Spring Turning to Early Summer?

Drought to Worsen as Spring Heats Up

Another 'Norther or Two, but Freeze Threat is Largely Over

Overview

Indeed, the Valley ***did*** see its first widespread freeze in nearly six years in January 2017, as the North Pole opened up to drain modified arctic air through all of Texas and even into northern Mexico on the first full weekend of the month. As expected, however, the event was a "one-off" and was followed by warm and dry weather for the balance of the month, which included a day of all-time records in the *middle 90s* on January 21st, and another 90°F+ day on the 24th for the Upper Valley and ranchlands. Just before the end of January, average temperatures ranged from 5.5 to 7°F above the 1981-2010 normal, ensuring winter (December-February) would end up above-to-much above average as forecast prior the start of the season. January was likely to continue the string of months ranking among the top 15 warmest, a fitting start to month following a record to near record calendar year 2016 for the Rio Grande Valley. The combination of persistence and a favorable pattern for warm, and likely dry February, the Rio Grande Valley is off the mark to an early spring, and an early summer-like feel (temperatures) by the end of April.

What to Watch For: Big Picture

Overall, by the end of April and headed into the end of spring 2017, the following situations are expected to predominate:

- "Gray" 'northers occurred twice in December 2016 and twice in January 2017. Another cannot be ruled out sometime in February or even in early March, but the pattern through February strongly suggests that the real chilly air will remain bottled up anywhere from the northern Plains to the Great Lakes and northeast U.S., and well into Canada.
- Should the general pattern shown below (see "Pattern Matters") dominate not only February but March and April, the opportunity for significant rain will be very low. Especially in February into March, when the best opportunity would be from Texas Gulf low pressure areas rather than convective systems. By April, one can never rule out one or two convective systems that can provide welcome rain in a hurry, even embedded in an otherwise dry steering pattern. This potential may explain why the three month precipitation forecast (not shown) is for "Equal Chances" (roughly 33 percent for below, near average, or above average rainfall, which ranges from 3.5 to 5 inches across the Valley) during the period.
- Wildfire behavior became a story with a "flash drought" event on January 22, when the combination of gusting winds over 40 mph, humidity falling below 10 percent, and temperatures reaching the lower 80s explosively spread a ranch fire – known as the "Hopper Fire" - in western Brooks County to burn at total of at least 8000 acres in just a few hours. A few more small grass fires occurred on that day in the Valley. Most importantly, the January 7 and 8 freeze that cured grasses and brush was enhanced by a hot and dry day on the 21st which set the table for the events on the 22nd. Additional drying due to minimal rainfall, warming temperatures, and fronts that bring low humidity and gusty northwest wind will continue the threat for rapid to explosive growth of wildfires on such days through April.
- Severe drought returned to northern Hidalgo, southwest Kenedy, and northeast Kenedy County by the end of January, and moderate drought expanded for much of the remainder of the Valley. The normal warming of spring combined with the confidence in an above average temperature outcome, along with minimal rain through March are likely to expand the coverage of severe drought and even introduce some areas of extreme drought at some point. April may be an inflection point – welcome rains would slow down or reverse drought impacts, but continued low to no rainfall would certainly push more areas into extreme drought and require significant irrigation for the growth period of many Valley crops.

Teleconnections: Where Do They Go From Here?

El Niño/Southern Oscillation (ENSO), which likely just met the required five month La Niña (Oceanic Niño Index below -0.5) requirement when the November-January three-month period is computed, had firmly retreated back to neutral (near 0) to begin February. That condition was likely to continue through spring and perhaps show enough warming to edge toward a weak El Niño by summer. The combination of the neutral ENSO with a spike in eastern tropical and subtropical Pacific sea surface temperatures, a continued positive phase of the Pacific Decadal Oscillation (PDO), and a "lean" toward a positive North Atlantic and Arctic Oscillation all favor the continuation of the warm conditions overall through the period.

As mentioned above, the rainfall forecast could be a bit more difficult especially by April; positive phase PDO/NAO/AO could support additional influence of deeper atmospheric moisture, if an upper level disturbance can develop in northern Mexico or dive far enough southward (i.e., Baja California before moving eastward) to activate such deep moisture. This is just another reason why confidence is a bit lower on just how April's precipitation forecast ultimately turns out.

Above: Probabilistic ENSO forecast through autumn 2017, showing weak La Niña ending in February with neutral conditions dominating through spring 2017.

