

Rio Grande|Bravo

CLIMATE IMPACTS & OUTLOOK October 2016

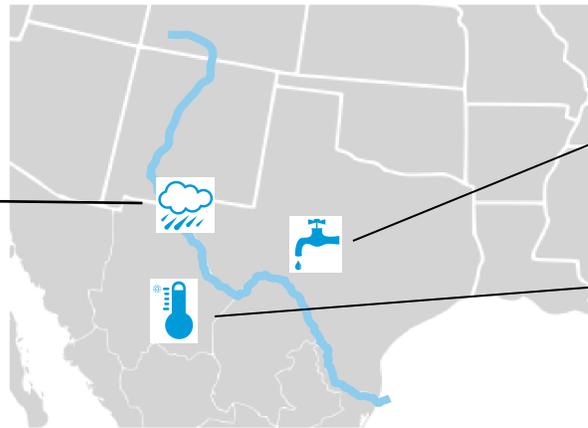
SUMMARY

Forecasts favor above-average temperatures in the Rio Grande/Bravo Basin through December.

AT A GLANCE

El Paso, Texas

Farmers in the border region report that summer monsoon rain has led to above-average pecan production this season, despite extreme summer temperatures.



Texas

Reservoir levels for the Rio-Grande Basin Reservoirs in Texas were at 62% of capacity in mid-October.

Mexico

Areas in Chihuahua, Coahuila, and Nuevo León recorded up to 10 days with temperatures exceeding 105°F (40°C) in September.

REGIONAL CLIMATE OVERVIEW

JULY | AUGUST | SEPTEMBER

From July 1st through September 30th the Rio Grande/Bravo Basin received precipitation ranging from 70-200% of average (Figure 1, left). New Mexico received average to below-average precipitation for the majority of the state, while the majority of Texas recorded average to above-average precipitation. Temperatures were 1-3°F (0.5-1.6°C) above average for almost all of the region for the same time period (Figure 1, right). During the first half of October, precipitation varied from 200% of average in south-central New Mexico to 5-25% of average in Texas. Temperatures were average to 2°F (1.1°C) above average in the region during the same period.

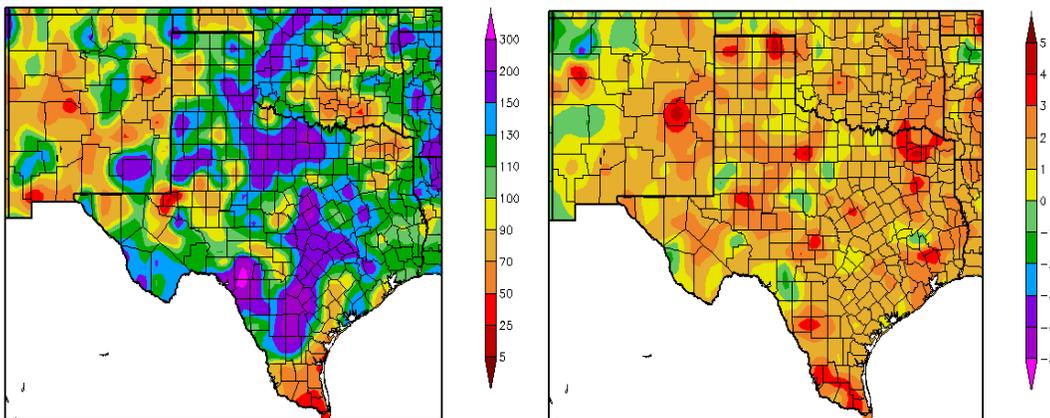


Figure 1: Percent of normal precipitation (left) and departure from normal temperature (right), for 7/1/2016 - 9/30/2016. Maps from HPRCC.

The average temperature for September in northern Mexico ranged from 68-86°F (20-30°C), with below-average temperatures in southern Chihuahua and northern Coahuila. Southern Coahuila, Nuevo León, and Tamaulipas observed above-average temperatures (Figure 2, left). Areas in Chihuahua, Coahuila, and Nuevo León recorded up to 10 days with temperatures exceeding 105°F (40°C) in September (Figure 2, right).

