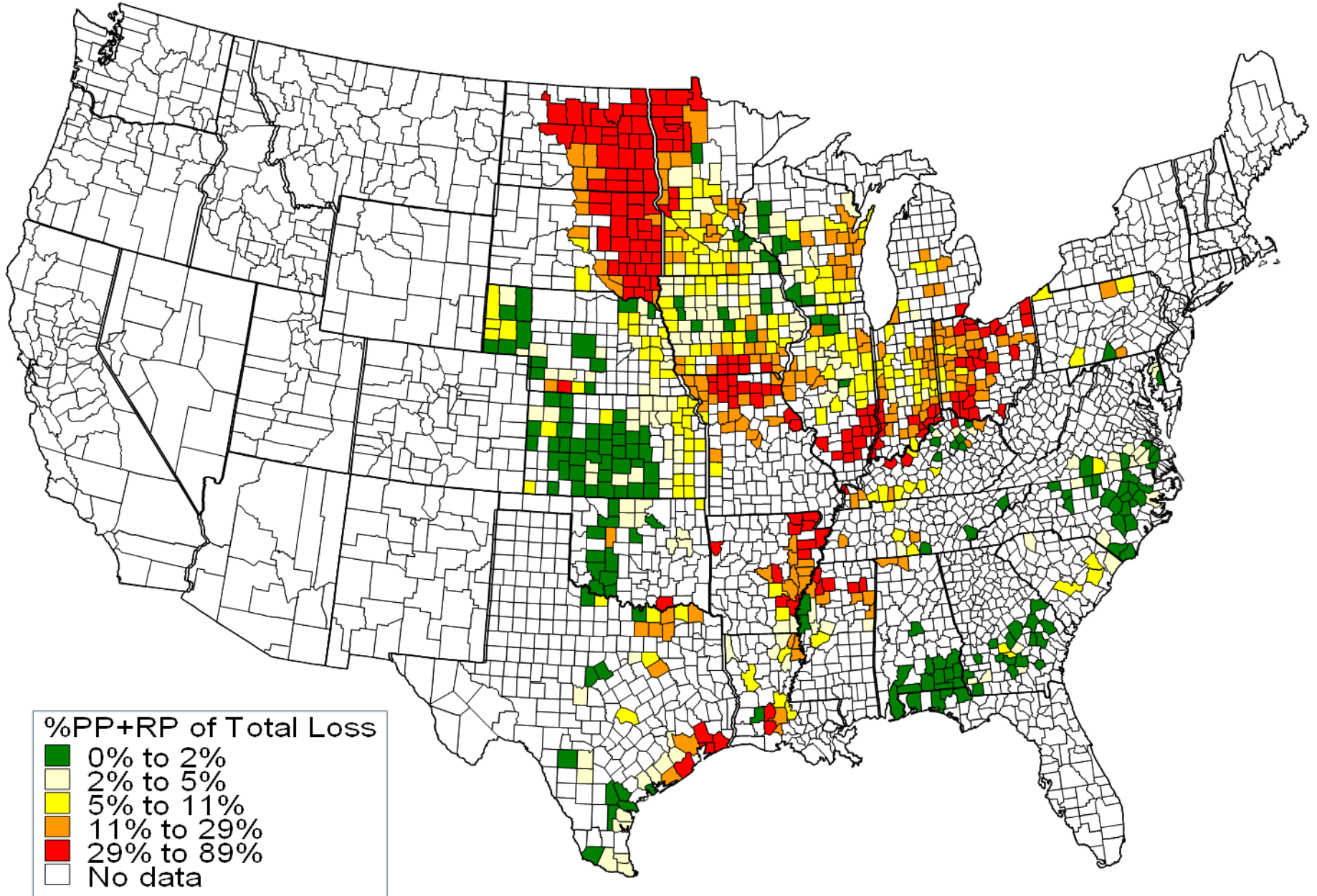
# dRP85 Ent Premium 2012-15



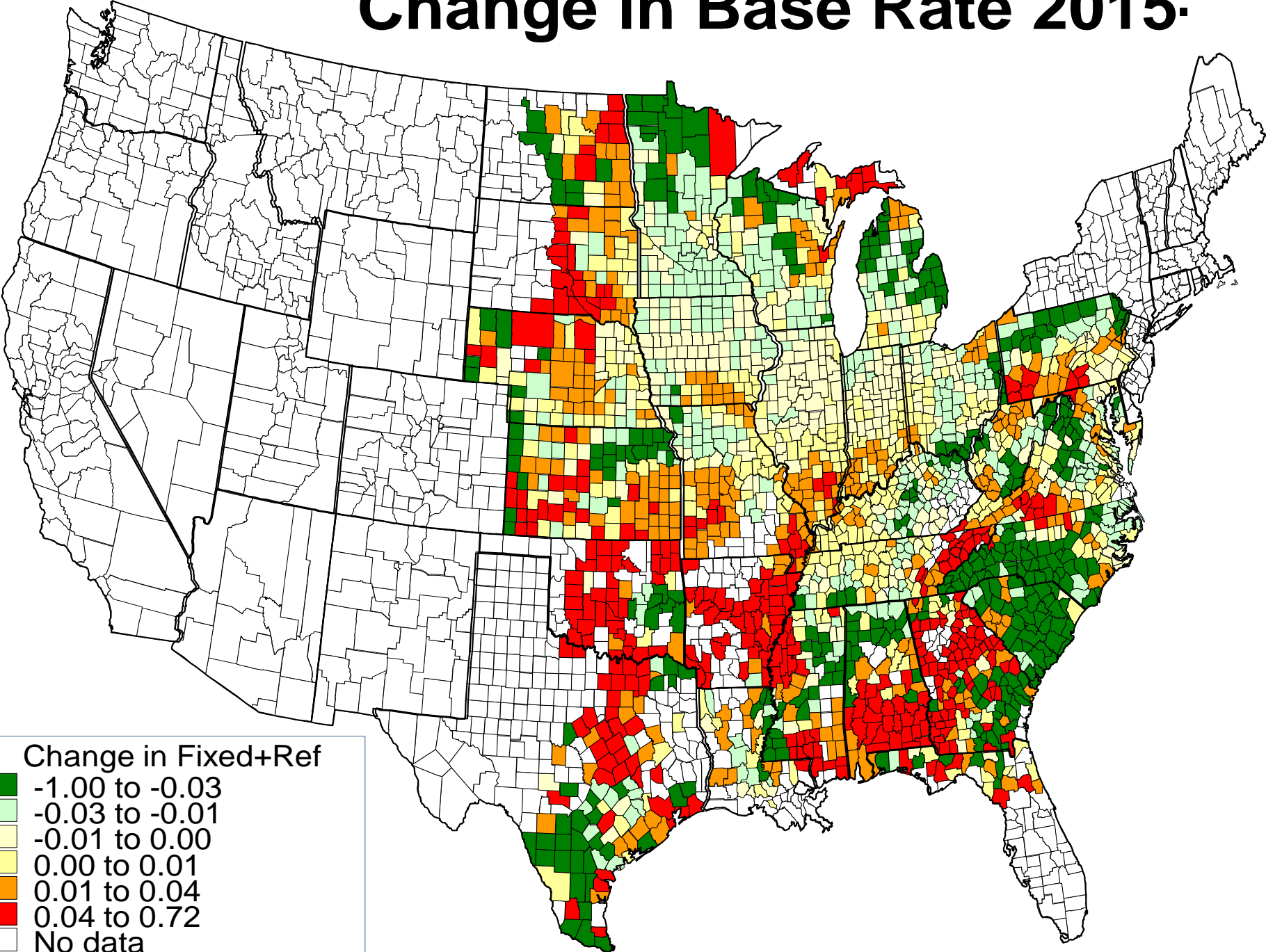
\$/Acre at Ave APH

- 58 to -13
- 13 to -10
- 10 to -8
- 8 to -7
- 7 to 0
- 0 to 22
- No data

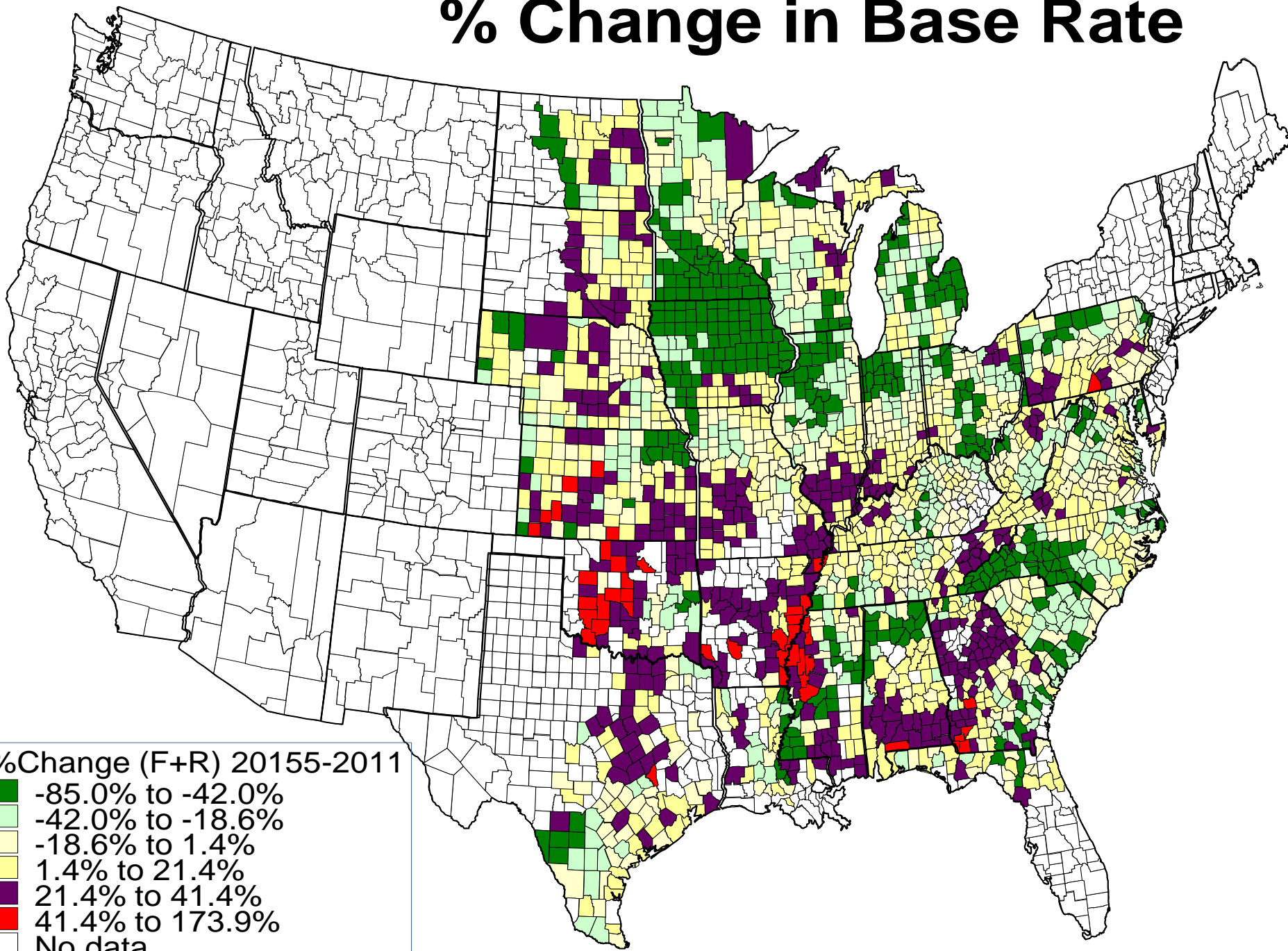
# % of Loss from Prevented and Replant



# Change in Base Rate 2015.



# % Change in Base Rate



%Change (F+R) 20155-2011

- 85.0% to -42.0%
- 42.0% to -18.6%
- 18.6% to 1.4%
- 1.4% to 21.4%
- 21.4% to 41.4%
- 41.4% to 173.9%
- No data

