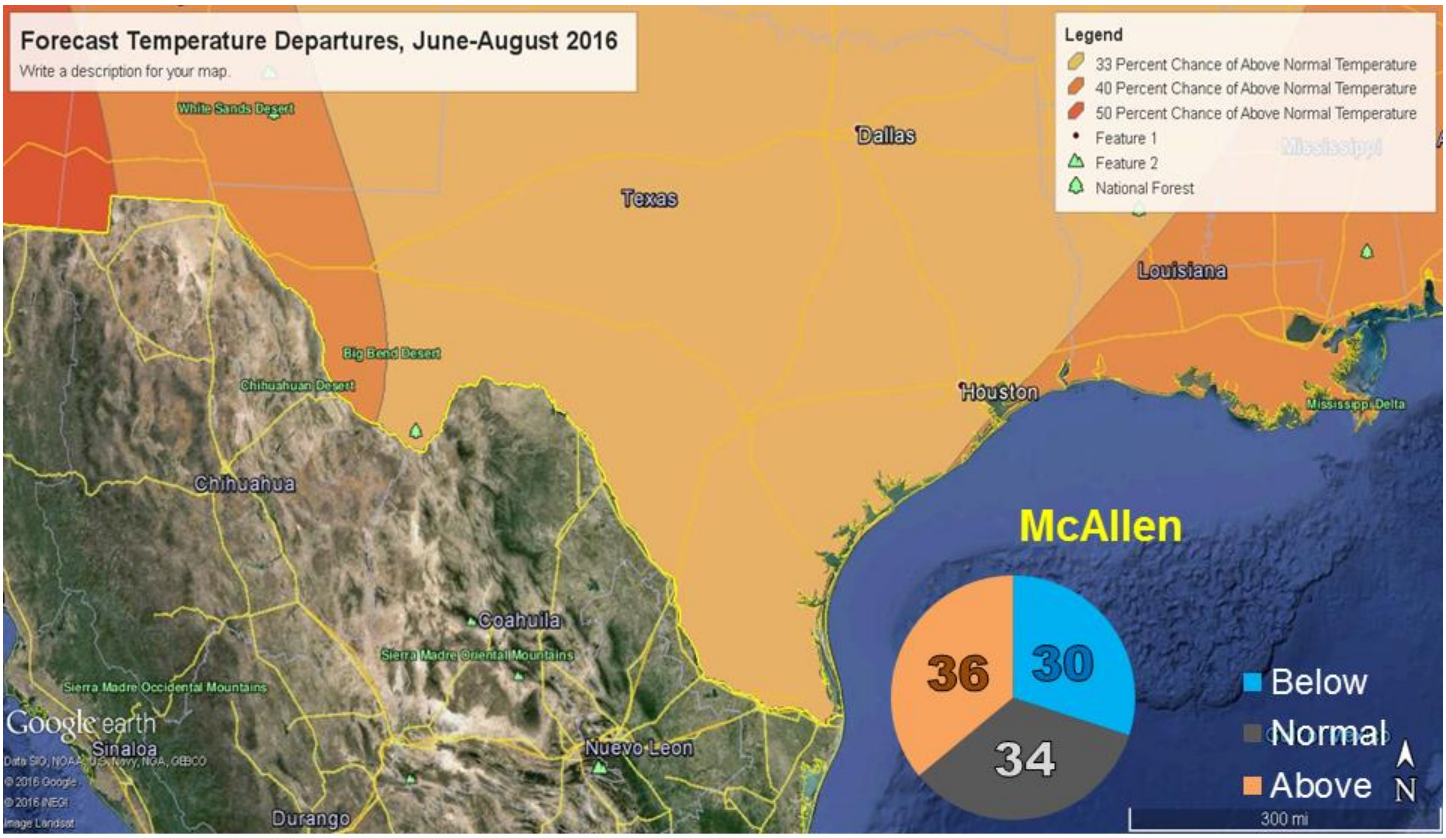
Summer 2016 Outlook



Average Afternoon: ~90° Beaches, 95° Lower Valley, 97-99° Mid-Upper Valley
Average Wake-Up: ~78° Beaches, 74-77 Elsewhere
Average All Hours: 85-87°

