

Warmest Year on Record in 2017 Becoming Near Certain October “Normal” Not Enough to Overcome the End of Year Warmth Overall

La Niña Gives Confidence in Outcome, but “Wild Card” Cold Could Repeat in Dec/Jan

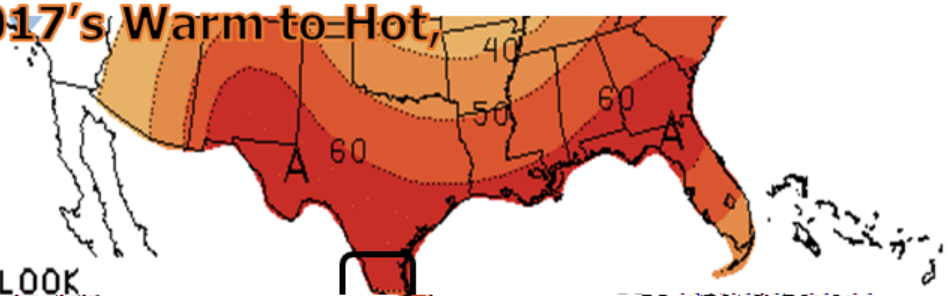
Overview

October 2017 was the month that provided a temporary break to the prolonged, solidly above average temperature trends that have dominated most of the past two years. Despite a late month cold front that broke several morning minimum temperature records on the 29th under clear skies and calm winds, and earlier cool downs that brought refreshingly cool mornings and warm but dry days, the month overall was near or a shade above average. More welcome was a band of heavy rainfall to the tune of 3 to more than 6 inches along the season’s first cooling front on October 10th, along IH-2 in Hidalgo County that eviscerated the moderate to severe drought, at least temporarily. For the first 10 days of the month, October acted more like September with a feed of tropical moisture providing some rain opportunity on many days. Thereafter, rainfall largely ceased and lower humidity arrived on multiple occasions. In locations where beneficial rains did not fall, drought conditions began to worsen, with moderate to locally severe drought across the ranches of Starr and Jim Hogg county as well as moderate conditions redeveloping near the Lower Texas coast.

The initial foray into November showed the end of October cooldown that felt like typical weather from the Midwest to the Mid Atlantic here in the Rio Grande Valley. Late September-like temperatures were expected for at least the first ten days – some 10°F above average along with little to no rain, including a few potential new maxima records – setting the tone for a month where the likelihood of above average temperature soared

over 60 percent (chance for below average at less than 10 percent), with below average rainfall near 50 percent (above average chance only near 20 percent).

November 2017's Warm-to-Hot, Dry Tale?



ONE-MONTH OUTLOOK

TEMPERATURE PROBABILITY

0.10 MONTH LEAD

VALID NOV 2017

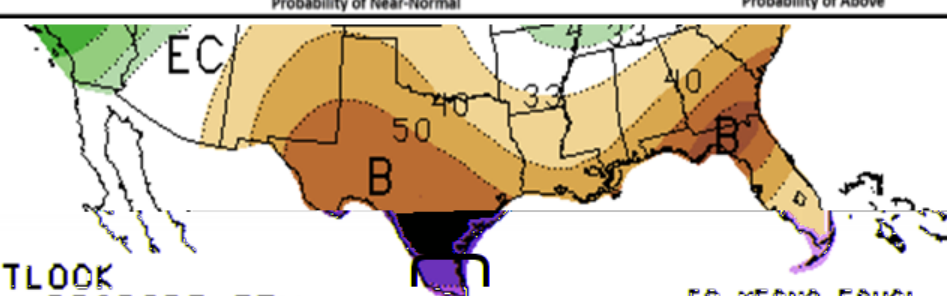
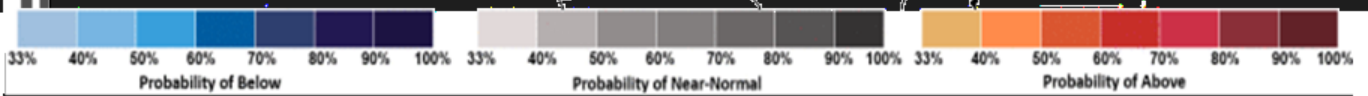
MADE 31 OCT 2017

