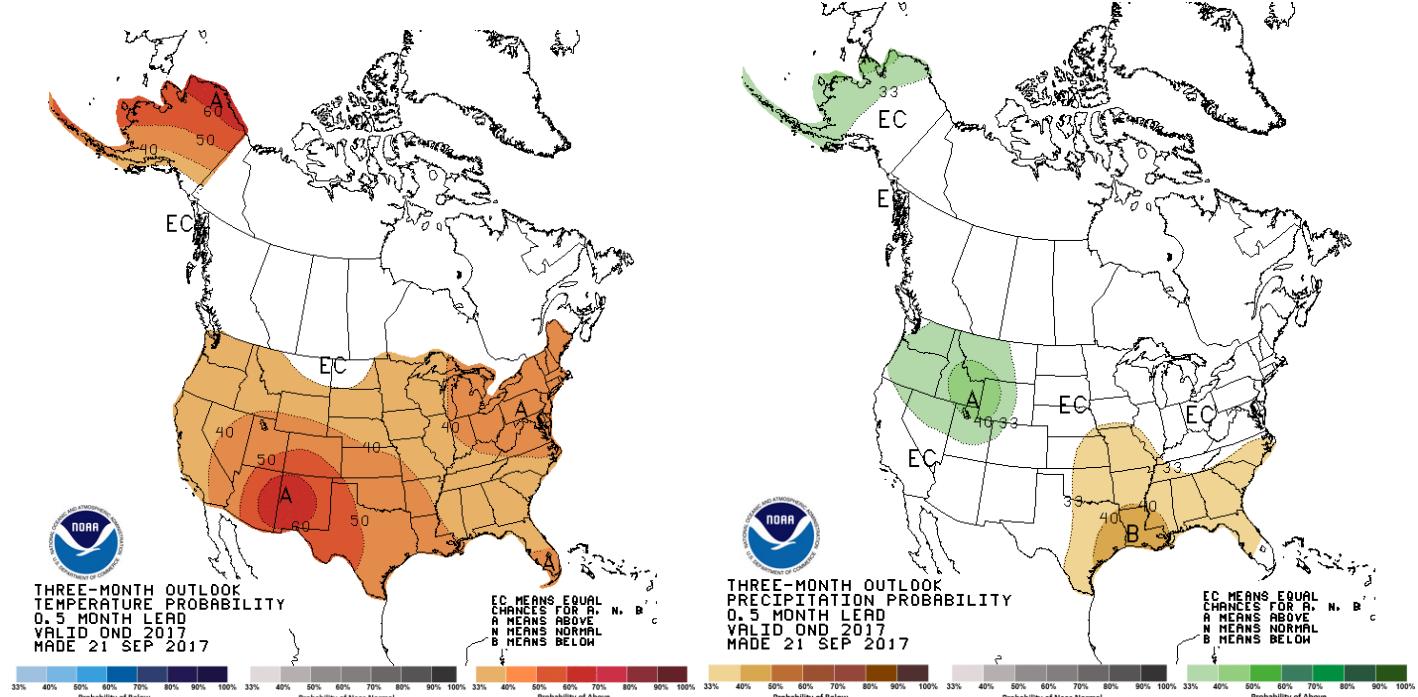


RGV October-December 2017 Outlook



Above: Left – Temperature Outlook; Right – Precipitation Outlook. EC shows “equal chances” (generally, 33.3% for above, “average”, or below). For temperature, the RGV is forecast to have a 45% chance of above average with only a 22% chance of below average; for rainfall, the RGV is forecast to have a 37% chance for below average with a 30% chance for above average. Find interactive maps for your location [here](#).

Warmest Year on Record in 2017?

