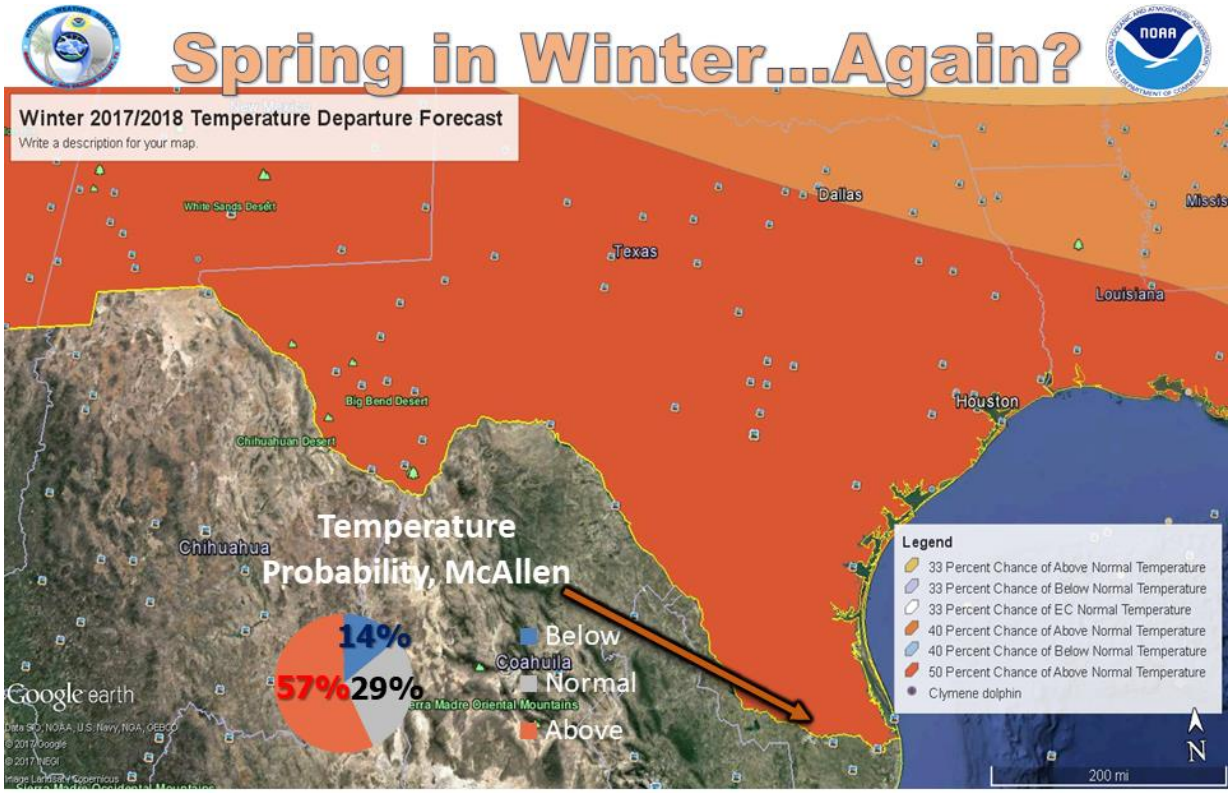
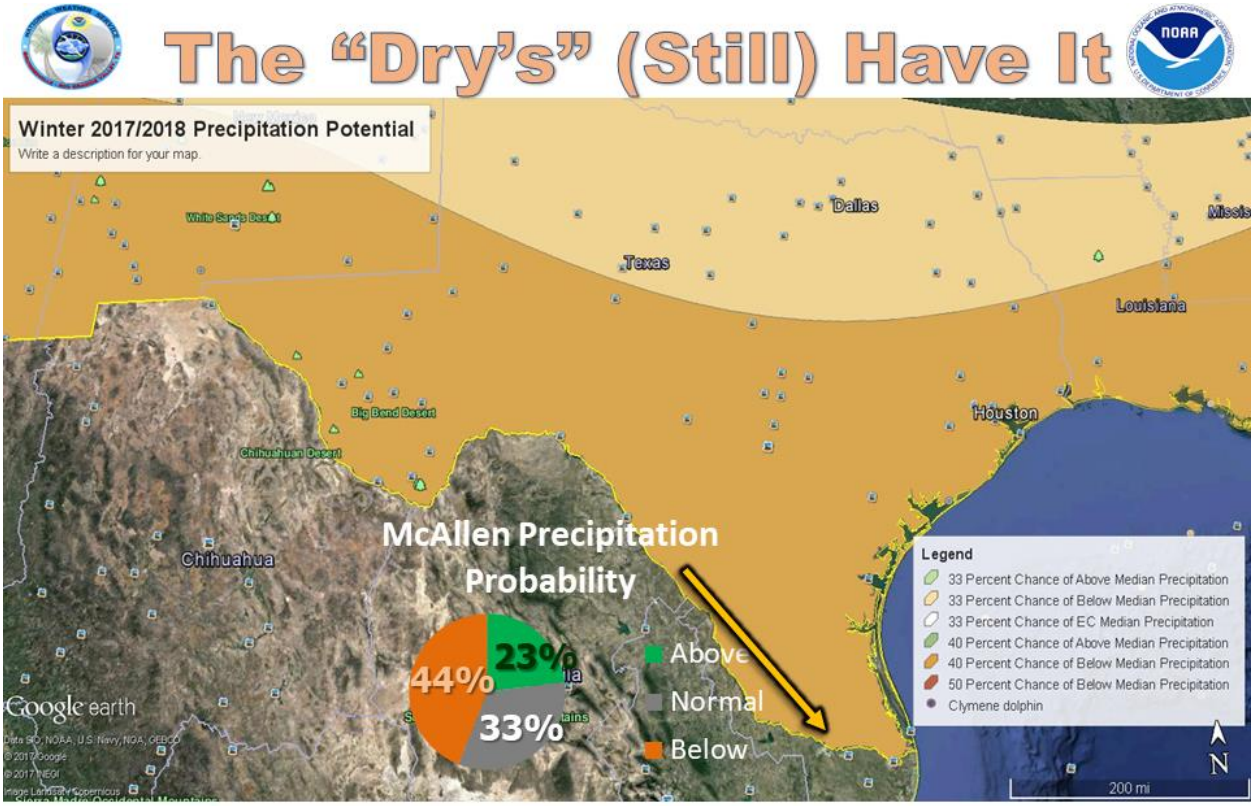
RGV Winter 2017-2018 Outlook