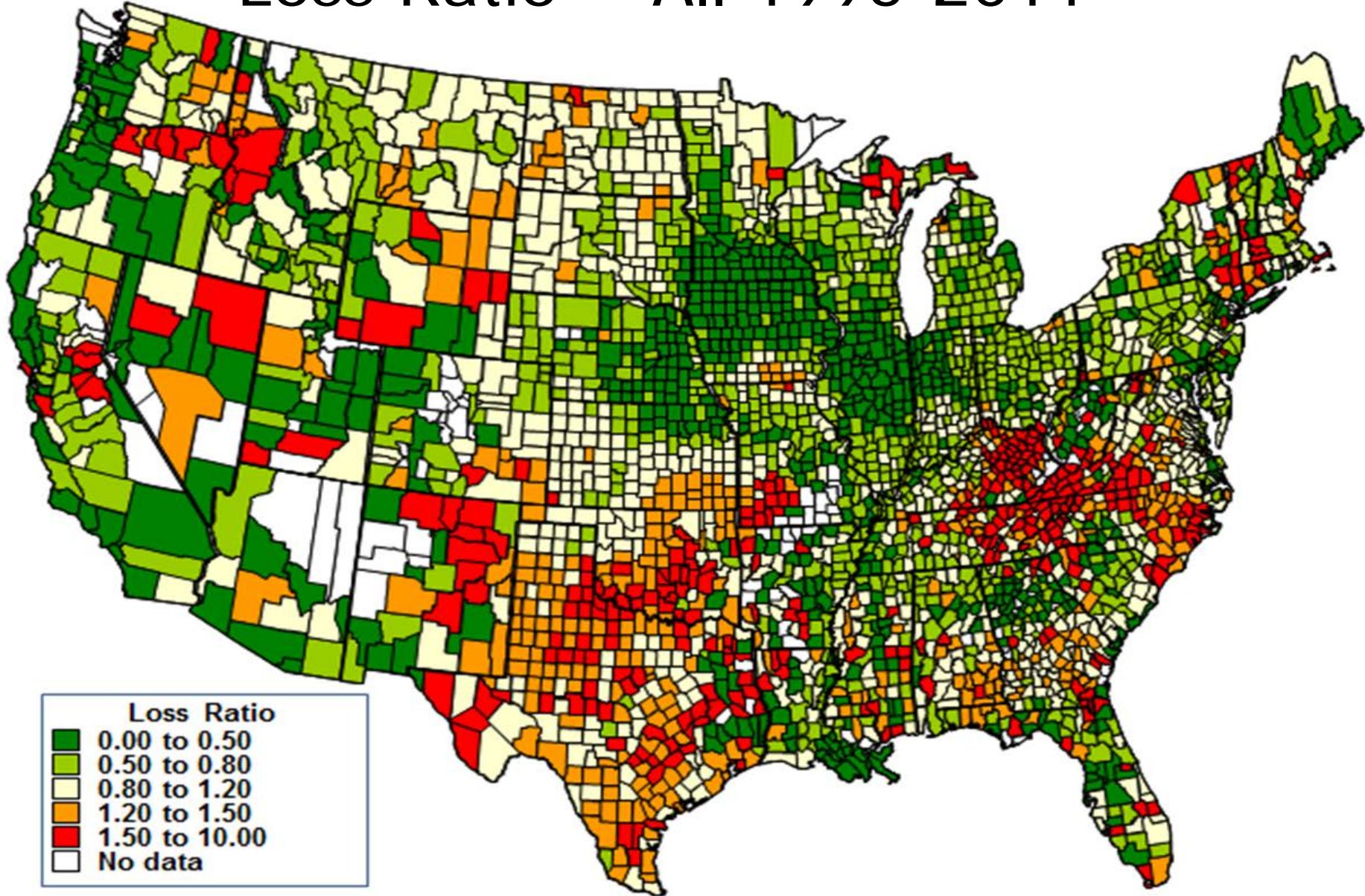
# AIP Company Loss issues

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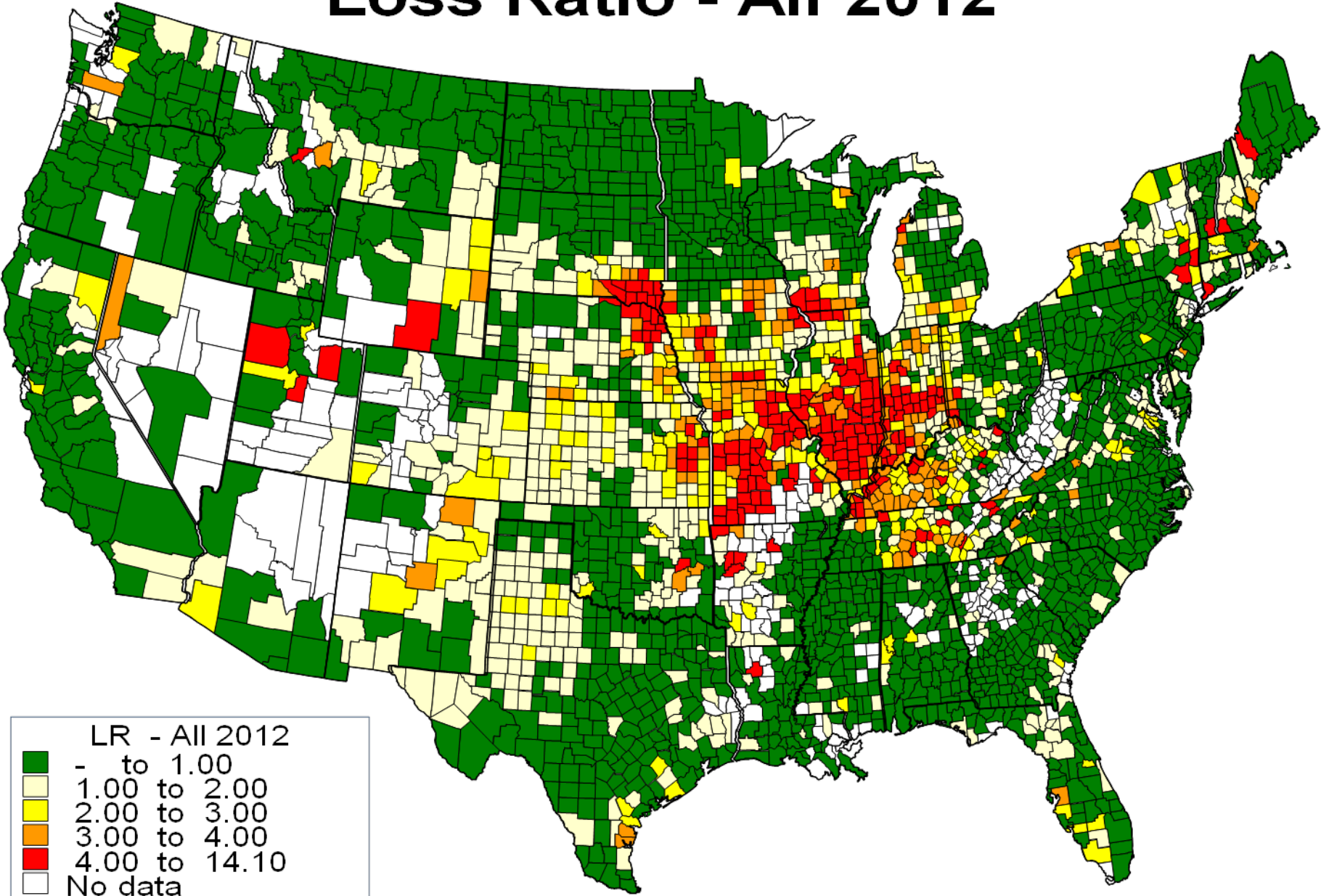
- Argued that 2012 “more than wiped out all gains”. Argued that reductions in rates “went too far” and should be reconsidered. “Implemented too fast”
- Why? SRA negotiations(?), perhaps A&O lobby as well as UW gains. Group1 vs. Group 2 more equilibrated. Other needs to cover costs and ROR(P)
- Need to understand SRA in addition to Ratings design to appreciate performance of programs
- Co.’s fortunate to have lost ceding argument
- Fund designation decisions and reinsurance design had huge impact on individual performance