Early October Rainfall Relief Likely to Give Way to Worsening Drought

La Niña Has Increasing Chance to Form and Favor Dry and Warm Close to 2017

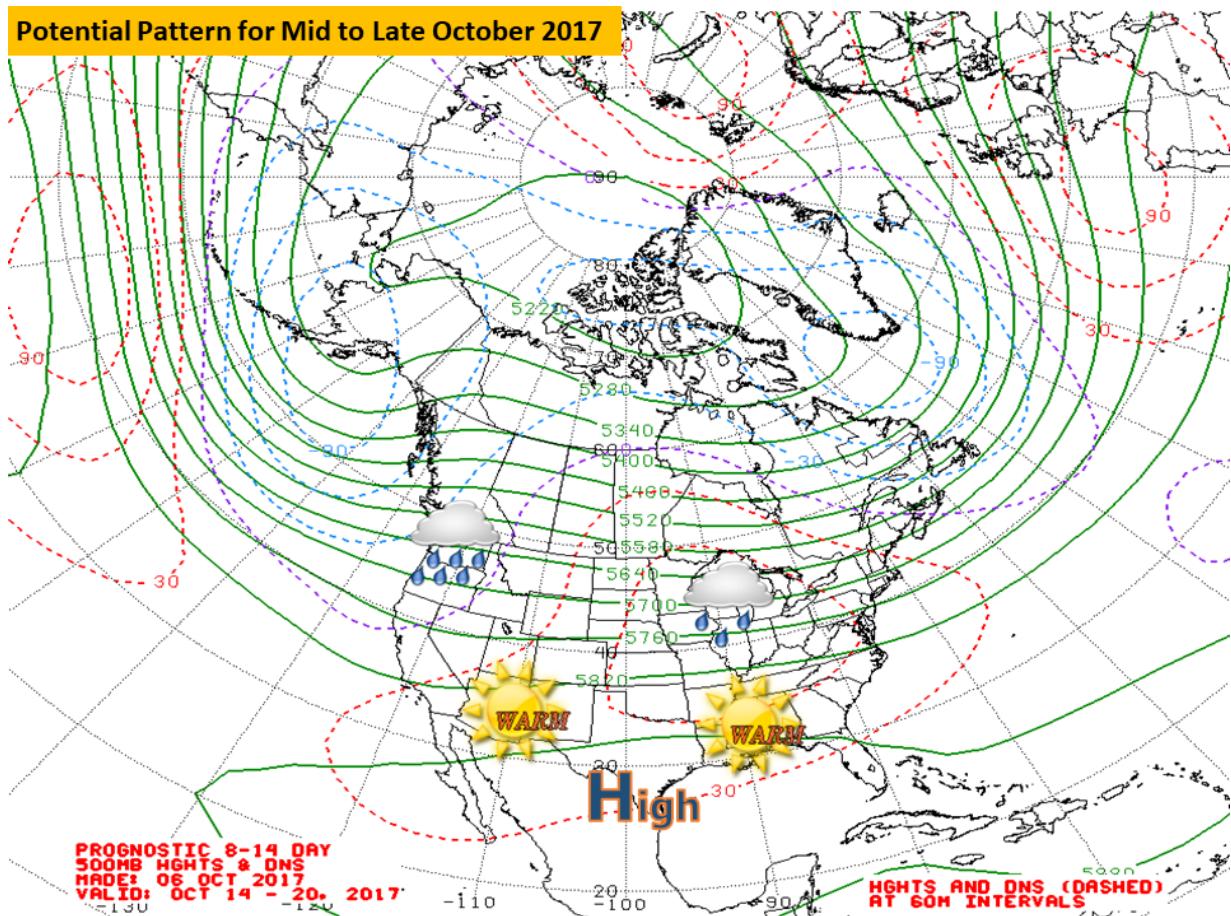
Overview

September 2017 will be remembered as the month of destructive hurricanes – Irma and Maria, each which devastated parts of the West Indies to Puerto Rico, as well as lingering flood impacts in Southeast Texas from the Noah’s Ark-like event known as Hurricane Harvey. For the Rio Grande Valley, September was not surprisingly drier than average for all but a few pockets of the southern tip of Texas, as most areas ranged from one-third to two-thirds the monthly average of 4.5 to 6 inches. Winners included Brownsville and Boca Chica, where 2 to 3 inches of rain from an outer convergence band behind Hurricane Katia were key to keeping monthly totals near normal, and Weslaco/Donna, where a more traditional September pattern finally arrived at the end of the month and brought monthly totals there to just above normal (4.98 vs. 4.91).

Other locations were not as fortunate. Harlingen finished around 30% of average, and McAllen a little over half of average; parts of Starr, Willacy, and Jim Hogg County landed at just 10 to 30% of average in a month where rainfall is king. Without the rains of September, crops, livestock and even water suppliers may need to rely on water from reservoirs for needs in spring of 2018. To that end, an “atmospheric river” event of rich tropical moisture moving north from the eastern tropical Pacific, which included the remains of Tropical Cyclone Pilar, brought several days of torrential rain – up to 20” or more along the Rio Grande between Laredo and Eagle Pass and 10 to 15” along the Rio Salado in northwest Tamaulipas – and the combination of rain created a flood that ranked among the Top 11 along the Rio Grande at Columbia Bridge and Laredo. The mass of water was taken in by Falcon Reservoir, whose pool level rose nearly 17 feet, pushing reservoir storage from 27.2 percent on the 25th of September to nearly double that (53 percent) in early October, with total acre-feet having nearly doubled as well (600 thousand to nearly 1.3 million).