Heat Is On…Still

Above Normal Temperatures to Continue; La Canícula Should Dominate

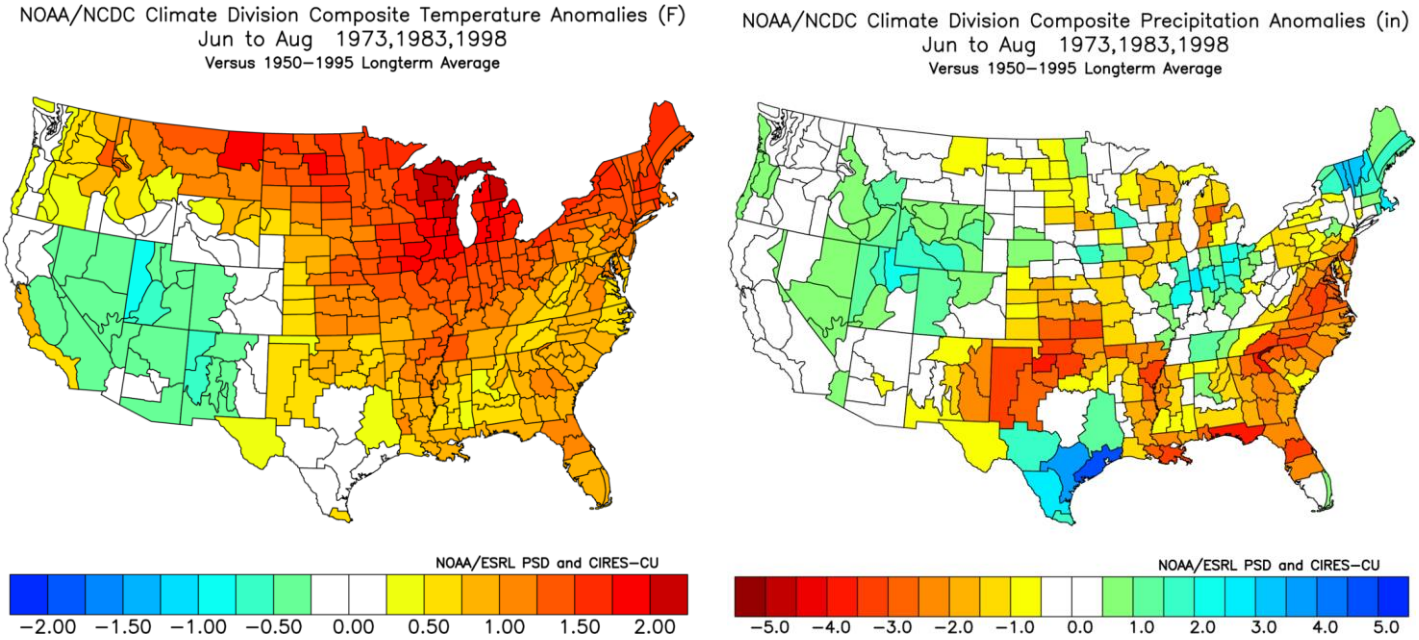
After a week of cool mornings and seasonably warm afternoons, May picked up where April left off – hot, humid weather dominated, with plenty of clouds and southerly flow keeping overnight and morning temperatures above average (and well above average for the final ten days), with daytime temperatures a few degrees above average and leading to a month where the final values were some 1 to 3°F above the monthly normals (which are generally around 90 by afternoon and the lower 70s at daybreak). Storminess arrived by mid-month as well, and would ultimately push rainfall totals up to three times average, with highest departures from the Upper Valley to the ranchlands (3 to 5 times normal, which is around 2 to 3 inches).

April and May's wetness, and a wet first week of June, virtually guaranteed a late spring/early summer (April to June) above average marker. But with patterns beginning to change as June got going, how long might that trend last?

El Niño Fading Away

By early June, as forecast, weekly El Niño values (Oceanic Niño Index, or ONI) had fallen to neutral in the primary zone of the equatorial tropical eastern Pacific Ocean (0.1°C; +0.5°C begins the El Niño condition), and all indications suggested that a continued drop would persist through the summer and into autumn 2016. What

