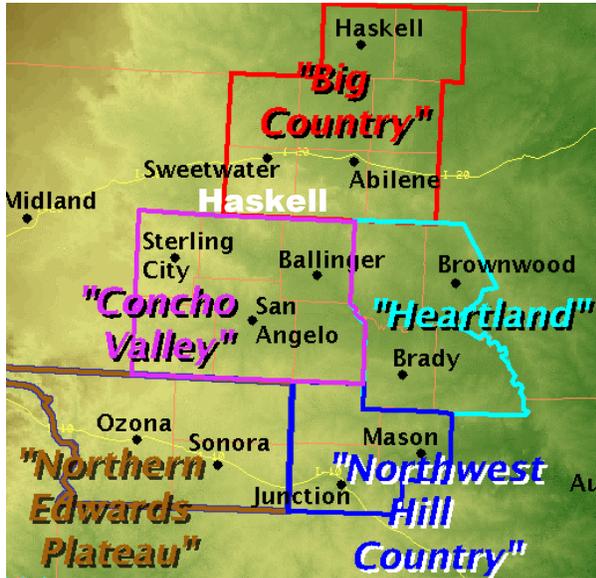


Winter 2012-2013 Outlook

Recent Weather Trends and Drought Status in West Central Texas



The background map to the left shows the geographic regions of West Central Texas which are referenced in this outlook.

The widespread, heavy rainfall event in the last week of September helped to replenish soil moisture, and resulted in some increase of water in area reservoirs. Since that rainfall event, however, conditions have been much drier across West Central Texas during October and November. Rainfall has been well-below normal across nearly the entire region. The rainfall coverage has been scattered and limited to a few events.

The U.S. Drought Monitor as of November 20th, issued through the National Drought Mitigation Center, shows severe to extreme drought affecting parts of the Big Country north and northwest of Abilene. Within this area, exceptional drought conditions exist across northern Jones, northeast Fisher, and southwest Haskell Counties. Severe to extreme drought conditions encompass portions of the Northern Edwards Plateau and Northwest Hill Country. Moderate drought is affecting much of the rest of West Central Texas. The Drought Monitor takes into account short-term meteorological parameters, agricultural aspects, and the hydrological components (water levels in lakes and rivers) of the drought.

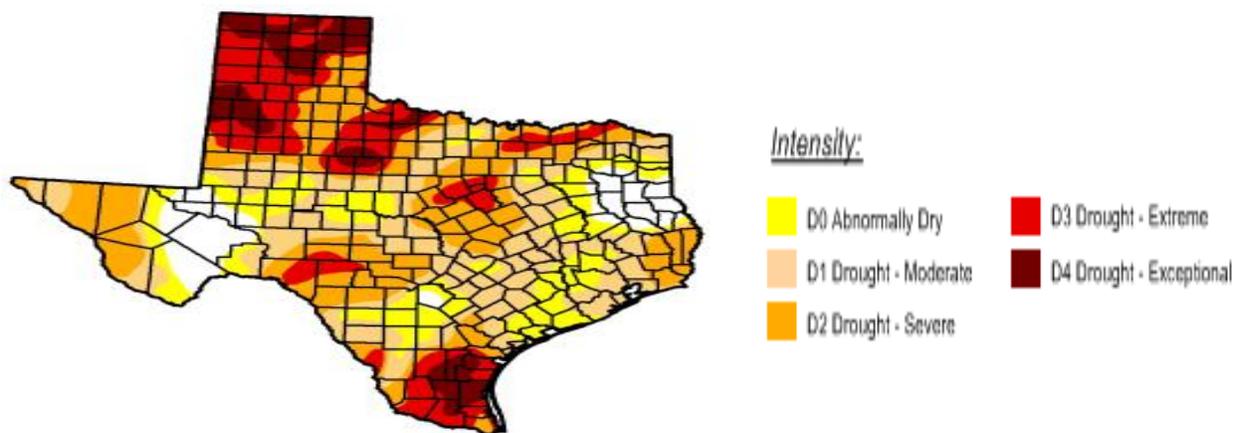


Figure 1: U.S. Drought Monitor for Texas (November 20th). Courtesy of USDA, National Drought Mitigation Center, Dept. of Commerce and NOAA.

