



## REPORT DASHBOARD

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### OVERALL SENTIMENT



### STORAGE DYNAMICS



### CURRENT WEATHER



### EXPECTED WEATHER TRENDS



### SEASONAL WEATHER TRENDS

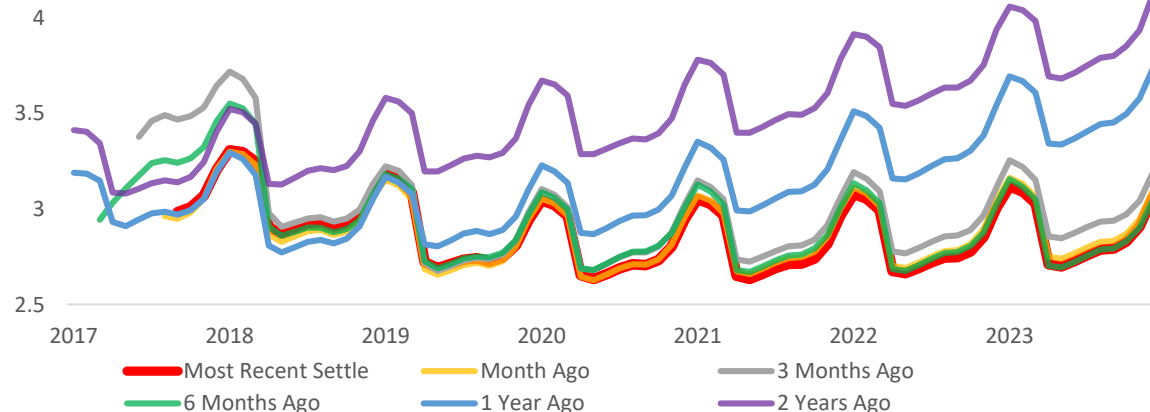


### MARKET TECHNICALS

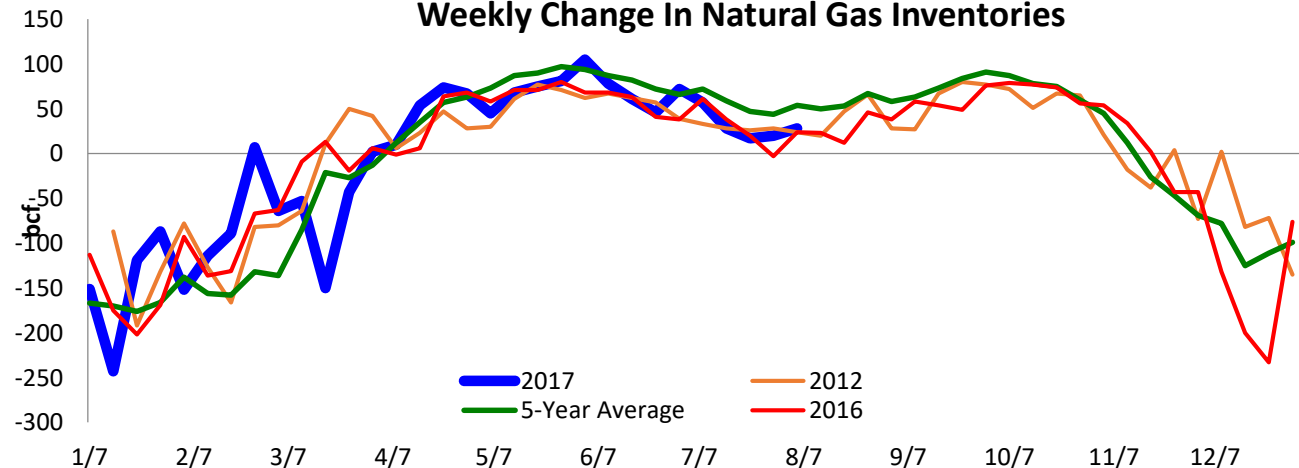


**Report Summary:** The September natural gas contract is down around a percent and a half today in the face of some bullish weather trends over the weekend. We see a large forecast injection on Thursday as weighing in a market that otherwise remains structurally tight and appears to be discounting colder risks to the fall and winter forecast. Medium-term hotter risks have supported prices, though some atmospheric indicators point towards cooler trends to end August and bring in September. Yet even with those we see downside as limited in a market where we are forecasting the current surplus to flip to a deficit by the middle of August. Though in the short-term our sentiment is neutral, in the longer-term we see more upside than downside.

### Natural Gas Futures Strip



### Weekly Change In Natural Gas Inventories





# Overall Sentiment: NEUTRAL

**Sentiment Summary:** The September natural gas contract is selling off so far today following a broad rally last week. We see current weather forecasts as supportive and this recent decline as more technical, though a large injection to be announced on Thursday may weigh on the market a bit too. Still, we see further downside from here as quite limited, even though late month cool risks are seen on some climate indicators, and hold neutral sentiment in the face of this selling.

## Storage Dynamics

We have continued to see significant tightness dominate through the summer with most storage injections over the past few months coming in significantly below average. Injection size is expected to increase dramatically with this Thursday's report thanks to widespread cooler weather last week, but from there we forecast injection size to shrink again as warmer weather returns and market tightness keeps injections below the 5-year average. On a short-term basis we see this week's print as a bit bearish, but any downside should be realized quickly.

Wk End	EIA Forecast
11-Aug	52
18-Aug	38
25-Aug	30
1-Sep	40

\*BWS Forecast

## Current Weather

We see current weather trends as overall supportive for this market, as a significant number of GWHDDs have arrived in the 8-14 Day forecast that should allow national natural gas demand to be decently above average. Over the weekend model guidance continues to show ridging risk across the East in the medium-term that would allow temperatures to remain slightly to moderately above average. Though not extremely bullish, current model output will certainly help support natural gas prices.

	GWDDs	Current
6-10 Day Forecast	46	
8-14 Day Forecast	82	

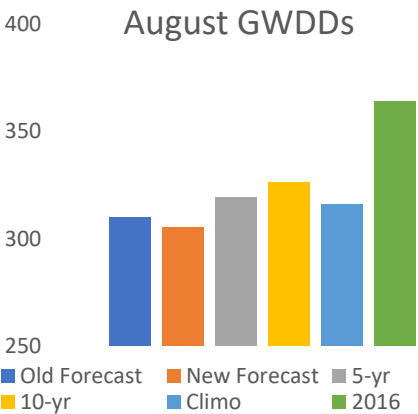
## Weather Trends

While current weather forecasts are quite bullish on balance for natural gas prices, we note that weather trends are not quite as convincingly bullish. We clearly added a significant number of GWHDDs to average over the weekend, thanks to new long-range forecasts having heat that is seen continuing from the medium-range. However, a number of atmospheric indicators show that heat in the 6-14 Day timeframe may be rather short-lived with cooler trends into September, which could limit the bullish impact of current weather forecasts.

	GWDDs
Today's 15-Day to Avg	19.2
Friday's 15-Day to Avg	7.7
Change	12

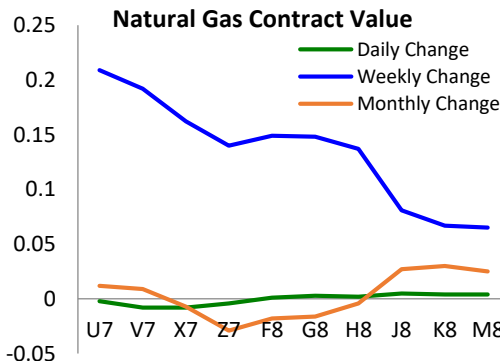
## Seasonal Trends

We are forecasting GWDDs to be decently below historic norms for the month of August, and demand will be far below 2016 levels even with the medium-term heat we see arriving in forecasts. However, we note that current climate indicators favor bullish cold risk as we move through the fall and into the winter, which we fear the natural gas market may not have yet priced in. Accordingly, our long-range sentiment is more bullish as we feel the market may be complacent in the face of colder winter risks.



## Market Technicals

The winter natural gas strip and recent spreads have not been especially supportive, especially given how tight this market seems to be. Already this morning we have seen prices reverse and come under heavy selling pressure, which is far from a bullish technical look. We are hitting support in the \$2.92-\$2.95 level, and a bounce off here would provide a more bullish look for charts, but with money managers increasing shorts as well the technical look is not all that supportive.





# Storage Dynamics: NEUTRAL

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**Section Summary:** The September natural rallied significantly last week, with cash prices moving significantly higher as well. The result should be some demand-driven loosening, as the price rally makes our adjusted models likely too tight. The result should be a far looser print to be announced on Thursday, but from there we see the market continuing to tighten as heat returns. Last week's print was tight enough to provide significant support to prices through the week as well.

Raw TDD Model

Average Adjusted TDD Model

Wk End	Estimate
11-Aug	41.8
18-Aug	25.2
25-Aug	13.3
1-Sep	19.3

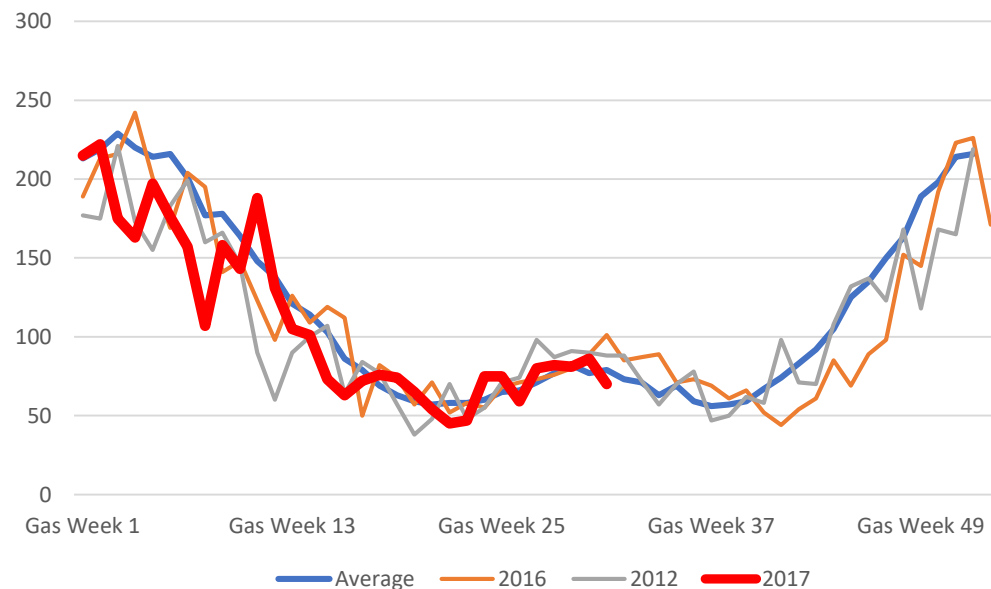
Wk End	Estimate
11-Aug	50.5
18-Aug	39.9
25-Aug	18.9
1-Sep	26.7

