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Title:	**Northern New Mexico Climate, Water Year 2012 at Los Alamos National Laboratory, Poster, Individual Permit for Storm Water, NPDES Permit No. NM0030759**
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Intended for:	Public
Purpose:	This poster was prepared for the June 2013 Individual Permit for Storm Water (IP) public meeting. The purpose of the meeting was to update the public on implementation of the permit as required under Part 1.I (7) of the IP (National Pollutant Discharge Elimination System Permit No. NM0030759). The poster will be available on Los Alamos National Laboratory's (LANL's) public website.

Northern New Mexico Climate

Water Year 2012 at Los Alamos National Laboratory

What is a Water Year?

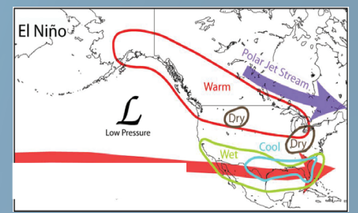
The water year begins on October 1 and ends on September 30 of the following year. As of October 1, 2011, we are in the 2012 water year. The water year is a more hydrologically sound measure of climate and hydrological activity than is the standard calendar year.

ENSO

El Niño and La Niña are weather patterns that are part of what's known as the El Niño-Southern Oscillation (ENSO). These weather patterns can deliver extensive rain and snow or cause widespread drought to the Southwest region. The origin of these weather patterns originate between the east and west Pacific Ocean where the oceanic surface air temperature and surface air pressures naturally fluctuate.

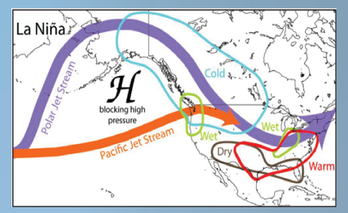
El Niño

During El Niño events the pacific jet stream is pulled south and storms form west of California. The combination of the jet stream and storms results in increased snow and rain across California and the southern United States.



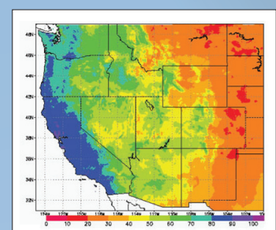
La Niña

In La Niña winters, the jetstream enters North America through the northwestern US, which brings wetter-than-average conditions to that region. As a result, storms are diverted away from the Southwest.

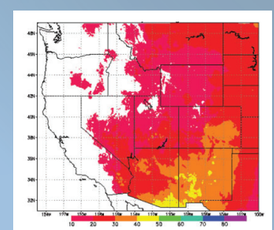


New Mexico Monsoon

New Mexico receives up to half of its annial rainfall during the summer monsoon season. Driven by the sun heating up the land and the Pacific Ocean, the warm land creates low pressure zones as hot air rises. As this pattern establishes, winds shift, and pressure differences between hot southwestern air and cool Mexican air causes the year's first monsoonal precipitation in northern Mexico in May. The moisture-laden monsoon air eventually travels north to Arizona and New Mexico.



Percent of average annual precipitation that falls between July and August



Percent of average annual precipitation that falls between October and March

New Mexico 2012 Water Year Climate Summaries

May

Warm temperatureswere set in across the Southwest as a result of high pressure systems that blocked movement of colder and moister air. As a result New Mexico continued to experience more severe drought conditions. Precipitation in parts of Southwestern New Mexico was 1-2 inches above average while westerrn New Mexico was excessively dry.

June

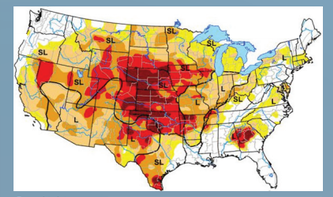
Dry conditions began in late December and intensified through June in New Mexico. The western half of New Mexico received less tthan 5 percent of the average rain in June.

July

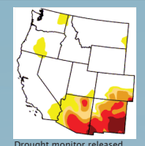
Drought conditions did not chnage much from June. About 80 percent of New Mexico was classifies with at least experiencing a severe drought.

August

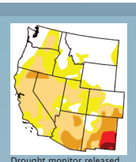
Although the monsoon precipitation brought some short-term relief from the drought, it left much of New Mexico extremely dry.



