

Rio Grande|Bravo

CLIMATE IMPACTS & OUTLOOK February 2016

SUMMARY

Forecasts call for increased chances of below-average temperatures and above-average precipitation for much of the region through April 2016, due to El Niño.

AT A GLANCE

Rio Grande Basin- Texas/New Mexico

Increased chances of above-average precipitation through April



New Mexico/Texas

January temperatures were 1-5°F (0.5-2.6°C) below average

Rio Grande/Bravo Basin

The entire region, both in the U.S. and Mexico, was drought free at the end of 2015, with only small pockets of abnormally dry conditions

REGIONAL CLIMATE OVERVIEW

NOVEMBER 10, 2015 – FEBRUARY 7, 2016

Temperatures across the Rio Grande Basin between January 10 and February 7 were variable, deviating from 5°F (2.2°C) below average in central New Mexico and along the Rio Grande corridor to 3°F (1.1°C) above the 1981-2010 average in eastern New Mexico and central Texas (Figure 1). The region also received varied precipitation from November 10, 2015 to February 7, 2016; southeastern New Mexico and southern Texas experienced precipitation 25-90% below average, while central New Mexico and northern Texas experienced precipitation 110-300% above average (Figure 2). Precipitation from January 8-February 6 fell predominantly below average (5-50% of average) for most of the Basin.

Between November 10, 2015 and February 10, 2016, Mexico experienced 26 frontal systems and 6 winter storms. In November, the northern border states experienced below-average temperatures and the number of days that registered a minimum temperature of 32°F (0°C) were higher than average in Durango and Chihuahua. December precipitation fell below average in the northern states and above average in Coahuila and Tamaulipas.

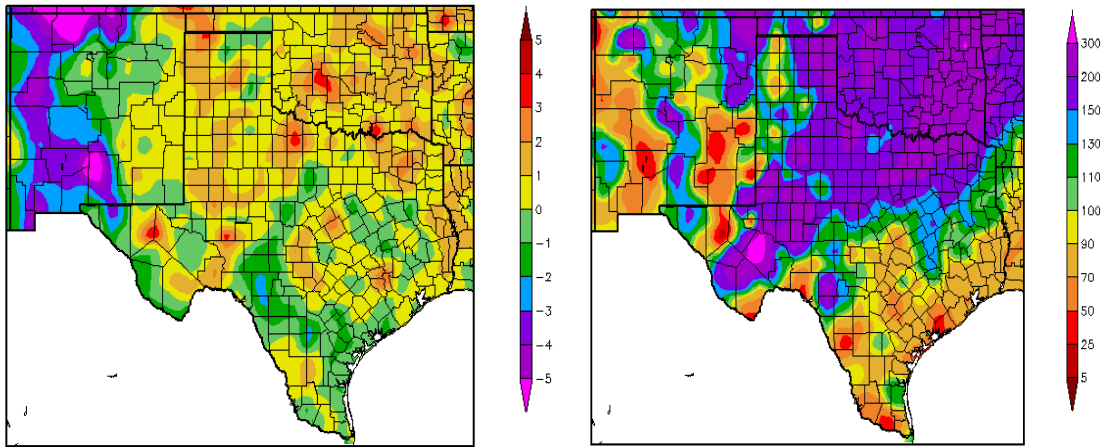


Figure 1 (left): Departure from normal temperature (°F) from 1/10/2016-2/7/2016. Map from [HPRCC](#).
Figure 2 (right): Percent of normal precipitation from 11/10/2015-2/7/2016. Map from [HPRCC](#).

DROUGHT

The North American Drought Monitor classified most of the Rio Grande/Bravo Basin as drought free, with small areas in western New Mexico, the Coahuila/Chihuahua/Texas border region, and central Nuevo Leon as abnormally dry. Current conditions in the U.S. are expected to remain unchanged through May 2016 according to NOAA’s Climate Prediction Center ([CPC](#)).