Bespoke Weather Services Official Forecasts

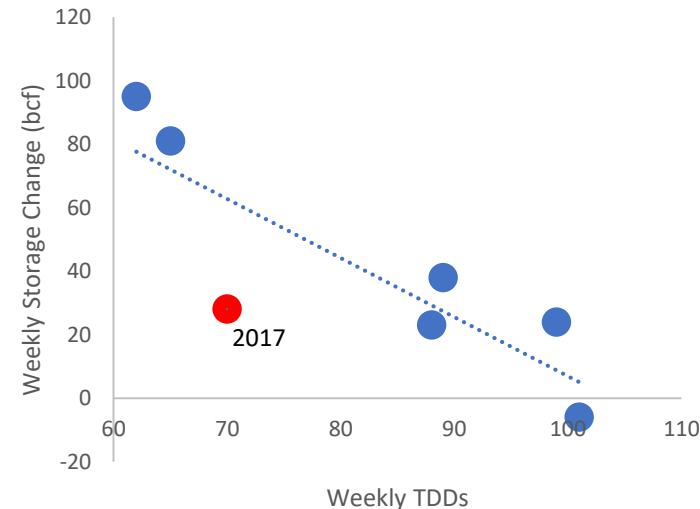
Week Ending	11-Aug	18-Aug	25-Aug	1-Sep
Storage Change (bcf)	52	38	30	40
5-yr Storage Change (bcf)	50	53	66	68
Forecast/Observed TDDs	57	71	81	76
5-yr Avg TDDs	75	71	67	72

4-Week Total Forecast (bcf)	120
4-Week Total 5-Year Average (bcf)	169
Gas Week 35 Stockpile Forecast (bcf)	3158
Gas Week 35 Stockpile 5-Year Average (bcf)	3205

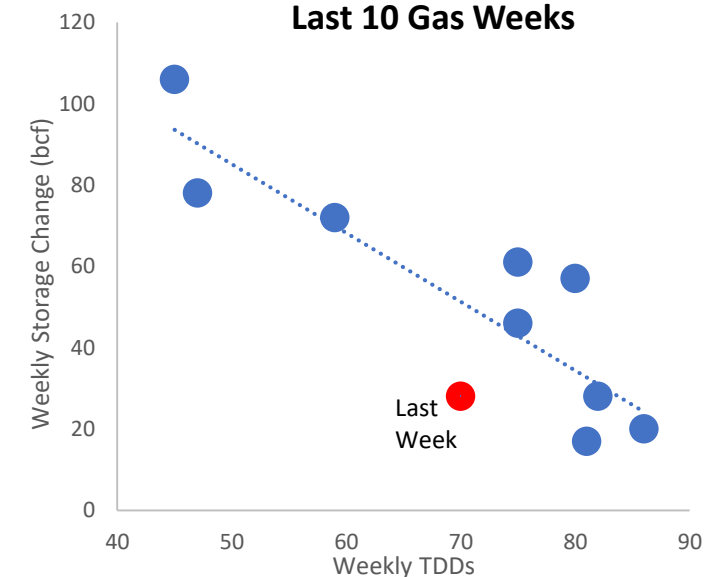
Weekly TDDs



Gas Week 31 Since 2011



Last 10 Gas Weeks



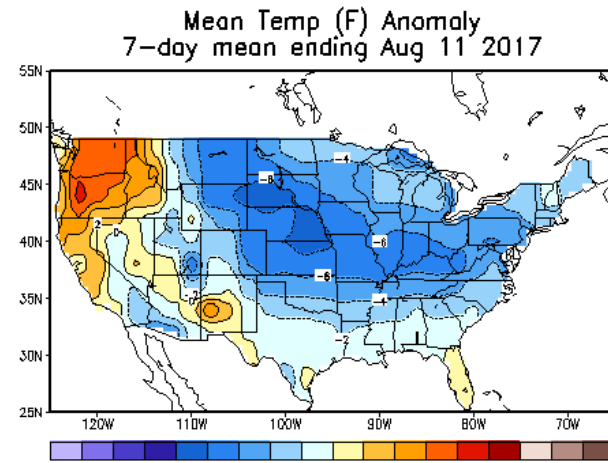


# Storage Dynamics: NEUTRAL

**Key Takeaway:** Last week temperatures were significantly below average across much of the country. The result is that power burns fell off rather significantly, and we see that the EIA announced production rose a bit as well. We see a significant amount of bearish risk with Thursday's print thanks to GWDDs being below average everywhere except in the Pacific last week as prices rallied, though we note that the rapidly shrinking surplus will continue to bolster natural gas prices regardless.

## Discussion

When analyzing the forecast print for Thursday, there are a number of dynamics in play that must be considered. The entire natural gas market is operating with a background of a shrinking surplus in a tightening market, and we forecast this surplus to be entirely erased in the next few weeks. Market tightness for the first time in years is not driven by storage constraints but instead seeming complacency over how elevated demand could get this winter. The result is that colder than average temperatures this winter could quickly spike prices, yet it is unclear exactly what could send prices in the short-term significantly higher. Weather last week was quite bearish overall, and though much of that was priced in we are forecasting a far looser print will be announced today than we have seen in any of the last 4 weeks. We see the inability of prices to significantly break above \$3 as evidence that this looser print has broadly already been priced in, but could see how in the short-term it limits upside for prices, even though we forecast the next few weeks will see far tighter EIA prints that will once again underscore just how tight the overall natural gas market is.



U.S. natural gas consumption - Gas Week: (8/3/17 - 8/9/17)

	Average daily values (Bcf/d):		
	this week	last week	last year
U.S. consumption	59.6	60.1	62.3
Power	33.0	34.6	36.5
Industrial	19.8	19.7	19.3
Residential/commercial	6.8	5.9	6.4
Mexico exports	4.4	4.3	4.2
Pipeline fuel use/losses	6.4	6.5	6.7
LNG pipeline receipts	1.8	2.1	0.9
Total demand	72.3	72.9	74.1

Source: OPIS PointLogic Energy, an IHS Company

Note: LNG pipeline receipts represent pipeline deliveries to LNG export terminals.

U.S. natural gas supply - Gas Week: (8/3/17 - 8/9/17)

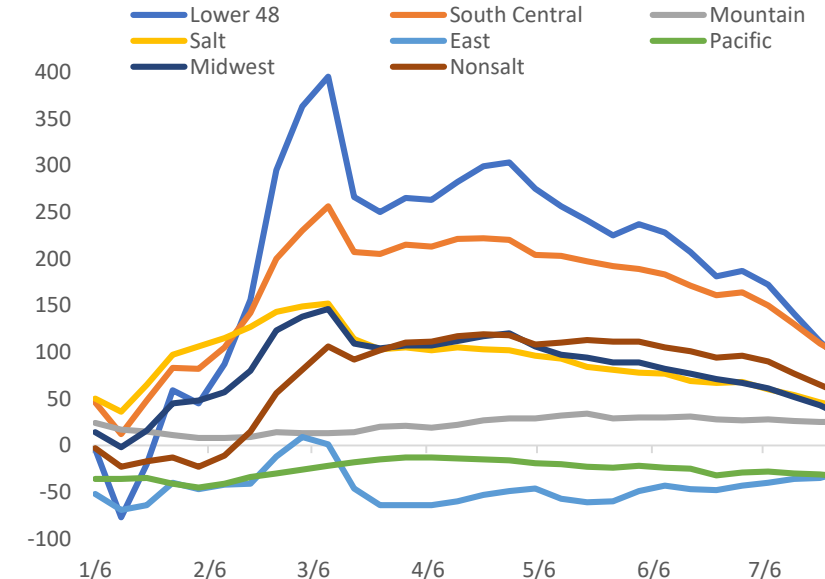
	Average daily values (Bcf/d):		
	this week	last week	last year
Marketed production	82.5	82.0	80.0
Dry production	73.2	72.8	71.3
Net Canada imports	5.9	6.0	6.4
LNG pipeline deliveries	0.3	0.3	0.2
Total supply	79.1	78.8	78.0

Source: OPIS PointLogic Energy, an IHS Company

Note: LNG pipeline deliveries represent gas sendout from LNG import terminals.

## Natural Gas Regional Storage Difference to 5-Year Average

GWDDs	5-Aug	6-Aug	7-Aug	8-Aug	9-Aug	10-Aug	11-Aug	Total	Climo Average
New England	7	2	1	2	3	5	4	24	46
Mid Atlantic	6	2	1	4	3	5	5	26	57
East North Central	0	1	3	2	3	5	5	19	55
West North Central	3	1	3	3	4	5	5	24	66
South Atlantic	14	12	12	12	11	11	13	85	100
East South Central	8	9	9	10	10	11	12	69	93
West South Central	18	18	14	15	15	18	18	116	129
Mountain	11	11	10	11	11	12	11	77	84
Pacific	10	9	9	10	9	10	9	66	50
Continental US	9	7	7	8	8	9	9	57	76



Current Weather: **SLIGHTLY BULLISH**

**Section Summary:** In the short-term we see cooler weather keeping GWDDs below average across the country. This only lasts a few days, however, as by the second half of this week we forecast that GWDDs will get back above average. The warmest period looks likely through Week 2, where sizable ridging is expected to propagate East and pull temperatures significantly above average. This should keep cooling demand above average over the next 15 day time period.