Note: Average Temperature For Period (RGV): Approximately 63°F Afternoon: ~73°F, Wake-Up: ~53°F.



Note: Average Precipitation for Period (RGV): 3 inches along the Rio Grande (Starr, SW Hidalgo); 3.5 to 4 inches elsewhere except 4 to 4.5 inches Along the Coast.

La Niña in Full Swing: Warm and Dry Winter Most Likely

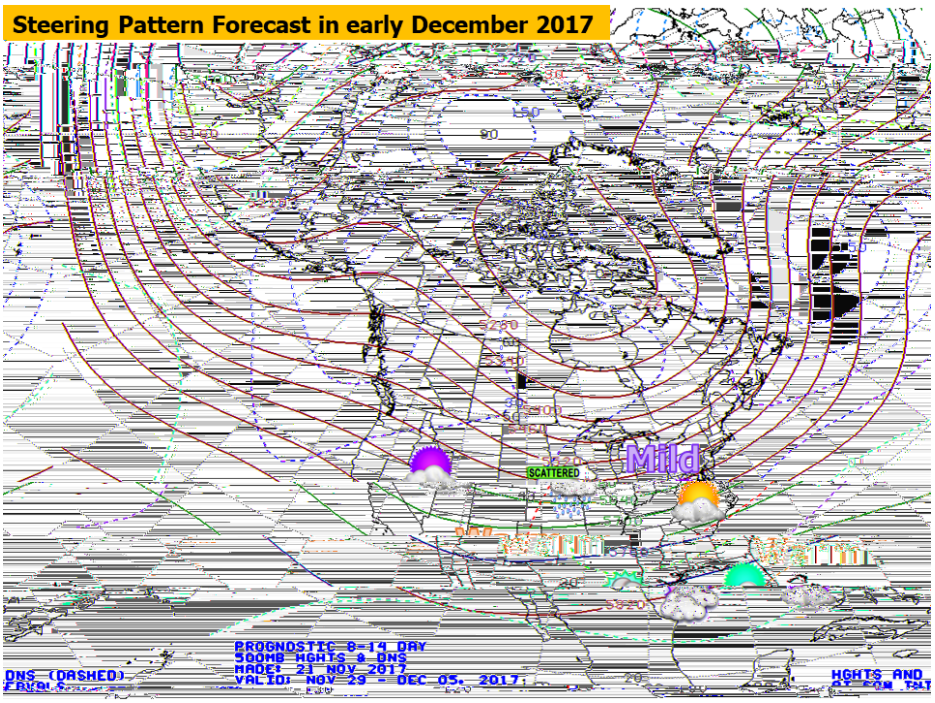
November's Pattern Expected to Rule Winter