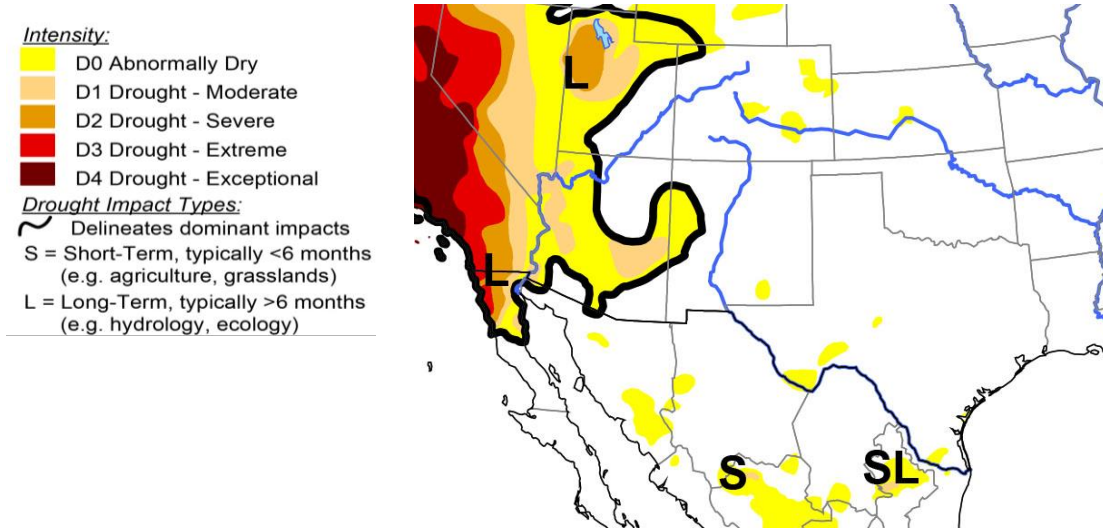


Figure 3: January North American Drought Monitor, released February 10, 2016. Map from [NCDC](#).

TEMPERATURE

The three-month NOAA temperature outlook calls for increased chances of below-average temperatures in Texas and New Mexico (Figure 4). CONAGUA’s Servicio Meteorológico Nacional (SMN) forecasts average to below-average temperatures for March and April for northeastern Mexico (Figure 5).

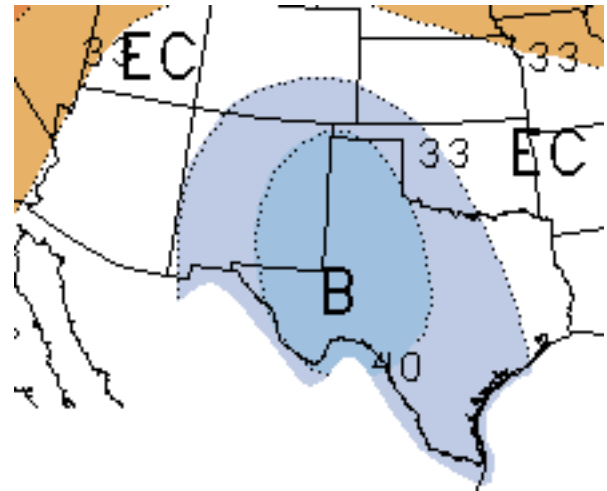


Figure 4 (right): NOAA March through May seasonal temperature outlook. Forecast made on February 18, 2016. Forecast from [CPC](#).

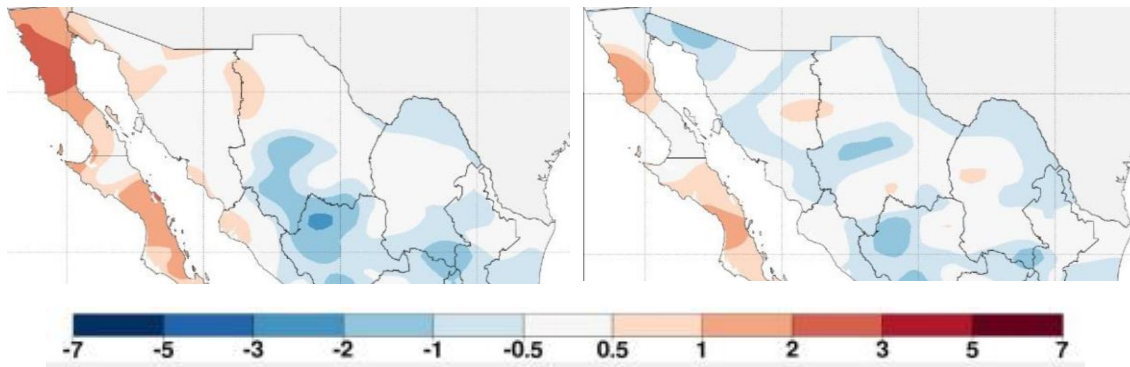


Figure 5: Predicted minimum temperature anomalies for northern Mexico (in °C). March (left) and April (right). Forecast made on February 5, 2016 by [SMN](#).

