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Prevented planting: Midwest flooding carves out uncharted terrain for crop insurers

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Drenching rains have flooded vast stretches of land across the Midwestern farm belt, swallowing fields, killing livestock, adulterating stockpiled grains, and subsuming roadways, rail lines, and other infrastructure. Unprecedented in their scope, these rains and lingering flooding have devastated the region's agricultural economy and left many farmers with a difficult choice of deciding whether it is worthwhile to plant this growing season. Their decisions will have a substantial impact on insurers' crop insurance losses. How large might losses be and where might the largest losses originate? A growing amount of data points to record insured prevented planting (PP) losses.

This year's flooding has been compared with the Great Flood of 1993, one of the worst in American history. That comparison is unfortunately all too accurate. The conditions leading up to this year's flooding—the heavy rains in 2018, the wet winter, and heavy spring rains—bear an eerie resemblance to 1993. That year, the rains continued through June.[1] This year, soil moisture in the corn belt continues to be well above average, according to June 24 soil rankings by the National Oceanic and Atmospheric Administration (NOAA).

TABLE 1: DELAYED PLANTING FOR SELECTED CORN-PRODUCING STATES

State	1993	2019	Average*	2019 Difference to Average
ILLINOIS	86	35	91	-61%
INDIANA	94	22	82	-73%
IOWA	83	76	94	-19%
KANSAS	90	70	91	-23%
KENTUCKY	92	82	84	-3%
MICHIGAN	90	33	82	-60%
MINNESOTA	85	66	92	-28%
MISSOURI	79	65	87	-25%
NEBRASKA	95	81	93	-13%
NORTH DAKOTA	N/A	63	85	-26%
OHIO	96	22	80	-73%
SOUTH DAKOTA	69	25	83	-70%
WISCONSIN	75	46	83	-45%

Source: NASS;

* Average 1979-2018 excluding 1993.

[1] Bosman, J., Turkewitz, J., & Williams, T. (June 4, 2019). In Midwest, relentless flooding dredge up "shadow" of 1993. New York Times.

A challenge in its own right, the flooding has also dumped tons of silt on farmlands, submerged tractors and other equipment, and littered fields with tanks, dead animals, and other debris. Even if the rains subsided for a while, before farmers can start planting they must still re-level the ground to ensure proper drainage, repair or replace flooded equipment, and remove debris from their fields, which could take three or four weeks. Perhaps even more troubling is the likelihood of more wet weather, which could wash away this year's crops if farmers do proceed with planting.

These issues have delayed planting. Only 58% of acres were planted across the 18 largest corn-producing states, down from a five-year average of 90%, according to the May 26 Crop Progress Report. This difference reflects the fact that a large number of states have planted only 20% or 30% of their acreage, far less than their five-year average. Table 1 below ("Delayed Planting for Selected Corn-Producing States") shows 2019 compared with historical averages as well as 1993.

Farmers generally purchase crop insurance policies from an Approved Insurance Provider (AIP), a public-private partnership with the federal government's U.S. Department of Agriculture Risk Management Agency (RMA). The multi-peril crop insurance (MPCI) polices define a Final Planting Date (FPD), which typically occurs in May or June depending on the crop. If the crop is not planted by this date, farmers have three choices: file a claim under PP, try to prepare the land for planting by the crop's End of Late Planting Date (ELPD), or plant a different crop. Those farmers who take the second alternative, and try to plant by the ELPD, see a 1% reduction in their crop protection coverage each day through the late planting period, the end of which is quickly approaching for many crops.[2]

A PP claim can be made if the crop is not planted for insurable causes such as excess moisture. Payment is 55% of the guarantee for corn and 60% for soybeans, although additional coverage can be selected. For example, a farm with a 200 bushel per acre Actual Production History (APH) yield for corn would be paid $374 per acre (200 APH yield x $4.00, this year's projected price per bushel, x 85% coverage level x 55% prevented payment factor).

