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Fire

Rio Grande | Bravo

CLIMATE IMPACTS & OUTLOOK

July 2018

Summary

Forecasts favor above-average temperatures for the entire Rio Grande/Bravo region, and below-average precipitation for South Texas and Northeast Mexico through October.

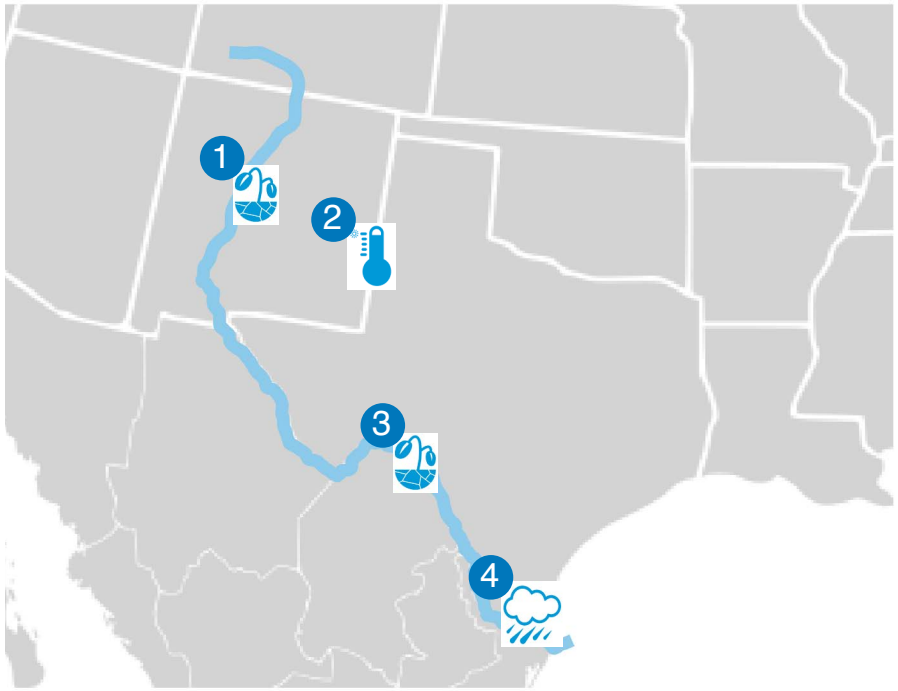
AT A GLANCE

1 **New Mexico**
Drought conditions persisted across the state over the past month, with over half of the state experiencing extreme to exceptional drought conditions.

2 **New Mexico/Texas**
Minimum temperatures in June were record warmest for both states. Although there were no extreme heat wave events over the past month, temperatures were consistently above average, with El Paso, Texas experiencing 20 days at or above 100°F.

3 **Del Rio, TX & Ciudad Acuña, Coahuila**
Extreme to exceptional drought conditions developed in the area over the last month.

4 **South Texas/Northeast Mexico**
On June 18-21 a slow-moving low-pressure system dropped record-setting rainfall and resulted in widespread flooding in the area.



REGIONAL CLIMATE OVERVIEW
APRIL | MAY | JUNE

Temperatures over the past three months (April-June) were 3-5°F (1.7-2.8°C) above average for most of New Mexico and North and West Texas, and 0-3°F (0-1.7°C) above average for East and South Texas (Figure 1; left). Precipitation over the same time period was well below average for most of both states, except for the southern tip of Texas which received precipitation 150-300% of average, mostly due to a slow-moving low-pressure system on June 18-21 that dropped record-setting rainfall and resulted in widespread flooding (Figure 1; right). Near Premont, TX, the rain gauge reached its capacity at 11 inches before overflowing (NOAA State of the Climate).

From January-June, New Mexico experienced record warm average and maximum temperatures, while temperatures in Texas were much above average. New Mexico and Texas experienced the warmest June monthly minimum temperatures on record. In Texas during June, there were several tornadoes and reports of strong wind gusts across the state that caused extensive damage, injuries, and one fatality on June 7 (NOAA State of the Climate).

Temperatures from July 1-17 were 0-3°F (0-1.7°C) above average in most of New Mexico and Texas, and Central Texas experienced temperatures 3-5°F (1.7-2.8°C) above average (figure not shown). Precipitation over the same time period was 150-300 % of average for western New Mexico and the southern half of Texas. Southeast New Mexico and northern Texas received well below average precipitation.

Most of Chihuahua and Durango experienced temperatures 5.4°F (3°C) above average between April and June. Temperatures were close to average in the Northwest and most of the Northeast parts of the country (Figure 2, left). There were 30 to 50 days at or above 104°F (40°C) in northern Baja California, Sonora, Sinaloa, Northeast Chihuahua, and northern Coahuila. There were 1 to 10 days above the same threshold in most of Chihuahua, Durango, Sinaloa, Coahuila, Nuevo León and Tamaulipas (Figure 2, right).