33 MEANS EQUAL CHANCES FOR A, N, B

A MEANS ABOVE

N MEANS NORMAL

B MEANS BELOW



ONE-MONTH OUTLOOK

PRECIPITATION PROBABILITY

0.10 MONTH LEAD

VALID NOV 2017

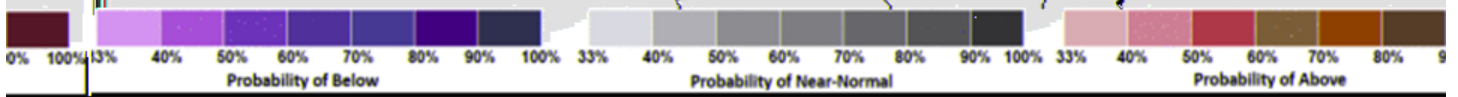
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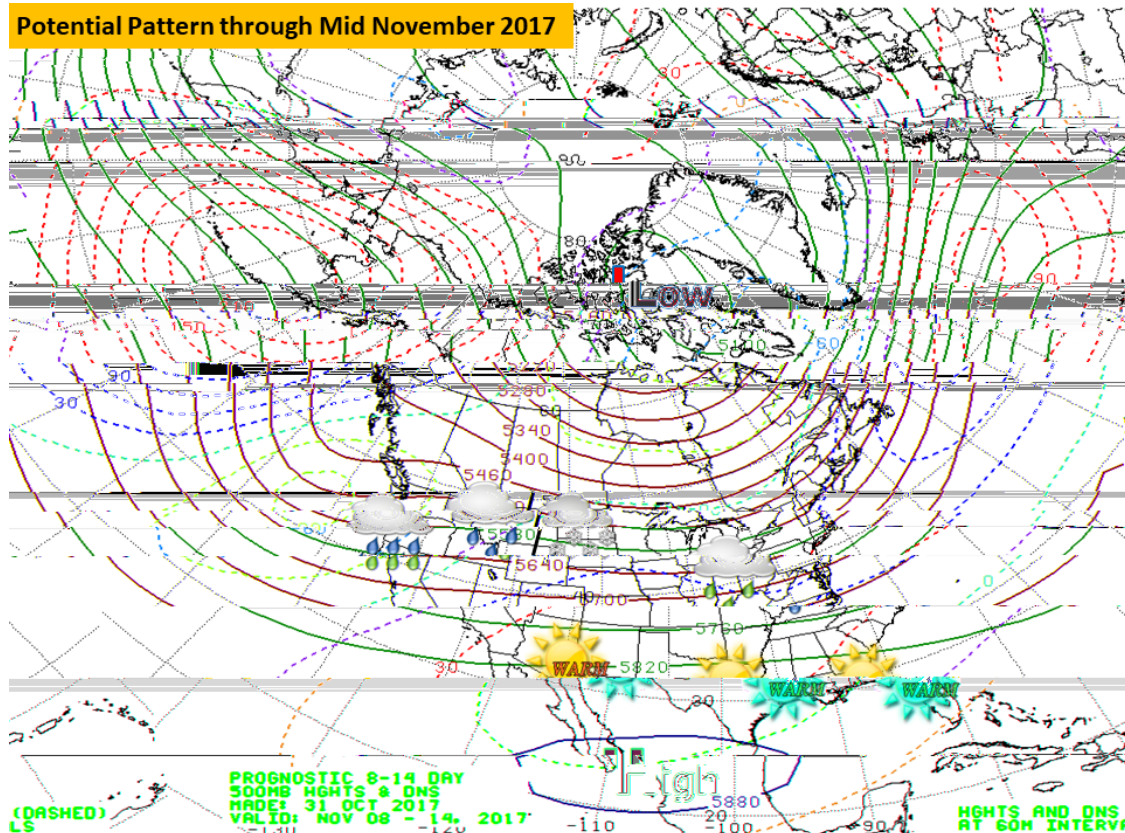
N MEANS NORMAL