The lack of overall rainfall was largely due to a disrupted “normal” September pattern – one where broad atmospheric high pressure extends from near Bermuda to the southern Plains and brings deep tropical moisture into the Valley – disrupted by the active Atlantic Hurricane season among other patterns. Temperatures remained a tick above normal, and by month’s end McAllen/Miller was just three 100°F days away from tying the 2016 all-time record by the start of October – quite a feat! By September’s end, nearly all Lower and Mid Valley locations were between 0.5 and 1° above the prior records for the first nine months of the calendar year.

Interestingly, October began with a September-like pattern, with ample rainfall between 100 and 300 percent of normal for much of the Rio Grande Valley. However, October sees daily rainfall plummet from an early month high of 0.14-0.17 inches to 0.08-0.09 inches by Halloween. As October settles in, drier conditions are also expected to do the same – though the wet start may end up keeping the month above average for rainfall overall.



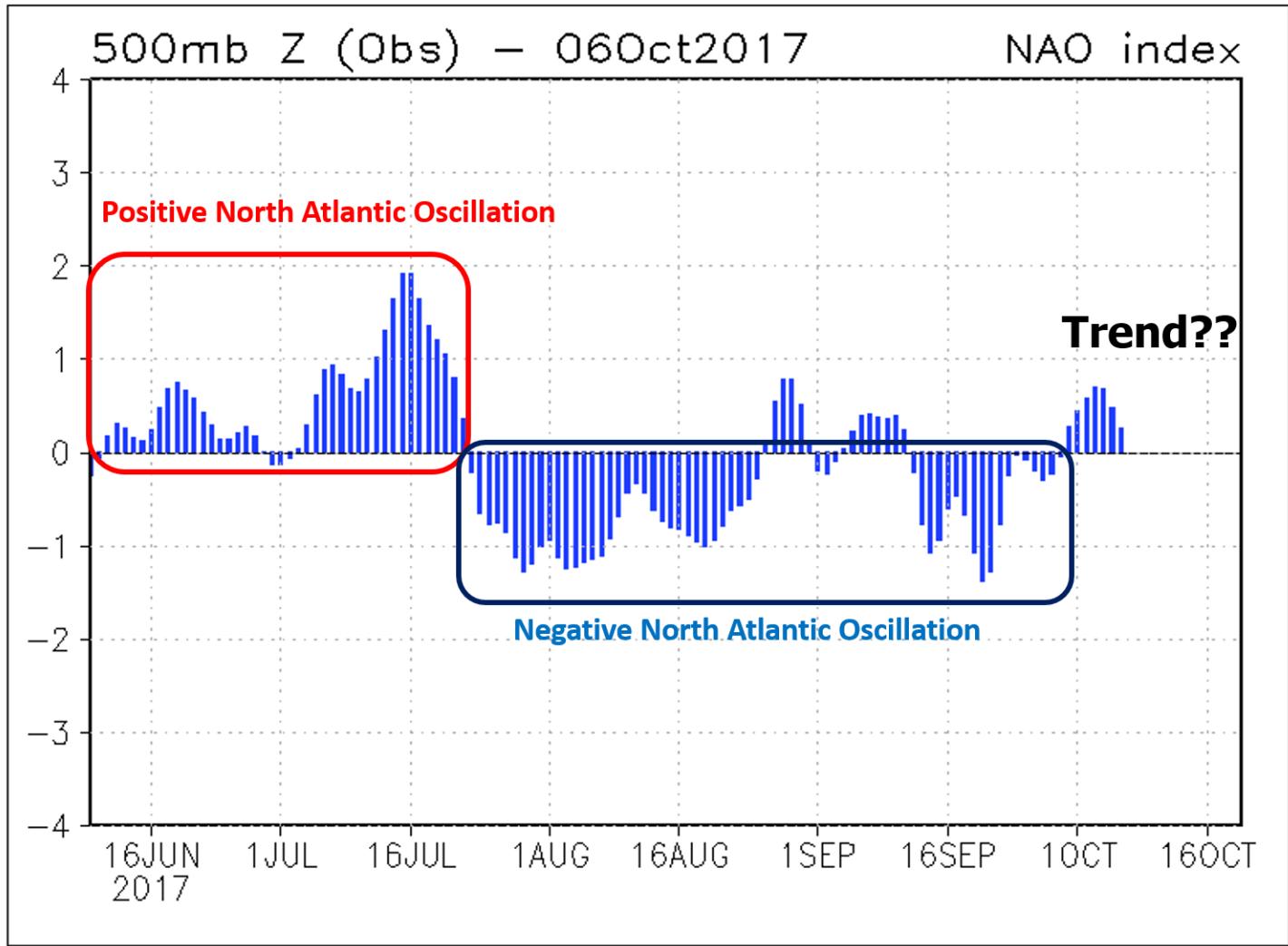
Above: A flattening high pressure ridge centered over Texas in mid to late October (from Weather Prediction Center) would favor a return to hot and generally dry conditions for South Texas/RGV. Could this be the future forecast trend for November and beyond?