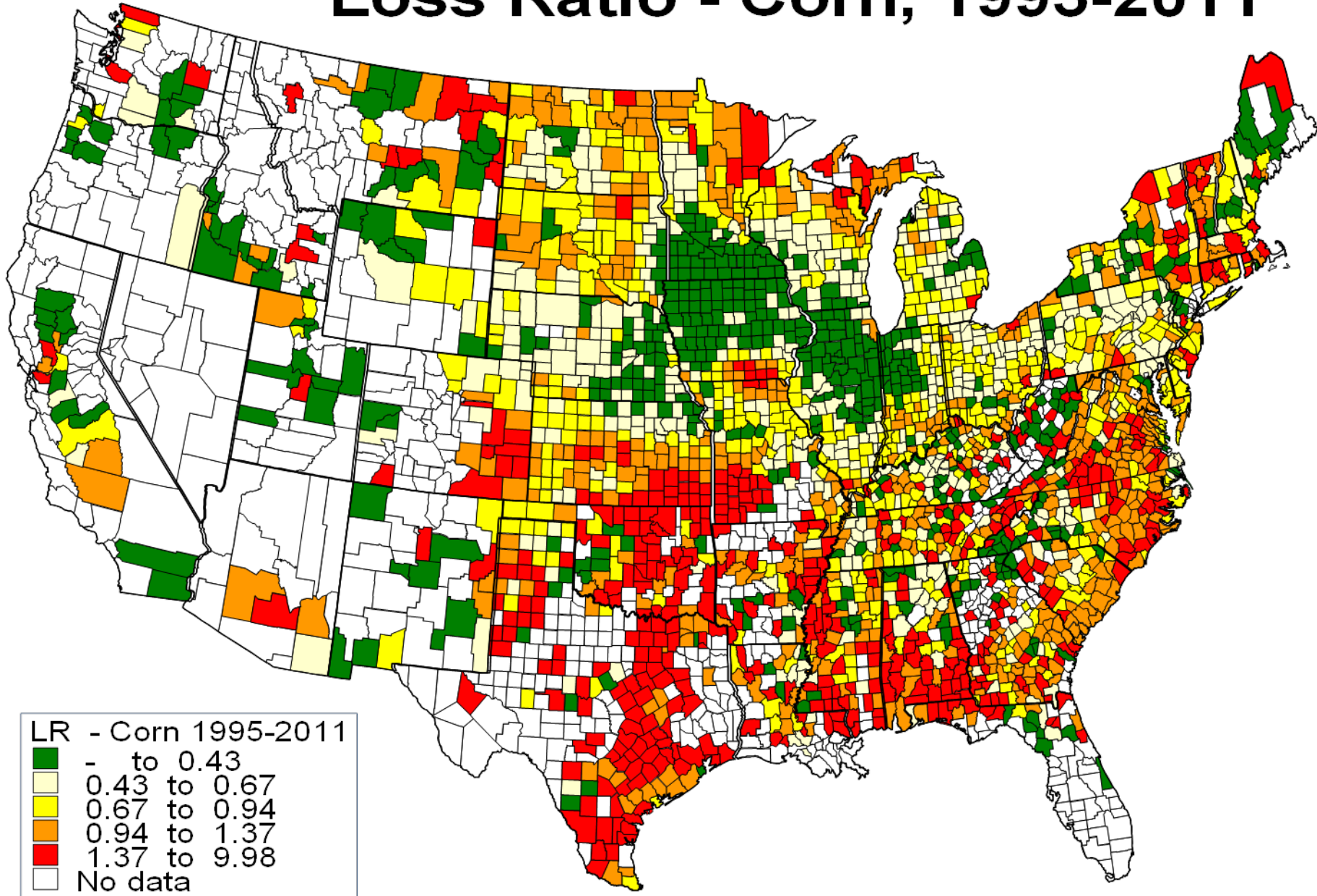
# Loss Ratio - All 1995-2011



# Loss Ratio - All 2012

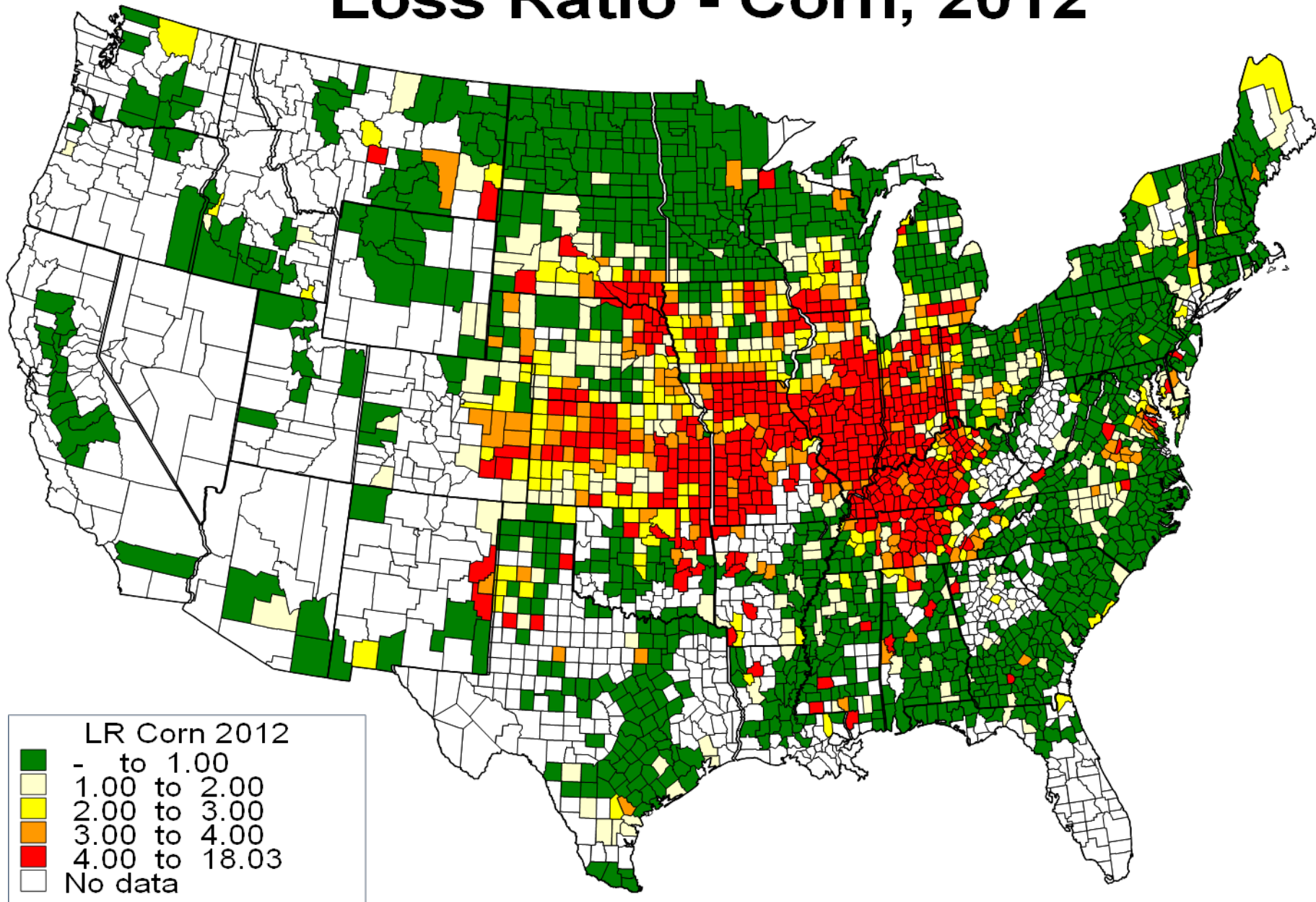


# Loss Ratio - Corn, 1995-2011

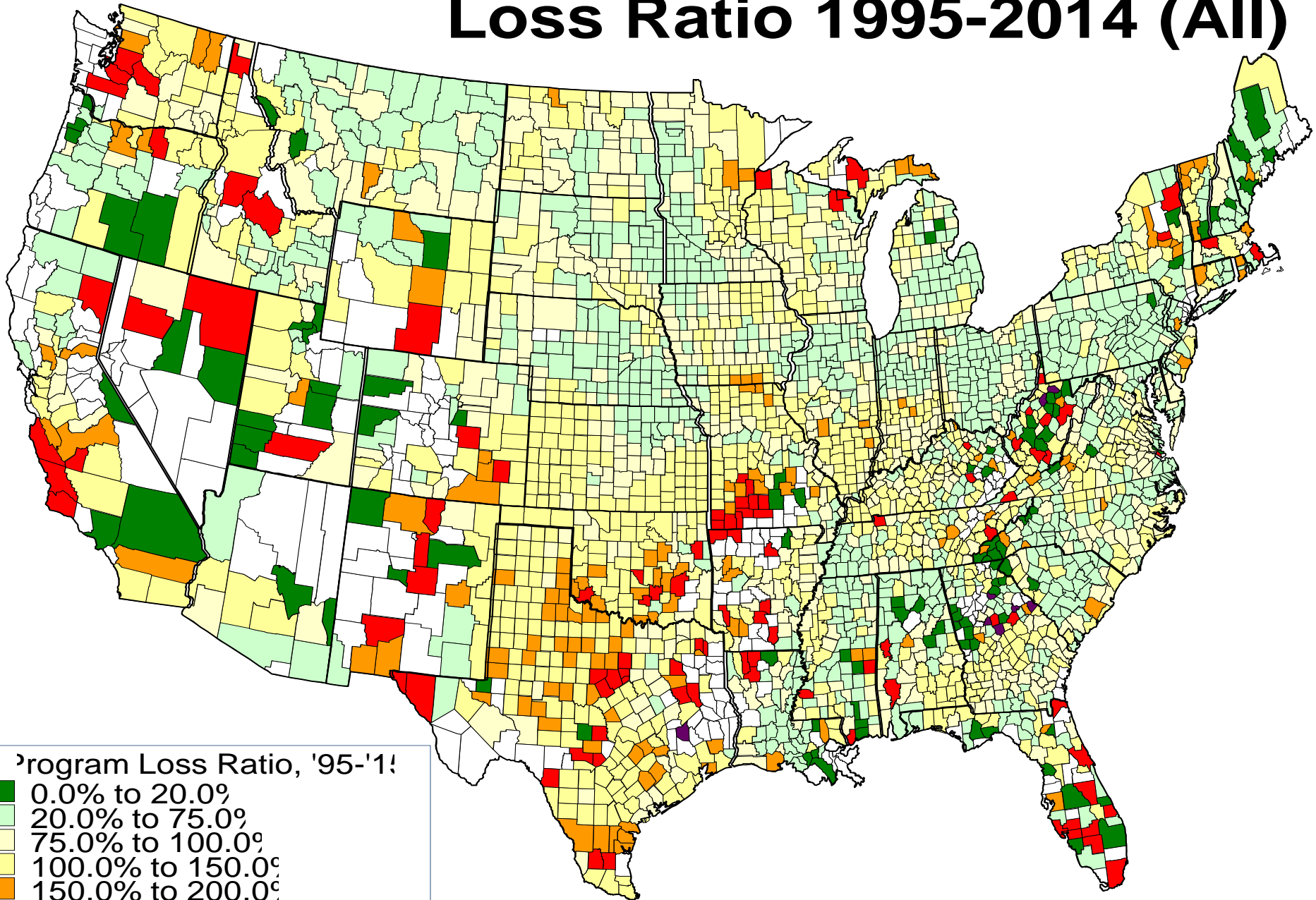




# Loss Ratio - Corn, 2012



# Loss Ratio 1995-2014 (All)



Program Loss Ratio, '95-'14

- 0.0% to 20.0%
- 20.0% to 75.0%
- 75.0% to 100.0%
- 100.0% to 150.0%
- 150.0% to 200.0%
- 200.0% to 1300.0%
- No data

# SRA loss sharing in perspective

Final losses/gains (\$) after SRA split shares and 6.5% required ceding

LR	Assigned Risk		Commercial 1		Commercial 2	
	AIP	FCIC	AIP	FCIC	AIP	FCIC
0.75	0.0526	0.1974	0.1753	0.0747	0.2221	0.0279
<b>1.00</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>
1.50	0.0351	0.4649	0.3039	0.1961	0.1987	0.3013
1.75	0.0505	0.6995	0.4278	0.3222	0.2665	0.4835
2.00	0.0645	0.9355	0.5330	0.4671	0.3132	0.6868
2.25	0.0771	1.1729	0.6218	0.6282	0.3530	0.8970

