



# Weekly Natural Gas and Weather Update

July 20, 2015

**Report Summary:** Yet another injection above the 5-year average to be reported Thursday is expected to keep a cap on natural gas prices. Cooler weather across the North in Week 1 should be almost canceled out by warmer weather across the South, with warmth overspreads much of the East early in Week 2. Later in Week 2 into Week 3, models are finally getting into better agreement that cool weather takes back much of the country. Trading last week was slightly profitable.

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Executive Summary

Week In Review

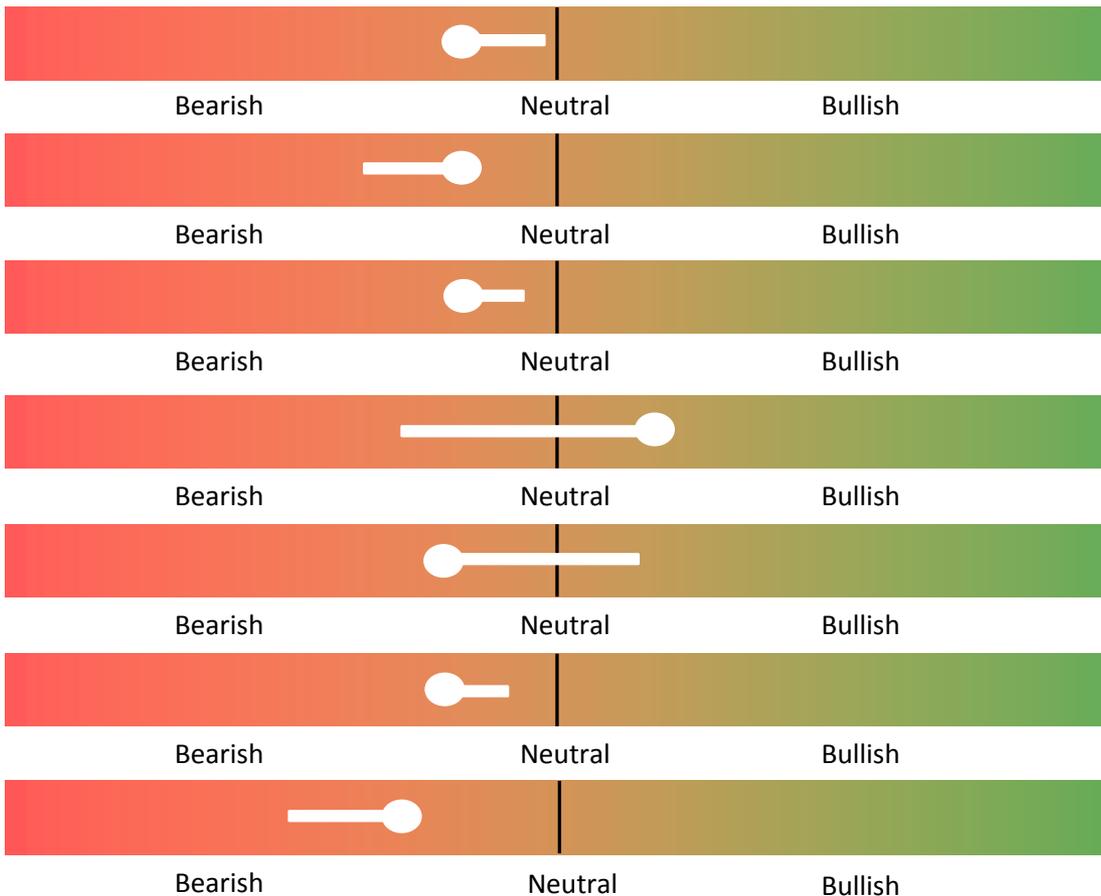
Week 1 (July 20-26)

Week 2 (July 27-Aug 2)

Week 3 (Aug 3-9)

Technical

Tropical Activity





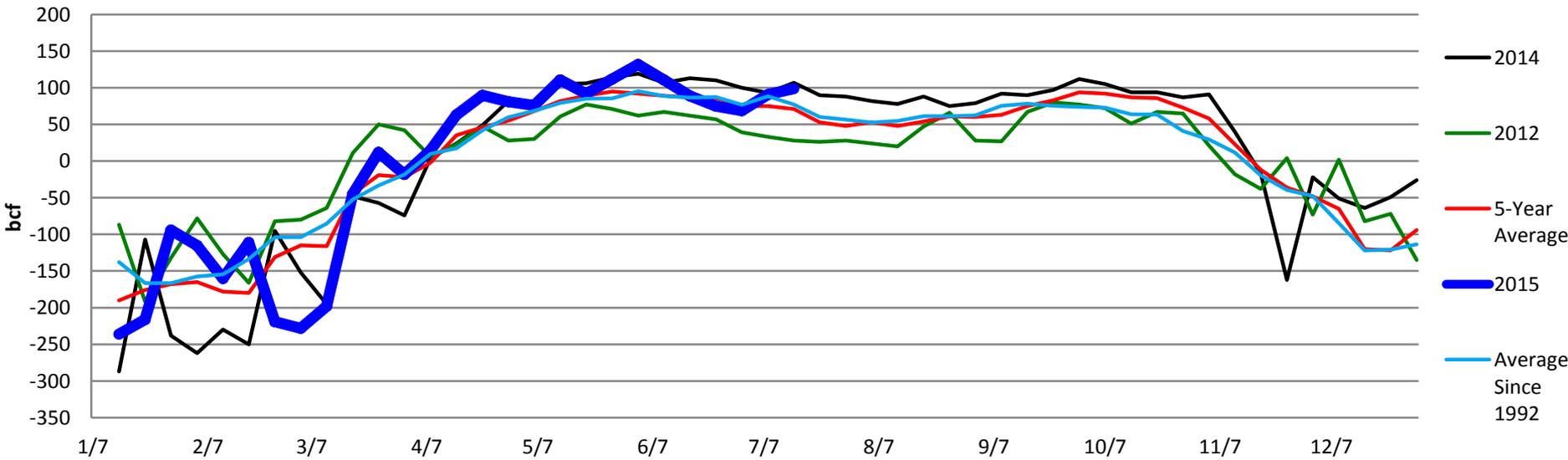
# Executive Summary: **SLIGHTLY BEARISH**

July 20, 2015

**Key Takeaway:** The upcoming injection should be closer to the 5-year average than either of the past two, but still looks to build inventories larger compared to average. Week 2 warmth will not be enough to cancel out cooler Weeks 1 and 3.

Weather this past week was slightly cooler than normal across much of the country, leading to cooling demand below average. This is expected once again to lead to an injection that will be above the 5-year average, though we expect it to be closer to the 5-year average than the week before and deviate further below last year's injection for this week. Weather in Week 1 is seen as slightly bearish, as cool weather through the middle part of the week is unlikely to be successfully canceled out by the warmer weather we have seen the last couple of days and a resurgence of some warmth late in the week. This warmer weather lingers into Week 2, when we expect cooling demand to get back above average. However, cooler weather is seen returning again late in Week 2 and potentially sticking around into Week 3 as a positive PNA pattern is expected to try and pump a ridge out West and allow a trough to dive into the Midwest and the Ohio River Valley. It is this longer-range cool expectation that kept us slightly bearish through the week last week and makes us believe the the natural gas market has potential to decline from here. Tropical activity is showing small signs of life into August, but it is too early for us to expect any market impacts from it. Technically, we were unable to break through resistance last week and have sold off since then, and we expect to decline further through the week and potentially test a couple support levels from the past few weeks. Any more bearish trends in weather guidance could lead us all the way back down to the long-term \$2.60 support level, but we still do not yet see any catalyst to break significantly out of the long-term \$2.60-\$3.05 trading range we remain in. We will need a more significant shift in weather expectations to drive us out of this range.