Despite Warmth, Cold Snaps and a Freeze or Two Possible in December and January

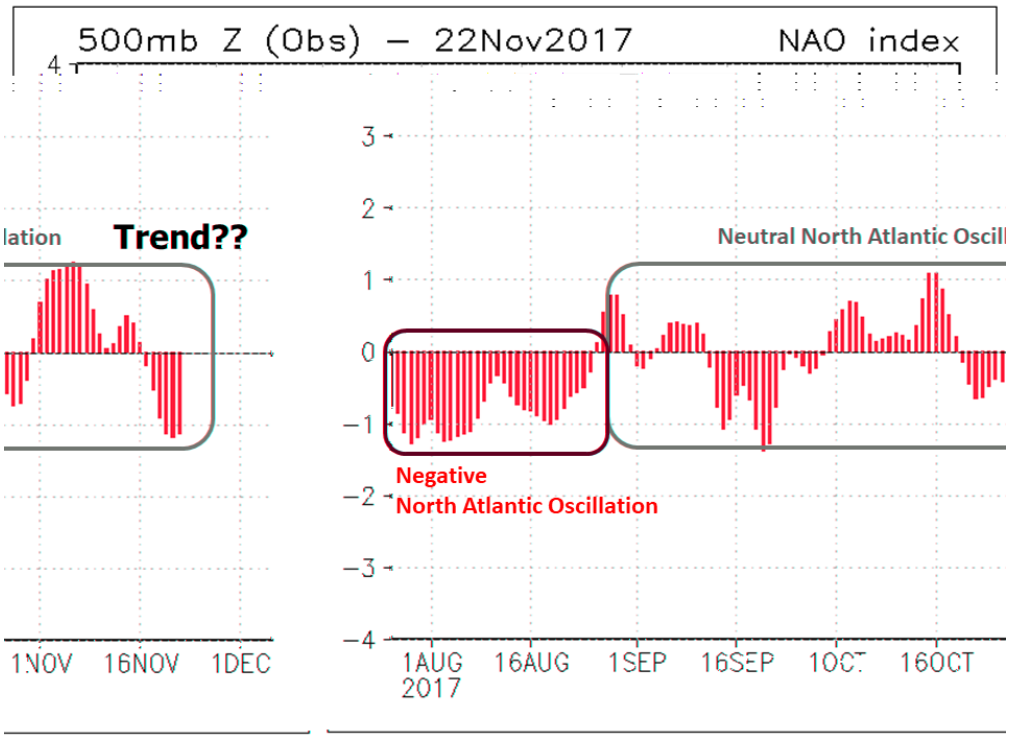
Overview

As expected, November 2017 was headed toward a final outcome with temperatures 3 to 5˚F above average (normal highs are near 80 for the month as a whole; lows near 60) with long stretches, often a week or more, with temperatures 5 to 10˚F above normal punctuated by one to three days that were 5 to 10˚F below average. Occasional cold fronts came through dry, with a quick return of sunshine (vs. prolonged raw north wind and light rain/drizzle) in most cases. Rainfall was highly dependent on a single event on November 13th (early morning); a stripe of persistent, tropical-style rain dropped between 2 and 4 inches over parts of the McAllen metro region (McAllen, Pharr, Mission, Edinburg) which, for some, was nearly three times the *monthly* average in just a few hours! Similar rains fell in stripes across eastern Starr, southeastern Jim Hogg, and western Brooks County while other areas were less than one half the monthly average at the time of this writing (November 22).

