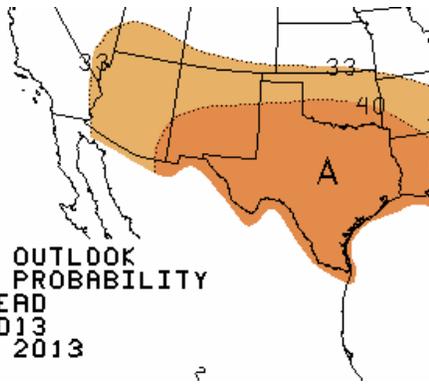


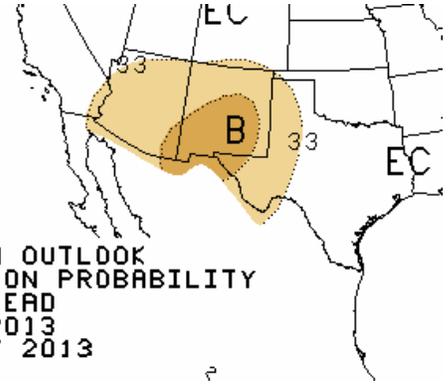
Winter 2014 (Dec. – Feb.) Outlook



THREE-MONTH OUTLOOK
TEMPERATURE PROBABILITY
0.5 MONTH LEAD
VALID DJF 2013
MADE 21 NOV 2013



THREE-MONTH OUTLOOK
PRECIPITATION PROBABILITY
0.5 MONTH LEAD
VALID DJF 2013
MADE 21 NOV 2013



(Still) Return of the Warm and Dry?

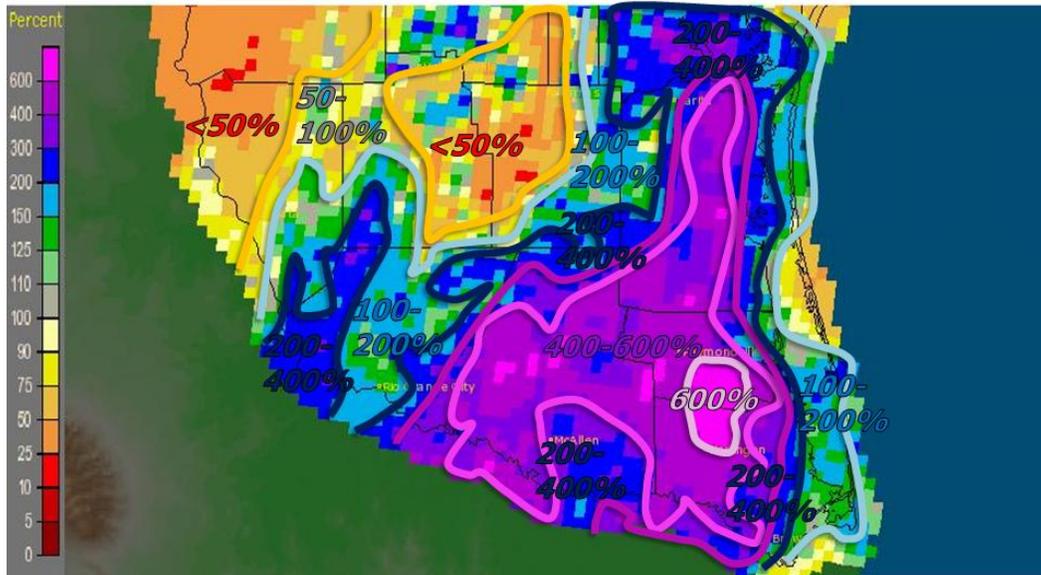
Neutral El Niño/Southern Oscillation Could Favor RGV Drought Resurgence

Two energetic frontal systems at the beginning and toward the end of November 2013 walloped the Lower Valley with up to six times the monthly average rainfall (below, through November 24). The second front brought modified arctic air for the fourth weekend of the month and locked up a below average monthly temperature; several days more than 15°F under the daily normal closed the month and erased a 1 to 2°F above normal trend through the 21st. Was November’s forecast “bust” a trend toward a cold and wet winter?

Not necessarily.