Group 1: IL, IN, IA, MN, NE

Group 2: All Others



# Crop Insurance Payments, 1995-2015

Table 1. Federal Crop Insurance, All locations, all Buyup, \$ Millions (except rates)

year	Total Premium	Farmer Subsidy	Indemnity Payments	Loss Ratio	\$Gain(loss)	%Prem Gain Rate	Farmer Prem Paid - \$	Farmer Net - \$
1995	1,090.51	436.53	1,400.14	1.284	(309.63)	-28.39%	653.98	746.16
1996	1,408.70	552.20	1,342.66	0.953	66.04	4.69%	856.50	486.17
1997	1,426.08	553.51	949.74	0.666	476.34	33.40%	872.57	77.17
1998	1,518.80	588.57	1,563.45	1.029	(44.65)	-2.94%	930.23	633.22
1999	2,014.35	1,096.10	2,352.76	1.168	(338.41)	-16.80%	918.25	1,434.52
2000	2,275.32	1,083.05	2,528.99	1.111	(253.67)	-11.15%	1,192.27	1,336.72
2001	2,715.81	1,528.02	2,909.97	1.071	(194.16)	-7.15%	1,187.79	1,722.18
2002	2,684.65	1,510.11	3,988.37	1.486	(1,303.72)	-48.56%	1,174.53	2,813.83
2003	3,205.47	1,816.15	3,216.22	1.003	(10.75)	-0.34%	1,389.33	1,826.89
2004	3,944.25	2,235.54	3,155.23	0.800	789.02	20.00%	1,708.71	1,446.53
2005	3,712.43	2,107.03	2,266.52	0.611	1,445.92	38.95%	1,605.40	661.11
2006	4,364.95	2,467.49	3,434.57	0.787	930.37	21.31%	1,897.46	1,537.11
2007	6,288.72	3,549.87	3,487.32	0.555	2,801.40	44.55%	2,738.85	748.47
2008	9,515.19	5,354.88	8,605.09	0.904	910.10	9.56%	4,160.32	4,444.78
2009	8,641.23	5,117.98	5,147.38	0.596	3,493.85	40.43%	3,523.25	1,624.13
2010	7,327.19	4,444.26	4,209.54	0.575	3,117.66	42.55%	2,882.93	1,326.61
2011	12,135.03	7,375.00	10,900.46	0.898	1,234.57	10.17%	4,760.04	6,140.43
2012	11,104.57	6,827.47	18,285.65	1.647	(7,181.09)	-64.67%	4,277.09	14,008.56
2013	11,543.70	7,034.38	12,018.53	1.041	(474.83)	-4.11%	4,509.33	7,509.21
2014	9,817.25	5,964.04	8,962.16	0.913	855.09	8.71%	3,853.21	5,108.95
2015	9,738.89	6,044.60	5,798.64	0.595	3,940.25	40.46%	3,694.29	2,104.35
Ave/year	5,546.34	3,223.18	5,072.54	0.938	473.79	0.06	2,323.16	2,749.39
Total (overall)	116,473.10	67,686.79	106,523.41	0.915	9,949.69	8.54%	48,786.31	57,737.10



# Normalized Scale Payments

Table 2. Federal Crop Insurance, All locations, All Crops, \$ Millions (except rates) 2015 basis

year	Total Premium	Farmer Subsidy	Indemnity Payments	Loss Ratio	\$Gain(loss)	%Prem Gain Rate	Farmer Prem Paid - \$	Farmer Net - \$
1995	9,738.89	3,898.48	12,504.09	1.284	(2,765.20)	-28.39%	5,840.41	6,663.68
1996	9,738.89	3,817.59	9,282.36	0.953	456.53	4.69%	5,921.30	3,361.06
1997	9,738.89	3,779.99	6,485.91	0.666	3,252.98	33.40%	5,958.90	527.01
1998	9,738.89	3,774.06	10,025.21	1.029	(286.32)	-2.94%	5,964.83	4,060.38
1999	9,738.89	5,299.39	11,375.03	1.168	(1,636.14)	-16.80%	4,439.50	6,935.54
2000	9,738.89	4,635.70	10,824.65	1.111	(1,085.76)	-11.15%	5,103.19	5,721.46
2001	9,738.89	5,479.47	10,435.16	1.071	(696.27)	-7.15%	4,259.42	6,175.74
2002	9,738.89	5,478.13	14,468.29	1.486	(4,729.40)	-48.56%	4,260.76	10,207.52
2003	9,738.89	5,517.82	9,771.54	1.003	(32.65)	-0.34%	4,221.07	5,550.48
2004	9,738.89	5,519.86	7,790.70	0.800	1,948.19	20.00%	4,219.03	3,571.67
2005	9,738.89	5,527.41	5,945.79	0.611	3,793.10	38.95%	4,211.48	1,734.31
2006	9,738.89	5,505.36	7,663.08	0.787	2,075.81	21.31%	4,233.53	3,429.54
2007	9,738.89	5,497.43	5,400.56	0.555	4,338.33	44.55%	4,241.46	1,159.10
2008	9,738.89	5,480.77	8,807.39	0.904	931.50	9.56%	4,258.12	4,549.27
2009	9,738.89	5,768.10	5,801.23	0.596	3,937.66	40.43%	3,970.79	1,830.43
2010	9,738.89	5,907.06	5,595.08	0.575	4,143.81	42.55%	3,831.83	1,763.25
2011	9,738.89	5,918.75	8,748.09	0.898	990.80	10.17%	3,820.14	4,927.96
2012	9,738.89	5,987.81	16,036.82	1.647	(6,297.93)	-64.67%	3,751.08	12,285.74
2013	9,738.89	5,934.58	10,139.48	1.041	(400.59)	-4.11%	3,804.31	6,335.17
2014	9,738.89	5,916.43	8,890.63	0.913	848.26	8.71%	3,822.46	5,068.17
2015	9,738.89	6,044.60	5,798.64	0.595	3,940.25	40.46%	3,694.29	2,104.35
Ave/year	9,738.89	5,196.20	9,321.08	0.957	417.81	4.29%	4,542.69	4,778.38
Total (overall)	185,038.91	98,727.77	177,100.45	0.957	7,938.46	4.29%	86,311.14	90,789.31



# Post-SRA losses in perspective

Table 3. SRA Allocations per dollar of Premium

	Assigned Risk		Commercial Fund				
	AIP	FCIC	Group 1	AIP	FCIC	Group 2	AIP
1995	-0.0199	-0.2640	-0.1726	-0.1114	-0.1128	-0.1711	
1996	0.0099	0.0370	0.0329	0.0140	0.0416	0.0052	
1997	0.0703	0.2638	0.2342	0.0998	0.2967	0.0373	
1998	-0.0021	-0.0273	-0.0179	-0.0115	-0.0117	-0.0177	
1999	-0.0118	-0.1562	-0.1021	-0.0659	-0.0668	-0.1012	
2000	-0.0078	-0.1037	-0.0678	-0.0437	-0.0443	-0.0672	
2001	-0.0050	-0.0665	-0.0435	-0.0280	-0.0284	-0.0431	
2002	-0.0341	-0.4516	-0.2951	-0.1905	-0.1930	-0.2926	
2003	-0.0002	-0.0031	-0.0020	-0.0013	-0.0013	-0.0020	
2004	0.0421	0.1580	0.1403	0.0598	0.1777	0.0224	
2005	0.0786	0.3109	0.2602	0.1293	0.3257	0.0638	
2006	0.0448	0.1683	0.1495	0.0637	0.1893	0.0238	
2007	0.0857	0.3598	0.2811	0.1643	0.3466	0.0989	
2008	0.0201	0.0755	0.0671	0.0286	0.0850	0.0107	
2009	0.0805	0.3238	0.2658	0.1386	0.3312	0.0731	
2010	0.0832	0.3423	0.2737	0.1518	0.3391	0.0864	
2011	0.0214	0.0803	0.0713	0.0304	0.0904	0.0114	
2012	-0.0447	-0.6020	-0.3843	-0.2624	-0.2472	-0.3995	
2013	-0.0029	-0.0382	-0.0250	-0.0161	-0.0163	-0.0248	
2014	0.0131	0.0491	0.0436	0.0186	0.0553	0.0070	
2015	0.0180	0.0675	0.0599	0.0255	0.0759	0.0095	
Ave/year	0.0131	0.0491	0.0436	0.0186	0.0553	0.0070	
Weighted	0.0244	0.0288	0.0421	0.0111	0.0902	-0.0370	