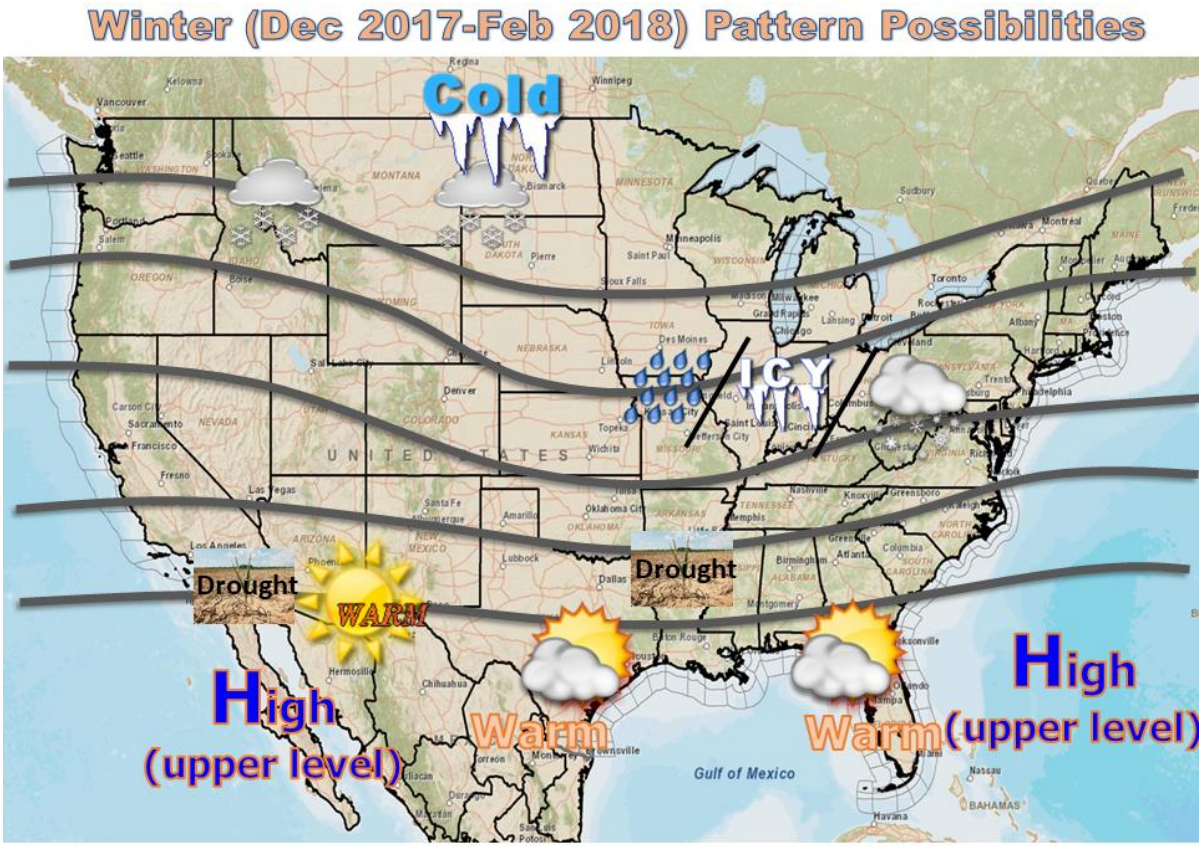
The very end of November and start to December were showing signs of a flattening of the persistent subtropical ridge, but with little prospect for a robust subtropical jet that would both enhance the potential for better rain chances and significantly lower temperatures. The flatter ridge and what is termed "zonal" flow would open the door to more frequent cold fronts that could put the lid on much above normal temperatures and keep values within range of normal, which at this that time is afternoons in the mid 70s and wake-up in the low to mid 50s. How long the "flat" flow lasts into December would go a long way in determining the final ranking of 2017's warmth: It is certain to finish number one in most areas for the first eleven months, but December would need to finish several degrees above average to guarantee the new record. In 2016, December finished more than 5 degrees above average, including a "green Christmas" stretch from December 22-29 where temperatures were nearly 15 degrees above the 1981-2010 average which locked up a new number one for several RGV locations.