B MEANS BELOW

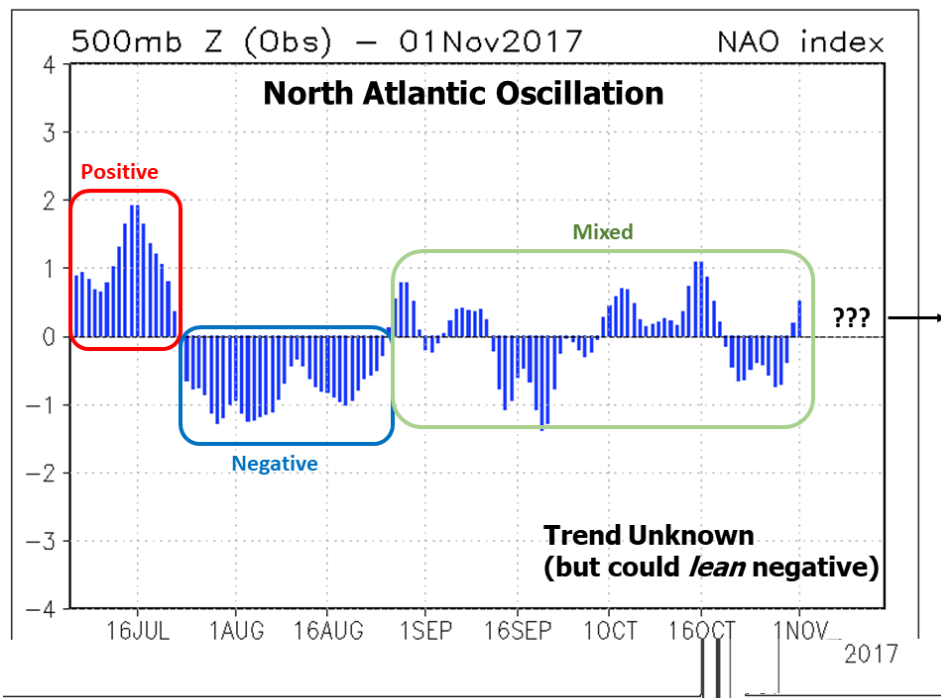


Above: November temperature and rainfall outlook for the southern third of the contiguous U.S. Deep South Texas/Rio Grande Valley is highlighted in black.

Potential Pattern through Mid November 2017



Above: The atmospheric pattern becomes more “tight” across the USA into mid-November, as cold polar air begins to descend south from Canada into the northern U.S. Meanwhile, the summer-like subtropical ridge holds firm from south Texas through Florida. This is likely a harbinger of the winter to come, where a cold and frozen northern third of the U.S. and a beachy warm Gulf Coast and Florida may exist simultaneously. Such is an expectation of a La Niña – though other teleconnections will play a role in sub-seasonal weather events. The winter outlook will be available the week following Thanksgiving.



Above: Phases of the NAO from June 16 through October 16 2017. Though there are other factors at play, in general, periods of negative NAO favored above normal temperatures and low rainfall in late summer and early fall; the period of positive NAO in July may have contributed to a closer to “normal” month, at least for temperatures. A negative NAO in late fall and winter can be favorable for dry weather with a La Niña (or a lean toward one) but may also tie in with cold outbreaks.

Pattern Matters

Warm and Humid with a Chance for Chill and a Freeze(?)

- Dry and warm air would be dominant underneath the ridge, including the Rio Grande Valley, which would suppress rainfall to one-quarter to one-half of average, area-wide, through most of November.
- From late November through January, a persistent or even strong negative NAO could contribute to opening the door for cold to very cold air to surge south from northwest Canada through the Great Plains and into northern Mexico. These surges could be short-lived as they were in late 2016/early 2017, especially if the negative phase of the NAO is fleeting. Freezes/sharp changes would be the most likely outcome in this case
- A neutral or slightly positive NAO would reduce the possibility for notable cold and increase the opportunity for persistently warm – but humid – outcomes through December and at times in January.