**Percentage of Average Rainfall
November 1-24, 2013**

Brownsville, TX (BR0): Current Month to Date Percent of Normal Precipitation
Valid at 11/24/2013 1200 UTC- Created 11/24/13 21:46 UTC

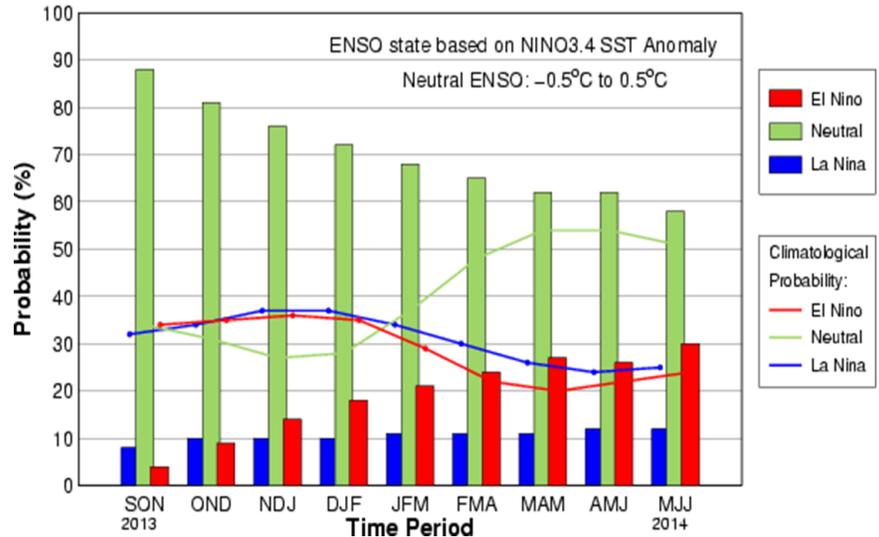


Average November rainfall ranges from 1/2 to 1 inch across the upper Rio Grande Valley (western three counties, above); 1 to 1 1/2 inches elsewhere except 1 1/2 to 2 inches across the lower right corner of the map (southeast Cameron County). More than 7 inches had fallen in Harlingen; average monthly rainfall is 1.41 inches.

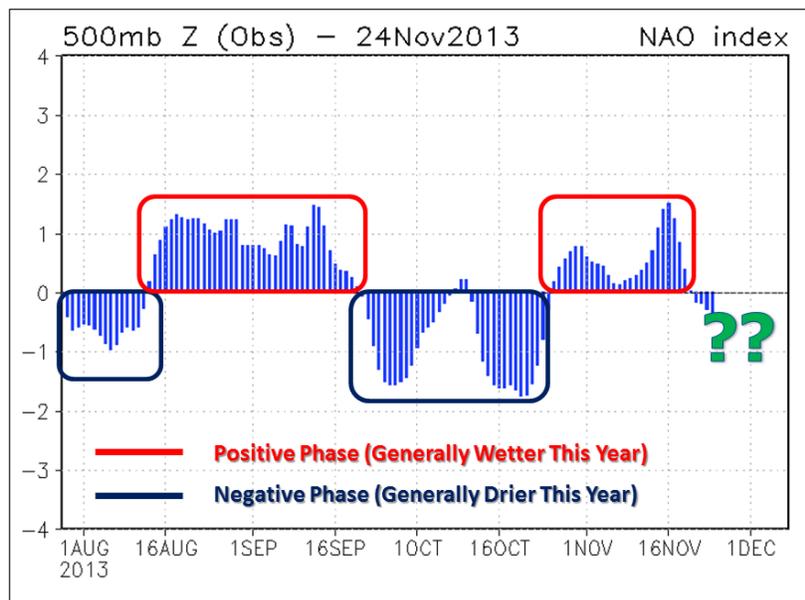
Despite the welcome drought-eliminating rainfall in parts of Hidalgo, Willacy, and Cameron County, the winter of 2013/2014 is expected to continue the trend of the past three years: lower than average rainfall during one of the climatologically driest parts of the year, and above average temperatures. Uncertainty, however, is a little higher than for previous winters based on the following reasons (among others):