### Weekly Change In Natural Gas Inventories



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# Week In Review: **SLIGHTLY BEARISH**

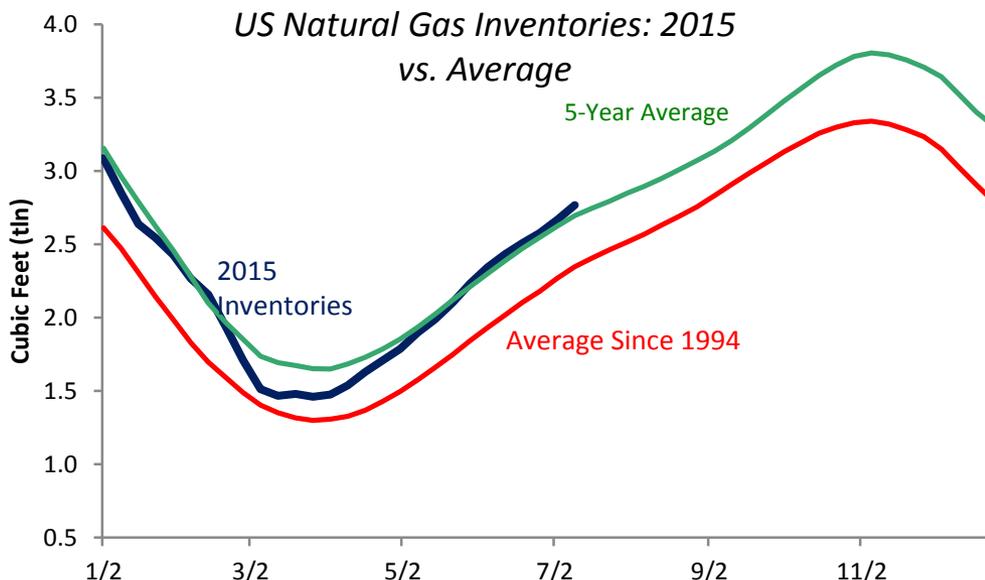
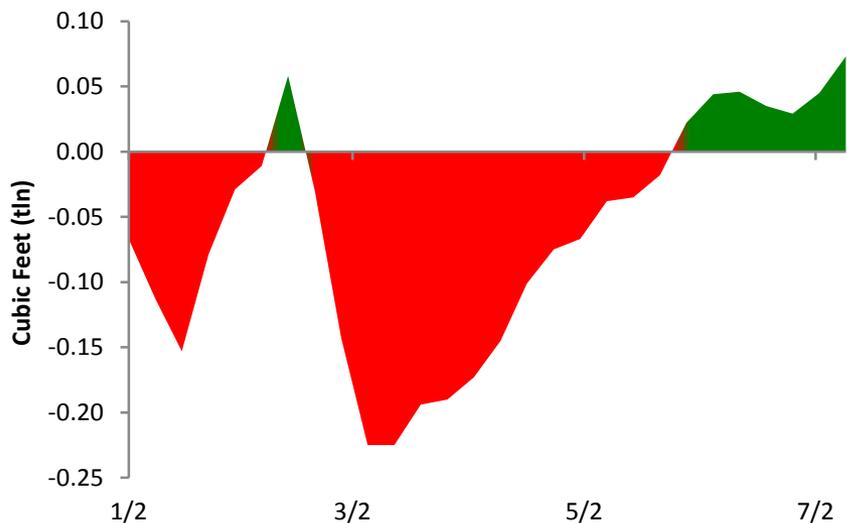
July 20, 2015

**Key Takeaway:** Yet again we expect to see an injection that will be above the 5-year average and keep pressure on natural gas prices. However, moderately warmer weather this past week compared to prior weeks should keep this week's injection closer to the historical average, allowing total stocks to grow at a slightly slower rate overall.

The week began with temperatures slightly below average across much of the Midwest into the Mid Atlantic, with much colder weather in the West and some warmth lingering in the Southeast. As the week progressed, warmer weather worked its way into the Midwest and eventually the South, as cooler weather remained across the East Coast. The warmth did not add significantly to the Southeast, which remained slightly above average. As the week ended, another cooler burst of Canadian air moved into New England and much of the East, pushing some warmer air further across Texas while warmer weather finally pushed into the Southwest, though the Northwest stayed cool.

Overall, our expectation for the past week is that cooling demand was right around average. Natural gas demand from this was right around to just slightly above average. We have seen coal plants continuing to be retired, and overall demand remains quite high due to the depressed prices. However, natural gas prices last week were on the higher side of the recent range, which could have slightly limited its demand. Still, we believe the Southeast (one of the main summer demand regions) saw demand sizably above average, which was only partially canceled out by less demand across the West and portions of the Northeast. Demand across the Midwest and Rockies was right around to slightly below average as well.

*Difference of 2015 Natural Gas Stocks to 5-Year Average*





# Week In Review: **SLIGHTLY BEARISH**

July 20, 2015

**Key Takeaway:** Heating Degree Days for gas are officially irrelevant, while Cooling Degree Days remained just below average this past week. Demand loss in the West and Mid Atlantic was not able to be offset by a warm Southeast.

Our projection for the week falls on the upper edge of the early market expectations. First, as can be seen, cooling demand this past week was slightly below average. Similarly, prices were quite elevated last week (which we continue to believe and are now seeing was unwarranted) which made the switchover from coal to gas slightly less desirable. Perhaps most importantly thus far, we have now seen back-to-back weeks where the official EIA injection data came in above the market expectation, and we now see that trend as likely for the coming week. These trends normally come in pairs of twos or threes, and we find it most likely that injection data will hit or exceed market expectations. This will result in a number at least 10-15 bcf above the 5-year average, continuing to result in above-average stockpiles. This should continue to keep prices under pressure, with only a very significant weather event enough to get prices to the \$3 level.

Heating Degree Days no longer seasonably occur for gas use across the United States, and we did not see any anomalous cold temperatures to sponsor unusual heating demand. Cooling demand was seen as slightly below average, but less so than the week before. Cooling demand was seen around average in New England but elevated across much of the South. Demand was below average across the Pacific and Mountain region, and also across the Mid Atlantic region. Some of the biggest changes occurred in the West North Central and Southeast, where very cool weather the week before flipped to allow for significantly more cooling demand. Still, cooler Pacific and Middle Atlantic regions were too much for these marginal increases in cooling demand in other parts of the country, and thus overall population-weighted cooling degree days remained 4 below the seasonal normal.