Above: The atmospheric continues to "tighten" into early December as cold polar air frequently descends south from Canada into the northern U.S. The summer-like subtropical ridge also gets flattened, a situation that would bring more intrusions of cooler air into the south despite a slightly above normal 10+ day period.



Above: Phases of the NAO from Aug. 1 through Nov. 20, 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. Since September, little discernable trend has been seen in the NAO. A lean toward 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. A lean toward a positive NAO could reduce the strength of cold outbreaks but could add a bit more precipitation and clouds, keeping temperatures a bit closer (though still above) normal.



Pattern Matters

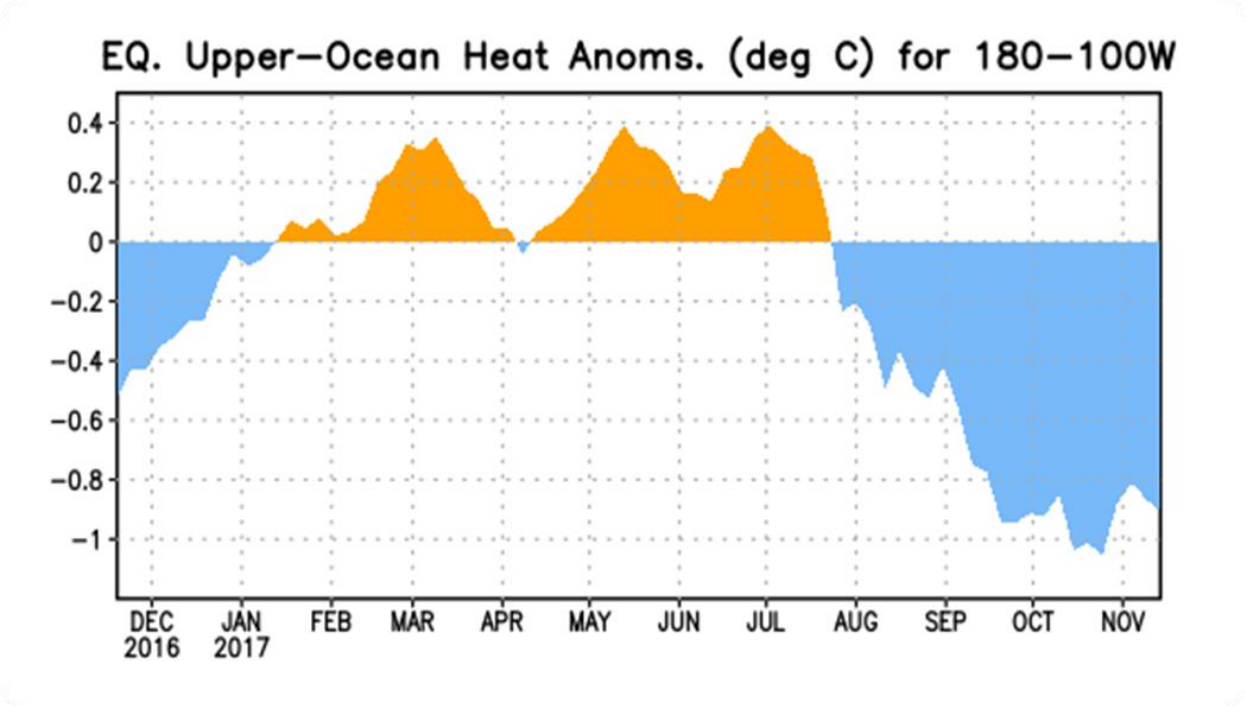
Warmer and Drier than Average; still a Chance for Chill and a Freeze(?)

