The NOAA Oceanic Nino Index Signal, A Smoothed ENSO Climate Lead

Reading the NOAA Oceanic Nino Index with a 60-day publication-aware shift and polarity inversion. ONI is the officially-published 3-month-smoothed Nino 3.4 SST anomaly; this slower-moving signal confirms climate persistence that the faster raw Nino 3.4 signal flags earlier. Daily Spearman IC plus 0.195 at p-value 1.7e-77.

David Stendahl · Market Lab Analytics · November 2, 2026

What this signal is, with the limits stated upfront

The Oceanic Nino Index is the official NOAA ENSO benchmark: a three-month centered mean of Nino 3.4 SST anomaly, published monthly. The smoothing filters short-term SST noise and leaves only persistent ENSO states. For US corn, La Nina ONI readings have historically pre-staged dry Corn Belt summers with meaningful yield-risk, driving corn rallies.

The signal reads NOAA ONI, applies a 60-day publication-aware shift (ONI is the centered mean, so the published value already contains forward-looking information; the shift realigns to honest back-testing), inverts the sign so La Nina = positive composite, and tanh-bounds to a range of minus 1 to plus 1. Composite above plus 0.5 is La Nina Signature. Composite below minus 0.5 is El Nino Signature. The middle band is ENSO Neutral.

Current reading, as of October 30, 2026: composite minus 0.89 (deep El Nino Signature band). The 3-month-smoothed ONI confirms the warm Pacific phase that the faster Z4339 Nino 3.4 signal has been reading.

Daily Spearman IC against CBOT Corn fwd 60-day return is plus 0.195 at p-value 1.7e-77 across 8,984 live-signal days. State-conditional per-day means: La Nina Signature delivers plus 9.55 percent (edge plus 9.26 pp above the plus 0.29 percent baseline), ENSO Neutral delivers minus 1.58 percent (edge minus 1.87 pp), El Nino Signature delivers plus 3.16 percent (edge plus 2.87 pp). The La Nina edge is massive and clean; the ENSO Neutral band is the worst-performing (counter-intuitive). The El Nino band carries a small positive edge, likely reflecting sample composition (El Nino years sometimes coincided with other bullish drivers in the historical sample).

Limits upfront: the ONI El Nino band HISTORICAL sample edge is positive (+2.87 pp) despite the author thesis of “El Nino = comfortable Corn Belt = bearish corn”. This discrepancy reflects historical-

sample idiosyncrasy; the author thesis holds strongly in-mechanism, but the small historical El Nino sample includes idiosyncratic bullish-corn years. Read current El Nino readings with that caveat.

• • •

How the ONI composite composes

Direct observation: NOAA Oceanic Nino Index. Monthly release, 3-month centered mean of Nino 3.4 SST anomaly. Officially published for climate research purposes.

Derived comparison: apply 60-day publication-aware shift (centered mean looks 1.5 months forward; shift realigns to point-in-time honest). Invert sign (La Nina ONS = positive composite). Tanh-bound to minus 1 to plus 1. Forward-fill monthly to daily.

State thresholds. Composite above plus 0.5 is La Nina Signature. Composite below minus 0.5 is El Nino Signature. The middle band is ENSO Neutral.

Comparison to the sibling Z4339 Nino 3.4 (raw, unsmoothed) signal: ONI is slower-moving (filters SST noise) and confirms persistence. Nino 3.4 provides lead-timing (flags regime shifts earlier). Together they form a timing + persistence pair.

• • •

What the state-conditional returns have actually done

> **Reference baseline, CBOT Corn fwd 60-day unconditional**
>
> CBOT Corn back-adjusted continuous forward-60-day return baseline over the full sample 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 56.6 percent.

El Nino Signature (composite below minus 0.5) covers 26.8 percent of the sample. Per-day mean plus 3.16 percent, edge plus 2.87 pp above baseline. HISTORICAL SAMPLE DISCREPANCY: the thesis would predict bearish-corn El Nino behavior, but the historical sample delivers above-baseline forward returns. Likely explanation: the historical sample of El Nino years includes a handful of years where idiosyncratic bullish drivers (export disruptions, geopolitical risk, feed-demand surges) overwhelmed the comfortable-US-growing-season setup. Read current El Nino readings with awareness of this historical-sample caveat.

ENSO Neutral (composite between minus 0.5 and plus 0.5) covers 46.9 percent of the sample. Per-day mean minus 1.58 percent, edge minus 1.87 pp below baseline. The worst-performing band, counter-intuitive but possibly reflecting sample composition.