- **El Niño/Southern Oscillation (ENSO) Parked in Neutral** (right). ENSO-Neutral generally correlates toward a [warm](#) and potentially [dry](#) winter based on data collected since 1950. However, there are some indications that a “lean” toward El Niño could develop later in the winter and early next spring.
- **Recent Trend of the North Atlantic Oscillation (NAO)** The correlation between persistent negative-phase NAO (or its relative, the Arctic Oscillation) favors dry weather across south Texas during winter, with a lean toward warmer weather. Since summer, the NAO has proved fickle and living up to its “Oscillation” (back and forth) name. Nearly equal periods of positive and negative phase NAO prevailed; future forecasts of the NAO/AO are generally accurate out to a couple of weeks – not a couple of months.
- **Persistent Negative Phase of the Pacific Decadal Oscillation (PDO).** [The PDO](#), in a negative (positive) phase, can [enhance the climate signal of La Niña \(El Niño\)](#). Should ENSO end up “leaning” negative, or toward La Niña, through early 2014, confidence in the December 2013-February 2014 period for dry, warm weather overall will increase. Otherwise, impact of the PDO, particularly on dry weather, is uncertain.

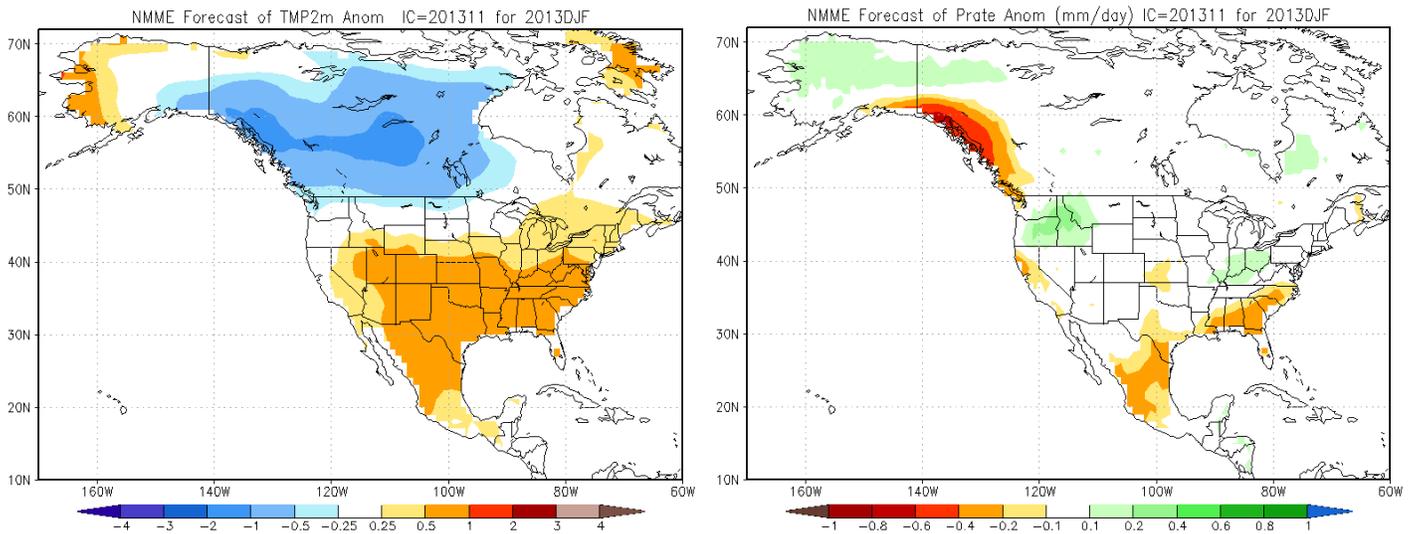
Early–Oct CPC/IRI Consensus Probabilistic ENSO Forecast



The combination of these three factors, and a similar trend on the [National Multi-Model \(Climate\) Ensemble Model \(NMME\)](#), offers increased confidence for the warm and potentially dry forecast (next page).



August – November North Atlantic Oscillation Index. Note: drier and wetter trends do not necessarily match perfectly with positive/negative phases, as a lag often occurs before the onset of short term pattern change.