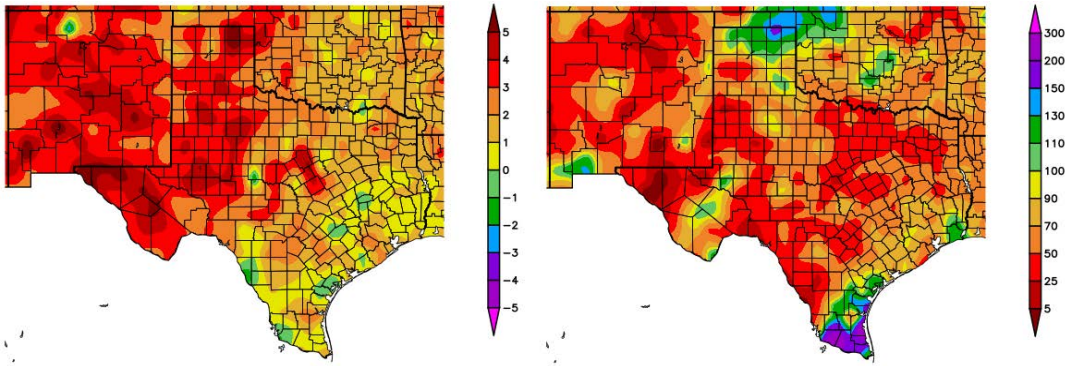


Figure 1 (above): Departure from average temperature in degrees F (left) and percent of average precipitation (right), compared to the 1981–2010 climate average, for 4/1/2018–6/30/2018. Maps from HPRCC

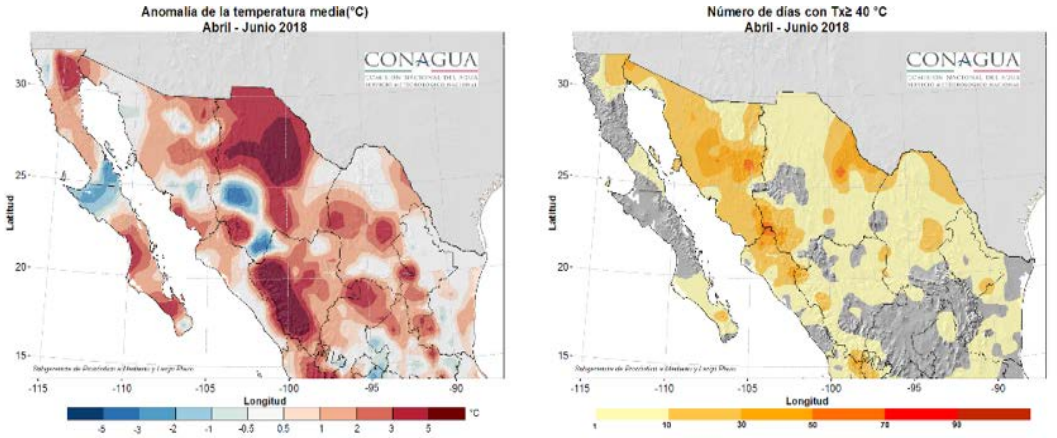


Figure 2 (above): Temperature anomalies in °C (left) and number of days with maximum temperatures at or above 104 °F (40 °C) (right) for April–June. Maps from SMN.

After beneficial rainfall in mid-June in the Northwest part of Mexico, the region did not receive heavy rains again until the beginning of July, which was the onset of the monsoon in northwestern Mexico. The Northeast region received the largest amounts of precipitation over the past three months, between 300-400 mm (12-16 inches) mainly in Tamaulipas (Figure 3, left). From April to June, above-average rainfall occurred in Baja California Sur, most of Sinaloa and southern Sonora, and the Northeast region. Chihuahua and Coahuila have received below 50% of average precipitation, resulting in drought conditions that have persisted or worsened (Figure 3, right).

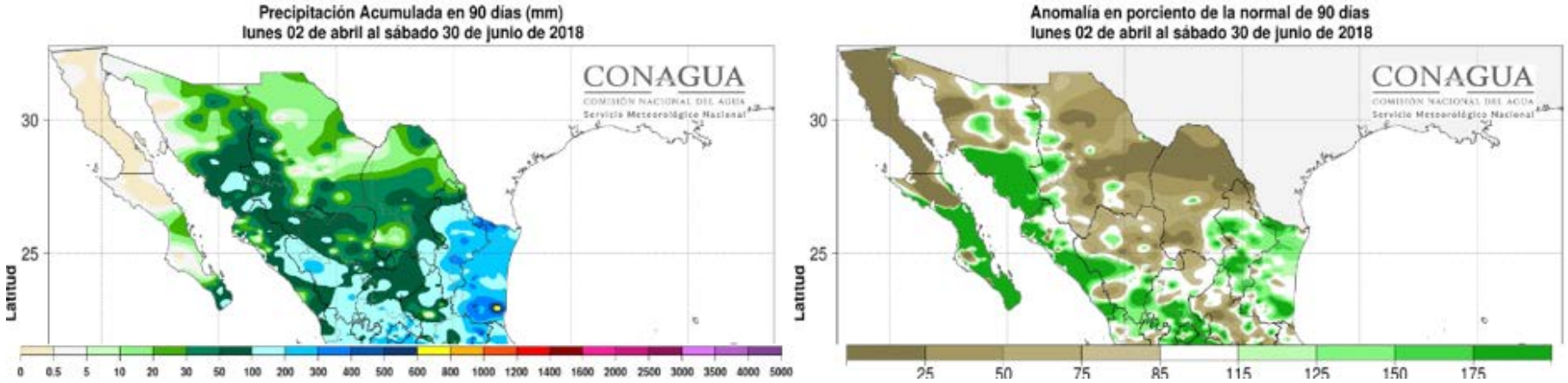


Figure 3 (above): Accumulated precipitation in mm (left) and percent of normal (right) for April–June. Maps from SMN.

DROUGHT

Drought conditions persisted in New Mexico during the past month, with exceptional drought across the northern part of the state, according to the North American Drought Monitor (NADM) (Figure 4). In Texas, drought conditions eased slightly in the panhandle, but moderate to severe drought expanded throughout the central part of the state. Near Del Rio, Texas, extreme drought expanded and exceptional drought developed. Abnormally dry conditions developed in western Texas and expanded across almost all of Chihuahua. Northern Coahuila and Nuevo León are now experiencing moderate to exceptional drought conditions. Drought conditions are predicted to remain, but improve in western New Mexico, and conditions are predicted to persist in Central and eastern New Mexico and in Texas, according to the U.S. Seasonal Drought Outlook. Drought is also predicted to develop in the parts of Texas where drought conditions are not currently present.