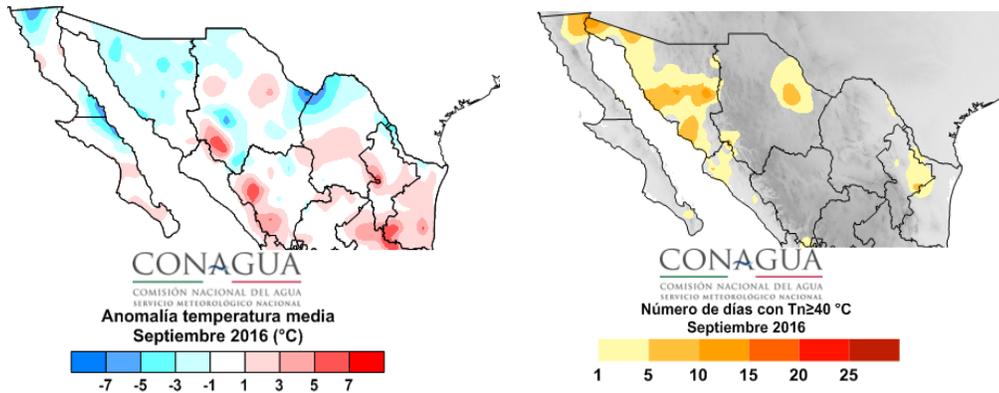


Figure 2: Temperature anomalies (left) and number of days with maximum temperatures at or above 105°F (40°C) in September. Maps from [SMN](#).

DROUGHT

According to the North American Drought Monitor (NADM), by the end of September, western New Mexico and isolated areas in Chihuahua, Tamaulipas, and Texas were experiencing abnormally dry conditions (Figure 3).

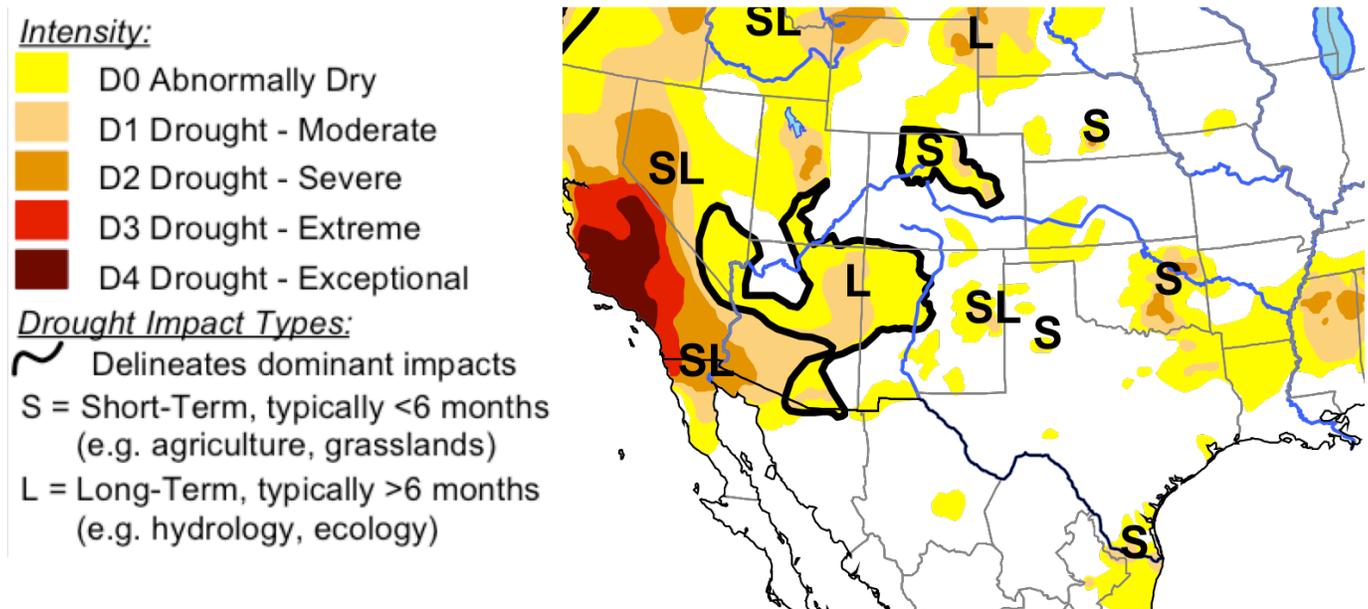


Figure 3 (above): North American Drought Monitor, released October 13, 2016.