NMME forecast of eye-level temperature departure from average (left, in °C), and precipitation departure from average (right, in mm/day), for December 2013 to February 2014. The model forecasts temperature to be up to 1°C (~2.5°F) above average in Texas, with daily precipitation between 0.1 and 0.4 mm (0.005 to 0.02 inch) below average in most of Texas.

A Freeze in the Future?

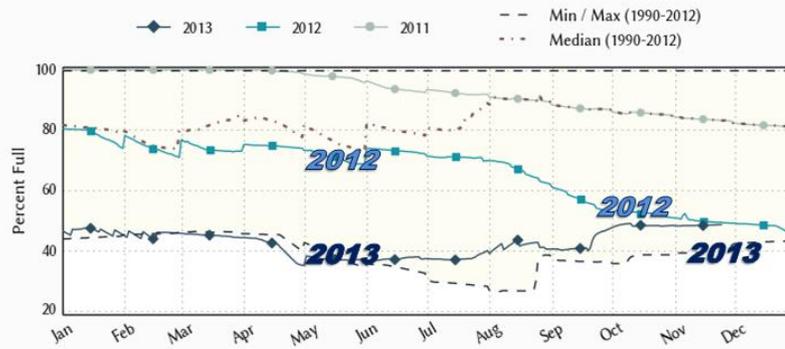
There were no widespread freezes (temperatures $\leq 32^{\circ}\text{F}$ for 2 or more hours) across the ranchlands or the Valley between December 2013 and February 2014. This is more the exception than the rule; in general, Valley populated areas see 3 of 5 winters with at least one freeze, and rural farm/ranch areas see a freeze 8 or 9 out of every 10 years. Statistically speaking, we'd be "due" for at least one minor freeze in 2013/2014, though there are no guarantees. The early arrival of modified arctic air that plunged temperatures into the 40s for three days in a row (November 23-25) at many locations in the Valley does not necessarily portend a freeze between December 1 and February 15. Still, preparing for at least one frosty event is always prudent. We'll keep an eye on trends in the NAO/AO and the oft-associated [Pacific North American \(PNA\) teleconnection](#); should a moderate to strong negative phase NAO/AO combine with a positive phase PNA, the likelihood of a significant freeze, or period of freezing temperatures, increases dramatically. Stay tuned.

Water Recovery...to a Point

September's rains in South Texas and the Rio Grande Valley, and early October's rainfall in South and Central Texas, improved or removed drought from many areas by mid-October. The heaviest rainfall in late September and early October bypassed the Rio Grande Valley, but November's rebound, particularly the 3 to 7+ inches in the Lower Valley and 2 to 4+ inches in the mid Valley, combined with persistent low clouds and cool to cold temperatures for several days allowed the water to soak into soil. This eliminated severe or greater drought for most of the Lower Valley and parts of the mid Valley. The rains were much less across the Rio Grande Plains and upstream locations along the Rio Grande with no additional reservoir relief (below). The dry forecast for December to February, should it come to pass, will begin to degrade drought conditions in many of these areas, and could eventually erase some of the gains to soil moisture levels especially if weather after fronts is very dry and breezy.

By the end of November 2013, reservoir levels (Texas share) at Amistad recovered to nearly the levels in November 2012, six months after being nearly half this amount when concern peaked for a potential widespread water emergency across the Valley and the South Texas ranch country. Falcon Dam (Texas share) levels in November 2013 were a shade above the levels in November 2012 (next page). Though a dire water crisis was averted for spring 2014, available water for spring 2014 planting ***may still be similar or less than in 2013***, especially if soil moisture turns dry by the end of January.

Amistad Reservoir is 48.6% full as of 2013-11-24



	Date	Percent Full	Water Level (ft)	Height Above Conservation Pool (ft)	Reservoir Storage (acre-ft)	Conservation Storage (acre-ft)	Conservation Capacity (acre-ft)	Surface Area (acres)
Today	2013-11-24	48.6	1,080.33	-36.67	1,460,724	895,072	1,840,849	36,151
Yesterday	2013-11-23	48.6	1,080.33	-36.67	1,460,595	894,992	1,840,849	36,148
2 days ago	2013-11-22	48.6	1,080.34	-36.66	1,461,031	895,260	1,840,849	36,158
1 week ago	2013-11-17	48.4	1,080.15	-36.85	1,454,322	891,149	1,840,849	36,017
1 month ago	2013-10-24	48.3	1,079.63	-37.37	1,435,745	890,047	1,840,849	35,624
3 months ago	2013-08-24	42.7	1,069.61	-47.39	1,121,027	786,038	1,840,849	28,657
6 months ago	2013-05-24	36.9	1,056.11	-60.89	793,461	679,411	1,840,849	20,796
1 year ago	2012-11-24	49.4	1,083.03	-33.97	1,559,689	908,808	1,840,849	38,210

* Percent Full is based on Conservation Storage and Conservation Capacity.