Pattern Matters

Texas Tropical Season Ends; Now What?

With the increasing west to east atmospheric flow that is the signatory transition from the last of summer to the dominance of fall, the key to any rainfall will shift from east to west - namely, will Pacific sourced deep moisture ride from the subtropics west of Baja California across northern Mexico and “overrun” mid to late autumn and early winter surface cold fronts? Or will broad high pressure shown above deflect moisture and lift well north of the Rio Grande Valley, leaving the region “high” (and warm) and dry? Developing La Niña (the cooling of the eastern tropical Pacific Ocean) can favor this pattern – but other critical puzzle pieces, such as the North Atlantic Oscillation, can help open other doors, such as northwest atmospheric flow from northwest Canada

and the Arctic to bring cold snaps through the Valley and deep into northern Mexico. In 2016 and just after the 2017 New Year, such a window opened, with each cold snap coming through mainly dry. The Valley's [first widespread hard freeze on January 6-8](#) was the first since 2011 – but was soon followed by a return to warm and dry weather (temperatures peaking in the 90s on the 21st) with winter (December-February) [ranking #1 all-time](#) for most locations.



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.

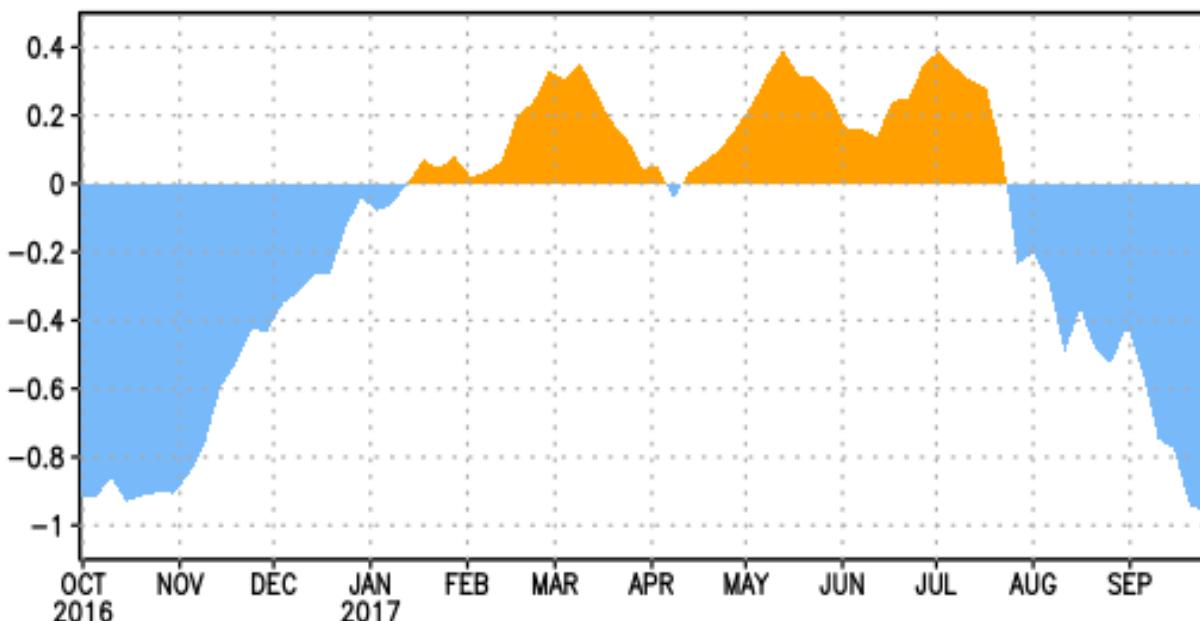
- Dry and warm air would be dominant underneath the ridge, including the Rio Grande Valley, which would suppress rainfall to perhaps one-quarter to one-half of average, area-wide, from mid October through at least mid November
- From mid November through New Year’s Eve, a persistent or even strong negative 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.
- A neutral or slightly positive NAO would reduce the possibility for cold and increase the opportunity for warm and dry outcomes.