# Farm Bill Crop Insurance Mutations

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- Conservation compliance – *not too bad*
- YE Ability to drop low yields from APH - *bad*
  - Yield Exclusion allowed in cases where county or contiguous county had yield below 50% of simple average of prior 10 years
  - Does not change rate yield
  - Equivalent to change in effective coverage
  - May lose portion of Trend Adjustment
- New Supplemental Coverage Option or SCO – *low relevance*



# Yield Exclusion – in practice

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- Does NOT depend on individual yield
- Immediately preceding crop year not available
- Can choose by individual APH database, can change decision in future
- Do not have to exclude if eligible county/crop
- YE or YA only – *actual yield* options only.
- Equivalent to changing “amount of insurance”
- Contiguity criterion seems baseless



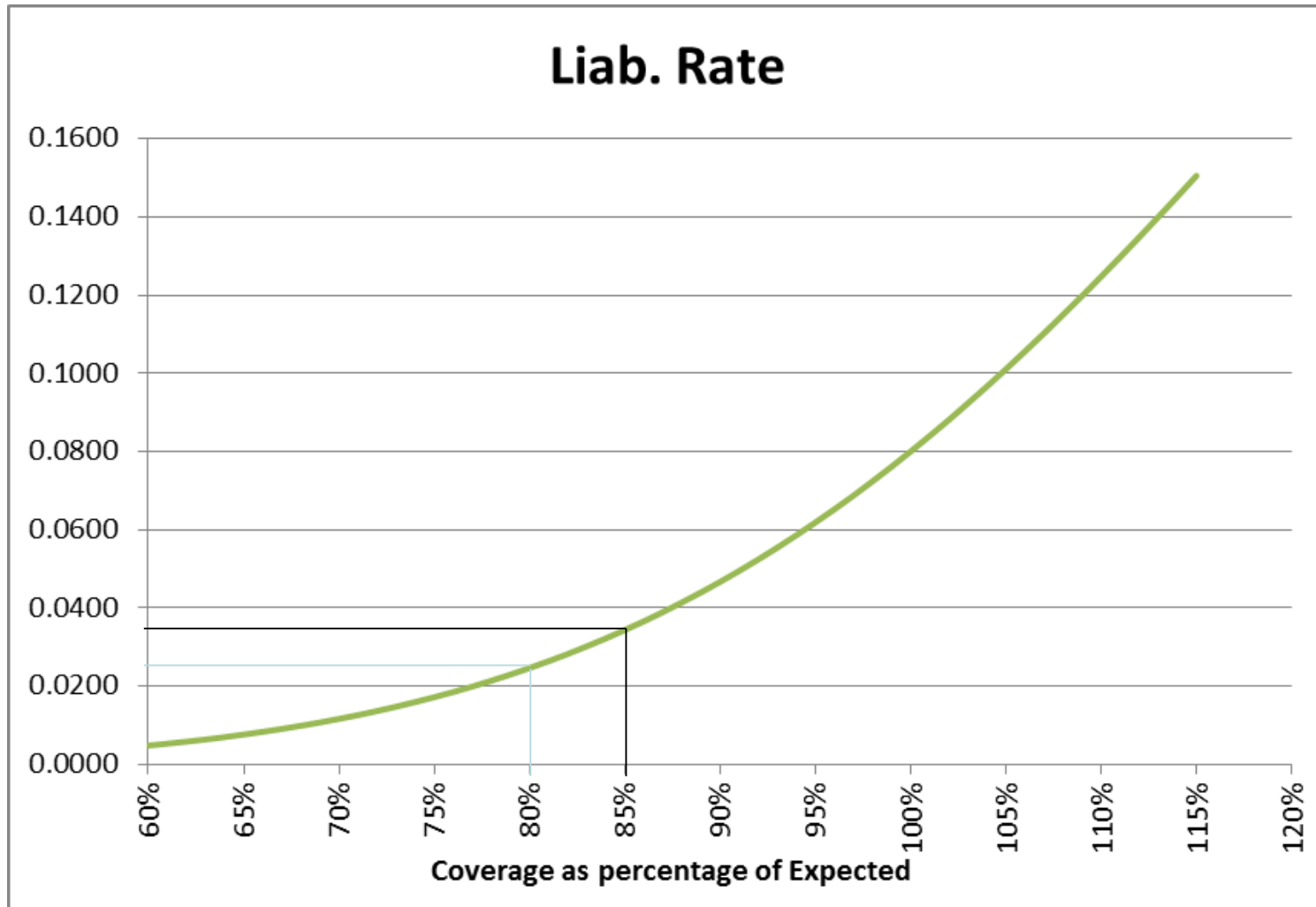


# Yield Exclusion – in practice

- **Producer has an APH data base and either a yield or a yield plug in a year eligible to exclude**
  - **Identifies the year to “drop” from calculation of APH**
  - **Continuous policy provision, doesn't add other years**
  - **If “count” used in TREND <4, Trend also reduced**
  - **Average of remaining yields becomes Coverage APH**
  - **Original average including low yield remains Rate yield**
  - **Calculate new effective Coverage rate**
  - **Calculate point on rate curve associated with new effective Coverage rate**
  - **Premium = effective coverage rate times Coverage APH**



# Ex: Coverage Rate Curve (Co.)



# Yield Exclusion – example

Step	Value	Description
1	180.0	All-data APH (used as rate yield)
2	80%	Coverage
3	144	Liability in bushels
4	2.47%	coverage rate
5	3.55	premium prior to subsidy, in bushels
	(times price times 1-subsidy = farmer cost)	\$ 7.53
6	191.0	Excluded Yield APH
7	80%	Coverage
8	152.8	Liability in bushels
9	84.89%	Implied Coverage = row8/row1
10	3.97%	implied coverage rate
11	6.0708	premium for excluded APH coverage
	needed to maintain same loss ratio relationship	\$ 12.87