TEMPERATURE

NOAA forecasts favor increased chances for above-average temperatures in the region through January (Figure 4). Forecasts from CONAGUA’s Servicio Meteorológico Nacional (SMN) predict similar conditions in Chihuahua and central Coahuila, with above-average minimum temperatures in November and December; average minimum temperatures are forecasted for the remainder of the border region (Figure 5).

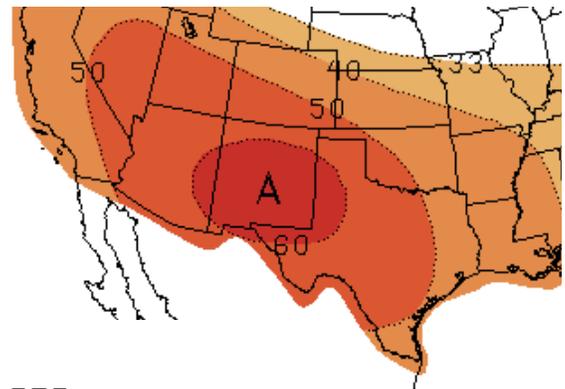


Figure 4 (above): NOAA November-January temperature outlook. Forecast made on October 20, 2016 by [CPC](#).

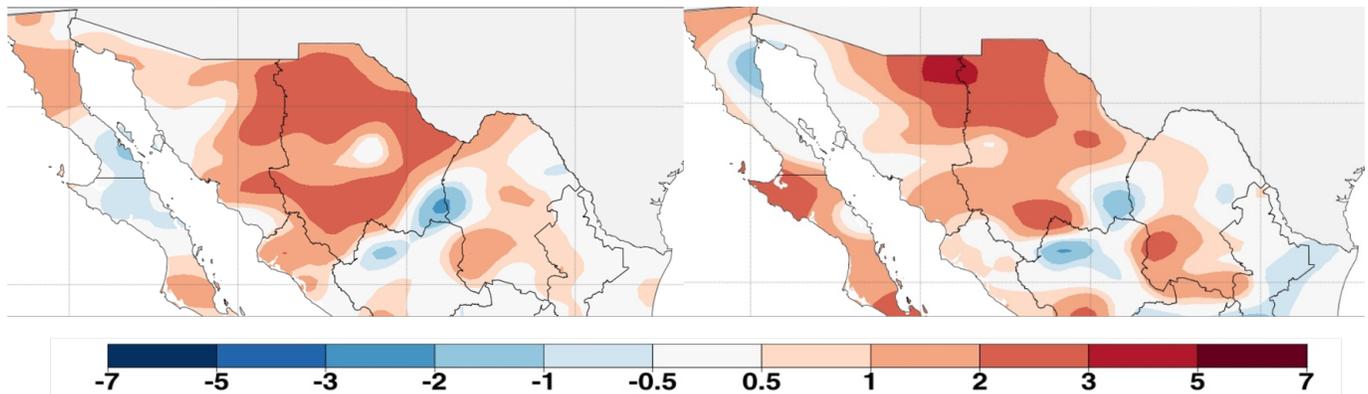


Figure 5 (above): Predicted minimum temperature anomalies for northern Mexico (in °C); November (left) and December (right). Forecast made on October 1, 2016 by [SMN](#).