	July 2	July 9	July 16	July 23*	July 30*
Actual	69	91	99	--	--
Market Expected	70-72	86	93-97	65-70	--
BWS Expected	76	87	92	70	50-60
5-Year Avg	75	75	71	53	48
Market Reaction	Slightly Bullish	Initially Bearish	Bearish	Neutral	Neutral

Region	HDD to Avg.		CDD to Avg.	
	Week Ending: July 10	July 17	July 10	July 17
New England	0	0	-10	1
Middle Atlantic	1	0	-7	-11
East North Central	3	0	-31	-12
West North Central	4	0	-33	19
South Atlantic	0	0	1	1
East South Central	0	0	-5	15
West South Central	0	0	-7	5
Mountain	-3	0	-18	-18
Pacific	3	0	-2	-12
United States	1	0	-9	-4

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\*estimate



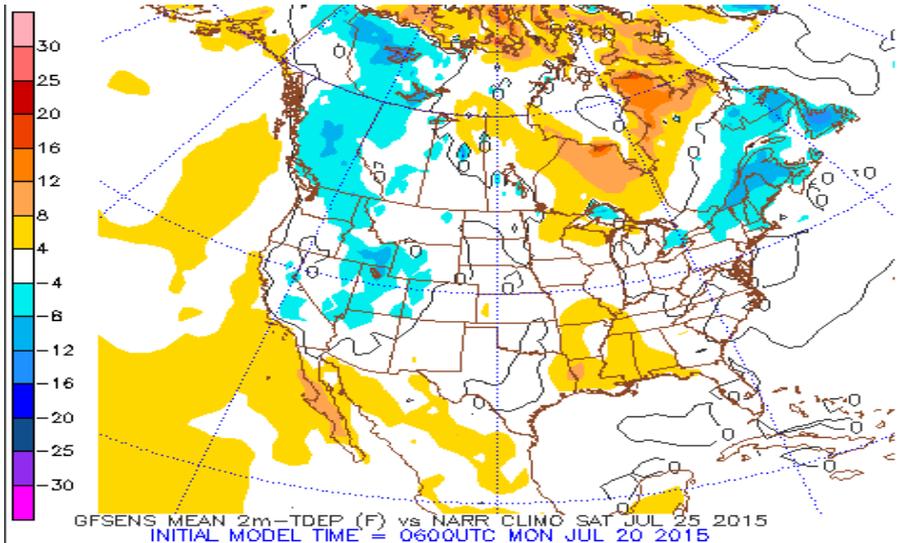
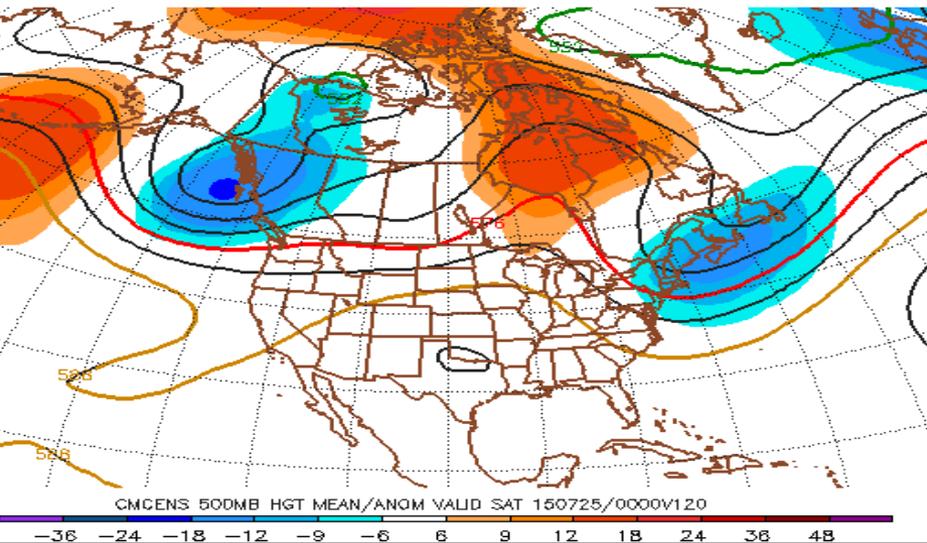
# Week 1 (July 20-26): SLIGHTLY BEARISH

July 20, 2015

**Key Takeaway:** Cool weather to start Week 1 across the northern half of the country will contrast greatly with warmer weather in the South, as more warm weather then slowly tries to overtake the Midwest by the end of the week.

The week will begin with warmth across much of the East and Southeast and much cooler temperatures diving into the Ohio River Valley, Midwest, and Rockies. This cooler weather will quickly slide East by the middle of the week, cooling off the Northeast and Mid Atlantic with the Southeast just remaining slightly above average. As this occurs, cooler weather will begin to move into the Pacific Northwest, kicking the weak ridging there further east over the Great Plains. Warmer weather will work its way into the Midwest, eventually attempting to slide into the East Coast by next weekend. However, the lack of any sustained southerly flow should prevent temperatures from getting as significantly above average, and instead we expect temperatures modestly above average to end the week in the East. Shown below is the latest CMC ensemble guidance for late this coming Friday, with the ridging over the Midwest seen bringing heat but a trough lingering off the Northeast and another moving into the Northwest.

Shown below is the 2-meter temperatures output from the GFS ensembles for this coming Saturday. We can see temperatures remain relatively cool across much of the Northeast with less heat in the Southeast and very cool temperatures entering into much of the West. The core of the warmth will be across the South, primarily Louisiana and on east into Mississippi. Heat will also be working its way into the Upper Midwest as the ridge attempts to set up through the region. This is a pattern with cooling demand right around average for the country. For the week, we would expect an injection in the 50-60 bcf range, again above the 5-year average of 48 bcf. This would be slightly bearish, as production remains high and it appears unlikely that weather will be bullish enough to overcome the remaining oversupply in the market. Warmth near the end of the week will help ensure that the injection for the week is not significantly higher than the average, but we still would be surprised to see an injection come in below average.



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# Week 2 (July 27- Aug 2): SLIGHTLY BULLISH

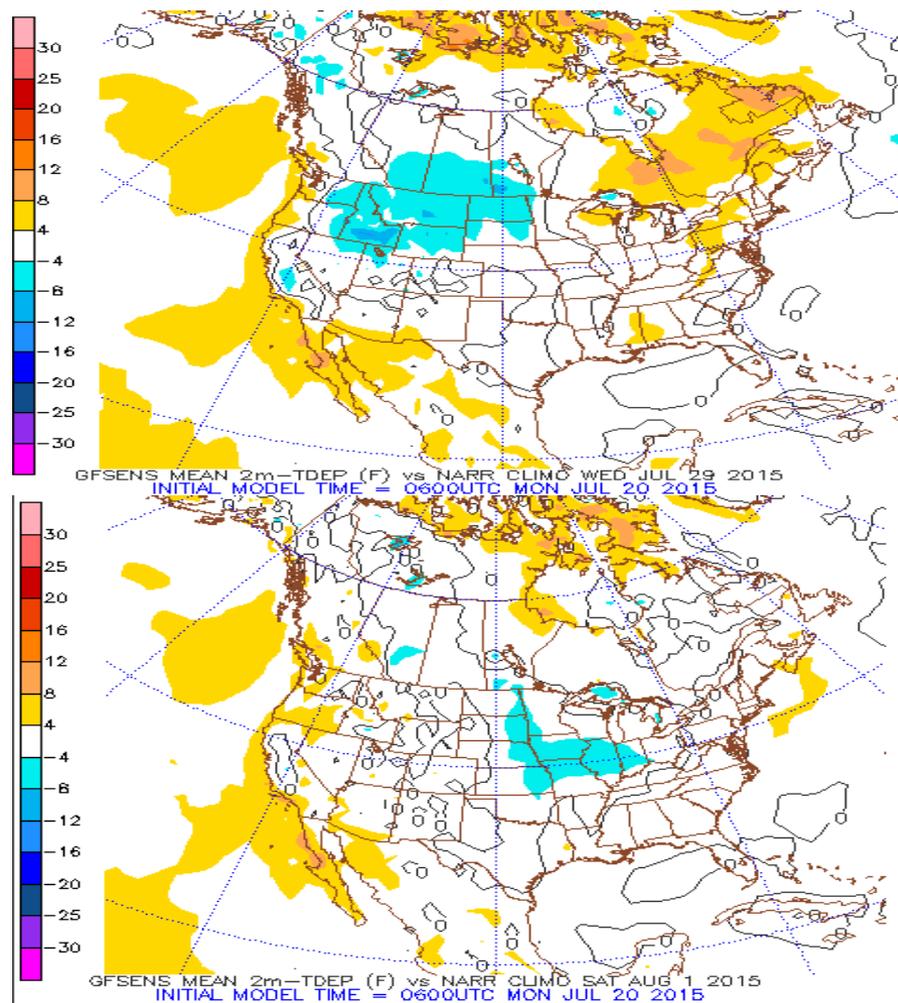
July 20, 2015

**Key Takeaway:** Warmth for the start of Week 2 will linger for much of the week, but late in the week we expect colder temperatures to work their way into much of the Midwest and Ohio River Valley. This will further limit cooling demand.