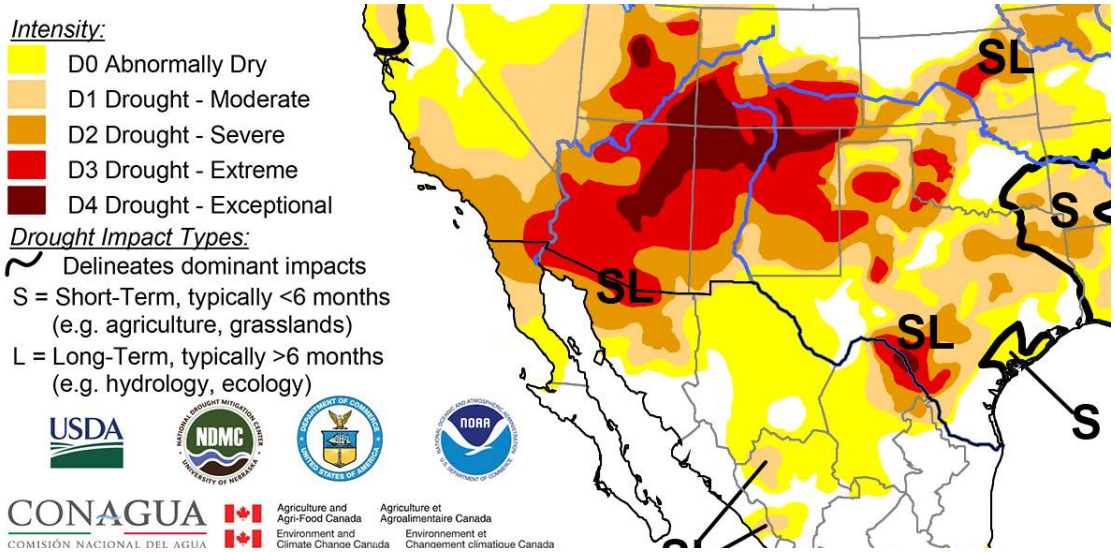


Figure 4 (above): North American Drought Monitor, released July 13, 2018.

FORECAST
AUGUST I SEPTEMBER I OCTOBER

TEMPERATURE

The three-month NOAA temperature outlook (August-October; Figure 5) favors chances for above-average temperatures for all of New Mexico and Texas through October. The one-month outlook also favors chances for above-average temperatures in both states for August (figure not shown).

The CONAGUA´s Meteorological Service (SMN) outlook for August predicts above-average maximum temperatures in Tamaulipas, Nuevo León, Coahuila and southern Baja California. Below-average maximum temperatures are predicted for northern Baja California, Sonora, Sinaloa, and Central Chihuahua. For September, SMN predicts above-average anomalies in Tamaulipas, Nuevo León and Coahuila, and below-average maximum temperatures in Baja California Peninsula, Sonora and Chihuahua (Figure 6).

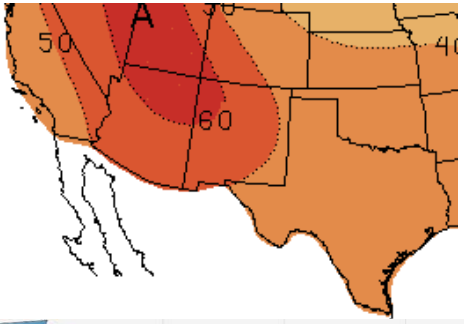
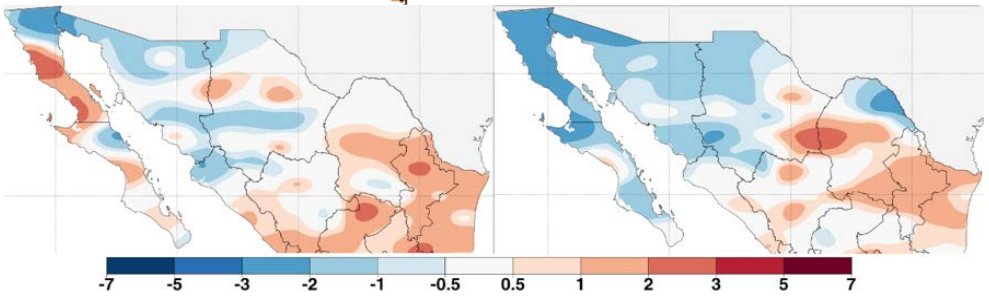


Figure 5 (left): NOAA three-month temperature outlook (August-October). Forecast made on July 19, 2018 by CPC.

Figure 6 (below): Predicted maximum temperature anomalies for northern Mexico in (°C), August (left) and September (right). Forecast made on July 1, 2018 by SMN.



PRECIPITATION

The NOAA three-month precipitation outlook (August-October; Figure 7) predicts equal chances for below-average, average, or above-average precipitation for the eastern half of New Mexico and the western half of Texas through October. Forecasts also favor increased chances of below-average precipitation for eastern and southern Texas during the same time period, and above-average precipitation for the western half of New Mexico, due to the predicted transition to El Niño during the summer and fall. The one-month NOAA outlook (August; figure not shown) shows a pattern of forecast probabilities similar to the three-month outlook, but favoring chances for below-average precipitation across most of Texas.

For August, the SMN precipitation outlook predicts above-average precipitation in Baja California Sur, Sonora, Central Chihuahua, and Southwest Coahuila. Below-average precipitation is predicted for Tamaulipas, Nuevo León, Coahuila, Northwest Sonora and Baja California. The precipitation forecast for September favors above-average conditions in some regions of Baja California Peninsula, Northwest Sonora, Chihuahua, Coahuila, southern Nuevo León and Central Tamaulipas, while the rest of the region is predicted to experience average precipitation (Figure 8).