Teleconnections: La Niña Near Certain for the Period

Eastern tropical Pacific water temperatures continued their downward trend into early November, and a 3 to 6 month period of La Niña conditions is now expected to close our 2017 and begin 2018 before a flip back to neutral by late spring and summer 2018. Other teleconnections such as the NAO (above) as well as the Pacific Decadal Oscillation (PDO) and Madden-Julian Oscillation (MJO) to shed some light. The PDO, which in positive mode can enhance El Niño and combine with a +NAO to potentially drive stronger subtropical jet stream waves across the southwest U.S. in the late autumn and beyond – hovered a bit above zero in September, slightly higher than its near zero (but still positive) values in late summer. A combination of negative ENSO, a negative NAO, and a neutral to negative PDO almost surely would result in a prolonged dry conditions with just minor incursions of rain-producing systems, with deep tropical moisture largely cutoff. However, a neutral or even +NAO could assist with occasional subtropical energy and add more than a little drizzle to seasonal shallow cold fronts as well as put the brakes on any potential diving cold outbreaks. Time will tell.

A weakly –NAO and weakly +PDO, combined with the anticipated weak (-0.5 to -1) Oceanic Niño Index (ONI) based La Niña would be nearly identical to these patterns in the late fall and winter of 2016/17. This is how the forecast will lean from November 2017-January 2018, and probably beyond.

Prior page: Upper oceanic heat content in the ENSO zone (generally equator to 5°N or so latitude) Positive summer values flirted with El Niño in 2017, but never quite reached. A short lived La Niña at the end of 2016 may have influenced the warm and dry autumn prior to the brief plunge of temperatures in mid-December and again in early January. The sharp drop in late summer through the end of October 2017 signals a coming La Niña to close out 2017 – which could also be equally as brief and end by spring 2018.

What to Watch For: Warm, Worsening Drought. A couple of Sharp Cold Snaps, too?

Overall, for the end of autumn and the first half of winter, the following situations are expected to predominate:

- *Dry and Warm Dominant.* The first ten days (or more) of November will feature majority 90°F afternoons for most of the Valley, 10 degrees above average (upper 70s to lower 80s). That will lock up an above normal month, even if a late month cool/cold snap arrives. Beyond November, sharp cold snaps could dent the warmth, but conditions won't last more than a couple of days before above to much above average temperature returns and dominates for days to a week or more. La Niña, combined with weakly valued (from zero) teleconnections such as the PDO and NAO, favors a lack of a subtropical mid to upper level jet stream, one that helps pull deep tropical moisture into the Valley on occasion and brings welcome rain.

Should the flat ridge pattern (map on page 3) persist through January, it would effectively block south Texas and northern Mexico from the necessary moisture to produce significant cool season rain

- *Drought.* Additional heat with little to no rainfall increases the stress on Valley/Brush Country grasses, trees, and brush. October saw a ten day period of occasional rains, highlighted on the final day with 3 to more than 6 inches across much of the IH-2 corridor, but also a good deal of the crop-rich areas of western Cameron, western Willacy, and central Hidalgo County. Unfortunately, very dry and breezy conditions near month's end may have evaporated much of the benefit, and a drier and warmer than average November-January period will worsen drought in all areas. Current drought areas could see conditions deteriorate to severe to extreme (levels D2 and D3), and locations in Hidalgo and Cameron County could return to at least moderate (D1) drought at some point.

The key to how fast drought returns lies in the type of warm, dry conditions dominate. A modest frequency (i.e. every 10 days or so) of dry fronts, similar to that seen on October 27, during the period would hasten evaporation rates and thus drought; humid conditions, particularly nights, would slow the advance given the normally low rainfall period and long nights, allowing wetting dew to be absorbed and slow drying a bit.

