The CPC Seasonal Precipitation Outlook Signal, Reading NOAA's Three-Month Forward View On The Corn Belt

Why reading the Climate Prediction Center's three-month-ahead signed-probability precipitation outlook for the Midwest corn-soy belt surfaces useful regime context – with a counter-intuitive wet-outlook tail that delivers plus 1.63 percent fwd 60-day against a plus 0.29 percent baseline – but why the headline daily IC of plus 0.15 at p-value 2e-44 is inflated by serial correlation, and why the non-overlapping-period IC collapses to insignificance.

David Stendahl · Market Lab Analytics · November 2, 2026

What this signal is

The Climate Prediction Center is the forecasting arm of the National Oceanic and Atmospheric Administration responsible for the official US seasonal weather outlooks. Each month CPC publishes probabilistic three-month-ahead maps of precipitation anomalies for the lower forty-eight, categorized by terciles – below-normal, near-normal, above-normal. The signed probability for the Midwest corn-soy belt region at lead windows out to four months, averaged, forward-filled daily, summer-weighted, z-scored on a 252-trading-day rolling window, and tanh-bounded, is the composite this signal reads.

Higher composite reads WETTER forward outlook. Lower reads DRIER. The 26-year empirical pattern across 8,984 live-signal days from November 29, 1990 through October 30, 2026 runs clean three-regime. The Wet outlook tail delivers modestly bullish forward returns; the Dry outlook tail delivers modestly bearish returns. The middle Normal band hugs the baseline.

Current reading as of October 30, 2026: composite plus 0.871, Wet outlook, phase plus 1. Run start August 20, 2026 at 51 trading days in band. The 91st percentile of the full-history distribution.

Daily Spearman IC against CBOT Corn fwd 60-day return is plus 0.1466 at p-value 2.325e-44 across 8,984 live-signal days – deeply significant in isolation. The non-overlapping-period caveat is the critical layer. CPC outlooks persist for weeks between monthly map updates, producing serial correlation that inflates the daily IC. Non-overlapping sixty-day-block resampling with N equal 150 independent blocks softens the IC to plus 0.0805 at p-value 0.3275 – not statistically distinguishable from zero on independent samples. Read the composite bands as regime context, not standalone directional alpha.

State-conditional edges are three-regime. Wet outlook delivers plus 1.63 percent per-day forward 60-day on 40.9 percent of the sample. Normal outlook delivers minus 0.10 percent on 18.8 percent of the sample. Dry outlook delivers minus 0.87 percent on 40.4 percent of the sample. The directional spread is 2.50 pp from the Dry tail to the Wet tail – not as wide as direct drought-severity signals, but monotone in direction.

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How the CPC precipitation-outlook composite composes

The signal reads one direct observation and one derived gate.

Direct observation: CPC monthly seasonal precipitation outlook signed-probability for the MIDWEST_CORN_SOY_BELT region at lead windows up to four months ahead. The outlooks are published by NOAA's Climate Prediction Center, nominally on the third Thursday of each month, with mid-month updates when needed. Signed probability is a scalar from minus one to plus one representing the forecast tilt toward above-normal or below-normal precipitation.

Derived gate: a cosine-weighted monthly envelope that peaks in July. The gate acknowledges that corn is biologically vulnerable to precipitation anomalies during the June-through-August pollination and grain-fill windows, and biologically insensitive during the November-through-March dormant window. The raw outlook is multiplied by this seasonal weight before entering the z-score transformation.

Signal construction. Monthly readings averaged across lead windows, forward-filled daily, summer-weighted, z-scored on a 252-trading-day rolling window with 63-day minimum, tanh-bounded to the plus-or-minus one range. State thresholds plus-or-minus 0.5 define the Wet, Normal, and Dry outlook bands. The 252-day z-score window keeps the composite responsive to multi-month precipitation-regime shifts without being whipsawed by week-to-week forecast noise.

The seasonal gate matters. A deep dry-outlook reading in January carries much less corn-price relevance than the same reading in June, because January precipitation anomalies do not affect the planted but un-emerged crop. The summer-weighted gate dampens off-season readings and amplifies in-season readings before the z-score transformation applies.

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What the state-conditional returns have actually done

> **Reference baseline, CBOT Corn fwd 60-day unconditional**
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> CBOT Corn back-adjusted continuous forward-60-day return baseline over the live-signal window of 1990-11-29 through 2026-10-30: mean plus 0.29 percent, median minus 1.01 percent, standard deviation 10.89 percent, percent negative 56.2 percent. Sample 8,984 trading days with observable fwd 60-day. Note the negative median against the positive mean: a right-skewed return distribution typical of commodity benchmarks where occasional large rallies pull the mean positive while the typical day underperforms.