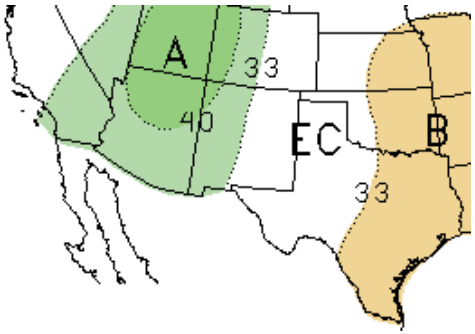
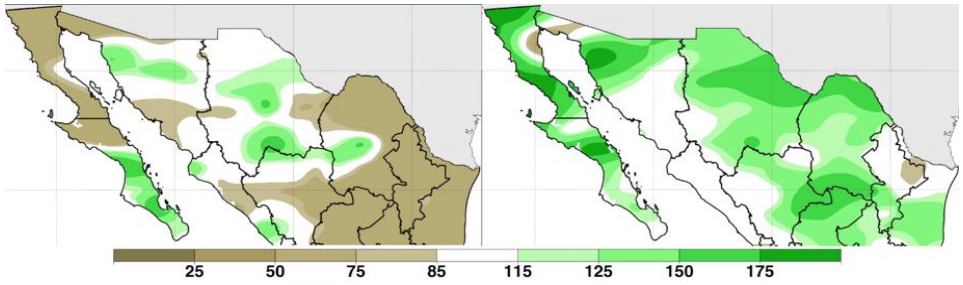


Figure 7 (left): NOAA three-month precipitation outlook (August-October). Forecast made on July 19, 2018 by CPC.

Figure 8 (below): Predicted precipitation anomalies for northern Mexico (in %), August (left) and September (right). Forecast made on July 1, 2018 by SMN.



FIRE

Monsoon precipitation moved into the Southwest U.S. and northern Mexico towards the end of June and has eliminated prospects for above-average fire potential across the region, according to the North American Seasonal Fire Assessment and Outlook. Before rains arrived, however, over 316,000 acres (128,000 hectares) burned in Chihuahua, since late May. Forecasts for August and September indicate average fire potential for all of the Southwest U.S. and Mexico, except for the peninsula of Baja California (Figure 9).

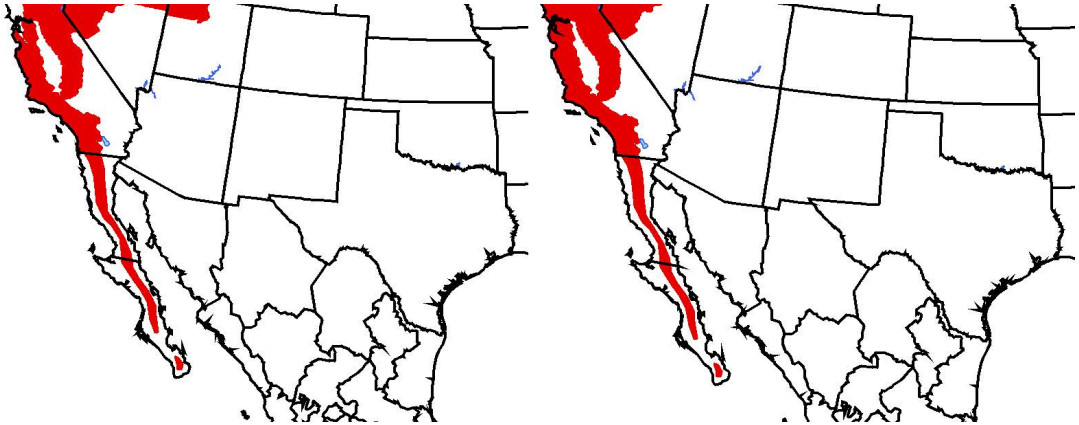


Figure 9 (above): Fire outlook for August (left) and September (right). Red shading indicates conditions that favor increased fire potential. Green shading indicates conditions that favor decreased fire potential. Forecast made on July 16, 2018 from NIFC and SMN.

EL NIÑO-SOUTHERN OSCILLATION (ENSO)

As of mid-July, sea-surface temperatures in the tropical Pacific Ocean were slightly above average, and continue to indicate ENSO-neutral conditions. Neutral conditions are forecast through the summer, with El Niño conditions forecasted to develop by the fall (IRI; NOAA). Chances of El Niño have increased from last month's forecasts, nearing 65% during the fall and ~70% during winter (Figure 10). There is considerable uncertainty in ENSO forecasts made during the spring, but that barrier has mostly passed and forecasters have come to a consensus that El Niño will develop later this year. If forecasts are correct, chances of a wet winter in the Southwest U.S. and northern Mexico are likely to increase.