Population Weighted Cooling Degree Days

	Region	13 Aug	14 Aug	15 Aug	16 Aug	17 Aug	18 Aug	19 Aug	Total	Diff from Avg.
New England	1	8 6 7 6 5 5 3	5 5 6 5 6 5	6 5 5 4 4	7 5 5 3	5 3 6	4 4	4	39	-1 -2.5%
Mid Atlantic	2	7 6 7 8 7 7 7	5 5 5 6 7 7	7 5 6 6 6	8 7 6 5	8 6 6	8 7	8	51	-1 -1.92%
E N Central	3	1 1 2 3 4 4 5	4 4 4 4 4 4	7 5 4 4 4	9 7 6 4	10 8 7	8 8	7	46	-2 -4.17%
W N Central	4	3 3 4 4 3 4 5	6 4 4 5 4 4	9 6 6 5 5	10 9 7 6	9 10 9	8 9	8	53	-5 -8.62%
S Atlantic	5	14 14 14 15 15 15 15	14 14 14 14 14 14	14 13 14 14 13	15 13 13 13	15 14 13	16 14	16	104	9 9.47%
E S Central	6	11 11 12 13 13 12 13	12 12 12 13 12 11	13 12 11 11 11	14 13 12 11	15 14 13	15 14	14	94	5 5.62%
W S Central	7	18 18 19 19 18 18 18	19 19 18 18 17 17	20 19 19 18 17	20 20 19 18	20 20 20	20 20	19	136	14 11.48%
Mountain	8	10 10 10 10 11 11 11	10 10 10 10 10 11	9 10 10 10 10	9 10 10 10	10 10 11	11 11	11	70	-6 -7.89%
Pacific	9	7 8 8 8 9 9 10	5 6 7 7 7 8	3 5 6 7 7	6 7 7 7	8 8 8	9 9	9	47	0 0.0%
Cont. US	CONUS	9 9 10 10 10 10 10	9 9 9 9 9 10	10 9 9 9 9	11 10 10 9	12 11 11	12 11	11	74	3 4.23%

Historic GWDDs

	8/14	8/15	8/16	8/17	8/18	8/19	8/20	8/21	8/22	8/23	8/24	8/25	8/26	8/27
2016	13	12	13	13	12	12	11	10	9	9	10	11	11	11
2015	11	12	13	12	12	12	9	8	9	9	10	9	8	8
2014	8	8	8	9	10	10	10	11	11	10	10	10	10	10
2013	9	7	6	6	7	8	10	11	11	10	9	9	9	11
2012	10	11	11	10	9	8	7	7	7	9	10	9	9	10
2011	9	9	9	10	11	11	11	11	10	10	11	11	12	12
2010	12	12	12	12	11	12	13	11	12	10	9	9	9	8
2009	10	10	11	12	12	12	11	11	10	9	8	8	9	10
2008	8	8	8	8	8	8	8	8	9	10	9	9	8	8
2007	11	12	13	12	10	10	11	12	12	11	12	12	11	10
2006	9	10	9	10	10	11	11	10	10	10	10	10	9	11
2005	12	10	10	10	10	11	12	13	11	10	9	9	10	10
2004	8	6	7	6	8	10	10	10	7	7	8	9	9	10
2003	12	13	13	12	11	11	12	13	13	10	9	11	13	13
2002	13	13	13	13	12	12	10	9	11	11	10	10	9	9
2001	10	9	10	10	10	10	9	9	9	10	10	10	10	11
2000	9	11	12	10	10	9	8	9	8	9	10	10	10	10
1999	11	10	9	11	12	10	9	8	8	9	10	10	11	11
1998	11	10	11	11	11	9	9	9	11	12	13	13	12	12
1997	11	10	13	13	11	9	9	9	8	7	7	8	7	8
1996	10	10	9	9	9	9	9	10	11	11	10	9	9	8
1995	14	14	13	14	14	12	11	11	11	10	10	9	9	10
1994	11	9	8	8	10	10	10	9	6	7	8	8	10	11
1993	10	11	11	11	11	11	11	10	10	10	11	12	13	13
1992	8	8	8	7	7	8	8	7	6	7	9	11	11	10
1991	9	9	10	11	11	10	8	7	9	10	10	10	10	10
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1989	9	9	9	8	7	7	8	10	10	11	10	9	9	9
1988	14	15	14	14	13	10	9	9	9	10	10	9	9	9
1987	9	11	12	13	12	10	10	10	10	9	9	9	9	9
1986	8	10	11	12	11	11	10	9	9	9	8	8	9	10
1985	11	11	10	9	9	9	9	8	8	7	8	8	9	9
1984	11	11	12	12	10	9	8	8	8	8	7	7	7	9
1983	10	9	11	12	12	13	14	13	12	11	11	11	12	13
1982	7	8	9	10	9	9	10	9	10	9	9	9	7	9
1981	10	11	10	8	8	6	5	6	6	7	8	8	9	9

Bespoke Gas Weighted Degree Day (GWDD) Forecasts

GWDDs	8/14	8/15	8/16	8/17	8/18	8/19	8/20	8/21	8/22	8/23	8/24	8/25	8/26	8/27	8/28	Total
New Forecast	9	10	11	12	11	11	11	11	12	12	12	12	12	11	11	168
Old Forecast	10	10	10	10	12	11	12	12	11	11	11	11	11	11	11	164
2016	13	12	13	13	12	12	11	10	9	9	10	11	11	11	12	169
5-yr Avg	10.2	10	10.2	10	10	10	9.4	9.4	9.4	9.4	9.8	9.6	9.4	10	10.2	147
1981-2010 Avg	10.2	10.2	10.5	10.5	10.3	10.0	9.7	9.6	9.4	9.3	9.5	9.6	9.7	10.1	10.3	149

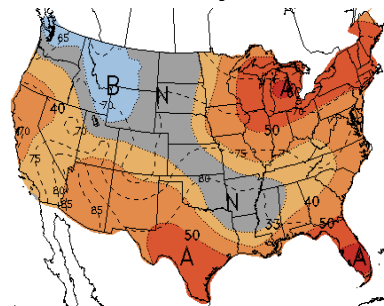




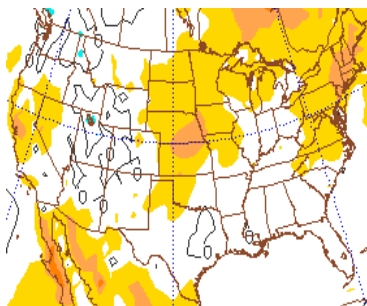
# Current Weather: SLIGHTLY BULLISH

**Key Takeaway:** CPC forecasts have gradually caught on to an increase in heat risk across much of the East, though we note that analogs do not favor much heat across the South. The same can be said for GEFS/CPC ensemble guidance, where most ridging looks to slide into the center of the country as we move towards Day 14.

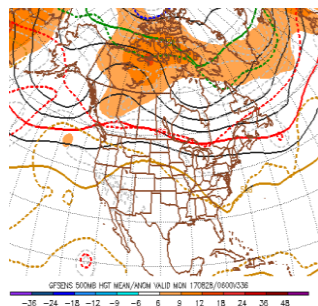
8-14 Day CPC



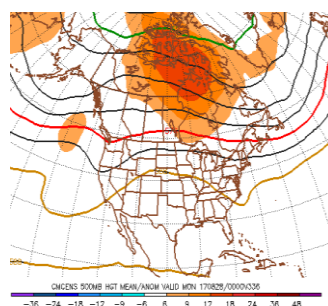
6z GEFS D4-10



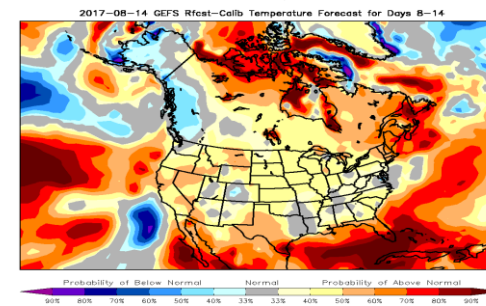
6z GEFS D14



0z GEFS D14



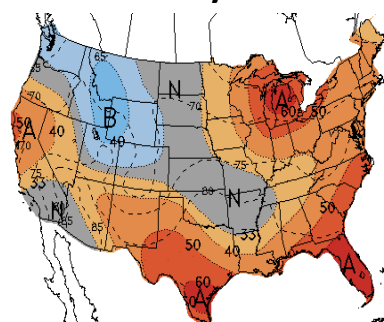
GEFS D8-14 Temp Anom Odds



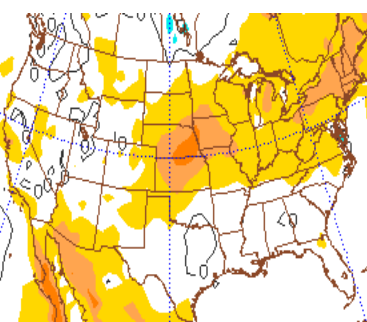
Discussion

Weather forecasts are quite bullish today for natural gas prices, as short-term cooler weather quickly gets eliminated and brings in warmer weather across the country. We note that almost all guidance favors a hotter 6-14 Day timeframe across the country, though much of that heat may be confined to parts of the country that do not seasonally see quite as much cooling demand this time of year. Day 10 guidance shows ridging into the center of the country with heat across much of the North. The NAEFs show this best with ridging central over eastern Canada and an otherwise zonal flow, but such ridging would prevent much cooler weather from moving into the country. The GEFS thus have odds slightly skewed to warmer weather in the 8-14 Day timeframe, but confidence in temperatures being significantly above average is not all that high. Rather, Week 2 looks to feature slightly warmer than average weather across most of the country, keeping cooling demand above average but not being all that extreme. Still, compared to the cool weather we have seen in the past couple of weeks, this hotter weather should help balance the natural gas market and we continue to see weather as a bullish influence on prices that will limit downside and offer support. The main cooler risks do not appear on guidance here until we approach the Day 14 timeframe still.