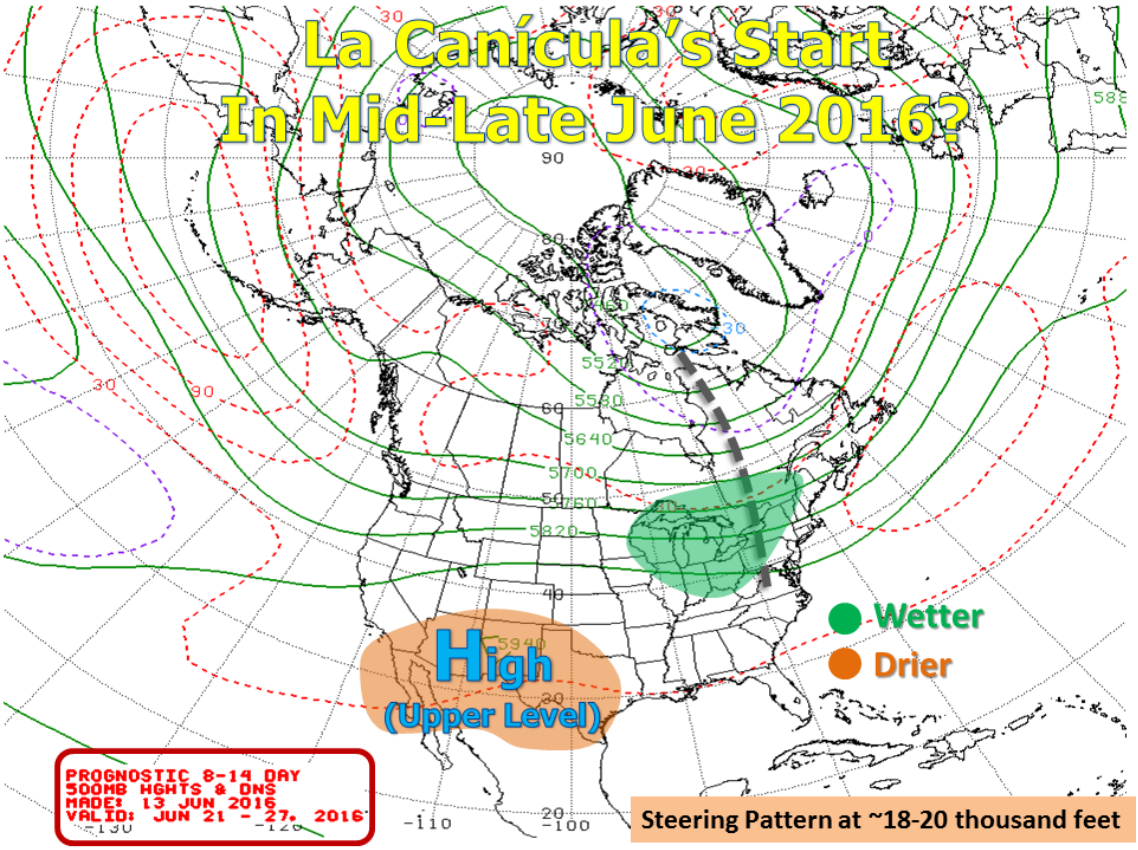
might that mean for summer weather? As mentioned here often, El Niño/Southern Oscillation (ENSO) is but one factor to consider. Previous summers with moderate or stronger El Niño (warm phase of the oscillation) have favored hotter, drier conditions (enhanced Canícular) in July and August, and sometimes into September if the tropics are quashed *and* mid to high level easterlies are replaced with drier northerly flow that keeps deep moisture pinned well south of Texas. 2009 was one such summer. Do similar "flips" from El Niño to La Niña mean a similar "flop" in temperature? Not necessarily. 2011's La Niña winter and spring that eased to a "leaning negative" neutral phase, led to one of the hottest and driest July to September periods on record in the Rio Grande Valley, and in Texas. Below, a comparison of temperature (left) and precipitation (right) departures from average for the combined summers of 1973, 1983, and 1998 are shown. Each year had a similar El Niño (strong) to neutral or La Niña (weak to moderate) shift between early spring and late summer/early fall. The signal for hotter temperatures is relatively stable; not so for precipitation, which is a mixed bag across Texas and the southeast U.S.



Outlook: Summer 2016

Summer forecasts are always among the most difficult for the Rio Grande Valley. The region is already known for its oppressive heat and humidity, so it takes prolonged drying or wetting to change the outcome one way (hotter and drier than average) or the other (cooler and rainier than average). Through mid-June, schizophrenia reigned, as a below average and wet start (temperatures 3 to 5°F below average with areas along/east of U.S. 281 at 400 to 600+ percent of average through the 12th) began to turn hot and dry for the second full week (June 12-18), as La Canícula made its first appearance of the season. Longer range deterministic forecasts through month's end showed Canícula (below) dominant through the end of June, but there was potential for the ridge to "tip over" and allow some energy to slide underneath and perhaps provide tropical-style rain to eastern Mexico, perhaps reaching the Rio Grande Valley.