Texas share of water levels at Amistad Reservoir at the end of November 2013. Note how the gap closed during autumn 2013, courtesy of heavy rainfall from a number of tropical and upper level systems affecting Texas in September and October. Storage values "Today" (Nov. 24, 2013) nearly doubled those from May 2013.

Falcon Reservoir is 33.9% full as of 2013-11-24



	Date	Percent Full	Water Level (ft)	Height Above Conservation Pool (ft)	Reservoir Storage (acre-ft)	Conservation Storage (acre-ft)	Conservation Capacity (acre-ft)	Surface Area (acres)
Today	2013-11-24	33.9	273.85	-27.25	935,065	525,793	1,551,007	43,224
Yesterday	2013-11-23	34.0	273.89	-27.21	936,732	526,730	1,551,007	43,270
2 days ago	2013-11-22	33.9	273.83	-27.27	934,345	525,388	1,551,007	43,205
1 week ago	2013-11-17	33.5	273.60	-27.50	924,249	519,710	1,551,007	42,927
1 month ago	2013-10-24	34.9	273.21	-27.89	907,048	540,631	1,551,007	42,454
3 months ago	2013-08-24	20.1	261.23	-39.87	484,527	312,254	1,551,007	28,841
6 months ago	2013-05-24	26.8	262.51	-38.59	522,346	414,910	1,551,007	30,278
1 year ago	2012-11-24	31.3	266.52	-34.58	652,794	485,293	1,551,007	34,758

* Percent Full is based on Conservation Storage and Conservation Capacity.

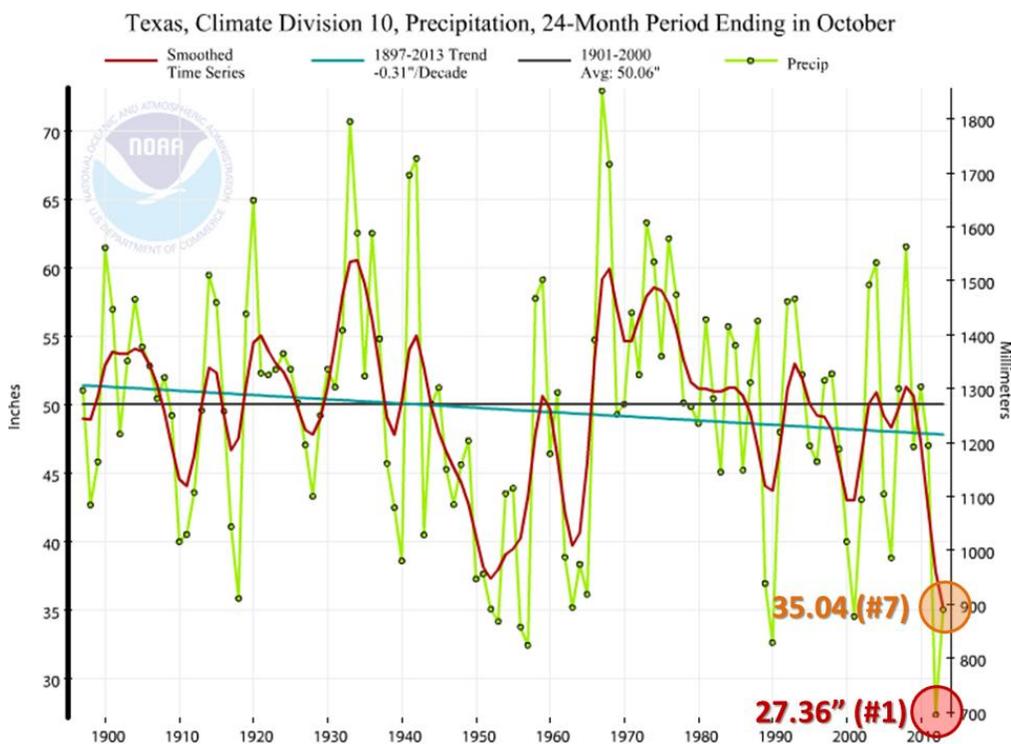
Texas share of water levels at Amistad Reservoir at the end of November 2013. Note how the gap closed during autumn 2013, courtesy of heavy rainfall from a number of tropical and upper level systems affecting Texas in September and October. Storage values "Today" (Nov. 24, 2013) nearly doubled those from May 2013.