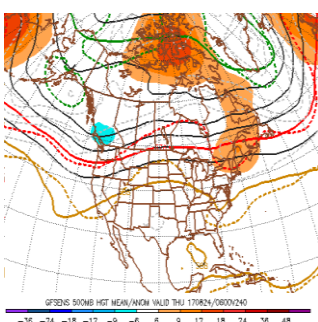
6-10 Day CPC



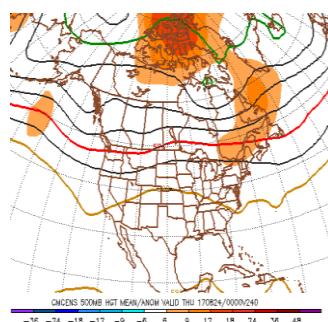
6z GEFS D8-14



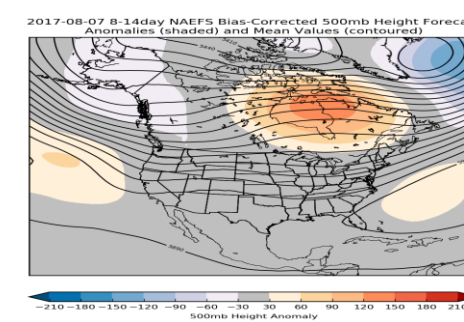
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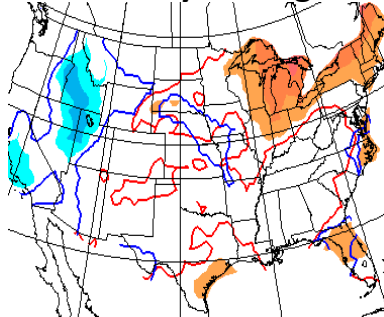
0z GEFS D10



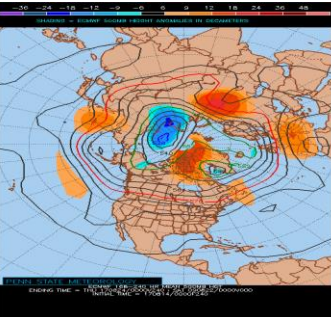
NAEFs 500mb Anom D8-14



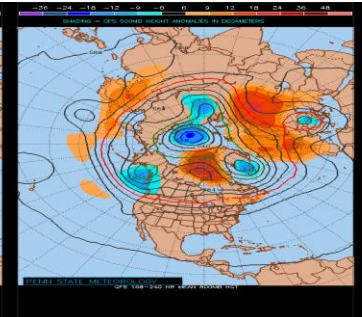
8-14 Day Analog



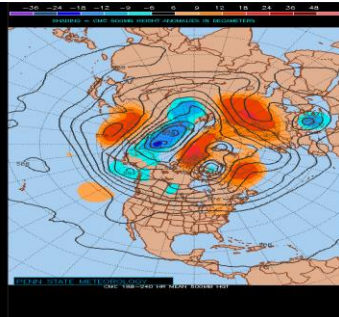
0z ECMWF D8-10



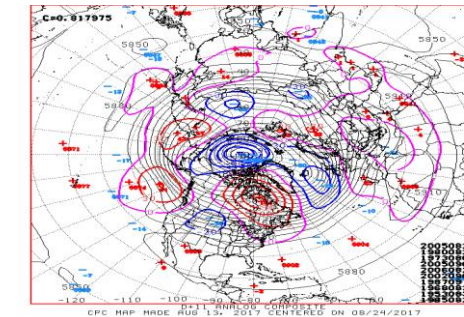
0z GFS D8-10



0z CMC D8-10



D11 GEFS Analog



Above images courtesy of Penn State Electronic Wall Map Site

Above images courtesy of the Climate Prediction Center





**Section Summary:** Weather trends overall support the heat we are forecasting in Week 2 but indicate late in Week 2 into Week 3 there could be an easing of heat across the East. PNA forecasts may gradually trend back positive, and negative NAO and AO trends are certainly not bearish. Analogs have begun to show more bearish risks moving later in the month, and other trends and climate models favor a couple of injections of cooler air across the East into early September.

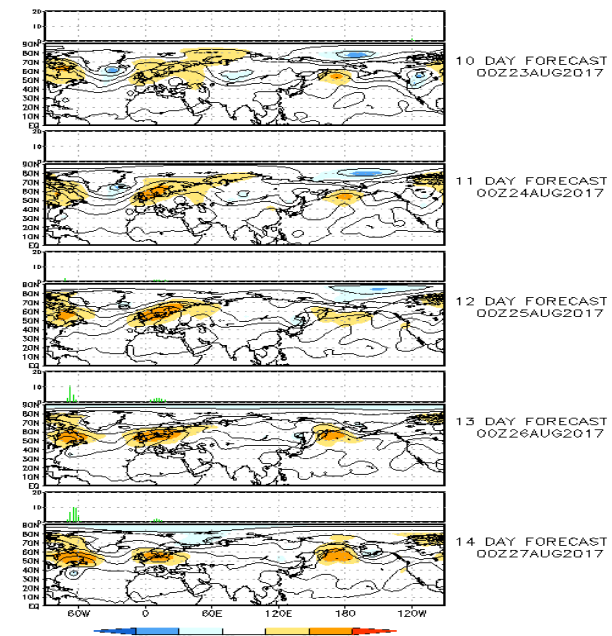
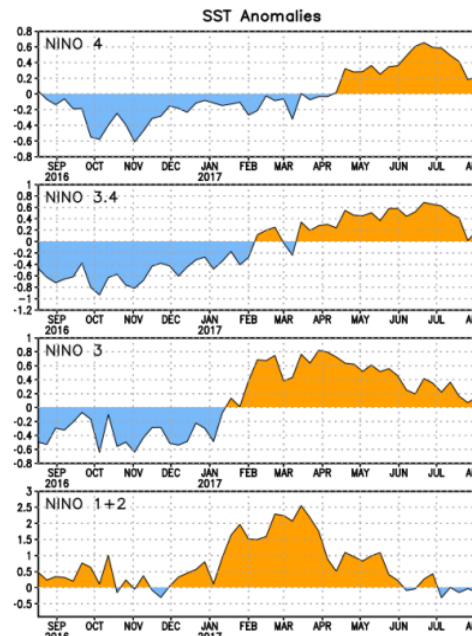
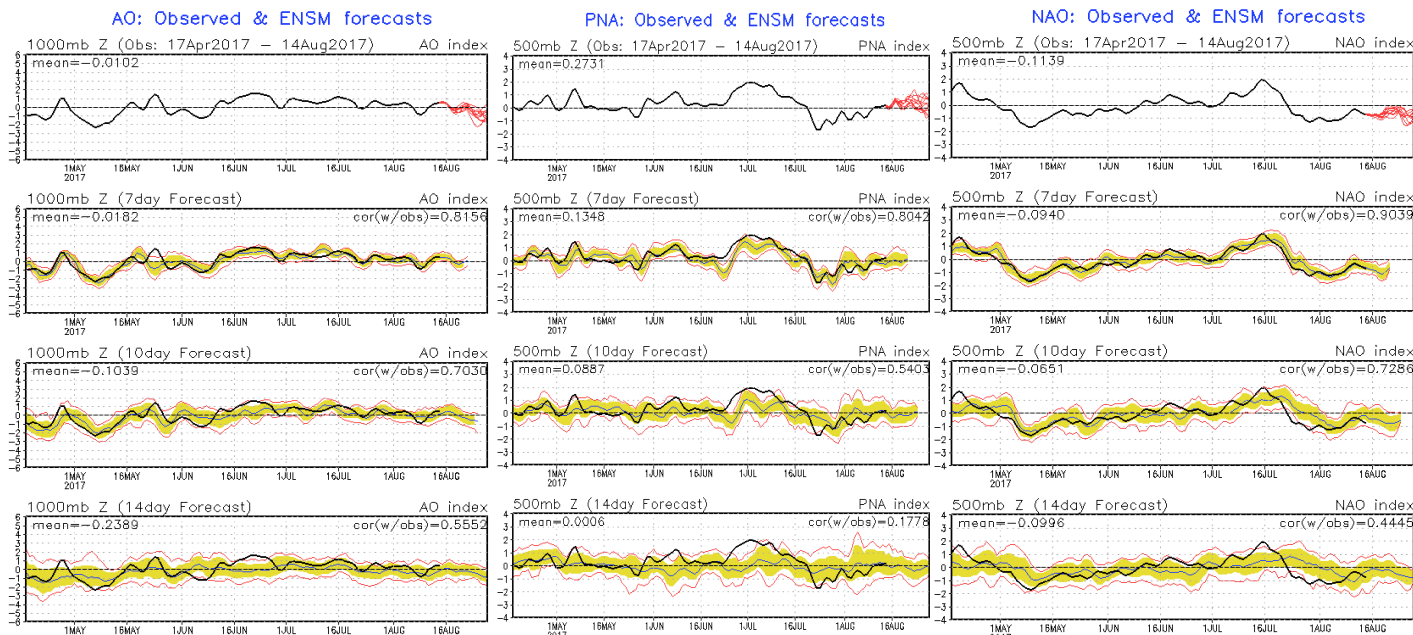
## AO Forecasts

## PNA Forecasts

## NAO Forecasts

## Pacific SST Anomalies

## GFS Blocking Forecasts



## GEFS MJO

## ECMWF MJO

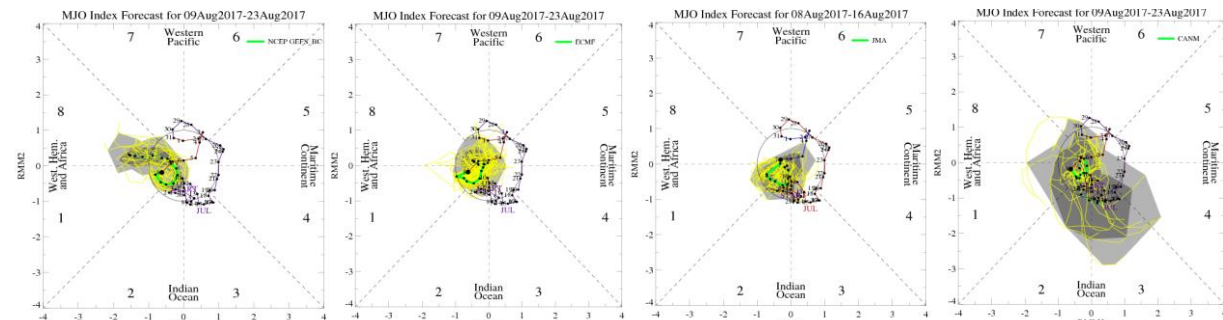
## JMA MJO

## CMC MJO

## SOI Index

## CIPS D12-14

## CFSv2 ENSO Forecast

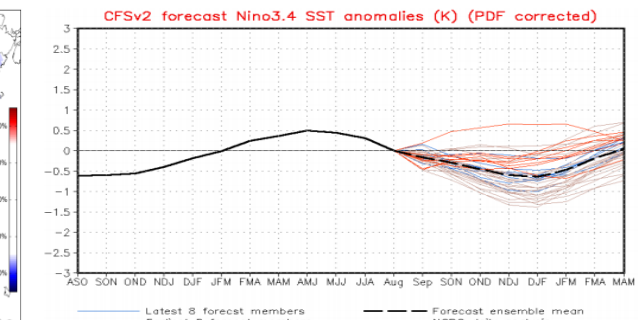
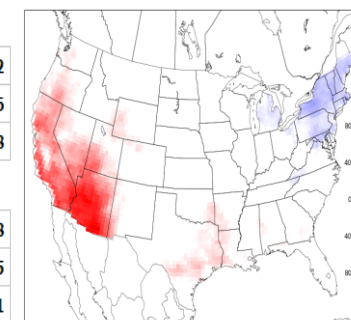