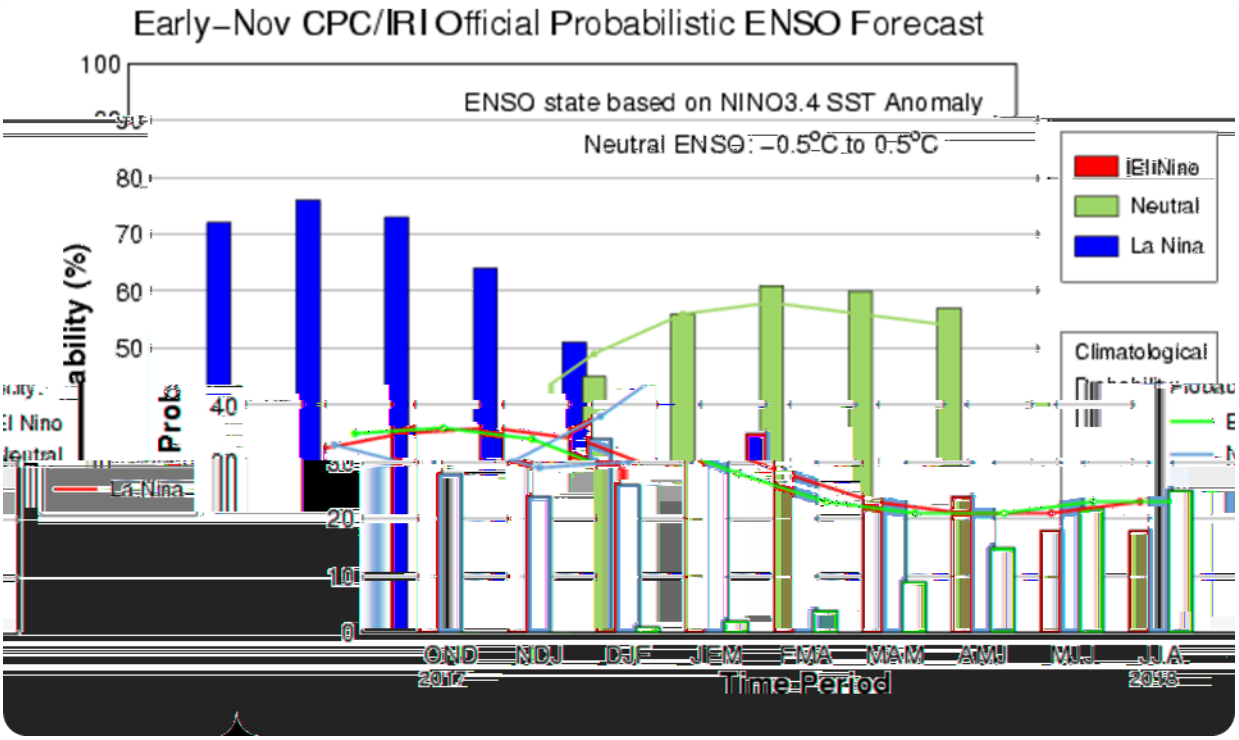
- Dry and warm air would be dominant underneath the subtropical ridge (above), including the Rio Grande Valley, which would suppress rainfall to one-quarter to one-half of average, area-wide, through winter.
- From December through early February, a persistent or even strong negative NAO could contribute 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 winter. However, a slightly positive NAO may also open the door for periods of a subtropical jet adding more clouds and possibly precipitation.
- *Uncertainty* in NAO trends is *high* at the start of winter 2017/18, making its use as a predictor difficult.