Weather during Week 2 looks to again be the most bullish of the three weeks we cover here, but even this looks to be only slightly bullish at best, as cooler temperatures late in the week will restrict how much cooling demand will be needed for much of the nation. It is the beginning and middle of the week that will see some amount of heat attempt to work its way East to the East Coast, and that is what we see temporarily stoking heating demand. Models remain varied on its strength, however.

Shown to the right (top) is the GFS American ensemble 2-meter temperature output for Wednesday, July 29<sup>th</sup>. We can see that the heat moving in late in Week 1 lingers through Wednesday here, with warmer temperatures extending from the Southeast up into the Ohio River Valley and the Northeast. The next round of cooler weather can also be seen back in the Great Plains and Pacific Northwest, however. Later on in the week, as shown below in the GFS ensemble output for August 1<sup>st</sup>, the cool weather out from the Great Plains begins to work into the Midwest and Ohio River Valley. As it progresses along to the east, it is also expected to kick out much of the warmer weather across the Southeast, which should limit the amount of cooling demand needed. Heat should also begin returning to the West as we see evidence of a positive PNA pattern beginning to return.

Overall, natural gas demand for the week is expected to be slightly above average, thanks to the warmer temperatures earlier in the week. This should help cancel out the additional production we have been seeing. Should prices remain depressed around or below the \$2.80 level through Week 2, we could see an injection getting more in line with the 5-year average, which is 53 bcf for the week. We would expect an injection somewhere in the 45-55 bcf range, slightly lower than the one expected from Week 1. This is only slightly bullish, but should support prices going forward. However, we feel much of this heat was priced in this past week when prices rose up to test the key \$2.92 resistance we had highlighted previously. Week 2 would need to trend warmer to add additional support.



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Week 2 Continued



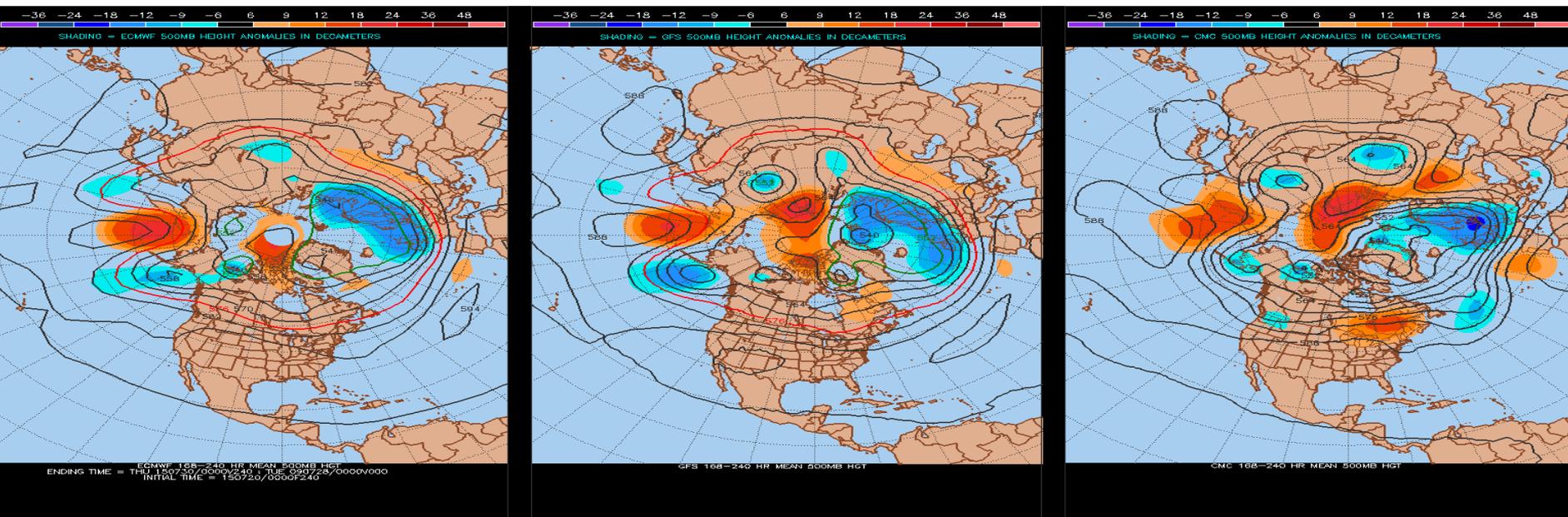
# Week 2 (July 27- Aug 2): SLIGHTLY BULLISH

July 20, 2015

**Key Takeaway:** American operational weather guidance is the most bearish days 7-10, with Canadian CMC guidance appearing the most bullish. European ECMWF guidance sits in between with a relatively zonal pattern for the US.

Below are three pieces of model output in the 168-240 hour (7-10 day) timeframe for the United States. Seen on the left is the European data, with the American data for the same timeframe in the middle and the Canadian data on the right. The ECMWF guidance shows a strong upper level low pressure center in the Gulf of Alaska directing a relatively zonal, flat jet into the West Coast. This is shown moving directly across North America in what would be a warm, zonal pattern days 7-10. No significant cold snaps would be allowed as there would be no significant trough action allowing Canadian influence, but a lack of ridging across the South would also keep that region from seeing the truly hot weather it has been seeing recently. This is a pattern that is seen as neutral to slightly bullish overall, warm but not quite hot.

In the middle is the GFS guidance for the same timeframe, which looks quite similar to the European ECMWF guidance. It shows slightly warmer weather across the Southwest, and has a slightly more defined trough signature across the East, but not enough to significantly change the overall pattern. Finally, the Canadian guidance on the right shows much higher heights across New England resulting in stronger ridging along much of the East. This is the most bullish guidance as it shows a rather significant heat wave. However, this guidance has a bias to over-amplify the overall pattern, and we feel that this model is very likely overdoing the potential for heat in the 7-10 day timeframe. While its ensemble guidance does agree with its output, we believe strong agreement between GFS and ECMWF guidance should always be favored when it exists, and thus expect only moderate warmth across the East early in Week 2.