- *Cold Snaps*. This is the “wildcard” for the late November (pre-Thanksgiving) through January especially with La Niña underway. Periods of –NAO that sync with a positive phase of [the Pacific North American teleconnection](#) (PNA; positive phase builds a stronger upper level ridge across the intermountain west and downstream eastern U.S. trough, opening the door for arctic-sourced surface high pressure from western Canada to spread all the way to northern Mexico) favor a few sharp cold fronts as we saw in [late December 2016](#) and [early January 2017](#). Confidence is **low** at this time, as recent trends of the NAO have been non-existent with neutral the average since early September. But something to watch for as winter – as defined in the Valley – approaches.

Outlook: Late Fall-Mid Winter 2017-2018

November starts nearly 10°F above normal for the first third of the month, and with would typically follow October’s lead, at least early on. The question for the latter half of the month depends on how other teleconnections – NAO, Pacific-North American (PNA), and PDO fit together. Neutral phases of the NAO and PNA combined with the (early onset) La Niña through the rest of November would likely keep sharp cold air intrusions well north of the Valley, ensuring a much above (more than 3 degrees) normal month after the jackrabbit hot start. Negative phases of the NAO combined with positive phases of PNA would tend to sharpen both the western U.S. ridge and eastern U.S. trough; the position of these features would determine if cool to cold Canadian air masses could reach the Valley on or before Thanksgiving week. At this point, even if this sets up by late month, it will be too late to bring temperatures back toward average overall – as indicated by the >60 percent probability for above average temperatures. Rainfall can be a tricky forecast in November, as all it would take is one slow moving front with upper level support to trigger thunderstorm clusters sufficient to

drop at least a November's worth of rainfall in just a few hours or less. This occurred on November 22, 2013, when 2 to 6+ inches fell along and behind a cold front – in some cases, four times the monthly average.

December should also be on the warm and dry side overall, dominated by the flat ridge with increasing warmth driven by southerly winds ahead of deepening Great Plains low pressure systems – systems that can produce everything from late autumn/early winter tornadoes to western Plains/foothills blizzards. What occurs behind these low pressure systems will be driven by the potential for northwest, or “cross-polar” mid to upper level winds that are a classic pattern for cold outbreaks toward year's end. This potential may be driven by prolonged favorable teleconnections (see November discussion). Such was the case in mid December 2016. And, with above to much above average temperatures leading the way into the cold front, sharp changes (45 to 50 degree air temperature differences) are in play at least once, with 30+ degree drops perhaps two or three times depending on the situation. A light freeze is also a possibility in such a situation, for the ranch and rural areas at minimum. Based on current trends – and assuming other teleconnections don't line up favorably as they did in 2016 – Christmas and New Year's Eve have a much greater potential to be warmer, not cooler, than average. Exactly *how* the fronts come through in December may go a long way to projecting how January turns out. –NAO and neutral PDO suggest dry (rainfall), while +NAO could see an overrunning event (light rain or drizzle) which could help temper any drought trends.

January would follow December's lead, but if the peak of the expected La Niña cycle comes to fruition, the following outcomes are possible. Overall, warmer and drier (rainfall) than normal is the high confidence forecast for the month. The PDO is expected to remain in the neutral/low positive range based on recent trends.

- Neutral NAO: Outside chance of a dry front with enough cold air to create a minor freeze, particularly over the ranchlands, but better chance for dry fronts with still warm air but lower humidity to enhance drought and wildfire spread threat
- -NAO: Decent chance for one or two dry fronts with sufficient cold air to cause a repeat of the freeze and hard freeze of January 7-8, 2017. Still, a rapid return to above average temperatures – and a dry front with warm air following could occur days or weeks after the freeze, as occurred in 2017. Low to nil rainfall.
- +NAO: Fronts would tend to be the “overrunning” type (light rain/drizzle in humid southerly flow overtop of the chilly northerly surface winds) and one could even combine with upper level energy to produce steadier rain. Warm recovery would be quick, however – but drought would be held up or even improved slightly.

Preparedness, Awareness

The forecast is high confidence for a generally warm and dry period, and despite some uncertainty on bi-weekly teleconnections that are not showing decent trends at the start of November, we think November 2017-January 2018 will end up similar on the whole to November 2016-January 2017. Hazards/potential impacts are identical.