[2] Schnitkey, G., C. Zulauf, K. Swanson, and R. Batts. "Prevented Planting Decision for Corn in the Midwest." farmdoc daily (9): 88, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, May 14, 2019.

[3] Office of Inspector General: Audit Report 05601-0001-31 (September 2013).

Prevented planting losses for 2019

The Federal Crop Insurance Reform and Department of Agriculture Reorganization Act of 1994 (1994 Act) required RMA to make prevented planting coverage a basic part of crop insurance policies in order to lessen the need for ad hoc disaster assistance for producers who were prevented from planting.[3] Because PP coverage was not available in 1993, no direct comparison can be made with this disastrous year. And while conditions are still changeable, a groundwork exists for estimating 2019 prevented planting losses using the National Agricultural Statistic Services (NASS) weekly published percentage of units planted, Crop Progress and publicly available data on historical liability, premium, and prevented planting data from RMA.

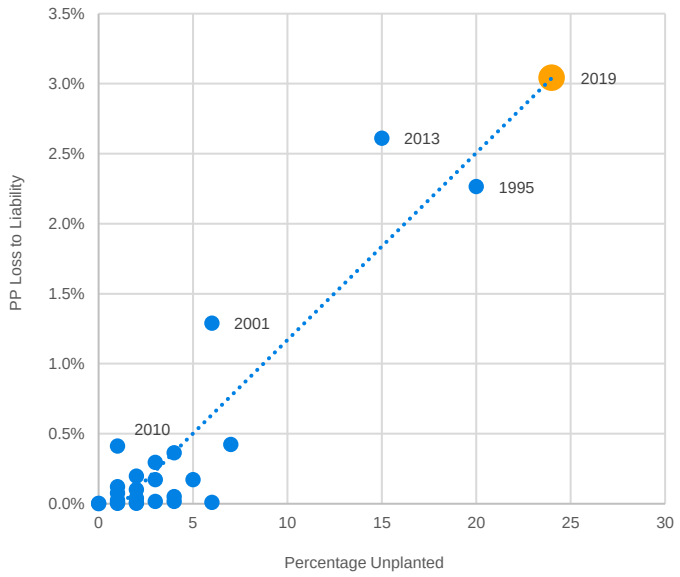
Using these data, a linear regression developed prevented planting losses to insured liability or a PP ratio as:

$$PP\ Ratio\ (y) = \alpha + \beta x$$

(where x = percentage unplanted)

For purposes of symmetry, historical NASS unplanted percentages for Iowa corn for Week 21(used in the regression) correspond to the May 26, 2019, NASS data. Based on this data, we estimate PP ratio for 2019 at 3%, the highest historical amount. The previous highest PP ratio for Iowa was in 2013, as shown in Figure 1. That year's result was followed closely by 1995. (It should be noted that 1995 had a higher unplanted percentage at Week 21.)

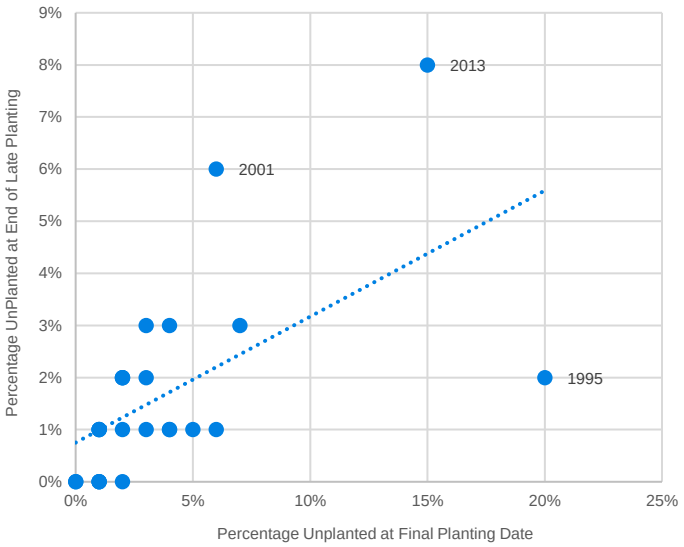
FIGURE 1: IOWA CORN PP LOSS TO LIABILITY RATIO BY PERCENTAGE UNPLANTED AT FINAL PLANTING DATE



The FPD for Iowa corn of May 31 has passed, and an ELPD of June 25 has allowed for some amount of planting. But how much planting is reasonable to expect given current conditions?