Current ENSO Status

In the equatorial Pacific Ocean, the warming trend which occurred last summer has stopped, and El Niño conditions are no longer expected to develop this winter. The current El Niño Southern Oscillation (ENSO) status reflects Neutral conditions or near average sea surface temperatures. The Climate Prediction Center indicates that ENSO Neutral conditions are likely to continue through the winter season.

Climate Outlook for December 2012 - February 2013

The 30-day temperature outlook for December (not shown), from the Climate Prediction Center (CPC or www.cpc.ncep.noaa.gov), indicates slightly enhanced probability for temperatures to average above normal across West Central Texas.

The CPC 90-day temperature outlook for December through February shows enhanced probability for temperatures to average above normal across our area (Figure 2).

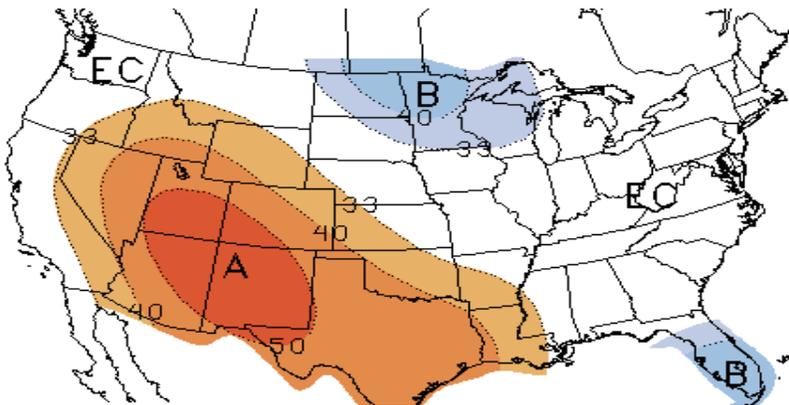


Figure 2: Climate Prediction Center 90 Day Outlook for Temperature for December-February.

The CPC 30-day precipitation outlook for December (not shown), indicates equal chances for precipitation to be below, near, or above normal across West Central Texas. The CPC 90-day precipitation outlook for December-February also shows equal chances for precipitation to be below, near, or above normal across our area (Figure 3).

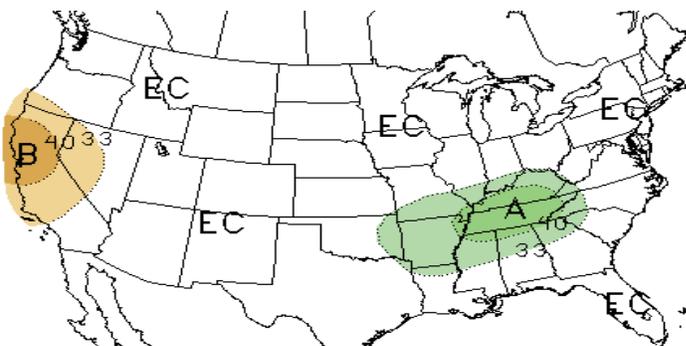


Figure 3: Climate Prediction Center 90 Day Outlook for Precipitation for December-February (www.cpc.ncep.noaa.gov).

When ENSO Neutral conditions are occurring, the climate outlooks incorporate trends of temperature across our region related to decadal variability. The trend compares the most recent 10-year average of temperature, to the 30-year climatology period (1981-2010), for given locations.

Local Study

Given the complexity of the climate system, when ENSO Neutral conditions prevail, there is much less of a climate signal in what kinds of patterns will develop and influence the global weather in the Northern Hemisphere winter season. In light of this, we conducted a local study, to investigate whether there may be an association with winter season precipitation and temperature, and the Neutral events. In our study, we examined temperature and precipitation records dating back to 1950, for Abilene, Rotan, San Angelo, and Brady. These stations were chosen because of their geographical location across the agricultural growing region of West Central Texas. In addition, the climate data record is more complete at these stations.