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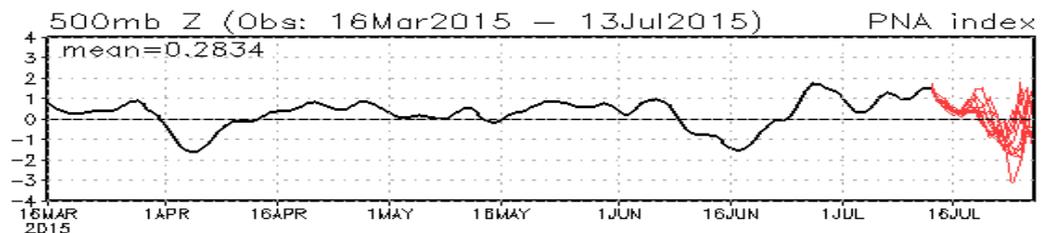
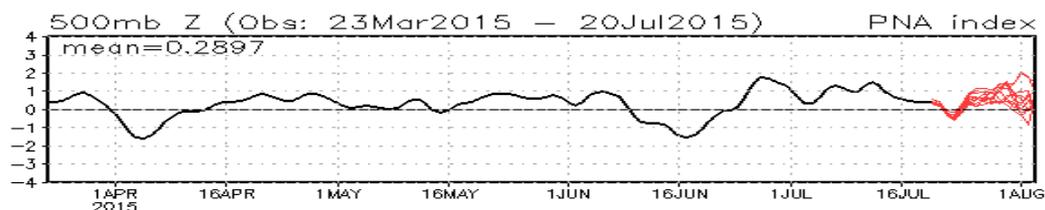
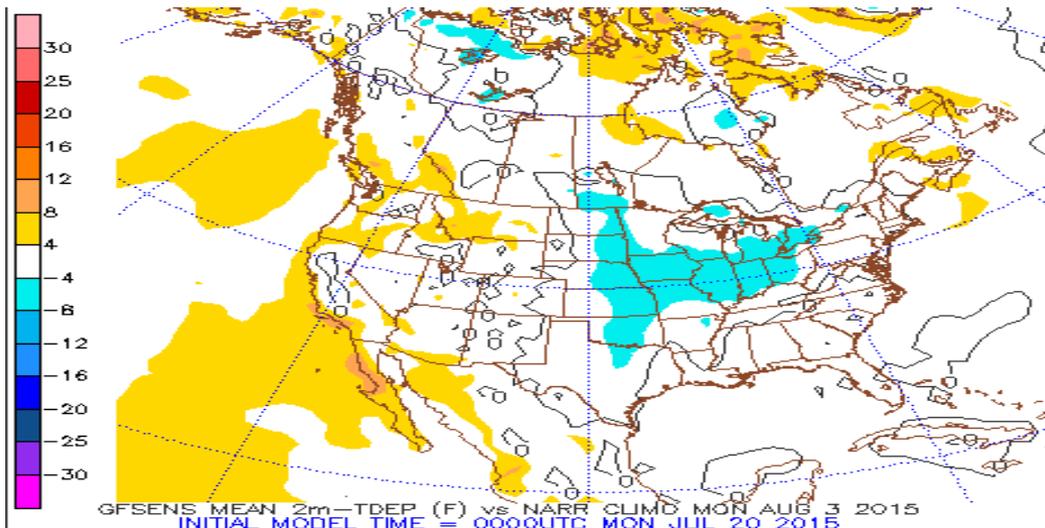
# Week 3 (Aug 3-9): SLIGHTLY BEARISH

July 20, 2015

**Key Takeaway:** Weather models into Week 3 indicate cooler weather should dominate across the Midwest and into the Ohio River Valley, with the potential for it to leak into the South and Northeast as well while the West heats up.

Shown to the right is the American GFS ensemble guidance for Monday, August 3<sup>rd</sup>. The model remains the coolest longer-term, as it has for quite awhile now. We can see that very cool temperatures are observed spilling into the Great Plains, Midwest, and Ohio River Valley, with cooler temperatures getting all the way into the South across parts of Texas and Oklahoma. Perhaps more importantly, no significantly above average temperatures are seen across the Southeast or East Coast, which is what should limit cooling demand alongside the cool air in the center of the country. Again, the American GFS guidance is the most bearish and strongest with this cold into the center of the country, but the model has been consistent and verifying better recently, with other model guidance beginning to trend towards this solution as well.

The American GFS PNA forecasts are available to the right. On top we have the most recent PNA forecast, while below that we have the PNA forecast from the last week. A positive PNA reinforces ridging across the West that often can allow cooler weather to spill into the Midwest and the East. As we can see, the more recent forecast on the top indicates that the PNA is likely to remain solidly positive as we enter August, with the potential for it to trend back to neutral. This is more bearish than the PNA forecast last week, which showed a strong consensus that the PNA would dip significantly negatively into the end of July before potentially trying to rebound into August. This trend in the PNA we do not exactly find surprisingly, as we had expected a generally positive PNA moving forward, but should help explain the recent decline in natural gas prices, and why longer-term we are maintaining our slightly bearish outlook for the market. We do not see the PNA dipping significantly negative into August at this time.



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[Week 3 Continued](#)

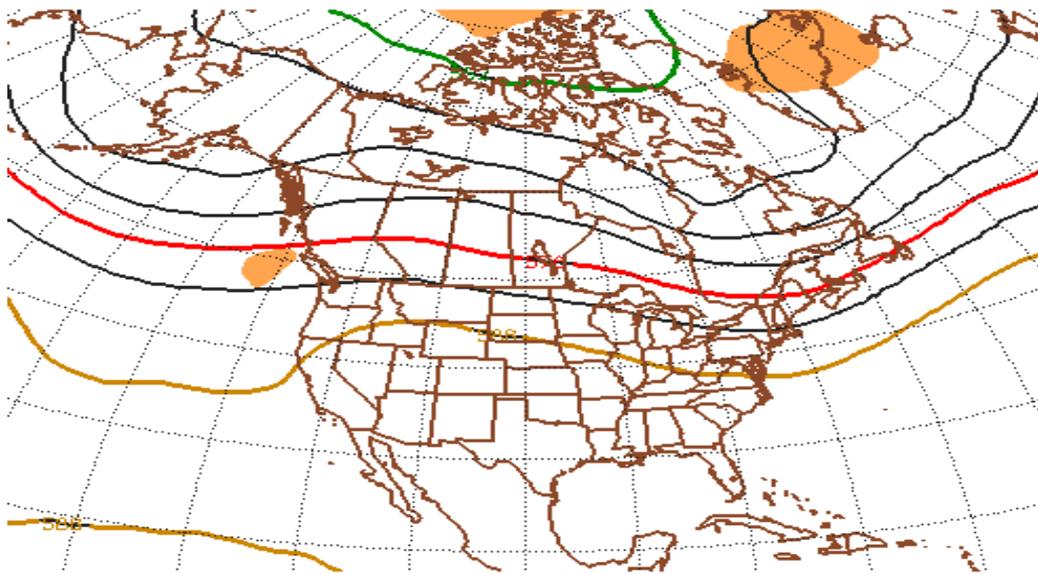


# Week 3 (Aug 3-9): SLIGHTLY BEARISH

July 20, 2015

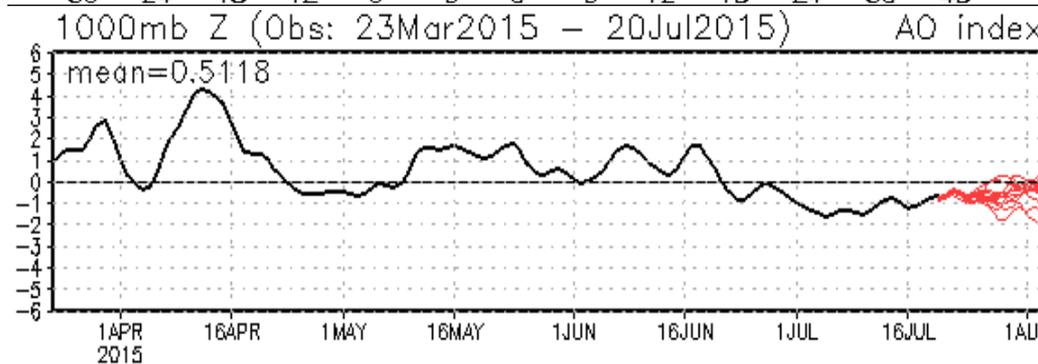
**Key Takeaway:** Canadian weather guidance remains the most bullish overall, which has been the trend recently, but even it has begun to trend more in a bearish direction, indicating more cool weather infiltrating parts of the eastern US.