**SOI values for 14 Aug 2017**

Average for last 30 days	5.02
Average for last 90 days	0.46
Daily contribution to SOI calculation	0.18

**Monthly average SOI values**

May	0.68
June	-9.45
July	6.51



Above images courtesy of Penn State Electronic Wall Map Site

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August 14, 2017

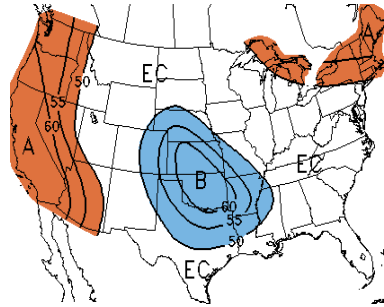


# Weather Trends: NEUTRAL

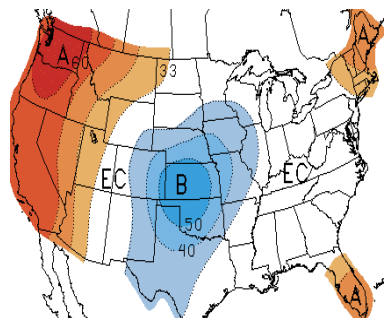
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**Key Takeaway:** We see risks as skewed in both directions, as a cooling Pacific and negative AAM would seem to increase the bullish risks we see Week 2 but teleconnection forecasts and some model output show increased bearish risks by late Week 2. We are unsure if weather trends much more bullish through the week.

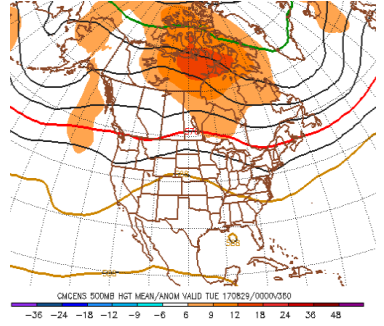
CPC 3-4 Week



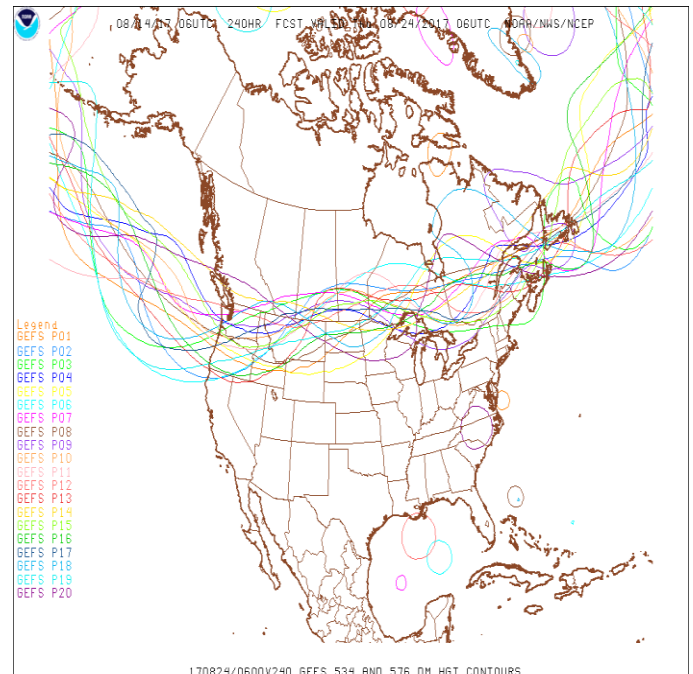
CPC Monthly



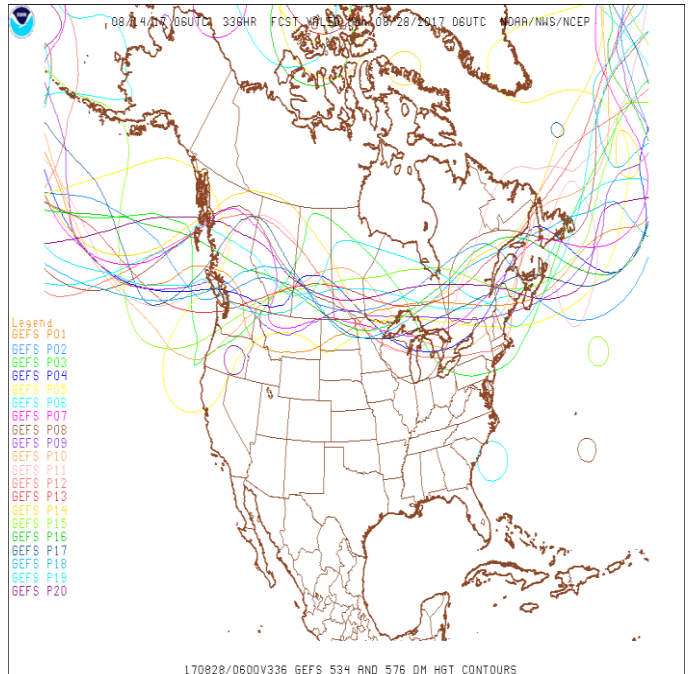
0z GEPS D15



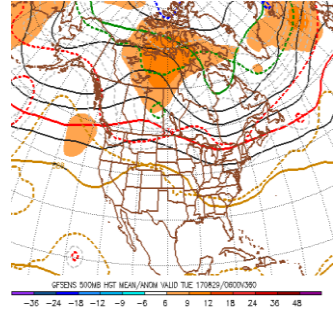
GEFS D10 534/576dm Spaghetti



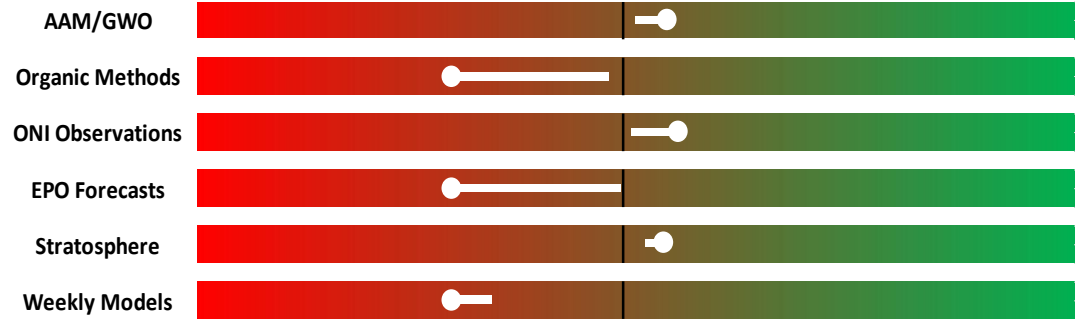
GEFS D14 534/576dm Spaghetti



0z GEFS D15



Other Forecast Contributors



## Discussion

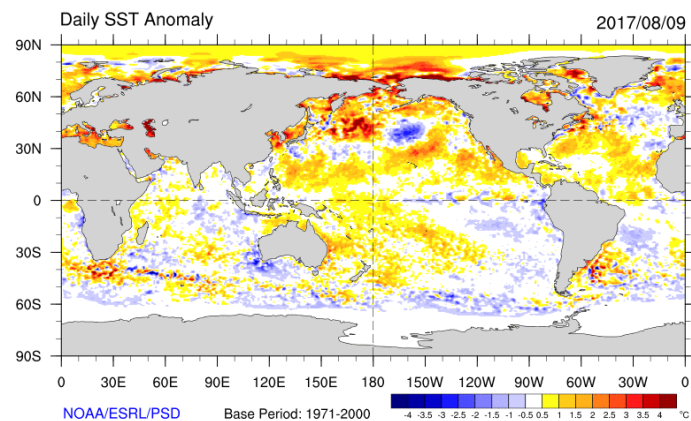
A volatile Pacific and often unresponsive atmosphere to shifting Pacific conditions have continued to complicate forecasts of where weather models are likely to trend in the coming week, and accordingly keep confidence past Day 10 a bit below average. We see on the GEFS spaghetti charts that Day 10 clearly has a stronger bullish consensus than Day 14, where a number of ensemble members show cooler risks beginning to return across the East. The Day 15 ensemble mean shows a similar trend as well with a weak trough returning to the East, and the CMC ensembles have been trending towards more ridging in the center of the country instead of the East as well. The result is that we do not expect the widespread heat seen on model guidance in Week 2 to necessarily continue into Week 3, and we would not be surprised to see model guidance through the week gradually cool forecasts in the 11-15 Day timeframe. The result would not necessarily be all that bearish for the natural gas market; we already are in a tight market and medium-term heat will result in even smaller storage injections. However, it may also delay any broad storage-driven rally, as this could allow far larger injections into September were cooler trends to return into the end of August. Still, confidence here is quite low, and should the bearish risk we see in some of our indicators ease we would begin to see more upside for natural gas prices than we already do.



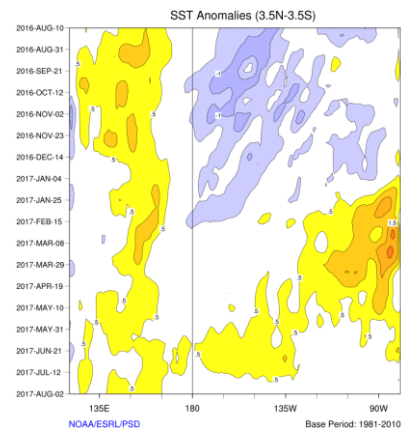


**Section Summary:** Seasonal trends continue to show a variable pattern through the end of the summer and we could have a rather cool fall as well. However, many of these seasonal trends are also pointing towards a colder winter than we have seen the last two years, something that at this point the natural gas market may not be properly pricing in. Confidence in bullish winter risks continues to grow as we see the QBO trend negative and any El Nino signal get erased from the Pacific.