The winter seasons classified by the Climate Prediction Center as ENSO Neutral include the following: 1950-60, 1960-61, 1961-62, 1962-63, 1966-67, 1967-68, 1978-79, 1979-80, 1980-81, 1981-82, 1985-86, 1989-90, 1990-91, 1992-93, 1993-94, 1996-97, 2001-02, 2003-04, 2008-09.

Our study compared the average winter temperature and precipitation for ENSO Neutral conditions to normal averages (based on the latest 30-year period of 1981-2010), for Abilene, Rotan, San Angelo, and Brady. The results of this study are shown in Tables 1 and 2. The ENSO Neutral average winter season temperature was slightly below normal for Abilene, Brady and San Angelo, and slightly above normal for Rotan (Table 1). The ENSO Neutral average winter season precipitation was slightly below normal, for all four stations (Table 2).

City	ENSO Neutral Average Winter Season Temperature	Normal (1981-2010) Average Winter Season Temperature
Abilene	46	46.3
Rotan	46.2	45.8
San Angelo	47.2	47.8
Brady	47	48.1

Table 1: Comparative Winter Season Average Temperatures

City	ENSO Neutral Average Winter Season Precipitation	Normal (1981-2010) Average Winter Season Precipitation
Abilene	3.34	3.61
Rotan	2.92	3.35
San Angelo	2.79	3.13
Brady	4.15	4.53

Table 2: Comparative Winter Season Average Precipitation

Although the ENSO Neutral departures from normal winter season precipitation were relatively small (less than one half inch), we found that the precipitation varied considerably among the individual ENSO Neutral winter seasons. This variability can be seen in Figures 11-14. This variability implies that the higher and lower amounts, for each station, are averaging within one half inch of normal.