# Yield Exclusion – example

	APH	YE-APH	Subsidy
Coverage	180	191	Rate
60%	108	115	80%
65%	117	124	80%
70%	126	134	80%
75%	135	143	77%
80%	144	153	68%
85%	153	162	53%



# Yield Exclusion – issues

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- **Highly counter to most standard actuarial principles.**
- **Excluded yield does not have to be “low”**
- **Rate differences can vary greatly across a county line**
- **Most likely in areas with higher starting loss ratios – less evidence of need**
- **Does not improve estimate of expected yield**
- **Black-eye potential for program**



# Supplemental Coverage Option

- Crop insurance program introduced in 2014 Farm Bill (run by RMA, not by FSA)
- Underlying combo product required
  - SCO covers a portion of the underlying policy deductible range
- County-triggered (86%), coverage down to individual policy coverage level
- Farms/commodities enrolled in ARC program are not eligible for SCO
- Payments on planted acreage, no payment limit on indemnities received
- HUGE ratings exercise for RMA, “little juice for the squeeze”



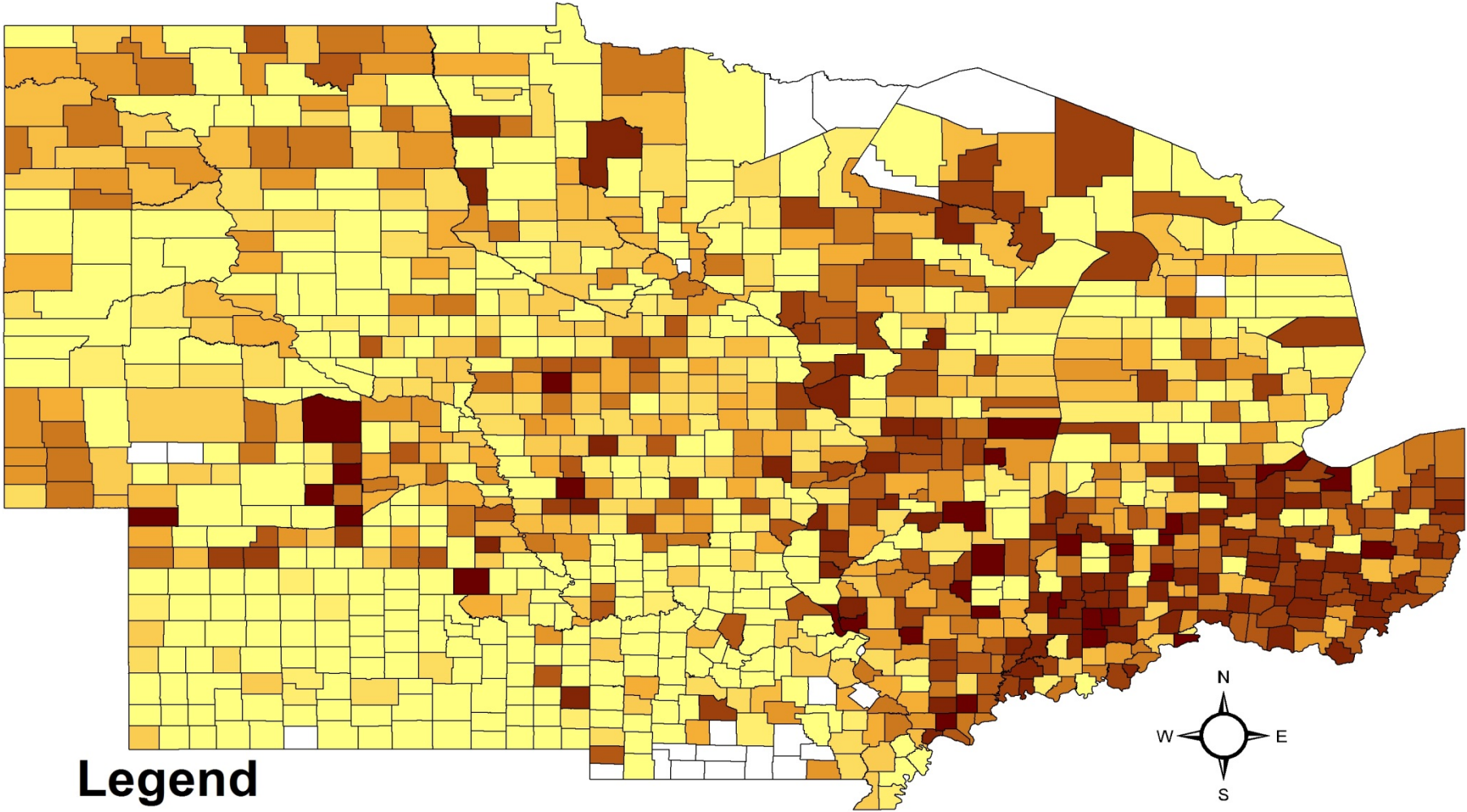
# Do SCO Strategies Pay More?

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- For enterprise units, the “best” expected paying SCO strategy is RP 80% with SCO to take advantage of differential subsidies
- But, it is largely now an academic exercise
- Most chose ARC, so not eligible



# 2015 ARC Payments - Average



## Legend

\$0.00 - \$5.59	\$22.30 - \$28.85	\$42.17 - \$49.28	\$63.47 - \$70.48
\$5.60 - \$15.29	\$28.86 - \$35.57	\$49.29 - \$56.46	\$70.49 - \$76.90
\$15.30 - \$22.29	\$35.58 - \$42.16	\$56.47 - \$63.46	\$76.91 - \$90.44



# Ratings issues and Qs

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- Insurance payments have reduced need for disaster assistance. Insurance worked largely as intended, *if that is the intent*
- 2012 drought (1-in-25 to 1-in-50 year event). Incomes good. 2013 was largest unintended consequence of 2012. Note: 2017 will likely follow 2016.
- Lower PP substantially reduces risk protection, increases need for higher coverage.
- Small payouts compared to other systemic insurance support programs, but still a favorite target for some budget axers, and “where the money is”



# Other Rating issues

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- SRA redesign likely needed to maintain active RE
- Delivery models inefficient for small policies
- Reduction of dependence on underwriting gains is tricky
- Omitted information from rating system, but ratings update mechanisms are not well suited to be changed
- New technologies in ag and new technologies for location specific informational inputs – (horizon has *not* been defeated – Jack Johnson)
- Private incentive issues



# Implications for Risk Management

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- Underwriting gains in most years, but bad years are really bad. Had program been the same size in previous ten-years, accumulated insurance gains would have more than covered losses. Insurance worked, *SRA and A&O???* ..
- Opinions: Lenders and grain handlers will be among “last ones standing” as AIPs
- Fund Designation increasingly critical
- Not a good conduit for targeted non insurance support (YE)
- Continued NRS Developments to compete



# Questions?

*Thanks!*

*Feel free to email questions/comments to:*

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