Some indication can be discerned by comparing the unplanted crop at Week 21 to the unplanted at the ELPD. For example, unplanted acreage in 1995 decreased from 20% to 2% over this timeframe while in 2013 the area decreased from 15% to 8%. These differences may partially explain why the 2013 PP ratio was higher than 1995's figure. It should be noted that NASS discontinues reporting planted percentages at some point, which constrained this analysis to the latest week available.

FIGURE 2: IOWA CORN PERCENTAGE UNPLANTED COMPARISON FINAL PLANTING AND END OF PLANTING DATES



While the amount planted by the ELPD is uncertain in many states, we can begin estimating PP losses from the current data and then replace the relevant data as new information becomes available.

Comparison of roll-up prevented planting losses to liability

Separate regressions, described above, for 22 of the largest premium states for corn and soybeans allow us to estimate PP ratios for each state and crop. Using the liability and premium amounts from 2018, we calculated the expected PP losses for 2019. As shown in Table 2, this analysis produces insured PP losses of approximately $1.4 billion for corn and $400 million for soybeans in 2019. This amount for corn and soybeans is nearly four times the historical average of $452 million (after adjusting for liability changes over time). With the exceptions of Kentucky, North Carolina, and Tennessee, the estimated 2019 PP ratio for corn in each state is greater than its historical average; often more than double and sometimes triple the historical average.

TABLE 2: CORN AND SOYBEAN PP LOSSES FOR LARGEST STATES

	Corn			Soybeans		
	2019			2019		
State	Estimated Premium in $ M	Estimated PP Loss Ratio	Historical PP Loss Ratio	Estimated Premium in $ M	Estimated PP Loss Ratio	Historical PP Loss Ratio
AR	20	121%	55%	45	6%	7%
CO	61	23%	15%	1	12%	7%
IA	382	60%	6%	232	10%	3%
IL	391	16%	4%	206	6%	5%
IN	179	38%	7%	134	7%	4%
KS	215	6%	2%	123	7%	2%
KY	53	6%	7%	50	3%	3%
LA	13	36%	17%	36	14%	10%
MI	55	15%	8%	47	3%	4%
MN	262	29%	10%	214	17%	5%
MO	174	47%	13%	162	34%	15%
MS	23	146%	55%	54	5%	4%
NC	28	1%	1%	46	0%	3%
ND	179	82%	35%	232	30%	18%
NE	328	4%	2%	134	2%	1%
OH	105	60%	11%	114	9%	4%
OK	10	13%	5%	16	4%	2%
PA	25	3%	2%	10	9%	3%
SD	289	171%	20%	184	76%	19%
TN	22	4%	6%	35	1%	2%
TX	74	7%	6%	6	20%	8%
WI	124	38%	8%	55	31%	8%
Total	3,012	46%	10%	2,136	19%	7%

Depending on late planting and the weather, the results of this analysis can change as the planting season elapses. Additionally, no adjustments for historical changes to the PP guarantee percentages or provisions were made in this analysis. Farmers may also decide to shift acreage to alternative crops. Final PP losses therefore will likely vary significantly from these estimates. But a recent article in *farmdoc daily* estimates prevented plant acres of 6.4 million for corn and 4.3 million for soybeans, "roughly 4 times the prevent plant acres…" of the average 2007-2018 years.[4] These amounts are consistent with the PP analysis above.

Total industry impact

Given the above constraints, we can still make some informed estimates regarding the impact of prevented planting losses on insurers' overall results.