Teleconnections: La Niña Near Certain for the Period

Eastern tropical Pacific water temperatures continued their downward trend through 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 and October, similar to its 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 (still) will tell.

With confidence in the dominant phase of NAO very low as of the end of November, there is a shade more uncertainty in the potential for cool to cold drizzly fronts (which could increase in potential) and surges of drier and cold air (for one or two freezes). However, trends that dominated October and November superimposed in the winter as a whole continue to lean toward a winter more similar to that of 2016/17 than different from it, and this is how the forecast will continue to lean for the December 2017-February 2018 period.





Above: Top - Upper oceanic heat content in the ENSO zone (generally equator to 5˚N or so latitude) continued to remain solidly in the ONI La Niña range (-0.5 or lower) through November, and the first three-month (September-November) period of such values was certain, and would be the start of a La Niña episode. Multi-model consensus forecasts improved the probability of a five or six period (short) La Niña episode through mid 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.* December may begin a bit more unsettled (more clouds, temperatures slightly above average) than the more “traditional” La Niña (on its own) pattern would dictate, but short of a change in other teleconnections (+NAO and +PDO, for instance), winter overall should feature more situations like the first ten days of November and the days following Thanksgiving (warm and dry

with low humidity). Sharp cold snaps could dent the warmth from December through early February, 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 dominate winter, 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. Interestingly, for each occasion when drought was threatening to increase in severity (i.e. Severe to Extreme, or D2 to D3 level; see below chart), a period of locally heavy rainfall put the stop sign up for worsening conditions. This occurred during the first ten days of October, highlighted by October 10th's 3 to more than 6 inches across much of the IH-2 corridor, and again on November 12 and 13, when a weak disturbance combined with low level tropical moisture to drop 2 to 4 or more inches in parts of the Valley and ranchlands. Could more "brief relief" events follow prolonged dry/warm spells in winter? Yes – and each would tend to halt the worsening drought – but not eliminate conditions in total. "Dry" fronts in February with warm air following them could set the stage for a worsening drought trend as sun angle rises.

- *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 remains **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: Winter 2017-2018

December looks to start a bit unsettled, with the flatter steering pattern allowing a bit more frequency with cold fronts while still shunting any deep cold air well to the north of the Valley, with temperatures a degree or so to the positive side overall. In time, assuming the lean toward –NAO and near zero PDO, among other teleconnections, the broad but flat subtropical ridge should return, leaving the overall sense of the month a few degrees above average with slightly below average rainfall. The degree of warmth will be dictated by the strength of 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-January outlook). 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 one or two 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 line up similarly to that of 2016/17 – Christmas and New Year's Eve have a 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, and with the peak of the expected La Niña cycle expected to occur here, 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. A +NAO by month's end would tend to shift toward warm conditions.

February could look like a shadow if its record shattering sibling of 2017, which was remembered for temperatures more familiar to April – some 9 to 10 degrees above average, including a prolonged stretch of 90˚+ days to close out the month in the mid Valley (McAllen had such a case between the 18th and 28th, with two exceptions on the 20th and 25th). 2018 would be hard pressed to match the warmth of 2017 – but should the NAO return to positive values (as happened in 2017) a 5+ degree or higher above average month can't be ruled out. Rainfall is highly dependent on individual situations, but the "sense" of the month looks to be dry. February 2017 set the year on its way toward what are now record to near record warm conditions; while a perfect match is unlikely, even 5 degrees above average would be sufficient to set the year on its way to above average conditions once again. As for severe (wind/hail) weather? With the rising sun angle and gradual return of unstable air near the surface (while the mid/upper levels remain relatively cold), individual events can't be ruled out. However, the expected steering pattern (page 2, above) does not favor such cases.

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

			Ranges				
Category	Description	Possible Impacts	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: ▪ short-term dryness slowing planting, growth of crops or pastures Coming out of drought: ▪ 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	▪ 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	▪ 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	▪ 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	▪ 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 December-February, 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 from mid December through early February. 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. 30 to 50 degree "feels like" temperature drops – literally from summer to winter temperatures - have occurred 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.