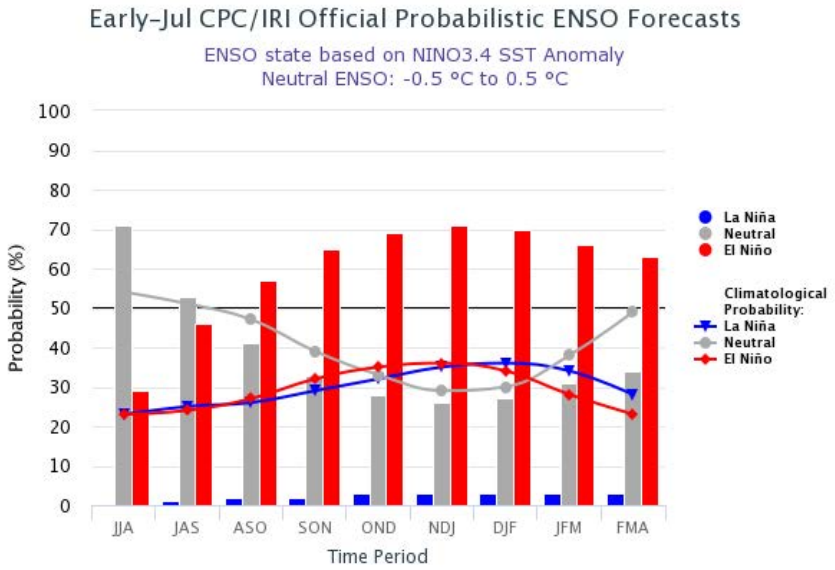


Figure10 (above): Probabilistic ENSO Forecast from IRI.

For more ENSO information:

English: http://iri.columbia.edu/our-expertise/climate/enso/enso-essentials/ y http://www.ncdc.noaa.gov/teleconnections/enso/.

Spanish: http://smn.cna.gob.mx/es/climatologia/diagnostico-climatico/enos y http://www.smn.gov.ar/?mod=biblioteca&id=68

HEAT WATCH

Unlike previous years, this June did not see extended extreme heat waves, but did see sustained warmer-than-average temperatures throughout the month and into July. Figure 11 shows the daily temperature anomalies for several Southwest U.S. cities. The histograms (on the right) show the number of days when temperatures reached levels above or below average. For example, in El Paso there were 8 days where temperatures were 6-8°F above average, and 10 occurrences where temperatures were 8°F or more above average. Although El Paso only broke the maximum temperature on one day (June 2), the city experienced 20 days over 100°F (38°C) during June—El Paso experiences about 15 days over 100°F in an average year.

Other cities along the Rio Grande broke temperature records in June and July. On June 23 and 24, Del Rio, Texas reached 106°F (41°C). Maximum temperatures in Santa Fe, New Mexico, set records on June 26 and 28 (97°F [36°C] and 98°F [36.7°C], respectively) and, although the record was not broken on June 27, the maximum temperature recorded was 100°F. Moving into July, record temperatures were set in Laredo, Texas, June 30-July 2, with temperatures of 104°F (40°C), 104°F, and 103°F (39.4°C), respectively.

In Mexico, the highest temperatures recorded in the most populated cities across Northwest Mexico were 113°F (45°C) in Mexicali on June 12, and 111.2°F (44°C) in Hermosillo and Ciudad Obregón, Sonora, on June 4 and 12, respectively. Ciudad Juárez, Chihuahua reached 105.8°F (41°C) on June 11-12, Culiacán, Sinaloa reached 104.9°F (40.5°C) on June 2, and Chihuahua, Chihuahua reached 104°F (40°C) on May 30. None of these temperatures broke previous records. Extreme temperatures for July were recorded in Sonora, with 120.2°F (49.0°C) in San Luis Rio Colorado and 119.3°F (48.5°C) in Hermosillo, both on July 5.

Looking ahead, forecasts indicate that temperatures will be above average over the next month for both New Mexico and Texas (Figure 5). A new heat forecasting tool produced by the U.S. National Weather Service provides additional insight into near future temperatures. HeatRisk is an experimental forecasting tool for visualizing heat risk potential one-week in advance (Figure 12).

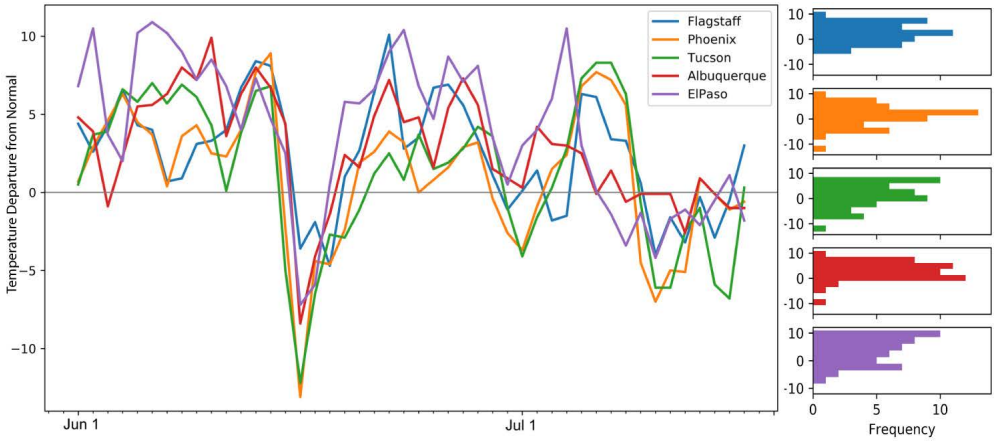
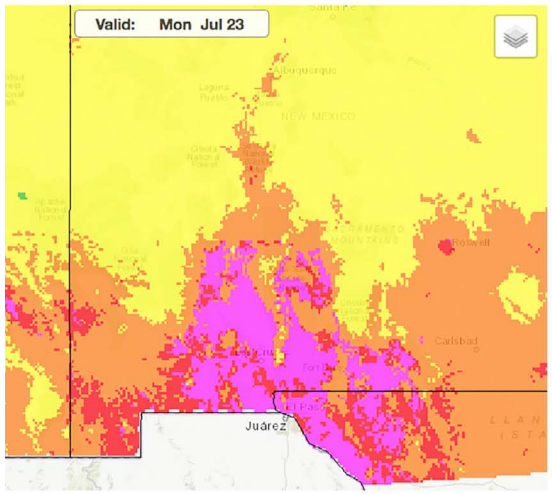


Figure 11 (above): Daily temperature anomalies from June 1 – July 16, 2018 (left) and frequency of temperature anomalies (right). Figure adapted from July Southwest Climate Outlook.