Drought, Still Standing?

The Valley was thankful for the [September 2013 soaking](#). However, reservoir recovery *only* to levels seen prior to the winter of 2012/2013, when a number of communities invoked mandatory conservation and some neared or reached crisis point. Another way to look at where we are, and how far we have to go, is indicated on the chart below. Shown is the [24-month precipitation accumulation](#) across Cameron, Hidalgo, and Willacy County, for the period ending in October dating back to 1897. The dearth of October 2013 rains was not enough to push the ranking back upward; the all-time driest (November 2010-October 2012) was followed by a 7th place finish for November 2011-October 2013. Similar to the October to September trends referenced in the [November 2013-January 2014 outlook](#), the smoothed trend remained at an *all-time low*, besting the prior record 2-year period of the early 1950s. The 24-month rainfall between November 1951-October 1953 now ranks #2; the 24-month rainfall between November 1952 and October 1954 ranks #4; combined, these two back-to-back years were 33.93 inches below the 1897 to 2013 average; the most recent back-to-back 24 month samples totaled 37.72 inches below the average.

The November 2013 rainfall average for the Lower Valley, at 400 to 600% of normal (top of this report), should make a dent into the 24-month ranking from December 2011 to November 2013, once the data are processed.

Future impact from prolonged drought will depend on whether the rest of the decade sees higher rainfall, equal rainfall, or lower rainfall than the 1950s. Climate models suggest that the 2010s may be similar to the 1950s at best, which would ensure a greater impact on a community with a population that will be four times greater in the 2010s than in the 1950s, as well as a billion dollar farming and livestock industry. Continue to monitor drought information for the Rio Grande Valley and Deep South Texas [here](#).



Wildfire Season 2013/2014: Problems Ahead?

In October 2010, the spigot literally turned off after [a record to near record water year](#) (October – September) ended at the end of September that year. Abundant fine and coarse fuel turned from lush green to tinder in only two months, and large grass and brush fires burned more than 10,000 acres from the King Ranch to other ranches in the Brush Country. Warm to hot, breezy, and dry weather brought extreme to exceptional drought to

nearly all of Texas by June, and one of the largest wildfires in recent [memory burned over 30,000 acres in northwest Brooks County](#).

So far, so good in autumn 2013; November's early and late rains reduced the rapid fire spread threat due to increased fuel moisture. Such rainfall could be a double edged sword, as the rains will provide some additional growth to fuels than was previously seen at the end of September. How December fares will go a long way to determining how critical the wildfire spread threat might be later this winter. A quick return to mild, dry, breezy to windy fronts would allow for rapid drying through December; should December's fronts be a mix of dry, windy with cold, brisk, and damp fronts, fuels should remain moist enough to preclude rapid spread of any fire starts.

Now is the time for ranchers, farmers, and others to consider the potential for abundant cured fuels to burn later this winter:

- Trim or cut grass and overgrown brush now, before curing begins.
- When fronts pass through windy and very dry, be sure to keep tractors and welding/grinding equipment away from tall grass or brush. Continue this practice a day or two after the front, as fires have started and spread rapidly two days after a front when winds are less but humidity is very low
- Be sure to park on dirt or paved surfaces. Hot undercarriages can spark a fire that can destroy a vehicle before spreading rapidly
- Be [firewise](#)! Remember, the best wildfire is the one that never starts. [Only you can prevent wildfires](#); now is a good time to review safe practices.