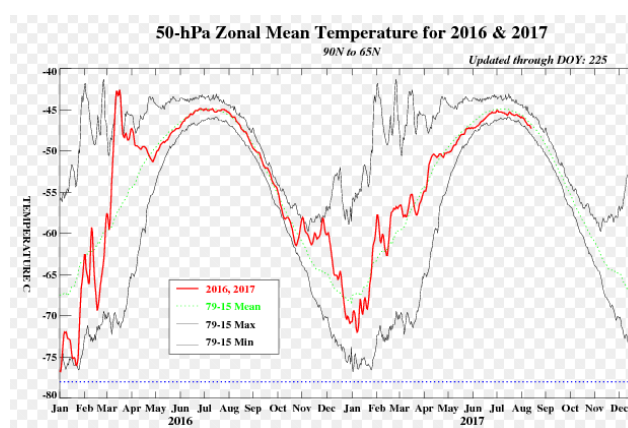
## Global Sea Surface Temperature Anom



## Pacific SSTs



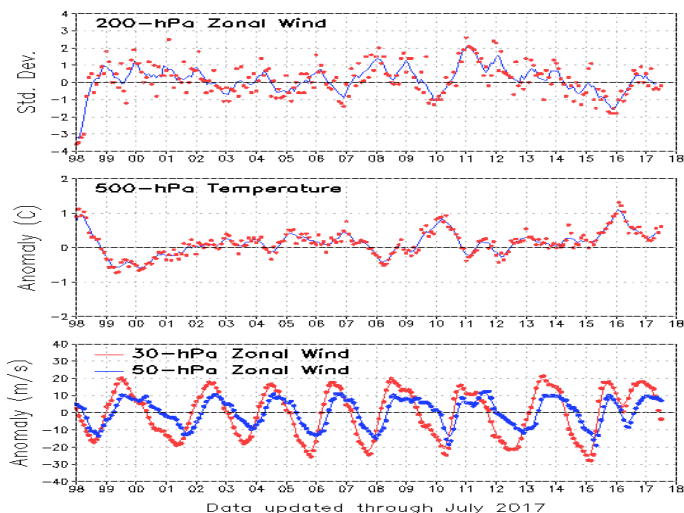
## Stratospheric Temperatures



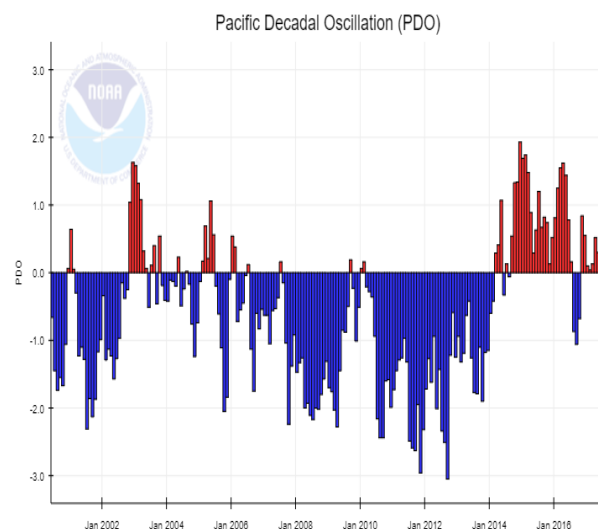
## Discussion

We continue to see a global atmospheric setup late this summer the likes of which we have not seen in a few years as we head into the fall. Grabbing our immediate attention is the continued reversal of the QBO back to a negative state, as we have had our first negative monthly print at the 30-hPa level in the two years. This is significantly increasing the odds of the QBO being a net bullish cold risk as we head into the winter. The AMM is similarly positive despite being rather volatile, while a neutral PDO would generally appear to support a zonal pattern through the winter with at least some level of zonal risk (though a positive PDO the last two winters has not been especially bullish by any stretch of the imagination). The main trend, however, has been a move away from any Nino-like conditions in the Pacific, as we have a cold pool south of Alaska pulling the PDO back to average as the equator similarly cools. CFSv2 American climate guidance currently forecasts a La Nina for the winter, though that appears unlikely as most other guidance is instead showing an ENSO-neutral winter. Either a weak Nina or ENSO-neutral winter would hold a fair level of bullish risks, and that combined with a favorable QBO and AMM should feature enough cold weather to support natural gas prices if not rally them significantly given the complacency we are seeing with current storage levels. Production increases may be able to cancel out some of the weather-driven demand increases, but we see risk skewed bullish in the long-term.

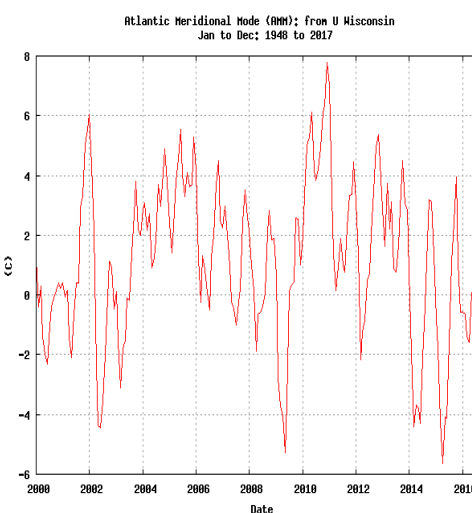
## Quasi-Biennial Oscillation (QBO)



## Pacific Decadal Oscillation



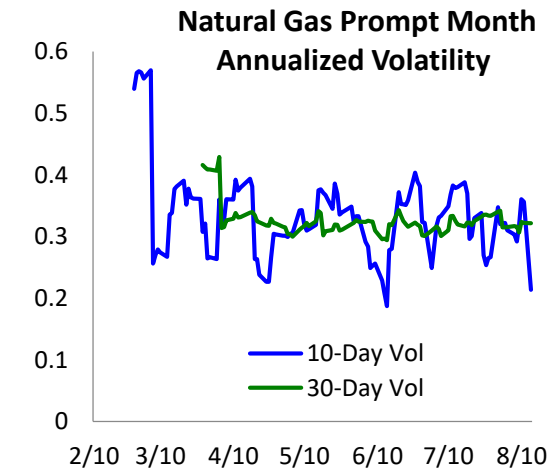
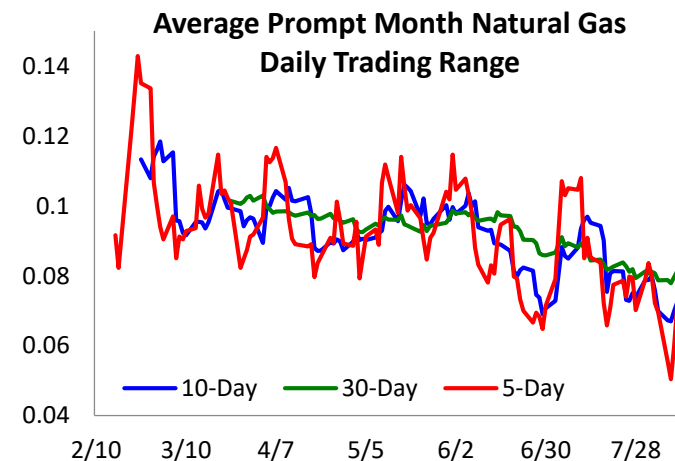
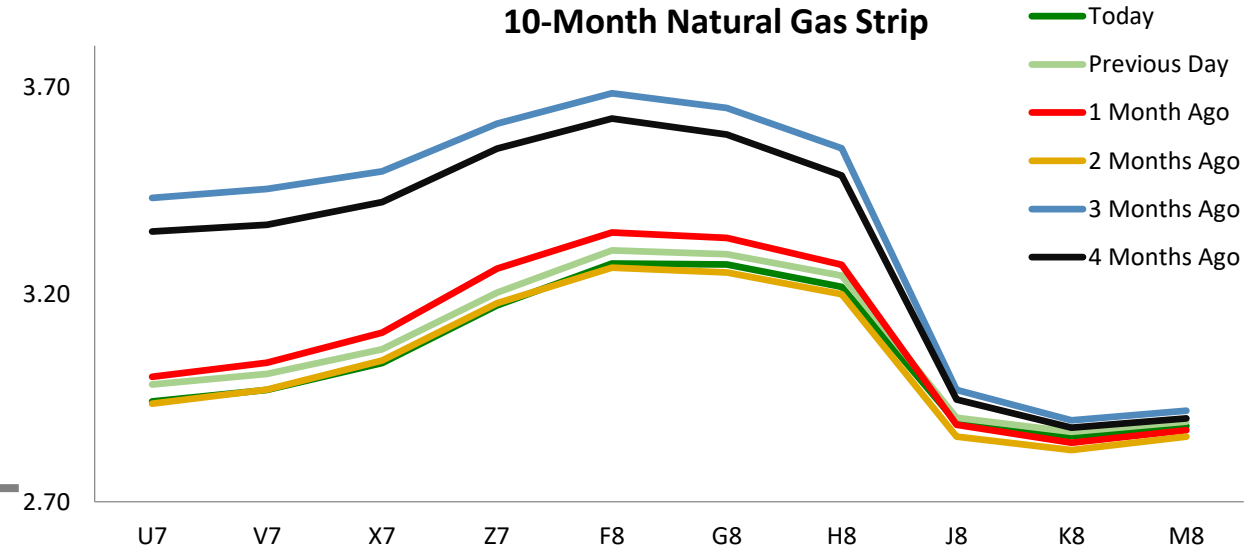
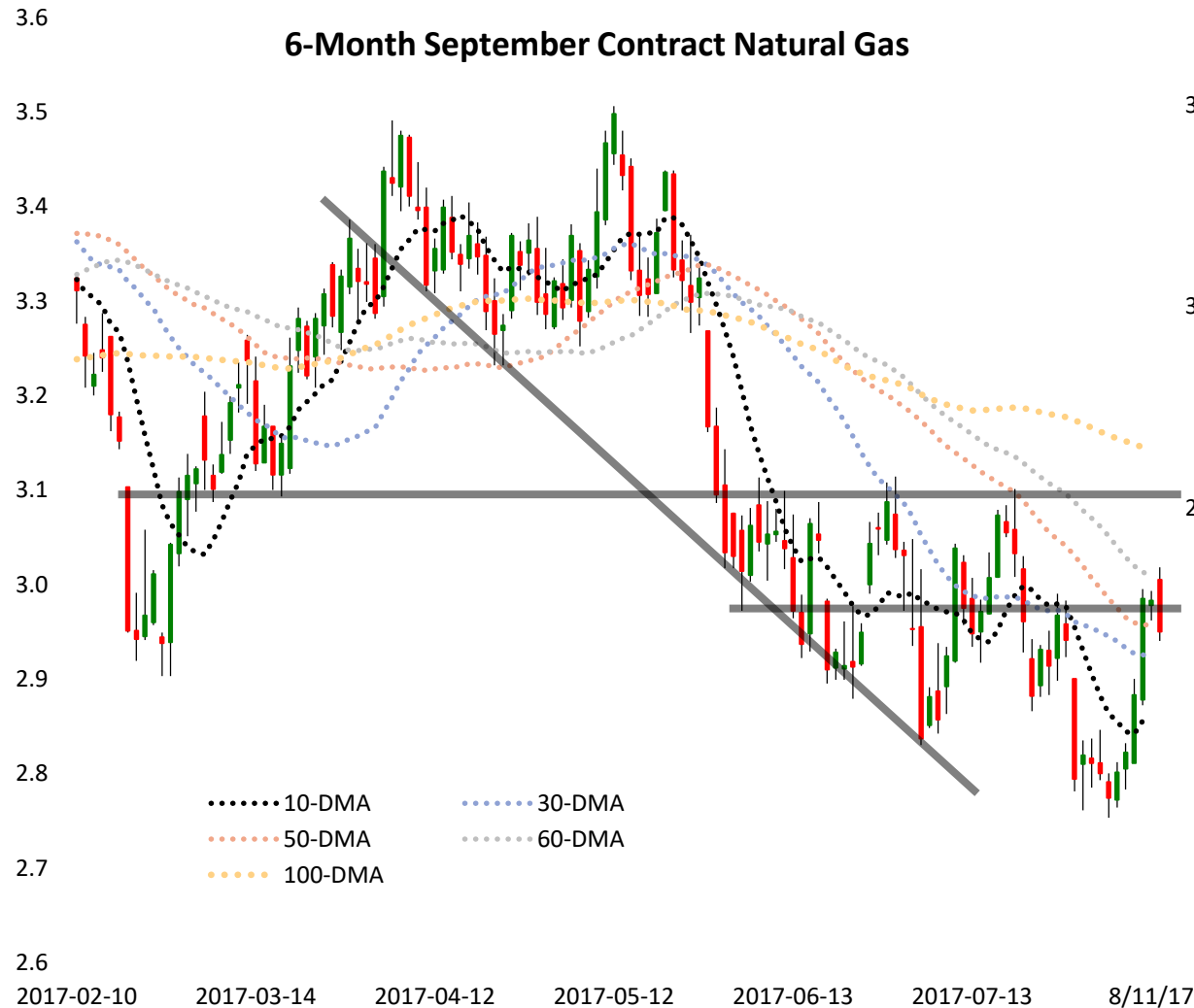
## Atlantic Meridional Mode