Teleconnections: ENSO Heading into La Niña?

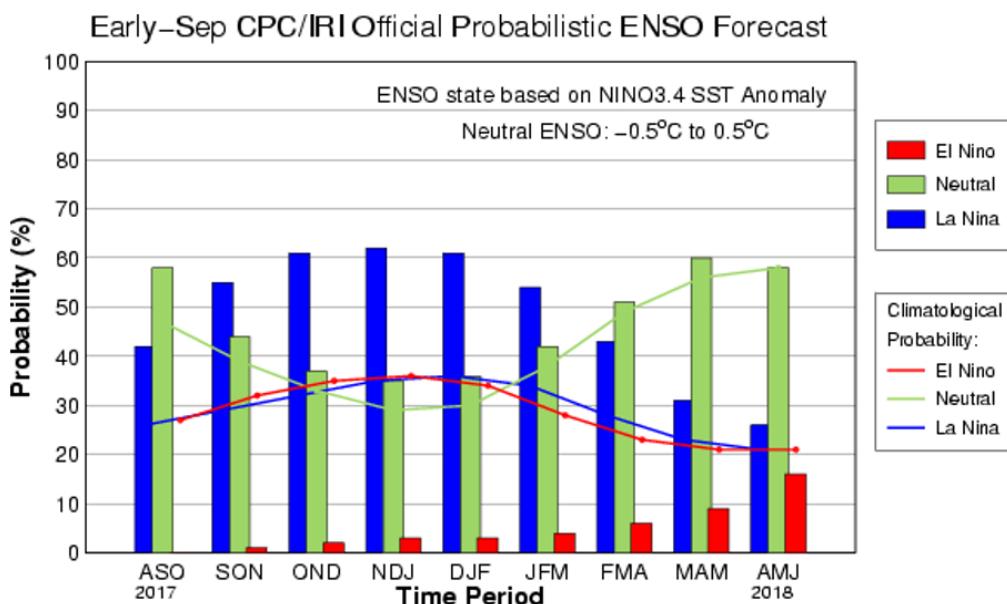
Eastern tropical Pacific water temperatures dipped solidly into the cooler than average zone, and trends now favor a 3 to 6 month period of potential La Niña conditions to close our 2017 and begin 2018 before a flip back

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 – remained near zero in August, its lowest value since early 2014. A combination of negative ENSO, a negative NAO, and a neutral to negative PDO almost surely would result in a prolonged period of dry conditions from mid to late October into December. 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.

EQ. Upper-Ocean Heat Anoms. (deg C) for 180–100W



Above: Upper oceanic heat content in the ENSO zone (generally equator to 5°N or so latitude) Recent positive 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/early autumn 2017 appears to signal a coming La Niña to close out 2017 – which could also be equally as brief.



What to Watch For: Warm to Hot Early, Worsening Drought. Rain??

Overall, for autumn, and likely into December the following situations are expected to predominate:

- **Wet Relief Back to Dry.** October's first half may have temporarily improved drought/dry conditions across the Lower/Mid Valley (while drought conditions continued to prevail or even worsen across the Upper Valley/Rio Grande Plains) but any improvement may be short lived as dry and likely warm conditions return from mid to late October through mid November, if not longer. A drier than average mid to late October pattern would favor a good share or even a majority of 90°F afternoons as was the case in 2016, even as lower humidity days may set in if drying fronts can continue. November may also be above average again in 2017, with several 90°F+ afternoons – but the oppressive heat should be seasonally faded away by then.
- **Drought.** Additional heat with little to no rainfall increases the stress on Valley/Brush Country grasses, trees, and brush. September saw an expansion of moderate (D1) drought conditions across much of the Valley and ranchlands, with a sliver of severe (D2) in southern Hidalgo County due to the area missing out on nearly all rain – for all but the last few days of the month. By early October, a “September-lite” pattern produced periodic rain of up to 300% of weekly averages, which combined with tropical air masses turned many brown/yellow areas back to green as longer nights and slightly lower temperatures helped. However, much of the rain was rapidly absorbed into the soil – and it would only take a week of warm to hot and dry conditions (with lower humidity) to dry top soil layers out once again. We expect the improved drought conditions to gradually deteriorate from late October into November; should fronts come through dry with still above normal temperatures following them, even into December, moderate to severe drought and perhaps even pockets of extreme drought (Starr and Jim Hogg) would develop.
- **Cold Snaps Late.** This is the “wildcard” for the late November (pre-Thanksgiving) through New Year’s Eve period, especially with the combination of an expected La Niña underway and a potential “lean” toward a –NAO, as well as some indication for a weakly negative PDO. This combination would favor at least one ‘norther’ where temperatures could plunge into the 30s or 40s – perhaps even touch freezing – as 2017 comes to a close. Confidence is **low** at this time, especially if all three facets do not sync together. But something to watch for as winter – as defined in the Valley – approaches.

Outlook: Late Summer/Early Fall 2017

October began wet and tropical, with temperatures *still* a few ticks above average mainly because of warm nights and high humidity. However, the continued development of La Niña would tend to favor a “shadow” La Canícula (southwest US ridge receding into northwest Mexico) that would keep, or the dry and generally warm to hot pattern to the Rio Grande Valley once again. One thing to watch is the westward extent of the ridge. An extension toward Nevada and the Sierra mountains of California could allow intrusion of cooler air to push southeast around the ridge, with a mid to late October front of note (sharp temperature change and the end of the persistent humidity) which could bring temperatures back toward average (low to mid 80s by the end of the month).

Of interest for the coast is the potential for another strong eastern U.S. high pressure system, similar to one that began a stretch of long fetch and long period swell that caused beach erosion after several days (October 4-6) followed by reinforcing swells from Hurricane Nate (October 7). With much of the beach flattened, until replenishment begins, the threat for tidal run-up has increased and would require less “work” to occur, especially during the typical astronomical high tide season that dominates much of October and November.

November 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. 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. Such a transition could bring overall temperatures back toward average on the whole, which is generally mornings in the 50s to lower 60s and afternoons in the

mid-70s to around 80. Synced teleconnections (above) could allow an early intrusion of chilly air – with or without light rain or drizzle – between the 15th and 30th.

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. 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, for the ranch and rural areas at minimum.

Preparedness, Awareness

The forecast is high confidence for a generally warm and dry mid October through New Year’s Eve, with tropical threats completed for 2017. With fall tending to be quieter – especially with a lower than average rain forecast – the focus is on drought, wildfire, cold snaps, and coastal impacts to close out 2017.

- **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 **irrigation** and **conservation** should always be part of everyone’s water use plans in our ever-growing Valley. The persistent extreme to exceptional drought of 2011 to 2013 demonstrated to the Rio Grande Valley that one year’s feast (the 2010 record **wet** water year, defined as October through September, rainfall) can become the next year’s famine (2011 record **dry** water year). September 2016’s drier (and hotter) than average result, followed by a much warmer and generally drier than average winter (December 2016 – February 2017) set the stage for the most irrigation water needs since 2013 for large and small crop growers alike.

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 ▪ Exceptional and widespread crop/pasture losses 	-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"> ▪ 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 generally dry and hot September (with some exceptions) maintained dry soils and high values of the [Keetch-Byram Drought Index](#) for most areas except a stripe of “lucky” locations along and east of US 281 in eastern Hidalgo, northwest Willacy, and the western King Ranch of eastern Brooks and western Kenedy County. Even these areas could rapidly dry out from mid to late October into November in a warmer than average late autumn and become a threat for fuel “loading” 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. With the verification of a dry September (one-third to two-thirds of the monthly average, dangerous spread conditions could begin in late October across Starr and Jim Hogg County, and spread elsewhere in November, should dry ‘northerns’ come through and offer

opportunity for rapid growth/spread of fire and/or erratic behavior of fires that start. Remember to be **Firewise**, anytime! **Only you can prevent wildfires.**

- ***Cold, Chill...A Freeze?*** The “wildcards” mentioned above could bear fruit in December. While it remains hot in October, the potential for sharply colder air will increase as we head through and past Thanksgiving and on toward Christmas and New Year’s Eve.
 - Dig out your cool weather clothes, and be prepared to have them on hand should more 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
 - 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.