Per-day sampling, matching the daily Spearman IC construction:

Dry outlook (composite below minus 0.5) covers 3,650 trading days, 40.4 percent of the sample. Per-day mean fwd 60-day minus 0.87 percent, edge minus 1.16 pp below baseline. The Dry tail is modestly bearish – counter to naive drought-equals-bullish thinking, but consistent with the forecast-versus-realized distinction. CPC dry outlooks arrive BEFORE physical drought materializes; markets have time to price the risk, and if the drought does not verify the positioning unwinds. The 2012 and 2022 cases below illustrate the dynamic.

Normal outlook (composite between minus 0.5 and plus 0.5) covers 1,696 trading days, 18.8 percent of the sample. Per-day mean fwd 60-day minus 0.10 percent, edge minus 0.39 pp below baseline. The middle band is where corn trades the growing season's noise.

Wet outlook (composite above plus 0.5) covers 3,698 trading days, 40.9 percent of the sample. Per-day mean fwd 60-day plus 1.63 percent, edge plus 1.34 pp above baseline. The Wet tail is counter-intuitively bullish. Two hypotheses compete. One: CPC wet outlook co-occurs with La Nina or cool-phase atmospheric regimes that can suppress corn yields in some geographies regardless of total precipitation. Two: markets systematically overprice drought risk during the planting window; CPC wet-outlook signatures unwind short premium and let the market lift.

The directional spread is 2.50 pp from the Dry tail to the Wet tail. Monotone across the three regimes but with the critical non-overlap caveat on IC significance.

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Three cases that frame how to read this signal

Case 1: Summer 2012. The Dry outlook archetype that verified.

The 2012 US corn crop was pulled forward by an unusually warm March through May across the Corn Belt. By early June the CPC three-month precipitation outlook for the Midwest region had flipped sharply below normal, with signed probability deep in the dry tail. The composite ran in the Dry outlook band through the entire pollination window as the CPC maps caught the La Nina-adjacent atmospheric setup. The 2012 case is the canonical Dry outlook signature. The subsequent yield collapse and corn rally from 650 cents per bushel in June to above 800 by late July validated the dry-outlook thesis. The 2012 episode is one of the historical anchors for the Dry outlook state's underperformance pattern, because corn rallied through the summer leaving dry-outlook days with mixed-to-negative forward returns on the 60-day horizon as the rally crested.

Case 2: Spring 2019. The Prevent-Plant Wet outlook extreme.

The 2019 US corn planting was the slowest on NASS record due to record Midwest flooding. By mid-spring the CPC three-month precipitation outlook had moved deep into above-normal territory for the belt region, with signed probability topping the Wet outlook band through most of the planting window. The signal was correctly reading the atmospheric wet-regime setup. Corn initially rallied on prevent-plant acres then gave back ground as the delayed-silking crop avoided peak heat exposure. The 2019 case illustrates the Wet outlook state's complex relationship with corn. Wet-outlook raises planting-delay risk but reduces subsequent heat-stress exposure. Net effect ambiguous, which is part of why the non-overlap IC softens.

Case 3: Current. The Wet outlook reading at the 91st percentile.

As of October 30, 2026, the composite reads plus 0.871. Wet outlook, phase plus 1, run start August 20, 2026, 51 trading days in band. 91st percentile of the full-history distribution. CBOT Corn front-month trades near 448 cents per bushel. The critical July heat window has passed for the 2026 season, so the forward-return relevance of this specific reading is low – the signal is in post-growing-season setup mode. The 2027 pollination-vulnerability window opens in April 2027. The current reading carries structural information for the next growing season's atmospheric setup rather than directional alpha for the next 60 days.

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How to use the signal today

As of November 2, 2026, the composite reads plus 0.871 and the state is Wet outlook, 51 trading days running. CPC is calling strongly above-normal precipitation across the Midwest corn-soy belt over the three-month forward window. Historical Wet outlook firings deliver plus 1.63 percent per-day mean fwd 60-day, plus 1.34 pp above the plus 0.29 percent baseline.

But the non-overlapping-period caveat is the first and most important thing to read. The daily IC of plus 0.1466 at p-value 2e-44 is inflated by the serial correlation inherent to monthly outlook updates. Non-overlap IC softens to plus 0.0805 at p-value 0.33 (N=150). Read the current wet-outlook signature as regime context, not as a standalone directional read for the next 60 days.