PRECIPITATION

NOAA precipitation forecasts favor increased chances of above-average precipitation for the entire U.S. Southwest region, mostly due to the strong El Niño conditions in the tropical Pacific Ocean (Figure 6). The SMN forecasts for March vary across the region, with northwestern Chihuahua predicted to receive above-average precipitation and eastern Chihuahua and northern Coahuila predicted to receive below-average precipitation. In April, SMN predicts average to below-average precipitation for almost all of the Rio Grande/Bravo Basin in Mexico (Figure 7).

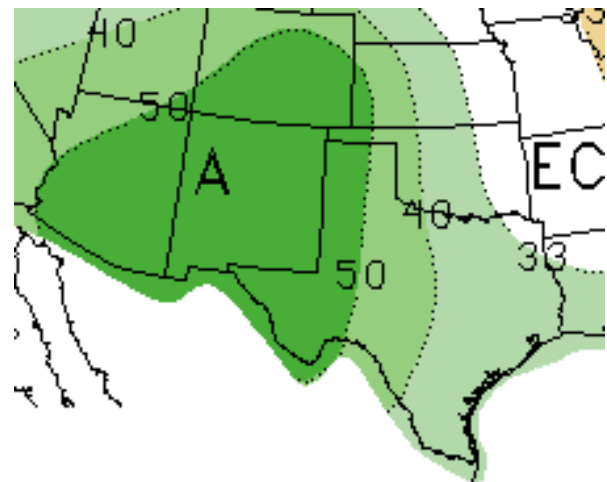


Figure 6 (above): NOAA March through May seasonal precipitation outlook. Forecast made on February 18, 2016. Forecast from [CPC](#).

The difference between the NOAA and SMN forecasts in March and April could be due to several factors: (1) NOAA forecasts are based on a combination of statistical and dynamic models, whereas SMN forecasts use statistical models, based on similar years from history. The SMN forecasts give higher significance to the role of the Atlantic Ocean in the analogue years used, (2) NOAA predicts shifts in the probability of precipitation, whereas the SMN predicts precipitation amounts, and (3) NOAA forecasts are for precipitation over a 3-month period, whereas SMN forecasts are for individual months, and each month may not be uniformly wetter-than-average.

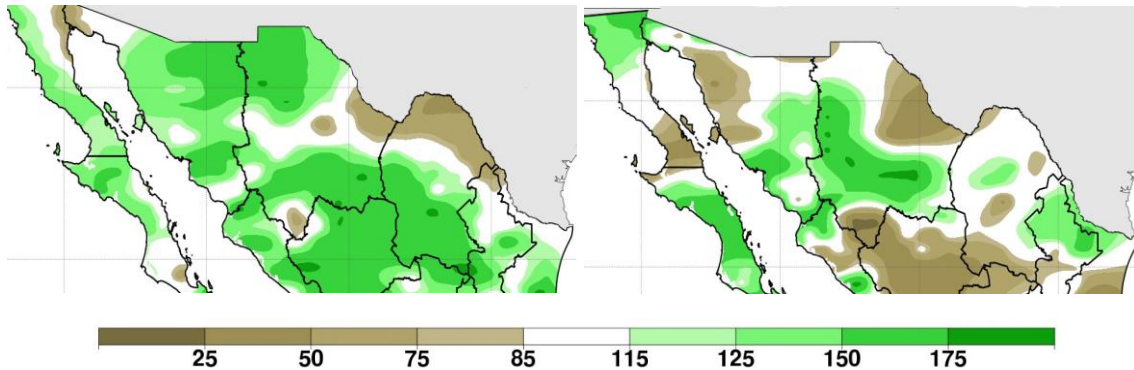


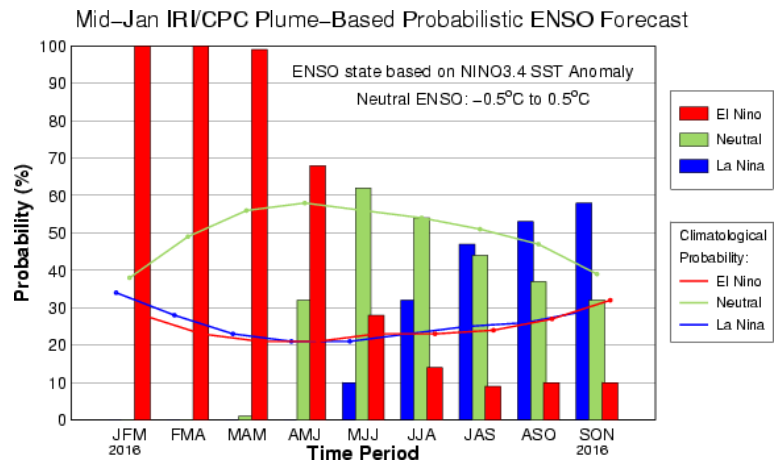
Figure 7 (above): Percent of average precipitation for northern Mexico. March (left) and April (right). Forecast made in February 2016 by [SMN](#).