PRECIPITATION

Precipitation forecasts from NOAA favor below-average precipitation for the Rio Grande/Bravo Basin through December (Figure 6). For Mexico, SMN forecasts favor above-average precipitation in the basin region through November. The December SMN forecast favors below-average precipitation in western and central Chihuahua, and average to above-average precipitation in eastern Chihuahua, Coahuila, Tamaulipas, and Nuevo León (Figure 7). Differences between the NOAA and SMN forecasts could be due to several factors: (1) NOAA forecasts are based on a

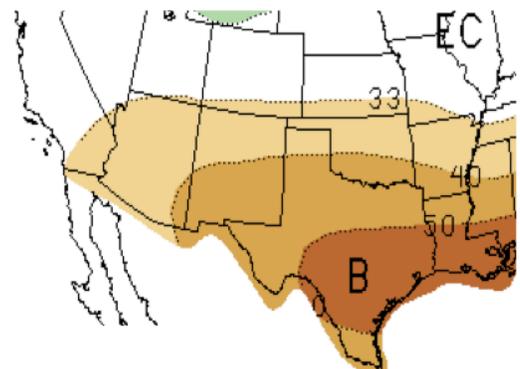


Figure 6 (above) : NOAA November-January precipitation outlook. Forecast made on October 20, 2016 by [CPC](#).

combination of statistical and dynamic models, whereas SMN forecasts use statistical models, analogues years and the output of climate global models and (2) NOAA predicts shifts in the probability of precipitation, whereas the SMN predicts precipitation amounts.

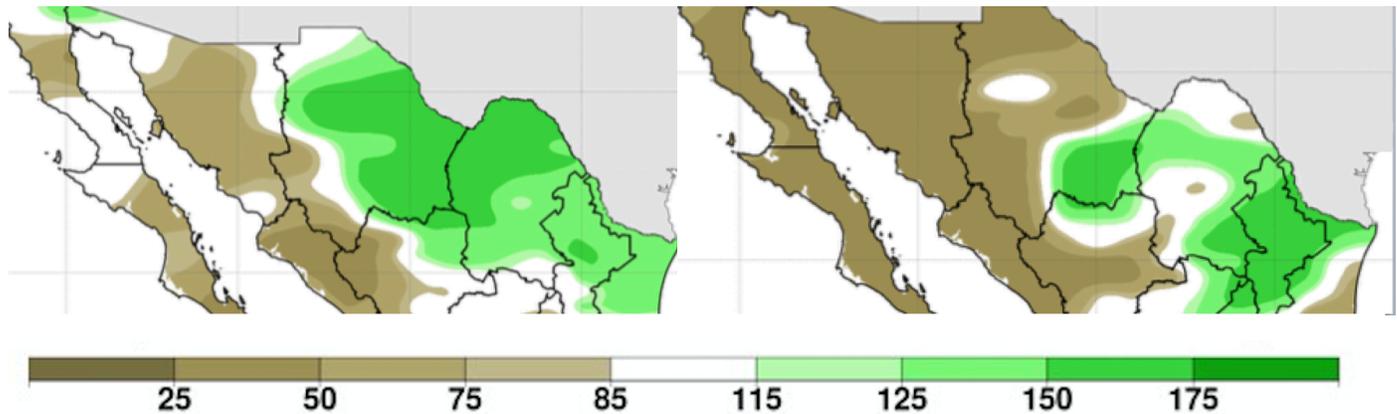


Figure 7 (above): Percent of average precipitation for northern Mexico; November (left) and December (right). Forecast made on October 1, 2016 by [SMN](#) using 1985, 1998, 2008, 2010, and 2014 as analogue years.

FIRE

The National Interagency Fire Center (NIFC) forecasts normal fire potential for the majority of the region through November. SMN forecasts favor above-normal fire activity in Tamaulipas due to continuing dry conditions in the area (Figure 8)..



Figure 8 (left): Significant wildfire potential outlook for November. Red shading indicates conditions that favor above-normal fire activity. Map from [SMN](#).