- **Drought Severity.** Falcon Reservoir got the water they needed to assist with any spring irrigation that may be required should the fall, winter, and early spring warm and dry overall trends bear out. That said, smart **conservation** should always be part of everyone's water use plans in our ever-growing Valley. Crop and livestock irrigation look very likely by the spring 2018 growing season based on the expectation of *widespread moderate to severe drought*, with pockets of extreme drought not out of the question – even during the lowest evaporation season of the calendar year.

Drought Severity Classification

Category	Description	Possible Impacts	Ranges				
			Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: <ul style="list-style-type: none"> short-term dryness slowing planting, growth of crops or pastures Coming out of drought: <ul style="list-style-type: none"> some lingering water deficits pastures or crops not fully recovered 	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	<ul style="list-style-type: none"> Some damage to crops, pastures Streams, reservoirs, or wells low, some water shortages developing or imminent Voluntary water-use restrictions requested 	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	<ul style="list-style-type: none"> Crop or pasture losses likely Water shortages common Water restrictions imposed 	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	<ul style="list-style-type: none"> Major crop/pasture losses Widespread water shortages or restrictions 	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	<ul style="list-style-type: none"> Exceptional and widespread crop/pasture losses Shortages of water in reservoirs, streams, and wells creating water emergencies 	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

- Wildfire Danger.** The welcome rains of early October helped reduce the coverage of very dry soils across parts of Hidalgo, Brooks, Kenedy, and western Cameron and Willacy Counties – but the breezy to windy and very dry weather at the end of the month began drying those areas out quickly once again. High values of the [Keetch-Byram Drought Index](#) dominated most of Starr and Jim Hogg County, and had returned along and east of US 77. A warmer and drier than average November-January, especially in areas where fine and medium fuels (grasses, but also small brush and mesquite) came back (known as fuel “loading”) would enhance drying and curing, which could be activated should a dry front, similar to one that whipped through the region in [late January 2017](#), pass through with gusty winds, warm temperatures, and very low humidity to follow. These dry ‘northers would offer opportunity for rapid growth/spread of fire and/or erratic behavior of fires that start. A preceding freeze (below), similar to what occurred two weeks prior to the late January 2017 fire in Brooks County, would instantly cure these fuels and exacerbate the threat. Remember to be [Firewise](#), anytime! [Only you can prevent wildfires](#).
- Cold, Chill...A Freeze?** The “wildcards” mentioned above could bear fruit in December. The near freezing temperatures of October 27 (sunrise) remind us that sharp changes can and do occur within unusually warm periods, with the potential for sharper day to day drops (especially with low clouds/drizzle/light rain) increasing as we head deeper into November and especially December and January.
 - Keep your cool weather clothes nearby, and be prepared to have them on hand if/when sharp cold fronts arrive by late November. 30 to 50 degree “feels like” temperature drops – literally from summer to winter temperatures - have occurred as early as the weekend before Thanksgiving (2013), and several times in Decembers’ past.
 - If you have tender tropical vegetation, set aside blankets and light coverings by the end of November to be ready in case freeze warnings are issued during December and January
 - Keep your vehicle checked for the following:
 - Brake pads/shoes – always important on rain-slick roads after dry spells; light rain behind cold fronts after prolonged dry weather can be especially dangerous
 - Windshield wipers/blades – dry rotting is common here, so frequent replacement ensures visibility.
 - Tires. Check tread wear and inflation pressures frequently, and repair/replace/inflate as necessary
 - Coolant. Anti-freeze is a necessity in both summer and winter, and sharp weather changes can cause stress on older vehicles’ cooling systems. Change as needed
 - Battery. Summer heat, humidity, salt air wear down batteries here more than most other places in the country. A cold snap could add further stress and the last thing you’d want is a stalled vehicle on a very cold day.

- Keep the Elderly and Infirm in mind. Sharply cold weather can be taxing and even injurious on those acclimated to our semi-tropical climate. If you have family or friends with no heating capability, be sure to educate them on home safety – i.e. small heating units or space heaters – well before the cold arrives.