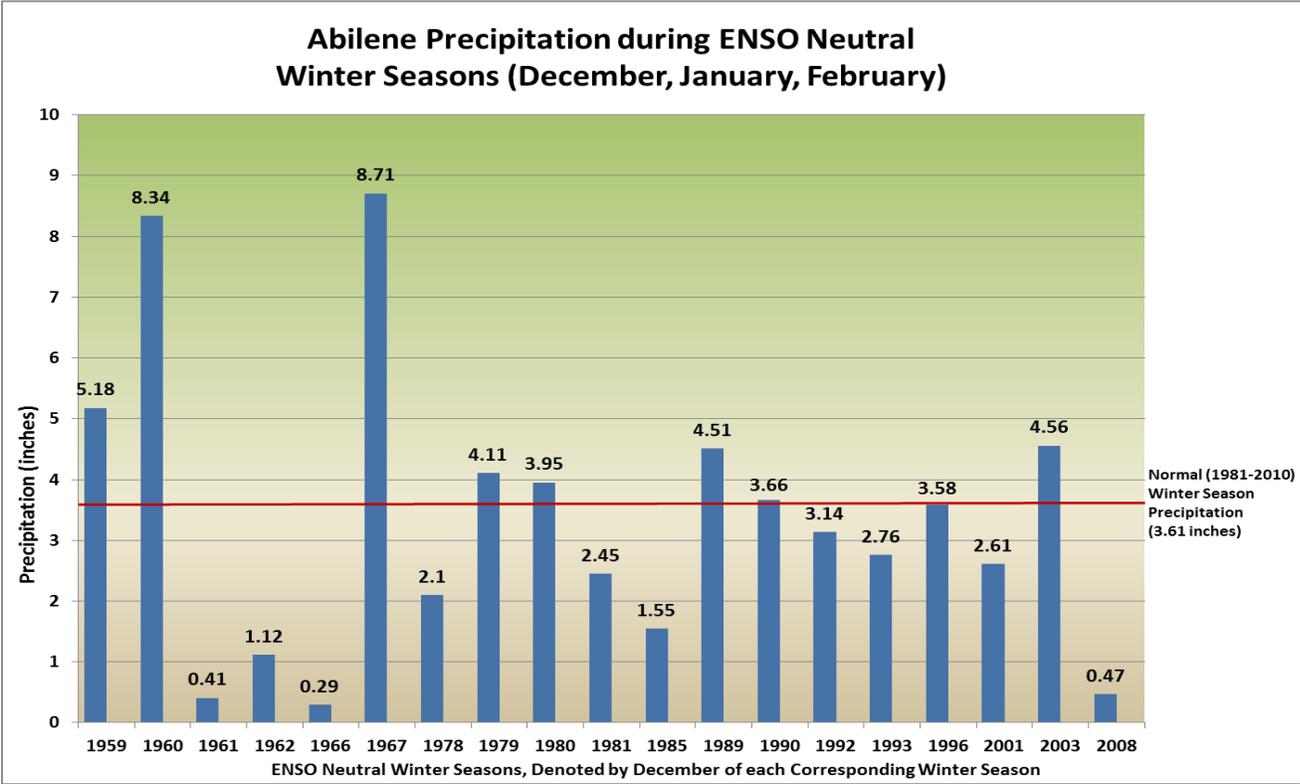


Figure 11. Abilene Precipitation for ENSO Neutral Winter Seasons.

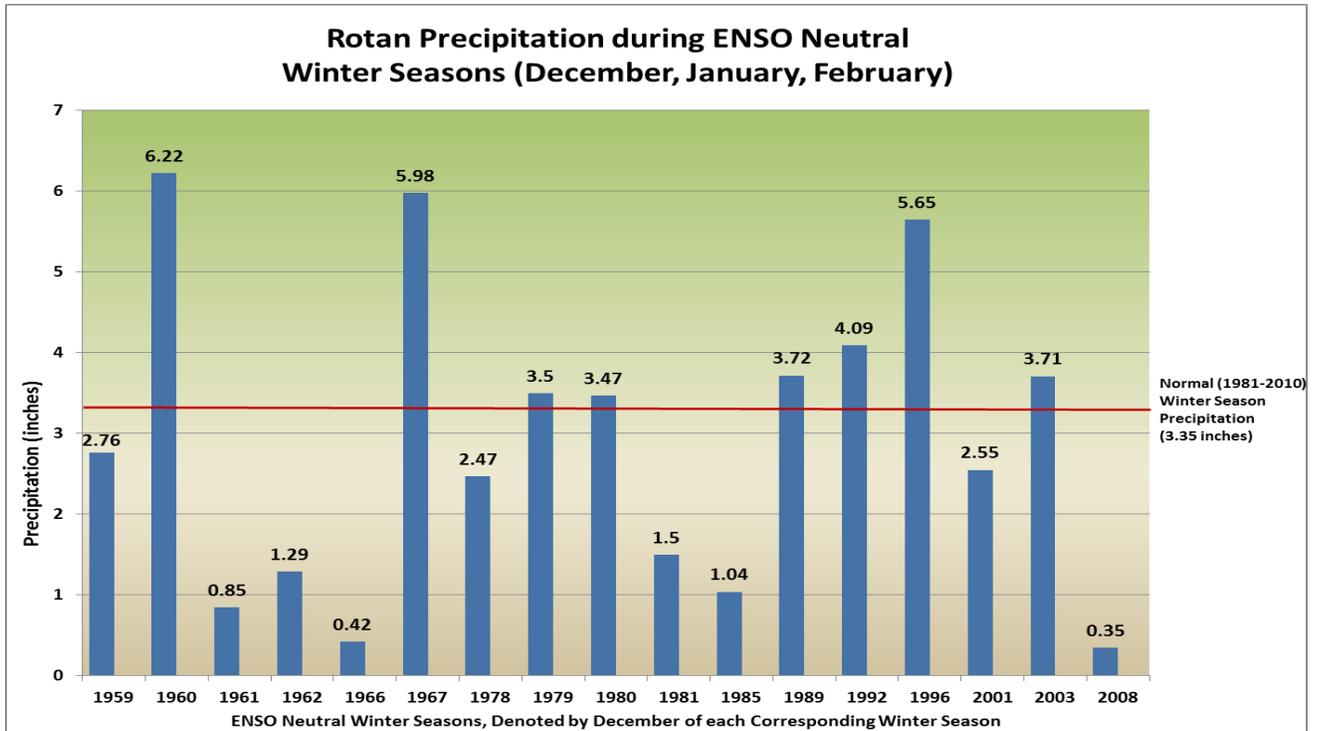


Figure 12. Rotan Precipitation for ENSO Neutral Winter Seasons | Winter Seasons.