# Market Technicals: **SLIGHTLY BEARISH**

**Section Summary:** The September natural gas contract has reversed back lower today and is now hitting support in the \$2.92-\$2.95 level. We do see support here as remaining quite strong, but we note the winter strip is not as supportive as it once was, and short-term technical upside prices may still be a bit limited. Volatility has fallen off again despite the rally last week, and trading ranges remain decently below average, allowing a pullback to remain on the table.

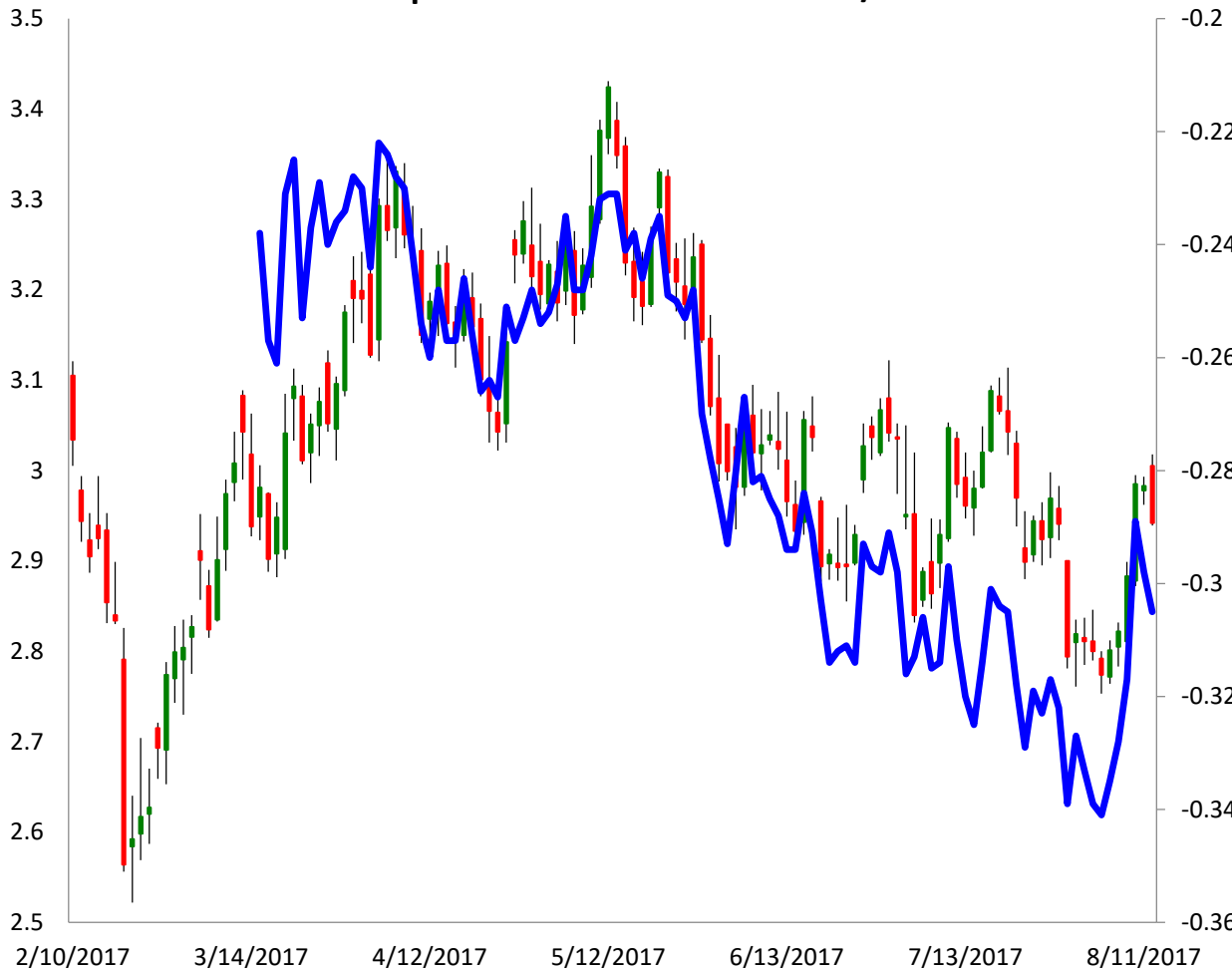




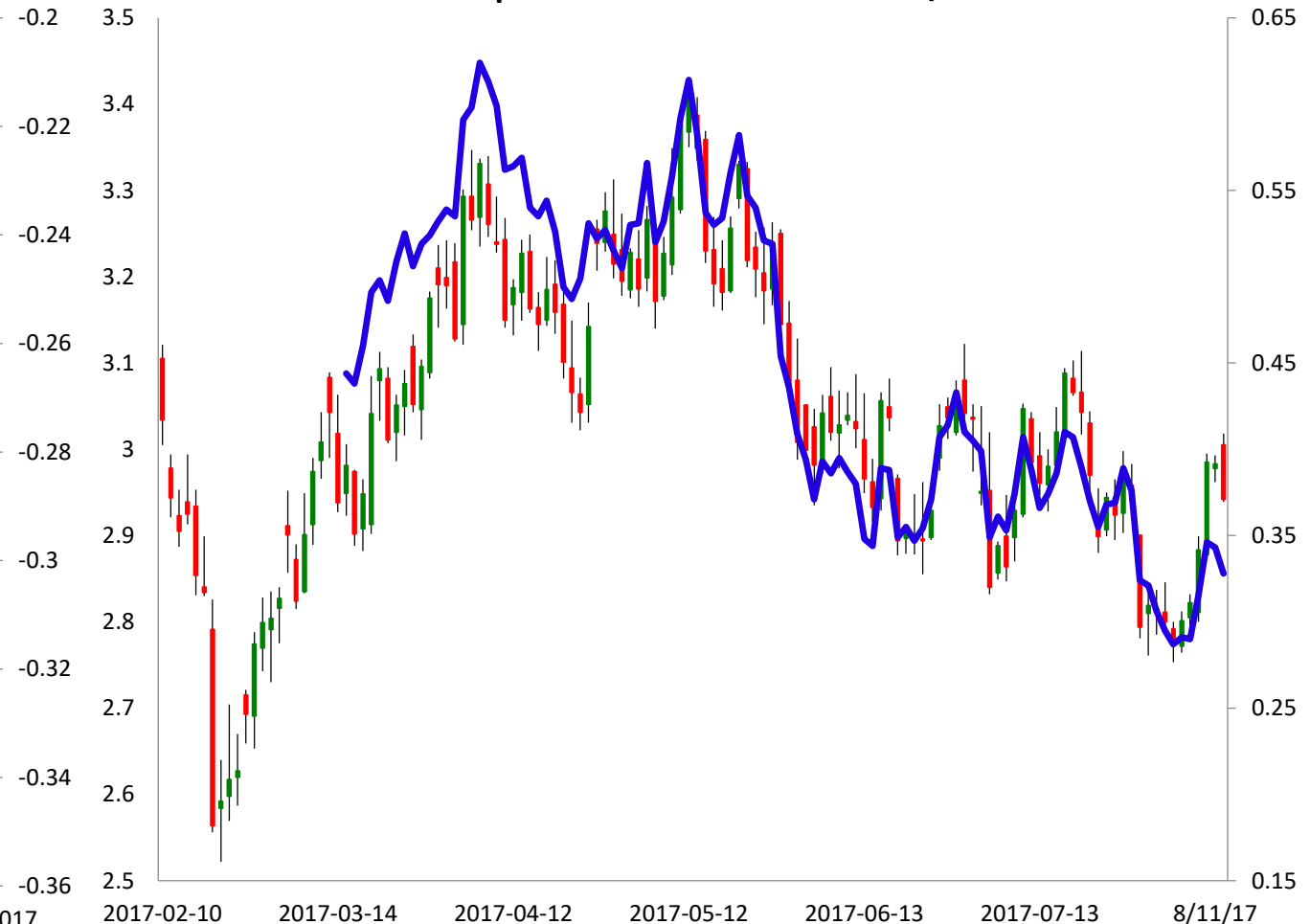
## Market Technicals: **SLIGHTLY BEARISH**

**Key Takeaway:** The September natural gas contract has seen heavy selling pressure today, with the heaviest selling once again at the front of the strip. The result is that we have seen a number of spreads bull back a bit too in a way that does not appear at all supportive to prices. The move in H/J to this point has been rather tempered, signifying downside is not all that impressive, and though V/F was appearing more impressive the pullback today there is a bit larger.