**MONITOREO DE FOCOS DE CALOR CUENCA RIO BRAVO
(Hazard Mapping System)
Septiembre 2016 (Acumulado)**

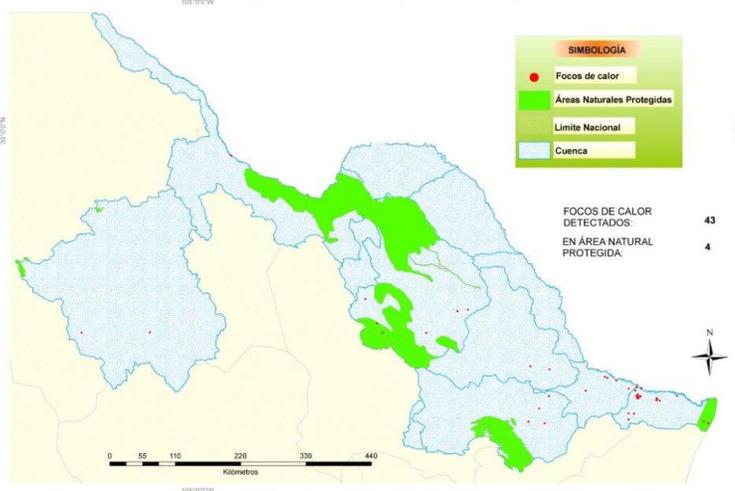
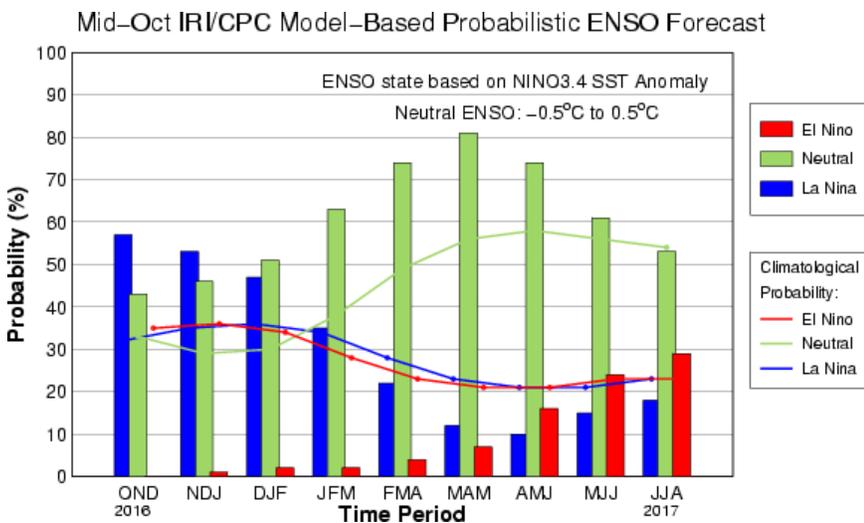


Figure 9 (left): Hotspots detected in the Rio Grande/Bravo Basin in September 2016 from [SMN](#).

EL NIÑO-SOUTHERN OSCILLATION (ENSO)

Sea surface temperatures (SSTs) in the east-central equatorial Pacific Ocean were cooler than the -0.5°C weak La Niña threshold during the first two weeks of October. However, variable atmospheric conditions have not been consistent with La Niña characteristics, and given the lack of enhanced trade winds, climatologists have classified September and October as ENSO-neutral ([IRI](#)). ENSO models forecast a transition this winter from SSTs indicative of a weak La Niña to those more like ENSO-neutral conditions (Figure 10).



For more ENSO information:
English:
<http://iri.columbia.edu/our-expertise/climate/ens/o-essentials/> and
<http://www.ncdc.noaa.gov/teleconnections/ens/>.
Spanish:
<http://www.smn.gov.ar/?m=od=biblioteca&id=67> and
<http://www.smn.gov.ar/?m=od=biblioteca&id=68>

Figure 10 (above): ENSO probabilistic forecast from [IRI](#).

THE NORTH AMERICAN MONSOON: 2016 RECAP

A large portion of the Rio Grande/Bravo Basin region experiences the North American Monsoon during the summer, which accounts for approximately half of total annual precipitation in most areas ([CPC](#)). As a result of unequal rates of warming over land and water, wind patterns over northern Mexico and the U.S. Southwest reverse, pulling moisture from the Gulf of Mexico, Gulf of California and the eastern Pacific Ocean. Monsoon season typically begins in mid to late June in northwest Mexico (Sonora, Chihuahua, Sinaloa, and Durango) and early July in the U.S. Southwest (New Mexico and Arizona).