Category	Level	Meaning
Green	0	No Elevated Risk
Yellow	1	Low Risk for those extremely sensitive to heat, especially those without effective cooling and/or adequate hydration
Orange	2	Moderate Risk for those who are sensitive to heat, especially those without effective cooling and/or adequate hydration
Red	3	High Risk for much of the population, especially those who are heat sensitive and those without effective cooling and/or adequate hydration
Magenta	4	Very High Risk for entire population due to long duration heat, with little to no relief overnight

Figure 12 (above): Screenshot of NWS HeatRisk for July 23. The table (right) describes the meaning of each color.

HEAT WATCH CONT'D

It is designed to provide guidance to decision makers and heat-sensitive populations (such as outdoor workers and those with young children) on when to take action to prepare for a heat event. Each color category shown in the map represents different levels of risk and specifies the population that is at risk. For example, yellow is a low-level of risk and means that those who are extremely sensitive to heat should take action to prevent illness. When the highest level (magenta) is forecasted, the entire population is at risk, due to long-duration heat with little to no relief overnight. HeatRisk can be accessed from the National Weather Service page for most cities (https://www.wrh.noaa.gov/wrh/heatrisk/?wfo=epz).

Extreme heat causes the most deaths in the U.S. of any weather-related disaster, according to the National Center for Environmental Information, and it is particularly important to be prepared for the unrelenting heat. Populations typically at increased risk of heat-related illness include children, pregnant women, elderly, those taking medications, those working outdoors, those with disabilities, those without adequate cooling, and the socially isolated. Be sure to check on loved ones and neighbors and call 911 if anyone is experiencing symptoms of heat stroke (e.g., headache, fast pulse, confusion, nausea, loss of consciousness). For more information on vulnerable populations, the symptoms of heat-related illness, and what to do to prepare, visit the CDC extreme heat webpage (en Espanol: https://www.cdc.gov/es/disasters/extremeheat/index.html).

MONSOON TRACKER

***The following summary is adapted from the July 2018 issue of the CLIMAS Southwest Climate Outlook.**

Monsoon season has officially begun in the Southwest U.S and northern Mexico. In 2008, the U.S. National Weather Service (NWS) changed the definition of the start of the North American monsoon from a variable date based on locally measured conditions to a fixed date of June 15 (and an end date of September 30). Prior to 2008, the start date reflected the seasonal progression of the monsoon (Figure 13), based on larger seasonal atmospheric patterns.

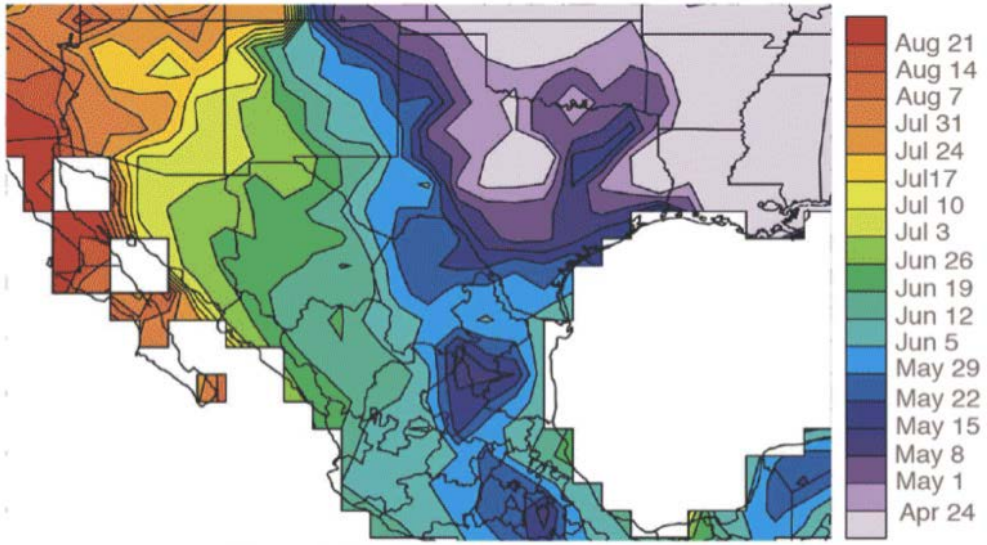


Figure 13: Historical Monsoon Onset Date. Source: Australian Bureau of Meteorology

MONSOON TRACKER CONT'D

In southern Arizona, the start date was based on the average daily dewpoint temperature. Phoenix and Tucson NWS offices used the criteria of three consecutive days of daily average dewpoint temperature above a threshold (55 degrees in Phoenix, 54 degrees in Tucson) to define the start date of the monsoon. The average daily dewpoint temperature is still a useful tool to track the onset and progression of conditions that favor monsoon events, and the NWS includes a dewpoint tracker in their suite of monsoon tools. Thirty-year averages for daily dewpoint and precipitation demonstrate the gradual increase in dewpoint temperatures during the monsoon season, as well as the variability of precipitation observed over the same window (Figure 14).

Using the dewpoint definition, the monsoon began in Tucson and Phoenix on July 8 this year and on July 6 for El Paso. While an imperfect measure, this increase in dewpoint temperature contextualizes the slightly later-than-average start to monsoon activity compared to climatology, and roughly corresponds with upticks in precipitation activity across the Southwest (Fig. 15). Despite the relatively late start, the monsoon is now in full swing. The seasonal totals since June 19th (Fig. 16) and the percent of average precipitation (Fig. 17) help characterize the spatial variability and intensity of the monsoon thus far.