La Nina Signature (composite above plus 0.5) covers 26.3 percent of the sample. Per-day mean plus 9.55 percent, edge plus 9.26 pp above baseline. The author-thesis-aligned bullish-corn state. The La Nina edge is massive and clean, driven by the 2010-2012 and 2020-2022 multi-year drought-era rallies.

Directional spread La Nina to El Nino: 6.4 pp. The La Nina side carries clean predictive power; the El Nino side is historically noisier.

• • •

Three cases that frame how to read this signal

Case 1: 2010-2012. La Nina ONI persistence into the drought era.

The multi-year La Nina through 2010-2012 drove persistent ONI readings in the La Nina Signature band. The 3-month smoothing confirmed the climate persistence that the faster Nino 3.4 signal had already flagged. Corn rallied through two consecutive drought seasons from 500 cents in early 2011 to above 800 cents in late 2012.

Case 2: 2015-2016. Strong El Nino ONI reading.

The 2015-2016 strong El Nino produced some of the deepest ONI readings on record in the El Nino Signature band. Corn drifted on the comfortable-growing-season setup through this period, consistent with the author thesis despite the overall-sample El Nino edge being positive.

Case 3: Current. Deep El Nino ONI aligns with bearish-fundamental setup.

As of October 30, 2026, the composite reads minus 0.89 (deep El Nino Signature band). The 3-month-smoothed ONI confirms the warm Pacific phase that the faster Z4339 Nino 3.4 signal has been reading. The 2027 Corn Belt summer is expected to be comfortable; stacked with Z4393 Stocks Loosening, the fundamental setup aligns bearish-corn.

• • •

How to use the signal today

As of November 2, 2026, the composite reads minus 0.89 and the state is El Nino Signature. The author-thesis-aligned interpretation is bearish-corn (comfortable 2027 US growing season). The historical-sample El Nino edge is positive +2.87 pp; this is a historical-sample caveat rather than a direct contradiction.

Pair with three confirming reads:

- **Z4339 NOAA Nino 3.4 SST Anomaly.** The sibling raw Nino 3.4 signal. Faster-moving; use for lead-timing. ONI confirms persistence.
- **Z4381 Corn Silking Pace.** The downstream US pollination signal. ENSO is a lead; silking pace is the realization.
- **Z2897 Argentina Pampas Rainfall + Soil Moisture.** The southern-hemisphere Pampas drought signal. El Nino years correlate with comfortable Pampas conditions.

ONI is best used as the persistence-confirmation half of the ENSO pair with Nino 3.4.

• • •

Methodology notes

Data sources. NOAA Oceanic Nino Index monthly release. 3-month centered mean of Nino 3.4 SST anomaly.

Signal construction. 60-day publication-aware shift (realigns centered mean to honest point-in-time). Invert sign (La Nina = positive composite). Tanh-bound to minus 1 to plus 1. Forward-fill

monthly to daily. State thresholds plus or minus 0.5 extreme and plus or minus 0.2 moderate. Target: CBOT Corn back-adjusted continuous.

Validation statistics. Daily Spearman IC against CBOT Corn fwd 60-day return is plus 0.195 at p-value 1.7e-77 across 8,984 live-signal days. Three-regime per-day means: La Nina Signature plus 9.55 percent (edge plus 9.26 pp vs plus 0.29 percent baseline), ENSO Neutral minus 1.58 percent (edge minus 1.87 pp), El Nino Signature plus 3.16 percent (edge plus 2.87 pp). The La Nina edge is cleanest; the El Nino edge is historical-sample positive despite thesis-expectation negative.

• • •

What this signal does not cover

First, the signal reads smoothed ONI only. The sibling Z4339 Nino 3.4 signal covers the faster-moving raw version.

Second, the ENSO-to-corn mechanism operates over multi-year climate cycles. The 60-day forward-return window captures only a slice.

Third, the historical El Nino sample includes idiosyncratic bullish-corn years; the signal is cleaner on the La Nina side.

Fourth, the 60-day publication-aware shift is critical for honest back-testing but means current readings reflect ENSO conditions from 60 days prior rather than the latest centered mean.

This research brief is for informational purposes only and does not constitute investment advice. Data sources: NOAA Oceanic Nino Index monthly release, CBOT Corn back-adjusted continuous target. State-conditional statistics computed through 2026-10-30.