Under the federal crop insurance program, an AIP can place each policy in either an Assigned Risk or Commercial Fund. Gains or losses are determined under the Standard Reinsurance Agreement (SRA), which each AIP is required to follow. This approach can result in comfortable gains when an AIP's loss ratio is less than 50%, but can also result in quickly deteriorating results above 50%. The impact can be seen by bifurcating losses between prevented planting estimated in the previous section and "all others," those losses that are incurred if a farmer plants but then experiences traditional yield and price risks throughout the growing season.

[4] Zulauf, C., Schnitkey, G., Swanson, K., Coppess, J., & Batts, R. (June 18, 2019). Prevent Plant for Corn and Soybeans, 2007-2018. farmdoc daily (9):112, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign.

FIGURE 3: STATE GROUP #1: COMMERCIAL FUND EXAMPLE

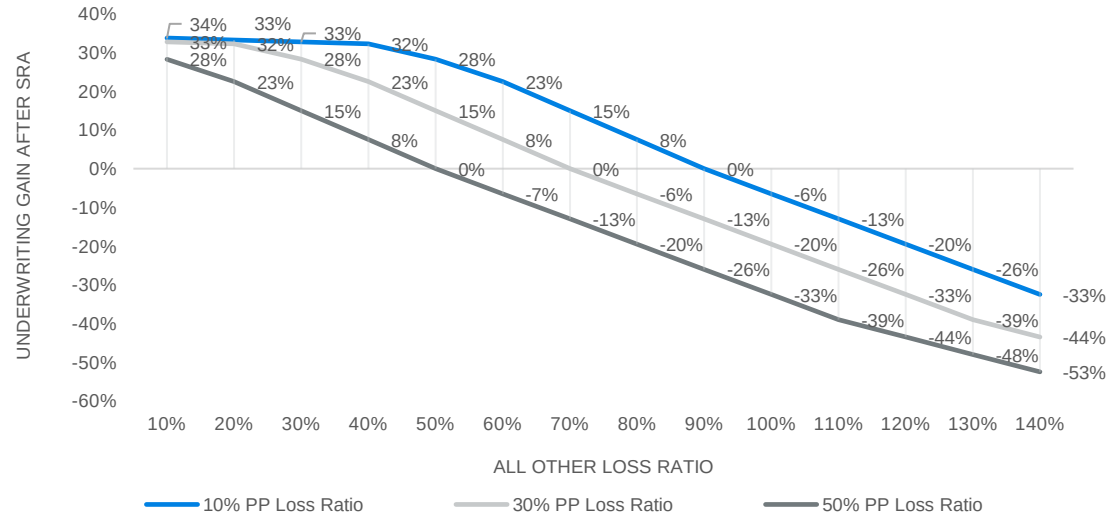


Figure 3, which displays the SRA underwriting gains for various “all other” loss ratios-based PP ratio scenarios at the 10%, 30%, and 50% levels, shows how quickly the “all other” loss ratios will erode the underwriting gain based on each PP scenario. For example, an AIP’s underwriting gain remains fairly stable at a PP ratio of 10% (blue line) if the "all other" loss ratio is 40% or less, but starts to trail off noticeably over 50%. This situation becomes much more pronounced at a PP ratio scenario of 50% (gray line).

With the heavy rains this spring, many states are expected to develop double-digit PP loss ratios, which will result in overall diminished underwriting gains or possibly losses. How leveraged the “all other” loss ratios will be in many states still depends on a number of factors, but PP losses are expected to be substantial. This means that ”all other” losses will need to be minimal in many states to maintain double-digit underwriting gains in these states, a highly unpredictable possibility given the uncertainty around how other crops may fare in these states. We would also expect significant fluctuations among AIPs due to geographical variations of exposures both between and within states. While it is too early to predict 2019 results with certainty, the underwriting returns posted in the last several years look like a fleeting possibility with each day farmers cannot plant. Further, this review does not contemplate the possible impact of lower-than-normal yields due to later planting on ”all other” losses or trade wars on the price of crops, which could drive losses still higher.

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