Pair with three confirming reads for stacked conviction when the mechanism fires:

- **USDM Drought Corn States.** The direct D2-plus severity measurement from the US Drought Monitor seven-state corn-belt composite. CPC outlook is a FORECAST of forward precipitation; USDM is the REALIZED drought severity. Pair for forward-view plus current-state cross-reference. Daily IC plus 0.21 at p=9e-68 with non-overlap p=0.029 clean significant – unusually robust for a commodity signal.
- **AMO Amplifier.** The Atlantic Multidecadal Oscillation phase signal. AMO positive-phase decades correlate with La Nina frequency and Midwest drought cycles, providing teleconnection context for CPC outlook signatures.
- **Corn Silking Pace, State-Weighted Belt.** The pollination-vulnerability phenology signal. CPC wet-outlook signatures during the June-August pollination window amplify or dampen the phenology-driven yield risk pathway.

The CPC outlook reads one specific forecast dimension with a counter-intuitive wet-outlook edge and a non-overlap caveat. The pairing reads cover the realized drought severity, the atmospheric teleconnection setup, and the phenology window.

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Methodology notes

Data sources. (A) NOAA Climate Prediction Center monthly seasonal precipitation outlook. (B) weather_data.CPC_PRCP_OUTLOOK_SEASONAL table with region=MIDWEST_CORN_SOY_BELT and lead less than or equal to four months.

Signal construction. Monthly CPC signed-probability readings averaged across lead windows, forward-filled to daily frequency, multiplied by a cosine summer-weighted gate peaking in July, z-scored on a 252-trading-day rolling window with 63-day minimum, tanh-bounded to minus 1 to plus 1. State thresholds plus-or-minus 0.5 (Wet / Normal / Dry outlook bands). Target: CBOT Corn back-adjusted continuous.

Validation statistics. Daily Spearman IC against CBOT Corn fwd 60-day return is plus 0.1466 at p-value 2.325e-44 across 8,984 live-signal days from 1990-11-29 through 2026-10-30. State-conditional per-day means: Wet outlook plus 1.63 percent (edge plus 1.34 pp above plus 0.29 percent baseline), Normal outlook minus 0.10 percent (minus 0.39 pp vs baseline), Dry outlook minus 0.87 percent (edge minus 1.16 pp). The baseline median is minus 1.01 percent and the standard deviation is 10.89 percent; the distribution is right-skewed with 56.2 percent of fwd 60-day observations negative.

Non-overlapping-period robustness. Non-overlapping sixty-day-block resampling across N equal 150 independent blocks softens the IC to plus 0.0805 at p-value 0.3275 – not statistically distinguishable from zero on independent samples. CPC outlooks persist for weeks between monthly map updates, producing serial correlation that inflates the daily IC. Read the composite bands as regime context, not standalone directional alpha.

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What this signal does not cover

First, the signal reads a forecast, not a realized state. CPC outlooks are probabilistic three-month-ahead predictions that may or may not verify. The forward-return edge is contingent on the market's pricing of the forecast at the time of the reading; subsequent verification or non-verification of the forecast is a separate variable.

Second, the headline daily IC is autocorrelation-inflated. CPC outlooks persist for weeks between monthly map updates; consecutive trading days are not independent samples of the outlook signal. The non-overlapping-period IC collapses to insignificance on independent samples. Read the composite bands as regime context, not standalone directional alpha.

Third, the signal is seasonal. The forward-return edge concentrates during the April-October growing season when corn is biologically vulnerable to precipitation anomalies. The November-March dormant window produces readings that update the engine but carry minimal corn-price edge.

Fourth, the signal reads US Midwest corn-soy belt only. Brazilian safrinha corn, Argentine Pampas corn, and other geographic exposures have their own CPC-analog outlook systems and distinct seasonal patterns.

Broader caveat: the CPC Seasonal Precipitation Outlook signal is a forecast lens with counter-intuitive wet-outlook edge in the historical sample, but the non-overlapping-period IC softens to insignificance. Pair with USDM Drought Corn States for realized-severity cross-reference, AMO Amplifier for teleconnection context, and Corn Silking Pace for in-season phenology-vulnerability conviction.

This research brief is for informational purposes only and does not constitute investment advice. Past performance is not indicative of future results. Signal reads reflect historical state-conditional statistics with the non-overlapping-period IC caveat explicitly disclosed; any decision to act on signal readings is the reader's responsibility. Data sources: NOAA Climate Prediction Center monthly seasonal precipitation outlook, CBOT Corn back-adjusted continuous target. State-conditional statistics computed through 2026-10-30.