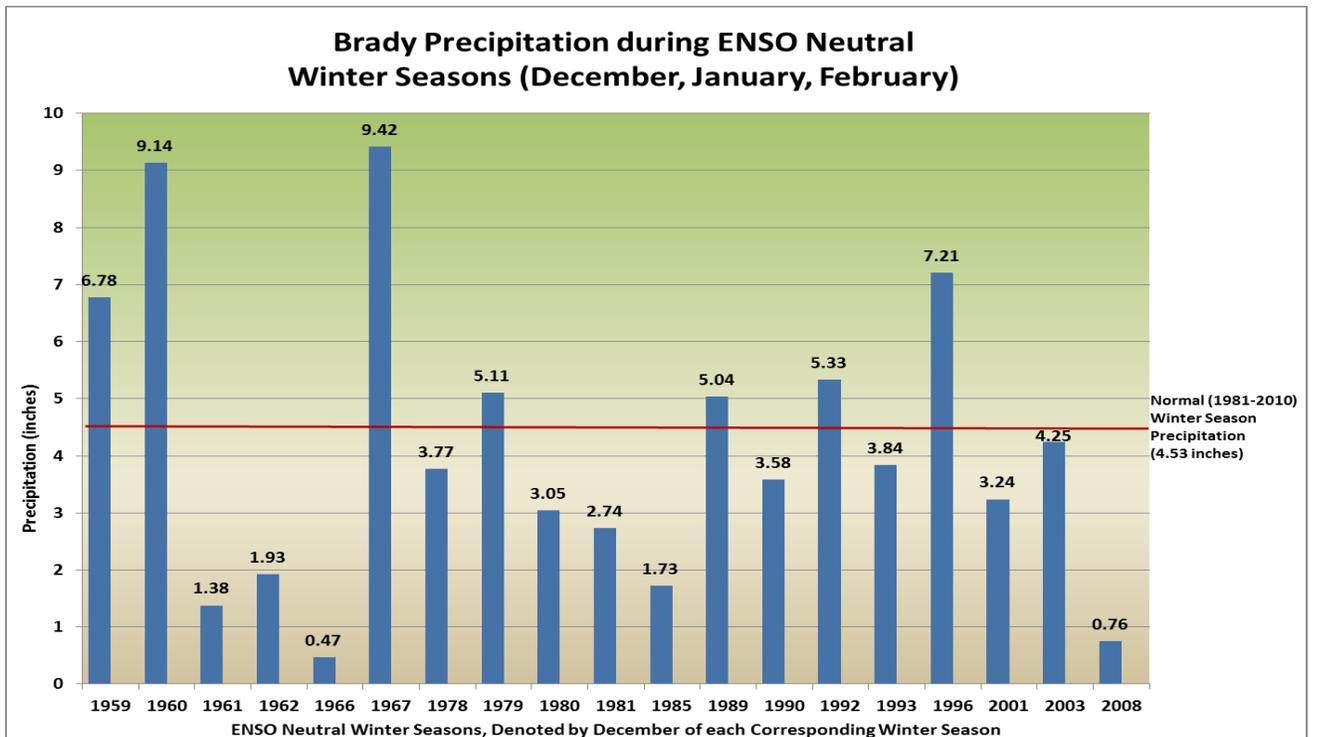


Figure 13. Brady Precipitation for ENSO Neutral Winter Seasons.