The Monsoon season got off to a late start in the majority of the region. For most of New Mexico and Texas, July was much drier than normal, and most stations did not receive significant precipitation until the end of the month (Figure 11). August, however, told a different story. The majority of the region received precipitation well above average, and some areas received precipitation up to 600% of normal. This boosted monsoon precipitation totals for much of the region, including El Paso, TX which ended with an above-average season. Northern New Mexico did not fare as well, and below-average precipitation again in September solidified a below-average season for the area, including stations near Albuquerque and Santa Fe. On the whole, most of New Mexico—and especially the northern part of the state—experienced a below-average monsoon season, while the U.S.-Mexico border region in Texas experienced an above-average season.

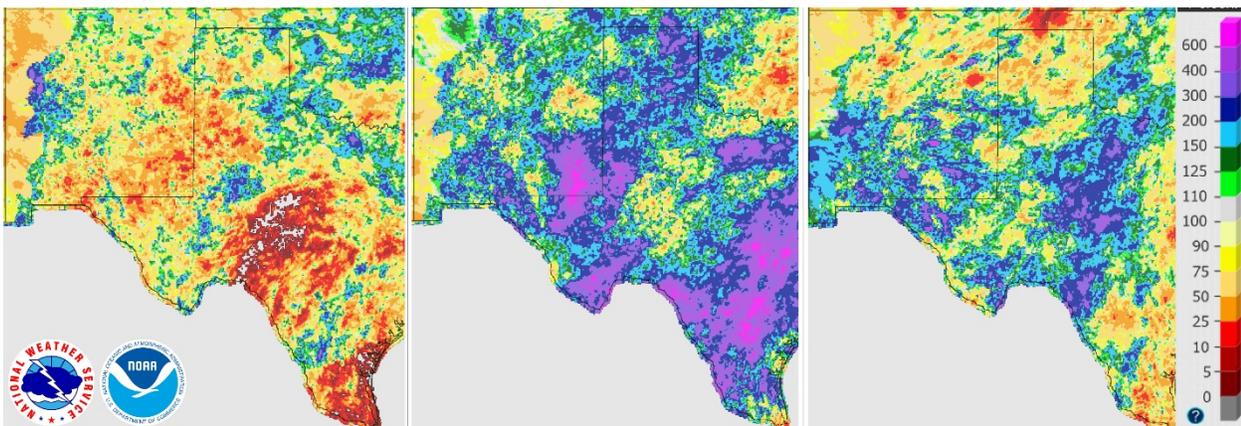


Figure 11 (above): Percent of normal precipitation for July (left), August (center), and September (right).
Source: [NWS](#)

Monsoon season in Mexico started later than usual, with monsoon activity not beginning until the second week of July. Convective activity in the region slowed from September 10 – 20, but reemerged towards the end of September. According to SMN, south and western Sonora experienced average monsoon precipitation from June 15 – September 30, and central Coahuila, Chihuahua, and central Sonora saw above-average monsoon activity.

Below are highlights from two cities in the Rio Grande/Bravo region.

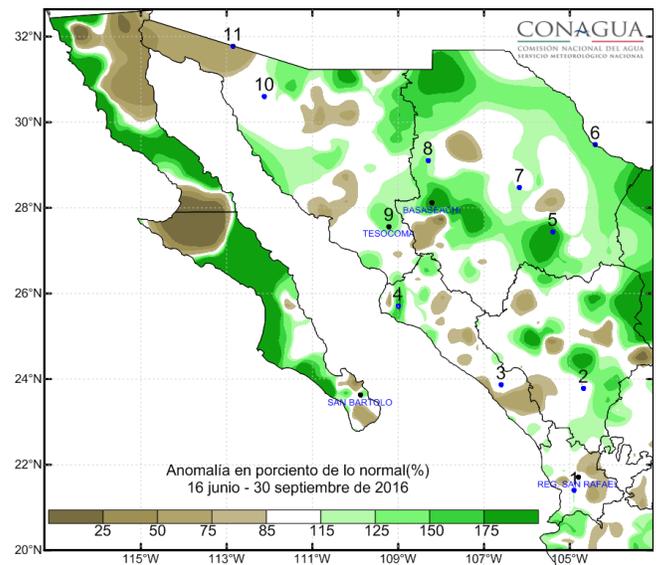


Figure 12: Precipitation anomalies from June 16 – September 30, 2016 from SMN.

