**Report on 90-day Weather Projection for the Northern Half of New Mexico**

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Introduction:

This 90-day weather forecast is for the northern half of New Mexico. The forecast area is bounded by the state borders on the north, west, and east, and Interstate 40 on the south.

The report contains a summary weather outlook for May through July (directly below), a review of the current El Nino Southern Oscillation (ENSO) condition, an official El Nino, and an overview of current weather trends along with outlook maps for the next 90 days.

Since I am short on time and because we are about to enter the monsoon season, I have included an excerpt from a previous report about the monsoon pattern in the SW US.

*Summary, Ninety-day weather outlook for forecast area:*

- *The El Nino condition is waning.*
- Most models suggest either ENSO neutral or La Nina conditions developing in the second half of the year.
- Precipitation throughout the forecast area during the past four weeks has been above average, as expected. Precipitation into early summer is expected to be about normal.

*Review of Current El Nino Southern Oscillation Situation and Discussion:*

The latest historic Oceanic Nino Index, which is the official metric from which a La Nina or El Nino is declared, is now at 1.2C, substantially less that it was at peak. This is one indicator that the condition is on the wane. The question now is: what happens next?

The majority of the of the 22 international computer models used to predict El Nino events suggest that the El Nino will officially end during the summer. About half the models suggest a La Nino developing during the second half of the year. The others suggest ENSO neutral conditions (i.e., neither a La Nina nor an El Nino) to prevail through the end of the year.

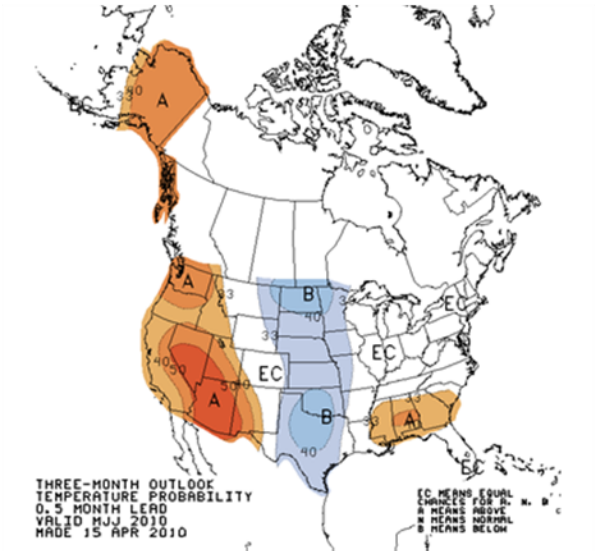
Last 30 days. Generally precipitation in the forecast area was above normal in almost all areas. There were a few central valley areas that were normal or below normal.

Next 90 days.

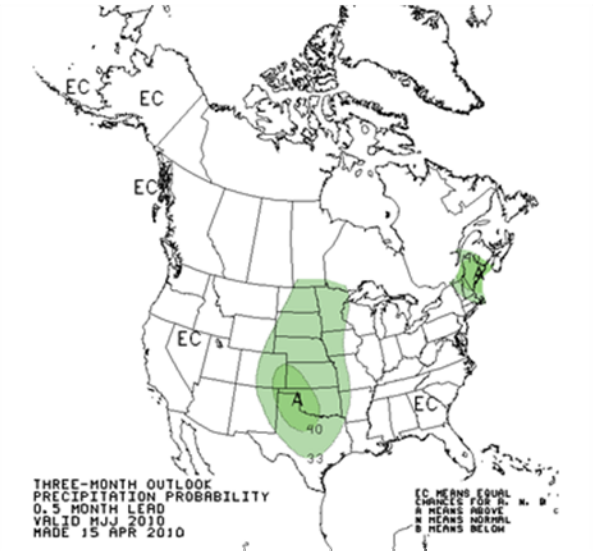
The prediction for the next 90 days can be seen below in the graphic from the National Climate Prediction Center.

# Outlook for May Through Jul 10

**Temperature**




**Precipitation**




*Excerpt from Report on July 2008*

The North American Monsoon

The North American Monsoon is the major weather-maker for the southwest corner of the US during the summer and is affected by ENSO. So far, the indications are that a normal monsoon is shaping up. The recent increase in moisture (as indicated by rising dew point temperatures[1]) and the associated spate of afternoon showers over the state in the past 10 days is seen as one of the initial markers of a normal monsoon. Generally, a monsoon is considered underway when dewpoint temperatures of 50F or more persist for days or weeks on end. Typically, this happens in most parts of the state from mid July though early September.