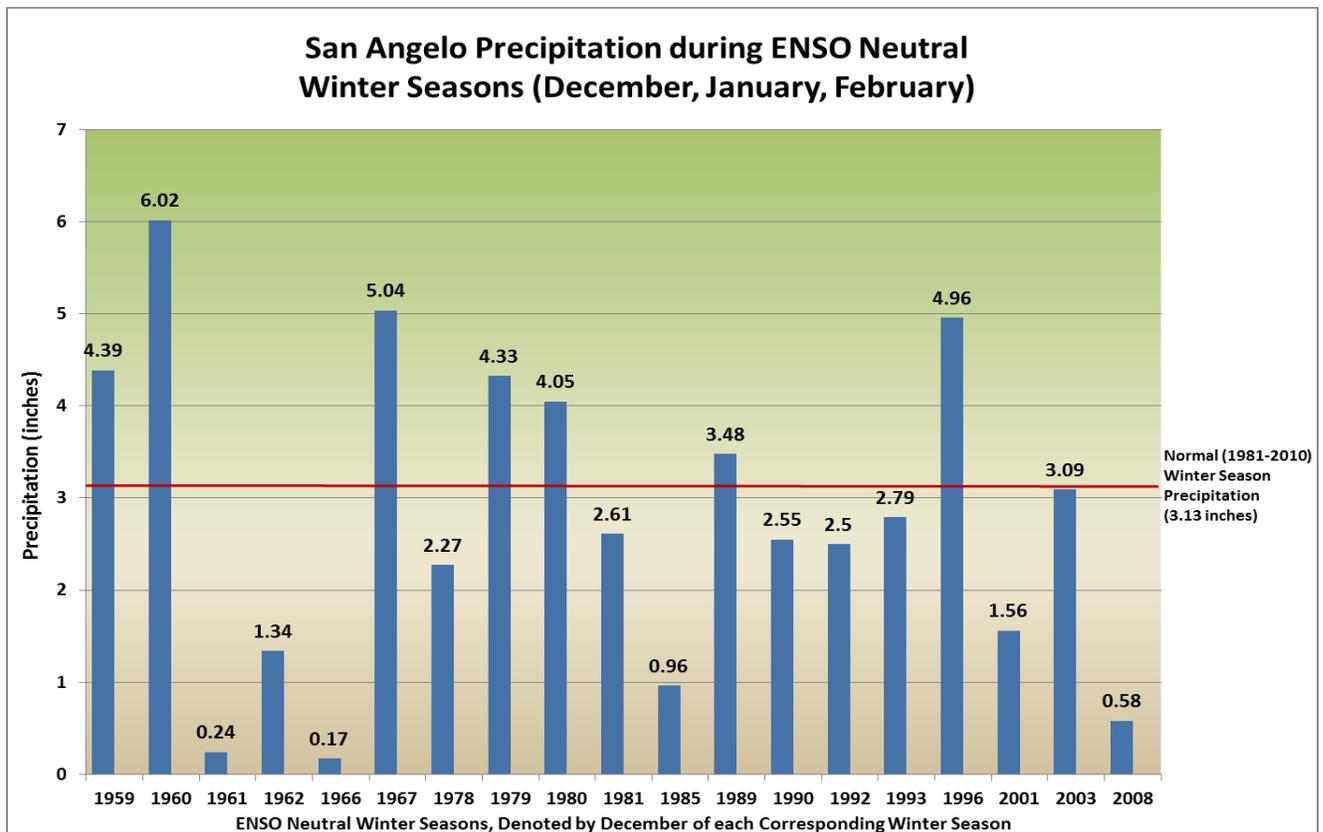


Figure 14. San Angelo Precipitation for ENSO Neutral Winter Seasons.

Minimum Temperatures in Winter Seasons (Neutral Years)

Upon further examination of the temperature data, we noticed that some of the coldest low temperatures occurred during winter seasons with ENSO Neutral conditions. To explore this further, a local study was conducted, to examine comparative winter season minimum temperatures between ENSO Neutral and non-ENSO Neutral conditions. In the local study, we examined the frequency of occurrence of daily low temperatures 15 degrees F or colder. This study was conducted for Abilene, San Angelo, Rotan, and Brady. The results of this study are shown in Table 3 and Figure 15.