EL NIÑO

The El Niño-Southern Oscillation (ENSO) is a natural climate phenomenon that originates in the equatorial Pacific Ocean and affects weather around the world. Strong El Niño conditions are currently present in the tropical Pacific Ocean and are predicted to remain through the remainder of the winter and early spring, indicating an increased likelihood of above-average precipitation through April for the Rio Grande/Bravo Basin. This strong El Niño event falls within the top three strongest episodes, as indicated by the magnitude of [SST anomalies](#), since 1950. Past strong episodes, such as 1982-1983 and 1997-1998, resulted in dramatically increased precipitation and flooding in some areas of the U.S.-Mexico border region. Conditions are predicted to gradually shift to ENSO-neutral conditions by late spring or early summer, as indicated by a probabilistic ENSO forecast (Figure 8), produced by The National Weather Service’s Climate Prediction Center (CPC) and the International Research Institute for Climate and Society (IRI).

The impacts of this El Niño event have already been felt in Mexico; increased humidity drawn from the Pacific Ocean in northeastern Mexico resulted in above-average precipitation in the region. El Niño conditions also played a role in the development of two tropical cyclones (Hurricane Sandra and Tropical Storm Rick) in late November as a result of positive SST anomalies in the tropical Pacific Ocean.

Figure 8 (right): ENSO Probabilistic Forecast from [IRI](http://iri.columbia.edu/).



For more ENSO information:

English: <http://iri.columbia.edu/our-expertise/climate/enso/enso-essentials/>

and

<http://www.ncdc.noaa.gov/teleconnections/enso/>.

Spanish: <http://www.smn.gov.ar/?mod=biblioteca&id=67> and

<http://www.smn.gov.ar/?mod=biblioteca&id=68>

FEATURE ARTICLE: WESTERN WATER AND CLIMATE CHANGE

Current climate change projections in the Rio Grande Basin north of Fort Quitman, Texas indicate large declines in streamflows, up to 50 percent in some areas, by 2100, which might sink the water system into permanent drought, according to the authors of a new paper published in *Ecological Applications*. Published in December, 2015, the paper details the climate change challenges of four iconic watershed basins in the arid west, including the Rio Grande Basin. Specific vulnerabilities of water resources in the Basin, such as a small headwater drainage area, complex allotment and compact entitlements, and over-allocation, will endanger the sustainable water management of the basin’s resources. To address increased water demand from a combination of population growth and climate change, the authors suggest that water strategies and solutions “that engage whole portfolios of differing supply and demand options, with differing climate vulnerabilities, may be the most robust in the future.”

NEWS HEADLINES

Lack of Predicted Rainfall Good News for South Texas Winter Vegetables, February 5, 2016:

<http://today.agrilife.org/2016/02/05/good-crop-of-south-texas-winter-vegetables/>

Southwest Dries as Wet Weather Systems Become More Rare, February 4, 2016:

<https://www2.ucar.edu/atmosnews/news/19173/southwest-dries-wet-weather-systems-become-more-rare>

El Niño Could Bring More Storms to Region, January 24, 2016:

<http://lubbockonline.com/local-news/2016-01-24/el-nino-could-bring-more-storms-region#.VqZJPFMrKXQWild>

New Mexico AG Seeks More Funds for Rio Grande Water Fight, January 13, 2016:

http://www.santafenewmexican.com/news/local_news/new-mexico-ag-seeks-more-funds-for-rio-grande-water/article_f8708146-1487-53ff-a6f2-ffc10448843f.html

ACKNOWLEDGEMENTS

David Brown
Southern Region Climate Services Director
NOAA National Centers for Environmental
Information (NCEI)

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

Hennessy Miller
Graduate Research Assistant
University of Arizona

Blanca E. Irigoyen/Brisia E. Espinosa
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)

Héctor Robles
Wildfire
Mexico National Meteorological Services
(SMN)

Aideé Saucedo Davila
National Institute of Ecology and Climate
Change
(INECC)