**Prompt Month Natural Gas and V7/F8**



**Prompt Month Natural Gas and H8/J8**



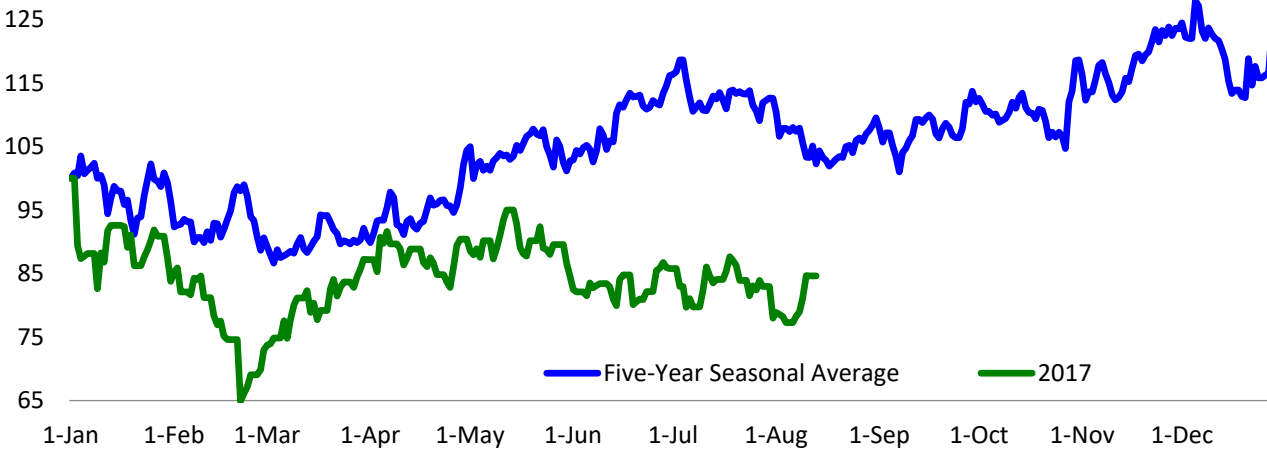




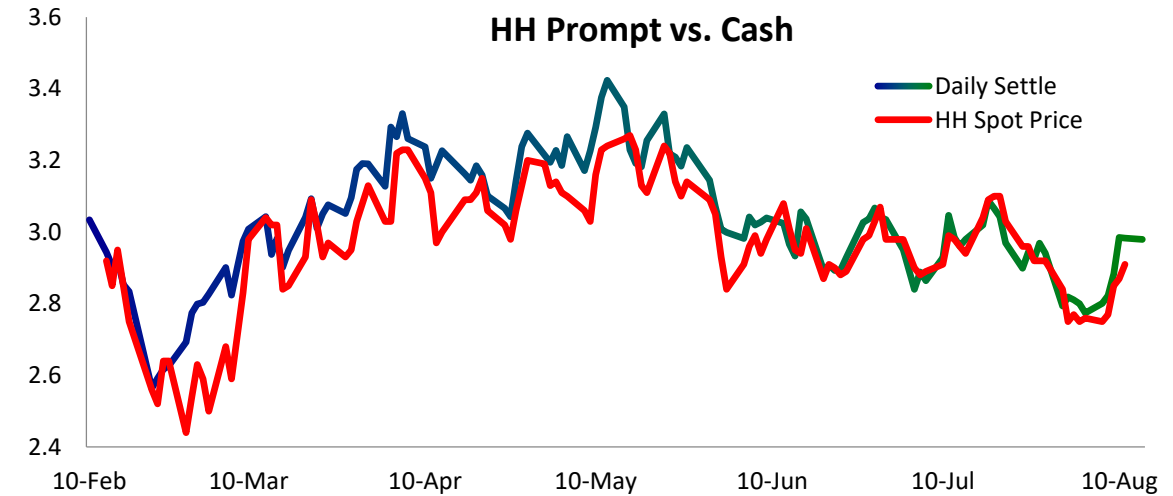
# Market Technicals: **SLIGHTLY BEARISH**

**Key Takeaway:** Natural gas prices seasonally bottom this week in August before seeing buying into September. This should add some support for prices, though we note that money managers have still been steadily increasing their outright bearish bets as we head into the winter and they still have ammunition remaining as well.

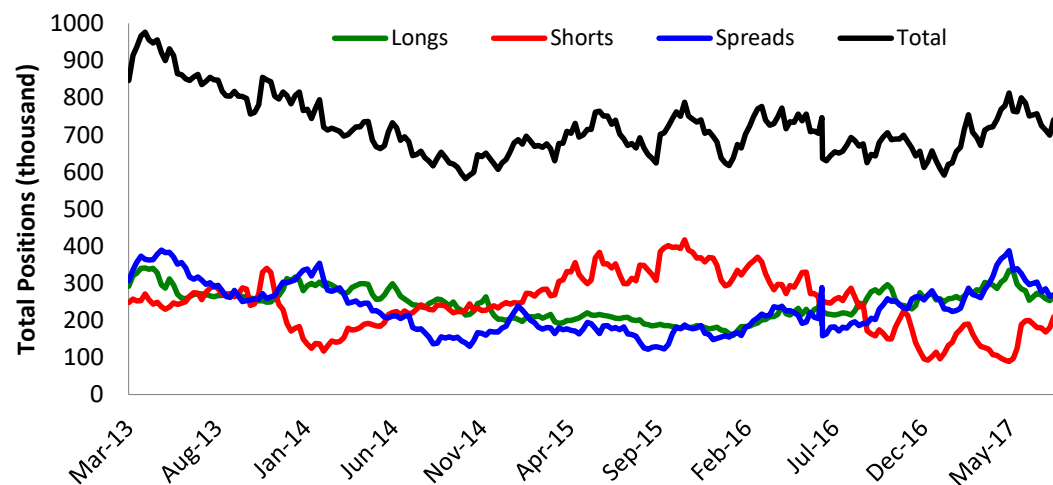
5-Year Natural Gas Seasonality



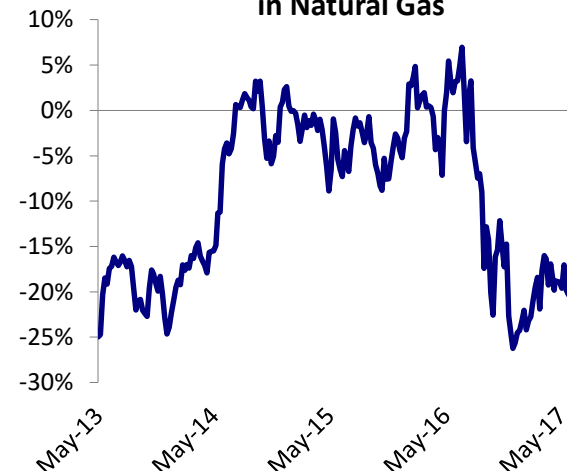
HH Prompt vs. Cash



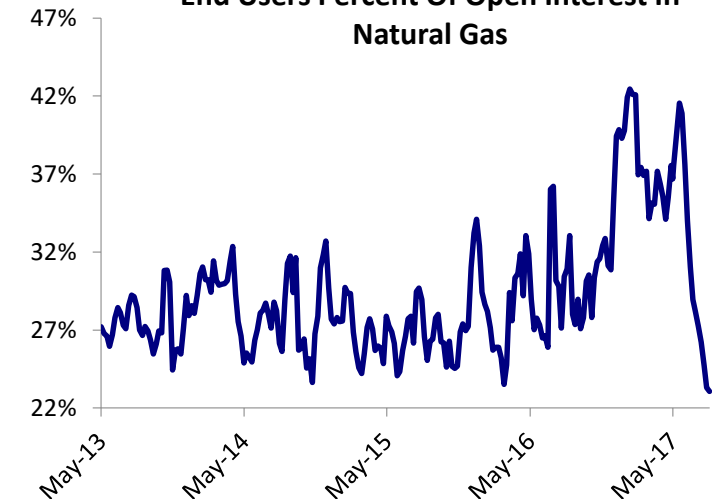
Money Manager Natural Gas (Futures Only) Positioning



Net Percent Position of End Users in Natural Gas



End Users Percent Of Open Interest In Natural Gas





# Weekly Update Disclaimer and Key

Bespoke Weather Services, LLC believes all information contained in this report to be accurate, but we do not guarantee its accuracy. None of the information in this report or any opinions expressed constitutes a solicitation of the purchase or sale of any securities or commodities.

## Key:

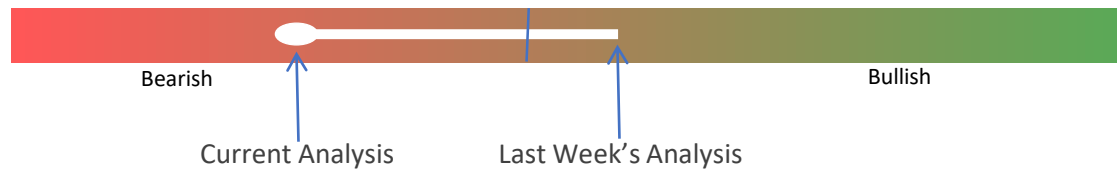
**CFSv2:** American climate model guidance

**CPC:** Climate Prediction Center

**Analog:** Previously occurring weather pattern that has similarities to the current one

**GEFS:** Global Ensemble Forecasting System, American modeling guidance

**Teleconnections:** Atmospheric indices that measure expected orientation both of upper and lower levels of the atmosphere (ie. MJO, NAO, AO, PNA, etc.)



**MJO:** Madden/Julian Oscillation, a measure of global convection (storminess) placement

**GWDDs:** Gas Weighted Degree Days (calculated by combining Population Weighted Cooling Degree Days (PWCDs) with Utility Gas Weighted Heating Degree Days (UGWHDDs))

**EIA Forecasts:** Our forecast for the weekly change in natural gas stockpiles, going out three or four weeks

**Note:** All above information is part of this informational key, and is not updated daily.