Table 3 shows a comparison of the average number of winter season days with minimum temperatures 15 degrees F or colder, for ENSO Neutral vs. non-ENSO Neutral conditions at Abilene, Rotan, San Angelo and Brady. For all four locations, the average number of days with these minimum temperatures is slightly higher for ENSO Neutral winter seasons.

From Figure 15, a higher percentage of winter seasons, with 5 or more occurrences of minimum temperatures 15 degrees F or colder, is during ENSO Neutral conditions at 3 of the 4 locations (Abilene, San Angelo, and Rotan).

City	ENSO Neutral Winter Seasons	Non-ENSO Neutral Winter Seasons
Abilene	3.5	2.8
Rotan	4.3	3.5
San Angelo	2.5	1.8
Brady	2.6	1.8

Table 3: Average Number of days with Minimum Temperature 15 degrees Fahrenheit or Colder, for ENSO Neutral vs. ENSO Non-Neutral Winter Seasons.

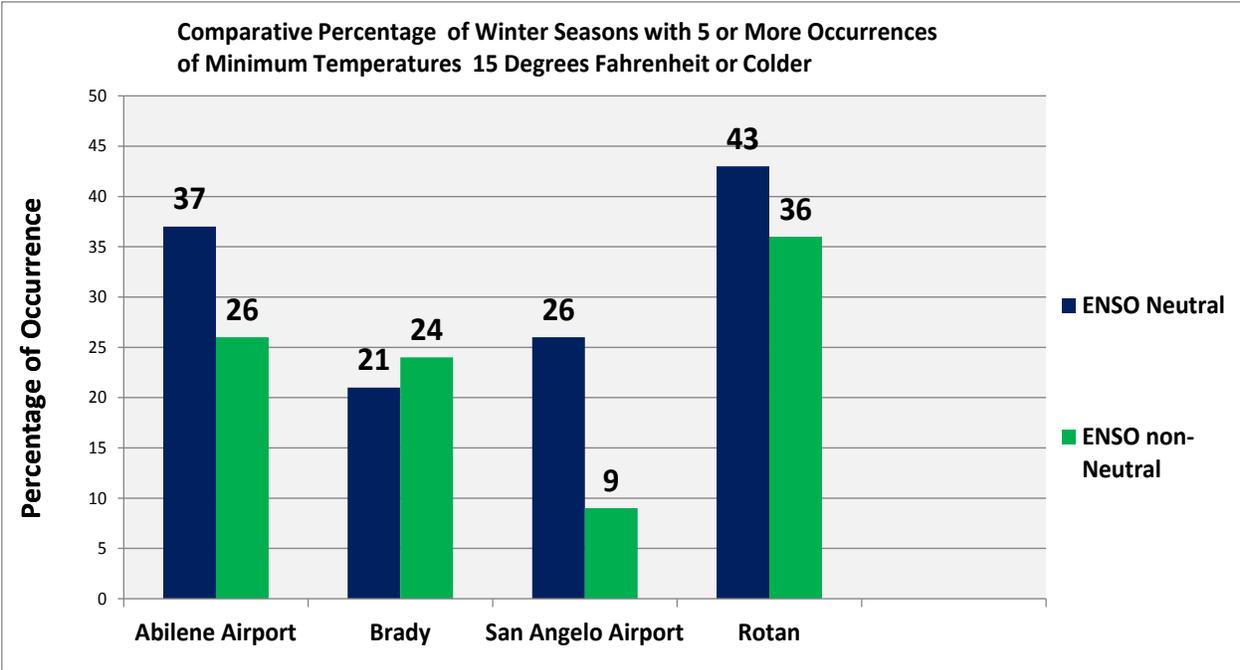


Figure 15: Comparative Percentage of Winter Seasons with 5 or more occurrences of Minimum Temperatures 15 degrees Fahrenheit or Colder.