Pattern Matters

Given all these factors, we expect the U.S. weather steering pattern from February to April 2017 to look as shown below. The main difference from the winter and early spring outlook is a return to a slightly stronger southwest U.S. steering ridge (bump) which should end the (welcome) rains in California. Unfortunately, for rain-wishers in the Rio Grande Valley, steering flow from the northwest from both typically drier locations of the southwest U.S. and the intermountain western U.S., as well as the relatively cooler eastern non-tropical Pacific Ocean will "shut the door" for any deep tropical moisture from both the western Gulf and the subtropical and tropical Pacific – each which will have abundant but untapped warmth and humidity for the most part. The wild card of mainly April, but perhaps late March, is whether a "one-off" diving upper level low pressure area from the Pacific Northwest into western Mexico can tap this moisture at some point – similar to what happened in early March, 2016 – or a rogue subtropical upper level disturbance rides from southwest to northeast across Baja California through Sinaloa/Sonora and into west Texas – to bring enough rainfall to turn brown/yellow fields green, at least briefly.

In terms of sensible weather, the Valley can expect more sunshine than clouds, but also the periodic return of the "Valley Wind Machine" (which does peak in February and March) which has already been a factor on several days in January. The "machine's" return is based on occasional to frequent surface low pressure systems forming east of the Front Range of the Rockies and moving out into the southern and central Great Plains. Some of these cyclones may be potent enough to produce severe thunderstorm and tornado outbreaks, which could include north Texas, Oklahoma, Kansas, Missouri, and Arkansas (at a minimum) and favor March into April.

Elsewhere in the United States, dry weather is expected across the Trans Pecos (Texas/New Mexico) and continue along the eastern seaboard, with drought potentially picking up across Florida. Cool to cold and somewhat snowy/rainy spots appear to be confined to the northern tier of states, as well as the Pacific

Northwest, while southern California and the southwest U.S. return to dry weather with the extreme to exceptional drought of the past several years (ending this winter) remaining stabilized, for now.

Outlook: February through April 2017

February and March The "endless spring" that was common in January should be a continuing theme in *February*, with dominant afternoon temperatures in the 80s (rather than the more "normal" 70s) and a mix of sunshine and clouds with occasional "Valley Wind Machine" episodes (winds from the south at 20 to 30 mph with higher gusts) sprinkled in. Rainfall will be limited, and when it falls will tend to favor locations in Texas well north of the lower Rio Grande. There will still be a few fronts with cooler temperatures following them, and one could be a "gray 'norther" with sharply cooler/colder temperatures in the 40s or 50s, perhaps with light rain/drizzle and a stiff wind. We can't rule out a local freeze, perhaps in the ranchlands – but aggregate model forecasts for the first half of the month indicate only a slight chance of very cold temperatures that would produce a widespread Valley freeze, and the chances decrease markedly, based on the climate record, thereafter.

March should continue with the warm trend, with 80°+ afternoon temperatures dominant and several days reaching 90° or higher. In fact, the potential for dry fronts with wind from the west or southwest preceding them could bring the year's first century mark readings (100° or higher) at some point – of course, if it doesn't arrive in February with a similar type of front; after all, January 21st 2017 shattered the all-time hottest January day with such a pre-frontal environment of southwest to west winds downsloping the Sierra Madre. Below average rainfall (monthly average ranges from just below an inch to just above an inch) is likely, though we'll be watching for the potential for thunderstorms toward month's end.

April should continue to see the heat build, with 90°+ afternoons becoming more common, and "cold" fronts only in name only providing the potential for early to mid-month heat "spikes" which would surge single-day temperatures above 100°. Toward late month, as we saw in 2015 and 2016, the potential exists for convective (thunderstorm) systems along slow moving/stationary fronts – though long term pattern signals suggest the chance in April 2017 is a bit lower than in recent years.

If the rains don't come, especially in April, drought conditions will continue to deteriorate and likely range from severe to extreme by the start of May. Drought Category descriptions are below.

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: ▪ 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