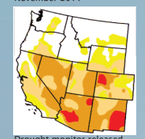
Drought data through September 18, 2012



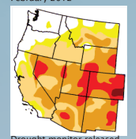
Drought monitor released November 2011



Drought monitor released February 2012



Drought monitor released May 2012



Drought monitor released August 2012

Period	Amount	20th Century Average	Departure	Rank	Wettest/Driest Since	Record Year
Jun - Sep 2012 4-month period	5.58" (141.73 mm)	7.52" (191.01 mm)	-1.94" (-49.28 mm)	14th Driest 106th Wettest	Driest since: 2011 Wettest since: 2010	Driest: 1956 Wettest: 1941
Jan - Sep 2012 9-month period	7.70" (195.58 mm)	11.06" (280.92 mm)	-3.36" (-85.34 mm)	9th Driest 110th Wettest	Driest since: 2011 Wettest since: 2010	Driest: 1956 Wettest: 1941
Oct 2011 - Sep 2012 12-month period	10.97" (278.64 mm)	13.49" (342.65 mm)	-2.52" (-64.01 mm)	23rd Driest 94th Wettest Tie: 1954	Driest since: 2011 Wettest since: 2010	Driest: 1956 Wettest: 1941
Oct 2010 - Sep 2012 24-month period	18.67" (474.22 mm)	27.01" (686.05 mm)	-8.34" (-211.83 mm)	1st Driest 116th Wettest	Driest to Date Wettest since: 2011	Driest: 2012 Wettest: 1942

The first 9 months of 2012 was the 9th driest on record for New Mexico. The last two water years were the driest consecutive years on record for New Mexico.

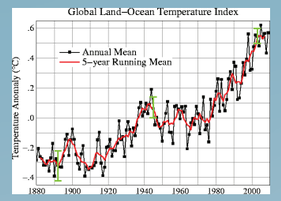
September

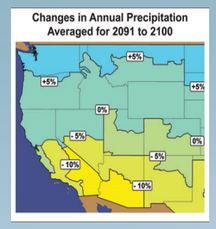
Monsoon rainfall brought some improvements to short term drought conditions, however New Mexico continued to experience severe drought, mostly due to longer-term deficits in precipitation.

Climate Change

Earth's global temperature has risen by 1.4°F and is projected to rise to 11.5°F within next 100 year as a result of increased greenhouse gases in the atmosphere. These rising global temperature have caused changes in rainfall, resulting in more floods, drought, or intense rain, as well as more frequent and severe heat waves.

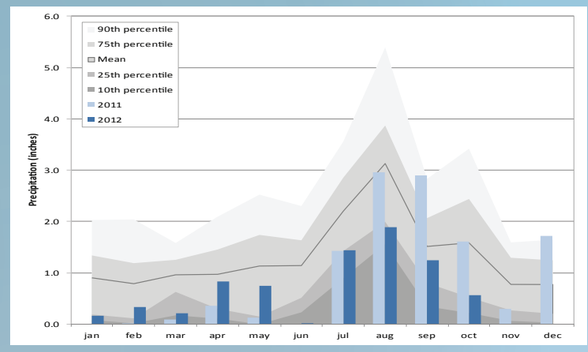
The Southwest is particularly susceptible to climate change because of its aridity. Within the region, climate change is projected to cause drier conditions and eventually lead to increased drought. In conjunction with regional drought, precipitation is projected to decrease, however, rain events may become more intense and cause more destructive flooding.





LANL 2012 Precipitation

The meteorological tower network located on Los Alamos National Laboratory property has been operational since approximately 1990 and was installed to assist with air, water and vegetation monitoring. The precipitation gauges on the meteorological towers are used to estimate the historical mean and variability, or baseline, of rainfall across the lab. Only data from 1992 to 2010 (19 years) is used to compute this baseline, as there were various problems with the equipment and data prior to 1992.



In the graph above, the mean (gray line) and 90th, 75th, 25th, and 10th percentiles (light to dark gray shaded areas) represent the historical, 19-year baseline of precipitation across the lab. As one can see, the lab receives the largest amount of precipitation from July through October, or during the monsoonal period. Also on this plot are the monthly total precipitation amounts for 2011 (light blue bars) and 2012 (dark blue bars) for comparison to the historical baseline. 2011's monsoon was much stronger than 2012's, with 2011's precipitation around the mean to 90th percentile of the historical baseline (except July) and 2012's precipitation around the 25th percentile of the historical baseline.

References:

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