To the right is the CMC ensemble mean 500mb upper level pattern expectation late on Tuesday, August 5<sup>th</sup>. The 500 mb pattern is slightly more bullish than the GFS guidance as it has a weak trough sitting further East, cooling off the East Coast but not the Midwest nearly as much. However, even this guidance is now showing positive height anomalies just off the Pacific Northwest, a signal that a positive PNA is likely trying to form that would allow more cool weather into the eastern US. There are no major features seen on the guidance long-range, indicating that the model is likely struggling with a wide array of solutions and agreement is not necessarily as strong. GFS AO guidance (bottom right), meanwhile, shows slightly stronger agreement in the negative phase remaining, as does European guidance. This allows us to continue favoring a long-range GFS/ECMWF model blend moving forward, which would be slightly bearish for the natural gas market overall.



CMCENS 500MB HGT MEAN/ANOM VALID WED 150805/0000V384  
-36 -24 -18 -12 -9 -6 6 9 12 18 24 36 48

The ECMWF European guidance had ended last week as some of the most bullish, but over the weekend it backed off some of its more significant ridging into early August and instead indicates the potential for a trough to take over across the Northeast. The guidance verbatim still has higher heights at the 500mb level, which does not appear bearish, but the recent trend has been for lower heights and we expect this trend to continue in future model output. Similarly, the ECMWF ensemble output remains relatively cool at the surface, an indication that the model, despite higher heights, does not see significant heat as all that likely for the eastern US longer-term. Like the GFS, the ECMWF guidance keeps the core of the cold across the Midwest and Ohio River Valley, limiting heat into the South as well while the Northeast is seen around to slightly above average at times. This pattern is thus seen as slightly bearish, favoring natural gas prices somewhere in the \$2.70-\$2.75 range.



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[Week 3 Continued](#)



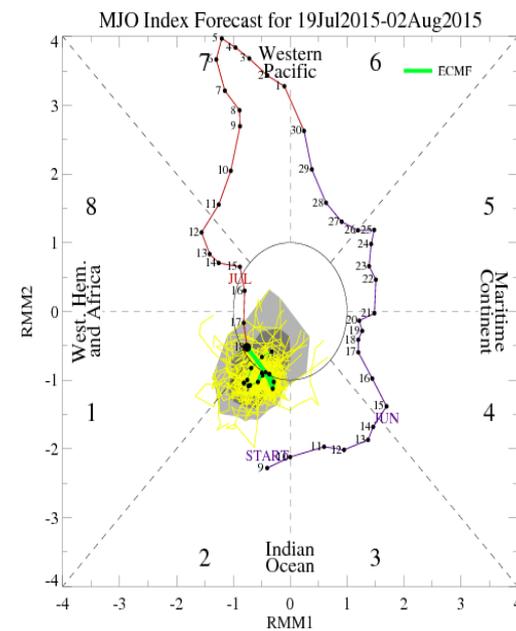
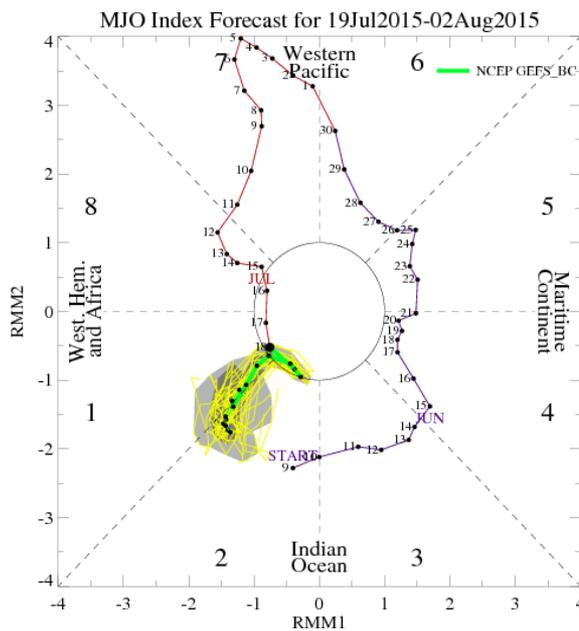
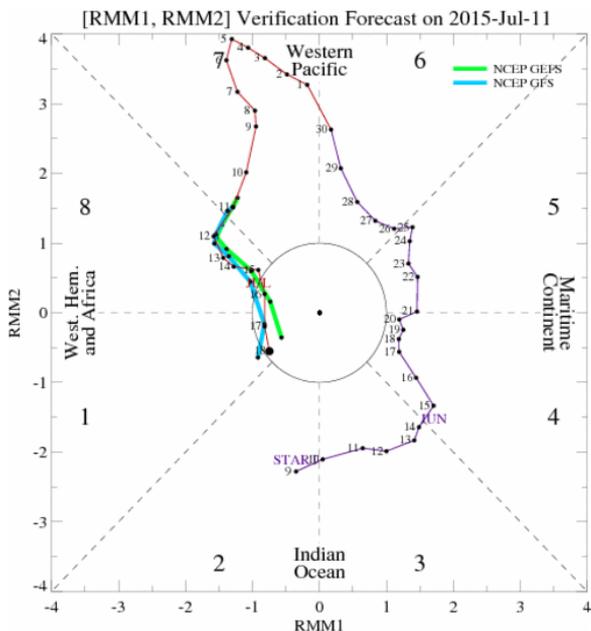
# Week 3 (Aug 3-9): SLIGHTLY BEARISH

July 20, 2015

**Key Takeaway:** Madden-Julian Oscillation verification with the GFS is the most impressive we have seen in the past two months, with the ECMWF guidance performing similarly well. Agreement is moderate among model guidance currently.

Shown below are the GFS American MJO verification, the GEFS American MJO forecasts, and ECMWF European MJO forecasts. The GFS/GEFS, as seen on the left, verified very well through the past week. Both the operational and the ensemble guidance called the placement almost perfectly a week in advance. Moving forward, we are adding additional weight to GEFS 500mb and MJO forecasts due to this added verification. The guidance now forecasts the MJO to move right in between phases 1 and 2 (bottom middle). Phase 2 has relatively cool conditions for much of the country, while phase 1 is warmer. Should we remain borderline between the two, like the guidance shows, we would expect the MJO to help lead to a relatively neutral pattern overall, limiting heat waves.

The ECMWF MJO forecast (bottom right) shows the MJO developing very little influence in the overall pattern, remaining right near the center circle on the edge of phase 2. With phase 2 being a neutral to slightly bearish pattern, we believe that these MJO forecasts are slightly bearish long-term. This flip is interesting, as the GFS has recently been the guidance with the weakest MJO forecasts and the ECMWF had kept the MJO stronger. We believe a blend between GFS and ECMWF guidance should be most accurate, and accordingly expect the MJO to remain weak and potentially enter briefly into phase 2. We do not expect the MJO to be a major pattern driver as it has been the past few weeks, and instead have been weighting other teleconnections, such as the PNA and AO, higher within forecasts as models have shown better agreement.