The North American Monsoon is fundamentally created by an influx of moister-laden air that is flowing around the large Bermuda[2] high pressure system, which is centered near the Bermuda Islands.

A high pressure system is an area of sinking air. In the northern hemisphere the air that is spreading out from the bottom of the high pressure area is forced to turn to the right by the Coriolis force. Thus, seen from a bird's eye view, it is an area of air rotating clockwise. It is opposite in the southern hemisphere. The map below shows this pattern for North America (greatly simplified for clarity).

[1] Dewpoint temperature is the temperature at which the air must be cooled in order for water vapor in the air to begin to condense into liquid water (rain). The higher the dewpoint, the less the moisture-laden air must be cooled to produce precipitation. Since air cools when it rises, a high dewpoint temperature means that less heating is needed to cause the air to rise and produce clouds. Another way to say this is that with high dewpoints, the atmosphere is less stable and more prone to produce showers.

[2] The Bermuda high is often called the Azores high when it centers itself over that area of the Atlantic during the winter.

As the air spins out of the Bermuda high and makes its way to the southwestern part of the US, it picks up moisture over the Gulf of Mexico.

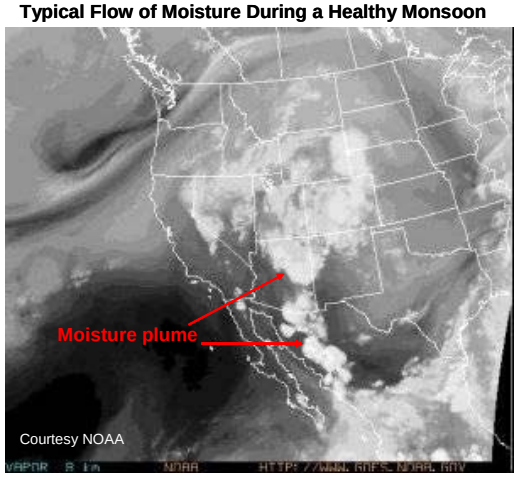
When this moist air is present over the dessert areas and the sun heats the ground, the air is heated and begins to rise. More heating caused more rising.

**Structure of *Healthy* North American Monsoon in Summer**


When air rises, it cools. If the dewpoints are high, as they are with monsoon air flows, large, billowing clouds are produced early in the day followed by thundershowers later in the day.

Once this turbulent activity begins it is self-perpetuating, even after the sun sets, due to a phenomenon called "auto-convection." When condensation occurs, as it does when clouds form, latent heat is released,[3] engendering more rising air.

**Typical Flow of Moisture During a Healthy Monsoon**




The satellite photo at right shows the clouds that typically form under the plume of moisture that is flowing out of the Bermuda high and into the southwest corner of the US.

For technical completeness, it is noted that some of monsoon moisture for the SW US can originate from the Gulf of California and the eastern pacific. But most of the monsoon flow comes from the Bermuda high.

Unfortunately, there are systems that can stymie the monsoon-induced thunderstorm activity over the Southwest US. This is called a blocking high or ridge.

This blocking high is an area of sinking air and centers itself over the dessert regions, as shown in the map below. Typically, this blocking high is in the upper atmosphere, the area needed for cooling the rapidly rising columns of moisture laden air from the surface. When these rising—and cooling—columns of air meet the sinking, and warming air aloft, the condensation process is stymied, clouds are inhibited, and little precipitation occurs. Thus, although very moist air can be

**Structure of *Stymied* North American Monsoon in Summer**


[3] Latent heat is consumed during the opposite event—evaporation. That is why it feels cool to the skin when water is drying.

present at the surface, having been transported there by the monsoon flow, little precipitation will result. This situation occurred a few years ago and created dry conditionsin the forecast area.

A La Nina condition is thought to influence the creation of the blocking high that stymies the convective activity.

The graphic at right shows the average date of the onset of the North American monsoon in the region from Central America to the forecast area.


Follow-up reports:

The next report is scheduled for early summer, as time permits.