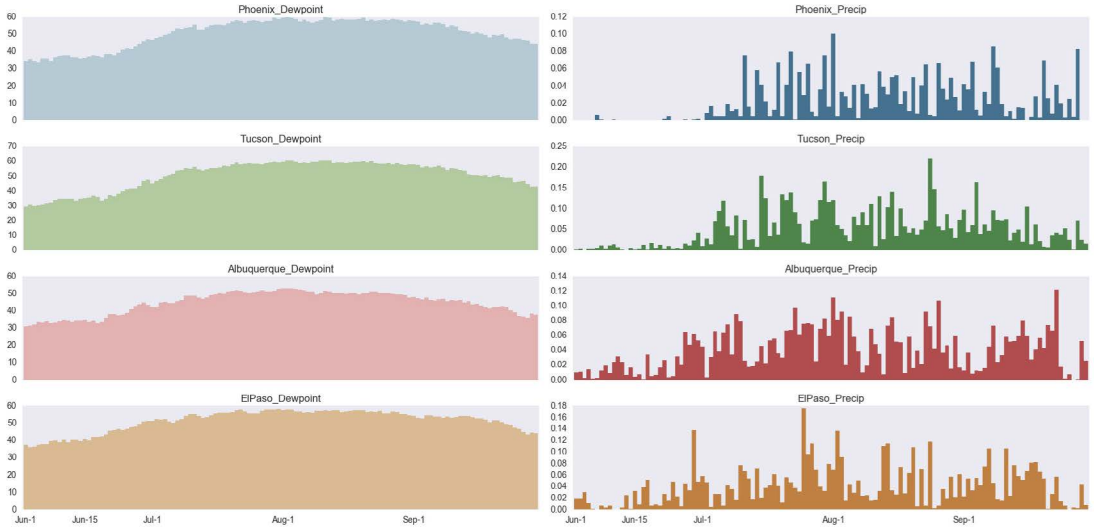


Figure 14 (left): Average daily dewpoint temperature (left [°F]) and average daily precipitation (right [in.]).

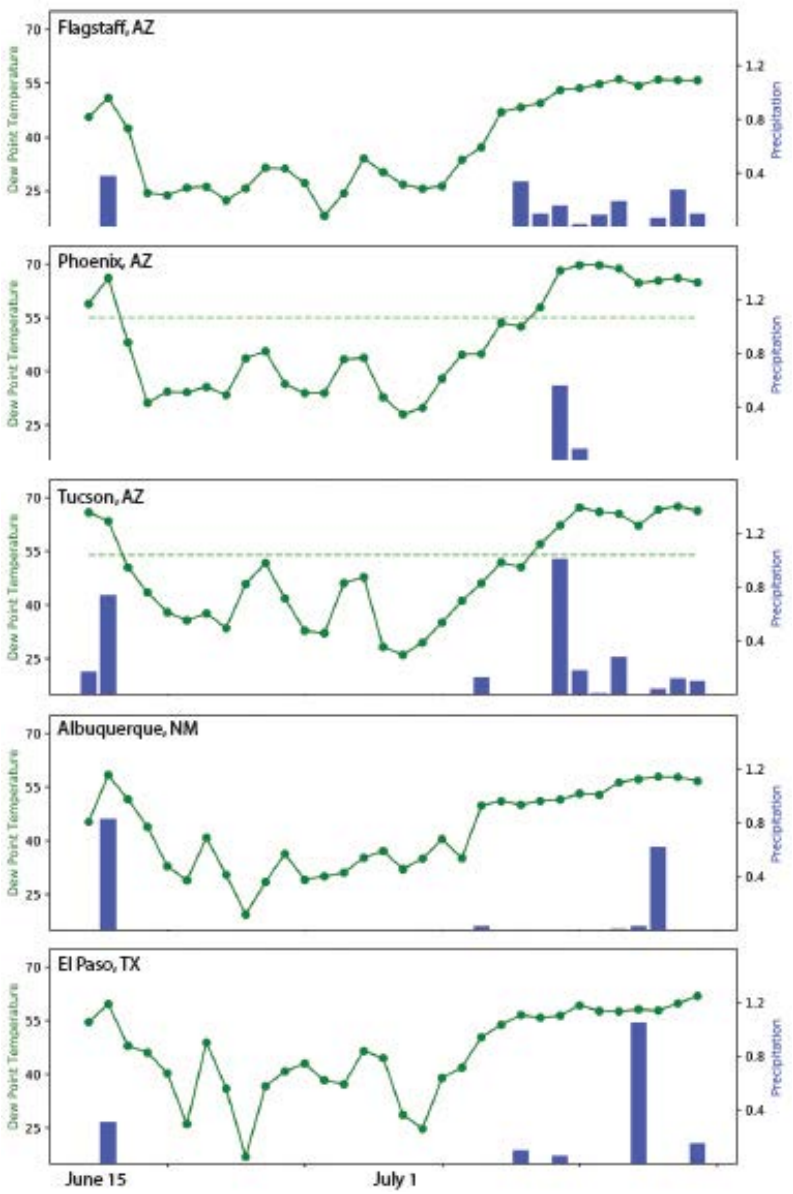


Figure 15: Dew Point Temperature [°F] & Daily Precipitation [in.], June 15-July 16.