Preparedness, Awareness

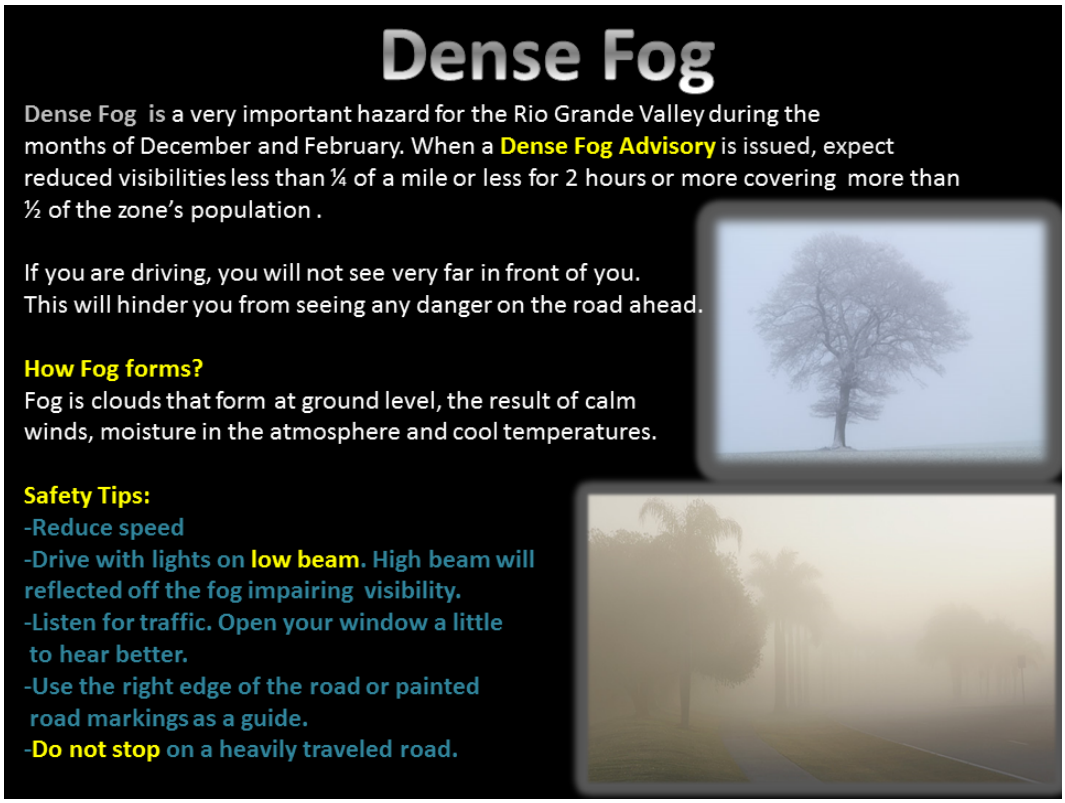
The dry freeze of January 7-8 followed by the "flash drought" event of January 21 and 22 (and the 8000 acre Brooks County wildfire that came on the 22nd), combined with the confidence in a warmer and drier than average February and March bubble up the threat for erratic to extreme wildfire behavior to the top of the spring list of preparedness. Second would be the potential for one more sharp chill-down into early March; one cannot forget the 50°F temperature plunge in early March, 2014 as well as the three events so far during the winter of 2016/17 where actual temperatures crashed more than 30 degrees and "feels like" temperatures fell up to 50 degrees. The threat of another Valley-wide freeze is minimal, given the warm expectations of February. By late March and April, despite a lean toward drier than average conditions, we bring back the threat for severe weather (wind damage and large hail), but keep low on the priority list and take a closer look for the potential with the spring (March-May 2017) outlook.

- ***Wildfire Behavior.*** The worsening drought and dried or "cured" fine fuels (grasses) and "long period" fuels such as brush and trees (mesquite, live oak) remains sufficient to maintain the threat for erratic wildfire behavior and spread, especially on days with gusty winds and humidity below 25 percent. A series of drying breezy to windy fronts with post-frontal sunshine and mild to warm air would quickly worsen the situation for rapid to explosive wildfire spread. Farmers, ranchers, and hunters should continue to follow safety precautions on dry days, including parking vehicles on dirt or pavement, avoiding driving in high grasses, refraining from using welding/grinding equipment in or near high grass/brush, and postponing target practice. Be Firewise! Remember, only you can prevent wildfires.

- ***Chilly Weather?*** Continue the following practices through February and into early March:
    - Keep cool weather clothes handy, and be prepared to have them on hand should more sharp cold fronts arrive. Apparent temperatures have already crashed more than 30 degrees from one afternoon (Dec. 7) to the next (Dec. 8), a 40 to 50°F drop occurred between the 17th and 18th, and a 40 to 45° drop between January 5 and 6, 2017. One more front in February or early March could produce similar results. In March, 2014, feels-like temperatures crashed from near 90 down to near 30 degrees in less than 24 hours!
    - 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.

- ***Land Fog.*** Dense fog was a frequent visitor to the Valley in December, and showed up at times during the first half of January. Winter is the season of fog for the Rio Grande Valley, most prevalent when cold conditions moderate slowly on the ground, while warmth and humidity surges just above the ground. The denser air near the ground can keep winds near calm, and the difference in dew point temperatures from the ground (lower) to just above ground (higher) can produce the cloud on or just above the ground – fog. With another gray 'northers" possible into February, and other fronts pulling up just short of the region (or

dissipating over it), another period of multi-day late night through mid-morning fog events is possible in February. The following graphic shows safety tips that can reduce the possibility of a vehicle pile-up.



- ***Thunderstorms.*** Though low on the hierarchy for the February-April time frame, the last half of April could provide the threat; after all, that is the heart of the climatological regime favoring hail and damaging wind storms, and we only need to step back to April 24, 2015, as well as April 20, 2012, to remember the impacts of wind and very large hail on the Rio Grande Valley. Residents should take some time in March to prepare their homes – check roofs, fences, siding, outdoor anchored furniture, etc. – and check their safety plans to have families ready for quick response should warnings be issued.

For all your spring weather safety tips, check out our Hazardous Weather Awareness Guide (last update: 2016) here.