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# Technical: **SLIGHTLY BEARISH**

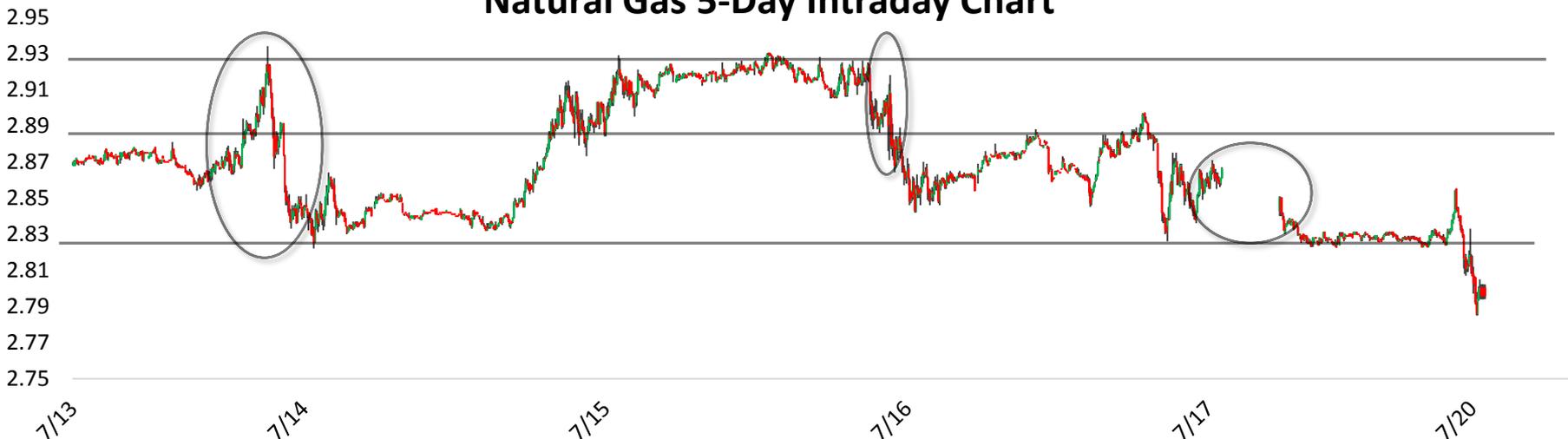
July 20, 2015

**Key Takeaway:** Natural gas prices rose early on Monday, remaining elevated through the day. Prices then reversed Tuesday before hitting resistance again Wednesday, selling off on bearish EIA data Thursday and stabilizing Friday.

Natural gas prices did not move significantly from pit open on Monday to pit close on Friday, with prices closing up around 10 cents on the week after gapping up and following through early on Monday. Prices spiked early on Tuesday before rapidly reversing upon hitting key technical resistance around the \$2.92 level, right in line with our expectations (circled). Prices then rebounded on Wednesday, rising back up to that critical \$2.92-\$2.93 resistance. Prices declined early on Thursday ahead of a bearish EIA data release, where they continue to decline through much of the day on Thursday (circled). Prices traded generally within a range on Friday, dropping in the late morning before hitting support and rallying into the end of the day. This late-day Friday rally was canceled out by a gap down in prices last evening (circled), with prices briefly rising this morning before dropping into the 9 AM open.

As will be also shown on the daily chart, key resistance right around \$2.92-\$2.93 held through the week, being tested first by a price spike on Tuesday and then again through the day on Wednesday when it was tested multiple times. Prices Wednesday closed just below the level, with it again being tested early Thursday morning before prices declined ahead of the EIA data. We saw the trading range for the week centered right around the \$2.89 level, with prices moving through the level on Tuesday, Wednesday, and then Thursday. Support for the week came around the \$2.82-\$2.83 level, which was tested briefly on Tuesday and again on the Friday sell-off before the recovery. This weak support was broken early this morning as prices significantly declined ahead of the pit open. No other clear support levels for the upcoming week appear on the 5-day chart, but moving forward we can see the \$2.92 resistance level holding significant weight.

### Natural Gas 5-Day Intraday Chart



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[Technical Continued](#)



# Technical: **SLIGHTLY BEARISH**

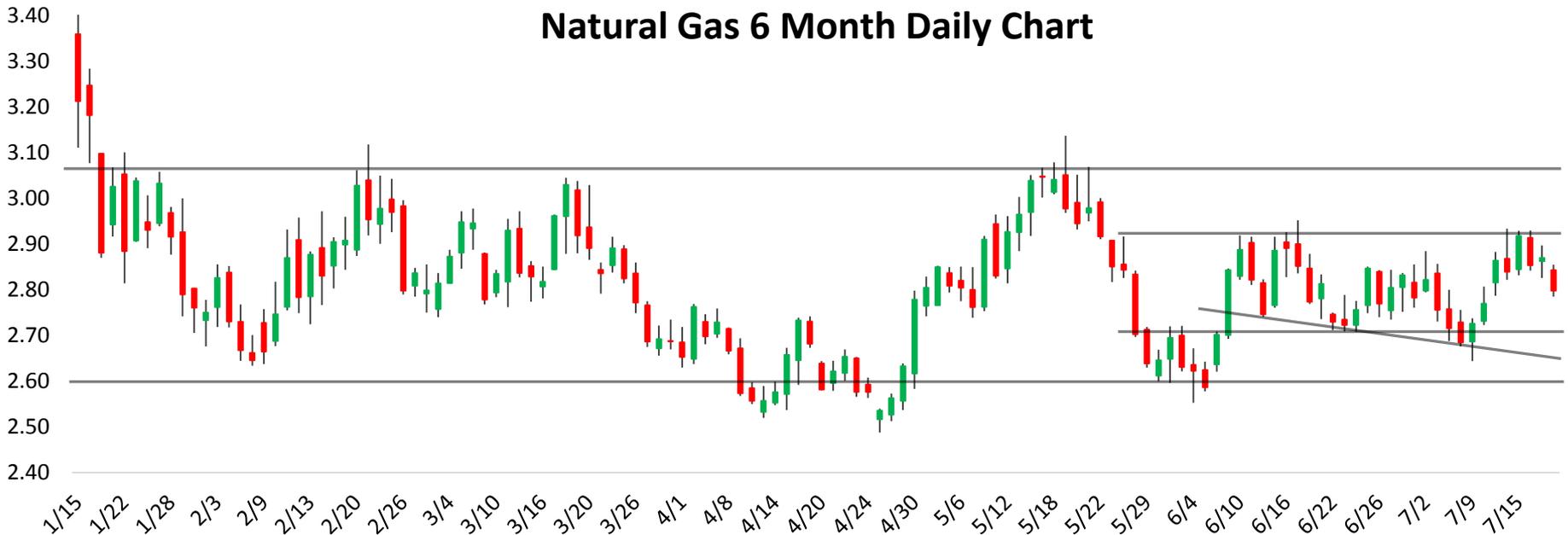
July 20, 2015

**Key Takeaway:** We tested longer-term support around the \$2.92 level this past week but were unable to break through, resulting in prices declining Thursday and Friday into today. A series of lower lows has been set over the last few weeks.

On the daily chart, we continue to see natural gas prices trade within the long-term range from \$2.60 to \$3.05. We have not seen prices move outside of this range since late April, and we continue to not see any evidence that this will occur moving forward. The key feature of the last week was a test three different days of the \$2.92 support level, which had held since early June. We were unable to break above that support level, which had led to a decline back into the center of our trading range. We see this as a slightly bearish technical indicator, as combined with weather factors we see it likely that we continue wandering lower towards support before we are able to see any sizable bounce in prices.

Another key feature that has arrived on the daily chart is a series of lower lows that have been set since back in mid June. On June 12<sup>th</sup> we settled at \$2.75 before proceeding to settle lower on June 22<sup>nd</sup> at \$2.73. This trend was continued two weeks ago, when we settled at \$2.69 on July 8<sup>th</sup>. Though we rebounded impressively from there, once again we were only able to hit resistance before falling back, and we are now looking to set a newer low. We would not be surprised if prices tested the \$2.60 support level moving through the week, and we will look for a close somewhere around the \$2.65 level to continue this trend of lower lows.