MONSOON TRACKER CONT'D

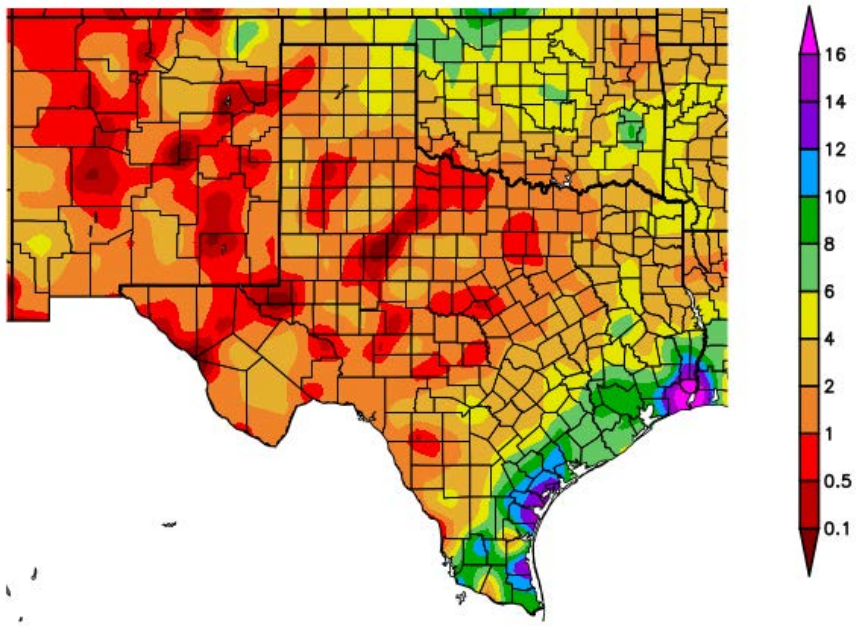


Figure 16 (above): Total precipitation (in inches), June 19-July 18. Maps from HPRCC.

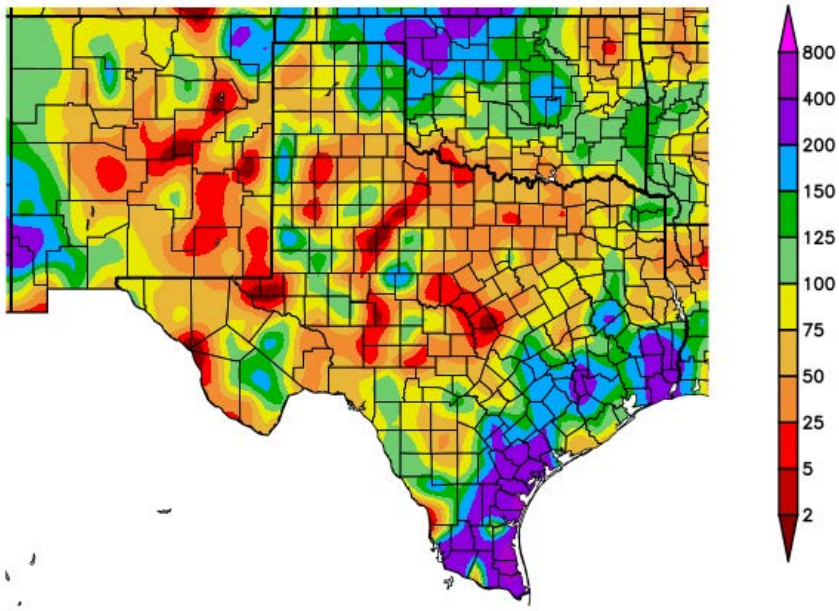


Figure 17 (above): Percent of average precipitation, June 19-July 18. Maps from HPRCC.

Additional Monsoon Resources:

- NWS: http://www.wrh.noaa.gov/twc/monsoon/monsoon_info.php
- CLIMAS: http://www.climas.arizona.edu/sw-climate/monsoon
- CONAGUA: http://www.gob.mx/conagua/prensa/inicio-el-monzon-de-norteamerica-en-el-noroeste-de-mexico

ANNOUNCEMENTS

WEBINARS – AMERICAN WATER WORKS ASSOCIATION

Two upcoming webinars by the American Water Works Association will discuss wildfire impacts on water quality and dealing with water loss from drought and other factors. The first webinar, Wildfire Impacts on Water Quality and Treatment, will be on August 15, and the second, Demystifying Water Loss, will be on August 22, both at 11AM MDT.

33RD ANNUAL WATEREUSE SYMPOSIUM

The symposium will be held September 9-12, 2018 in Austin, Texas, and will address advancing the policy, technology, innovation and public acceptance of water reuse.

SHAPING OUR WATER FUTURE – WORLD WATER CONGRESS & EXHIBITION 2018

This international conference will bring together water and environment professionals in Tokyo, Japan, September 16-21, 2018, to discuss new insights into pioneering science and technological innovation related to water management.

BORDER ENERGY FORUM XXII

Hosted by the North American Development Bank, the Border Energy Forum brings together local and state officials, private sector developers and investors, academics, and energy experts from the U.S. and Mexico to discuss topics including energy prosperity, innovation, financing, and cross-border opportunities. The forum is September 26-27 in San Antonio, TX.

CALL FOR ABSTRACTS – AMERICAN GEOPHYSICAL UNION FALL MEETING & AMERICAN METEOROLOGICAL SOCIETY 99TH ANNUAL MEETING

Abstracts are due August 1st, 2018 for two large, winter conferences. The American Geophysical Union Fall Meeting will be held in Washington, D.C., December 10-14, 2018. The American Meteorological Society Annual Meeting will be held in Phoenix, Arizona, January 6-10, 2018.

NEWS

Advierten escasez de agua en ciudades de la frontera para el 2030, June 24, 2018
Monsoon Rains Provide Some Relief to Drought-Stricken New Mexico, July 11, 2018
Flood Damages Homes, Power Line, Crops in Socorro County, July 16, 2018
Rapidly Declining Lake Levels Trigger Drought Level One, July 16, 2018
Audubon taps reservoirs to sustain life in Rio Grande, July 17, 2018