Other factors include the Pacific-Decadal Oscillation (PDO), which remained well positive through May. The PDO tends to favor warmer than average eastern Pacific water temperatures, including the subtropics – and can help to anchor or extend the Canícula ridge farther west toward the southwest U.S and northwest Mexico, including California, Arizona, and Baja. This *could* nudge the core of the ridge to the west, which would allow mid/upper level troughs to dip around, or move under, toward the Lower Texas coast and northeast Mexico. Finally, what of the North Atlantic Oscillation (NAO) and Madden-Julian Oscillation (MJO)? The NAO had been trending slightly negative since mid-spring, and a continued trend would favor an eastern U.S. trough and could enhance the Canícular ridge, especially in July and August. A neutral trend or positive resumption could strengthen the Bermuda High which might tend to enhance the idea of a southern California ridge, with a weakness (trough) in between over Texas, southern Plains, and Mississippi Valley.



Above: Forecast Upper level pattern for the latter half of June 2016. Should the pattern dominate the rest of summer, temperatures in the Rio Grande Valley would lean hotter than normal and rainfall would be more scarce than common.

What It All Means

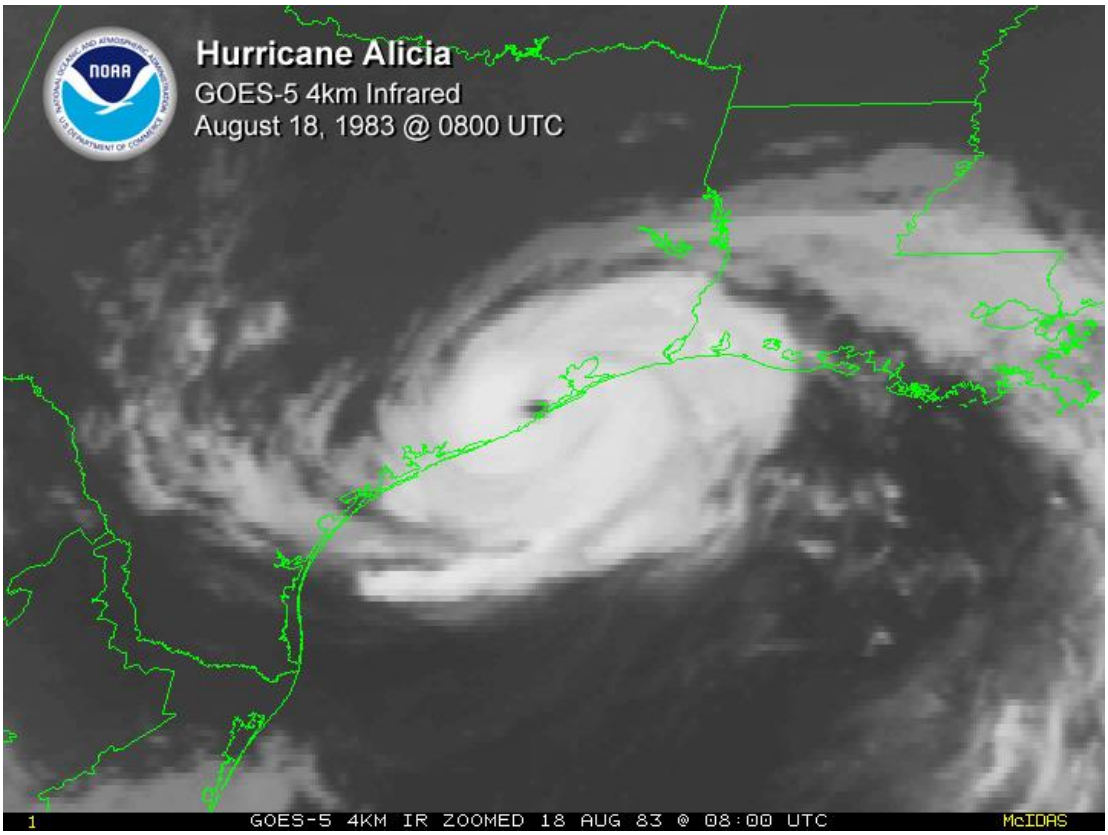
June began below average and wet, but the mid-month swelter with little rainfall, and potential for the Canícula ridge to hold tough, would tend to quickly flip the early month relative pleasantness into a hotter than average period that would even out the temperature trends by the third week of the month. A continued domination of this ridge would ensure yet another hotter than average month, though precipitation would end up near or above average for many, mainly along/east of U.S. 281 due to the early month southward displaced upper disturbance that brought 1 to 3 inches of rainfall to the Lower Valley on June 4th. Any northward extent of tropical moisture under a briefly "tipped over" upper ridge (bringing easterly waves and deep tropical moisture for the third week of the month) would ensure 2 to 4 times the monthly average of rainfall for the Lower Valley, and likely hold the monthly temperature departures near normal. Interestingly, drought was out – way out – with plenty of green in early to mid-June. But as Valley residents know, persistent hot and dry weather can suck all the moisture out of the region in just a few weeks. A strong Canicula ridge could return abnormally dry to even moderate drought conditions by late summer, especially if low humidity joins in.