EL PASO, TEXAS

El Paso, Texas received 6.43 inches of precipitation during the 2016 monsoon season (June 15 – September 30), approximately 1.3 inches above the 1942-2016 average (CAL5). Although the number of days with rainfall events (24 days) fell close to the historical average, the 2016 rainfall intensity (inches/day) was slightly above average. The temporal distribution of monsoon precipitation fell later in the season compared to average; 75% of the seasonal rainfall occurred after August 12th.

BASSASEACHIC, CHIHUAHUA

Bassaseachic, Chihuahua received 40.3 inches (1037.4 mm) of precipitation from June 15 – September 30, the highest recorded precipitation in the Mexican portion of the Rio Grande/Bravo Basin. Historical records from 2007 – 2016 indicate the 2016 season was the wettest in the past decade in Bassaseachic.

FEATURED: EPA CLIMATE RESILIENCE EVALUATION AND AWARENESS TOOL

The U.S. Environmental Protection Agency (EPA) has updated their Climate Resilience Evaluation and Awareness Tool (CREAT) to better assist water utilities with developing site-specific climate change adaptation plans. The updated tool features intuitive modules, monetized risk results, climate projection maps, and temperature and precipitation data. CREAT 3.0 was developed through a partnership between the EPA and wastewater and drinking water utilities, water sector associations, and climate scientists. The EPA recognizes that water utilities “operate on the front lines of climate change” and believe that CREAT is a valuable tool for communities to better understand and specify their climate adaptation strategies.

MEXICO CLIMATE FORUM

The VII Meeting of Climate Services and XXXI Climate Outlook Forum in Mexico will be held from November 29 to December 1 in Mexico City, Mexico. Topics include health and extreme heat, the drought monitor, early warning systems in health, wildfires, the hurricane systems, atmospheric conditions, and the upcoming climate perspective. For more information see:

<http://smn.cna.gob.mx/es/climatologia/foros-de-prediccion-climatica>

NEWS HEADLINES

Valley Soil Testing Campaign Runs Through January, October 16, 2016:

http://www.valleymorningstar.com/news/local_news/article_64181964-9420-11e6-9666-137d8c3a16bf.html

Exhibit Celebrates 100 Years of Elephant Butte Dam, October 10, 2016:

<http://www.demingheadlight.com/story/news/2016/10/10/exhibit-celebrates-100-years-elephant-butte-dam/91859146/>

The Southwest Will Probably Suffer a Crippling Megadrought This Century, October 5, 2016:

<http://www.popularmechanics.com/science/environment/a23225/megadrought-american-southwest/>

Environmental Group Ask State to Deny Firm's Request for Water Permit, September 30, 2016:

http://www.santafenewmexican.com/news/local_news/environmental-group-ask-state-to-deny-firm-s-request-for/article_e992cedf-3117-5e26-a594-3caa283bd4cb.html

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Victor Murphy
Climate Focal Point
NOAA-National Weather Service
Southern Region

Gregg Garfin
Climatologist
Climate Assessment for the Southwest
(CLIMAS)

Sarah LeRoy
Research Assistant
Climate Assessment for the Southwest
(CLIMAS)

Mark Shafer
Director of Climate Services
Southern Climate Impacts Planning Program

Meredith Muth
International Program Manager
Climate Program Office
(NOAA)

Hennessy Miller
Graduate Research Assistant
University of Arizona

Blanca E. Irigoyen/Brisia E. Espinoza
Climate Services
Mexico National Meteorological Services
(SMN)

Reynaldo Pascual/Adelina Albanil
Drought
Mexico National Meteorological Services
(SMN)

Martín Ibarra/Martín Guillén
Seasonal Forecasts
Mexico National Meteorological Services
(SMN)

Julio Martínez
Diagnostic Observations
Mexico National Meteorological Services
(SMN)

Juan Ramos
Wildfire
Mexico National Meteorological Services
(SMN)