### Natural Gas 6 Month Daily Chart



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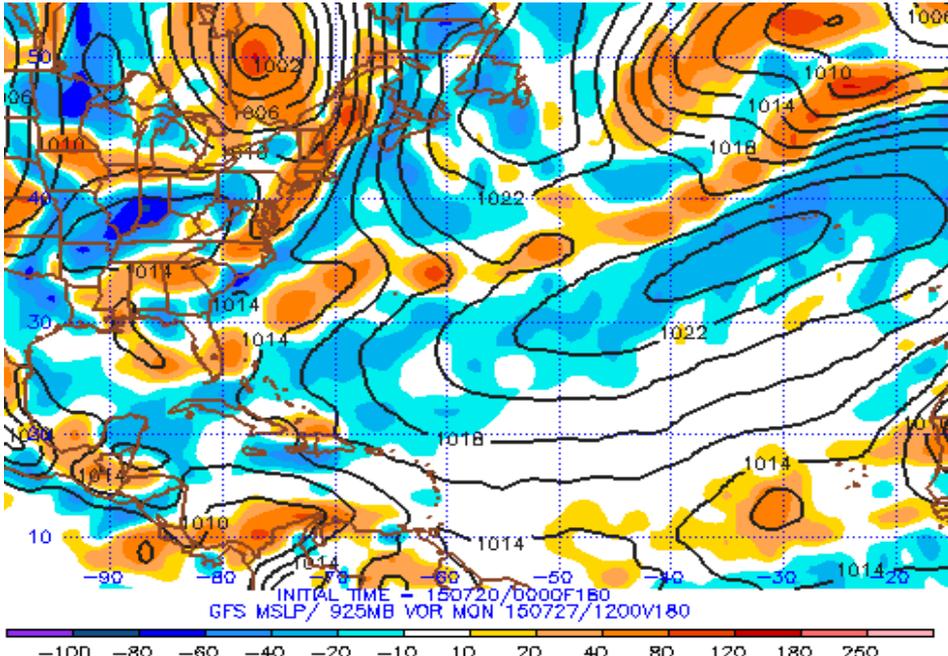
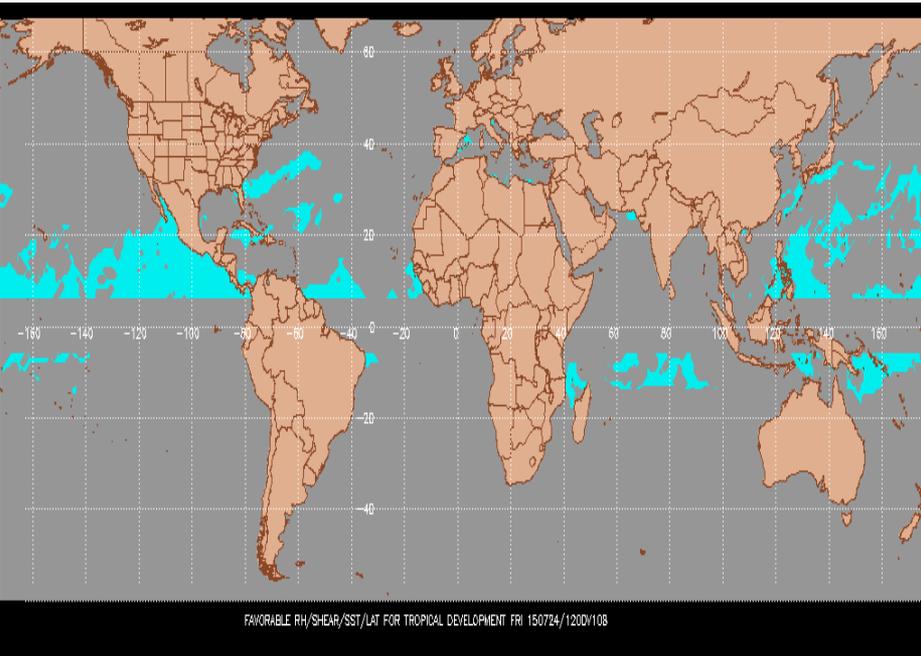
# Tropical Activity: **SLIGHTLY INACTIVE**

July 20, 2015

**Key Takeaway:** Models have begun to indicate that there may be more tropical threats to monitor over the coming 2-3 weeks, but agreement on any individual feature is low. More invests are shown moving off the African coast and could develop. Any threats to the United States do not appear significant, with the Carolinas the main region at risk.

Below is a compilation of weather model output focusing 120 hours out on what regions around the globe hold favorable humidity, shear, sea surface temperatures, and geographic placement for tropical development. As can be seen, the main threat regions remain just off the Southeast Coast, around Cuba, and in the southern Atlantic. All of these threat regions do not look to hold wide areas of favorable conditions, and thus in at least the coming 5 days we are not worried at all about tropical development. The Gulf of Mexico looks to remain especially tranquil, with dry conditions and decent shear enough to keep any disturbances from developing.

Shown below is the American GFS tropical output for early on Monday, July 27<sup>th</sup>. The model indicates a weak invest sitting off the coast of Africa with a small chance of developing as it moves further to the west. This is something worth monitoring at this point, but any development would be too far out in the future for weather models to successfully pick up on. Other than that, American and European guidance indicate scattered threats of tropical activity as we move into August, but we only see around a 10% chance of any US impacts into the first week of August. We will continue to monitor any potential tropical developments to see if market impacts could emerge.



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# Trading (July 13-17): Up 1.78%

July 20, 2015

**Key Takeaway:** A very slow trading week involved fewer trades than normal. A small profit overall was entirely acquired on Tuesday, when prices sold off dramatically right in line with expectations. Prices spiked unexpectedly Wednesday into Thursday, cutting into profits before we flattened and watched prices decline later on Thursday and stabilize Friday.

Monday (7/13): Sold @ \$2.85

Tuesday (7/14): Sold @ \$2.923, Bought @ \$2.85

Wednesday (7/15): Short 1

Thursday (7/16): Bought @ \$2.925

Friday (7/17): Flat

Weekend: Flat



\*Profits based off a starting equity of \$4,500

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# Disclaimer and Key

July 20, 2015

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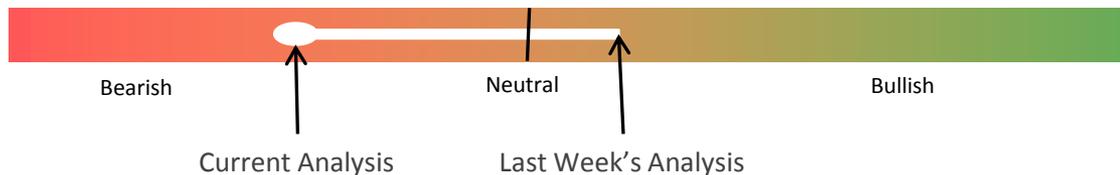
**Key:**

**GFS:** American Weather Model Guidance

**ECMWF:** European Weather Model Guidance

**CMC:** Canadian Weather Model Guidance

**0z/6z/12z/18z:** Time of day that model was released; 0z is overnight guidance while 12z is afternoon guidance



**MJO:** Madden/Julian Oscillation; a measure of convection and weather patterns in the western Pacific that correlates to weather progressing towards the US

**PNA:** Pacific North American Pattern; measures the upper level pattern over the West Coast of the US; positive index indicates a ridging inducing warmth riding up from the South Pacific, negative indicates the opposite

**Trough:** Southern dip in the jet-stream that allows an intrusion of colder air further south than is seasonable for the time of year

**Ridge:** Northern extension of the jet-stream that allows warmer air to flow further north than is seasonable for the time of year

**GEFS:** The ensemble abbreviation of the American weather model guidance (ensembles being the same model run numerous times under slightly different base conditions)