July: Bringing the Heat

Rare has a July not met expectations for at least average temperatures, which range generally from 95 to 100 by afternoon and 75 to 80 by morning. La Canícula alone allow this to occur, but a stronger Canícula signal almost guarantees strings of 98 to 104 degree afternoons (from east to west across the Valley) with little to no rainfall. That said, events such as tropical waves and rare cyclones, as was the case in 2008, can easily keep monthly temperatures below the hot averages. El Niño, La Niña, and "La Nada" have limited statistical influence on July weather in the Valley, and the true hurricane season doesn't arrive until August.

August climatologically starts hot and rain-free, but the pattern can evolve into a wetter and less hot situation for the last half should the aforementioned Bermuda High form for any length of time. A positive phase NAO could well help, in addition to unknown factors at the time of this writing (June). Finally, the ultimate wild card would be any tropical cyclone for the northwest Gulf of Mexico. There is no way to predict in June what might happen for one week in August, but as Hurricane Alicia (1983, next page) reminds us, in a year with only four tropical cyclones, three hurricane, and one major – that major could be in Texas, and occur in August. Alicia, of

course, slammed into the Houston Galveston and gave them a summer's worth of rainfall – but had it slid west rather than northwest from its starting point in the central Gulf, the Valley would have joined the wet (and wild) party.



Preparedness, Awareness

The heating of the atmosphere finally removed the threat for widespread wind or hail events, though the season ended with a "bang" on May 31st. Once again this year, summer heat above the usual swelter will require some safety precautions; any period of deeper tropical moisture surging across the Valley can bring local nuisance to life-threatening flood threat in just a few hours – including from the "one-off" local thunderstorm system, similar to the close-out event that slammed west Brownsville on August 31, 2015. And, with hurricane season in full swing by mid August, we remind everyone to be ready. Be responsive. Be resilient. Be #HurricaneStrong!

- ***Excessive Heat.*** Yes, the Valley is a hot place in late spring and summer. But a late May and June like 1998 would test even the most heat-hearty residents, especially since the early onset of 100°F temperatures and heat index ("feels like") temperatures nearing 110°F or higher borne on persistent southerly wind could become an issue, especially for the very young, elderly, and temporary residents. Check out local heat safety information and national safety tips, as well as ways to ensure you don't forget about those children and pets in vehicle backseats, in English and Spanish.

- ***Flooding Rain.*** The possibility of one or more slow-moving torrential rain events, more than likely involving thunder and lightning, remains a concern. This could be most important as we move into mid to late August.

  It's always a good time to check roofs and walls for leaky areas and repair; dry periods in March and probably April will provide the opportunity. But anytime is a good time to remove any debris from gutters and downspouts. Speaking of debris - after trimming brush and cutting grass, be sure to remove it and never clog drainage ditches or canals!! More here:
  - Flood Safety Awareness

- ***Tropical Readiness.*** As 2015's Tropical Storm Bill and 2010's Hurricane Alex showed, a rogue southwest Caribbean or southwest Gulf of Mexico tropical wave can fester into a tropical cyclone and potentially impact Texas during June. Bill occurred during the ramp-up to the current El Niño, while Alex formed during the rapid wind-down of the 2009/2010 El Niño. It's never too late to revisit your hurricane action plan and restock your family's "stay" or "go" kit, as well as improve your home or business resilience by checking roof connections inside and out, walls and doors for leaky areas, window coverings, foundation seals for leaks, and so much more. It's been six years since a significant impact on the Rio Grande Valley. Another hurricane will "land" nearby and produce significant to catastrophic impacts, someday. That day could be any year, including 2016.

  Learn how with our most recent Rio Grande Valley Hurricane Guide, in English and Spanish.