Item 5: Spring and Summer Weather Outlook

Chris Coleman
ERCOT Meteorologist

Board of Directors Meeting
ERCOT Public
March 19, 2013

Role of the ERCOT Meteorologist

ERCOT Meteorologist Primary Duties:

Forecasts

- Temperature input for hourly load forecasts.
- Long-range temperature forecasts (next season, current year, and next year) for ERCOT's long-range planning.
- Verify accuracy compared to vendor forecasts and computer models.

Communications

- Daily meeting with system operators to provide weather forecast for the upcoming week.
- Produce 10-day weather outlook to distribute via email and on ercot.com.

Weather Consulting/Other

- Drought monitoring and forecast updates.
- Tropical weather monitoring and forecast updates.
- Extreme weather updates.
- Geomagnetic disturbance alerts.

Looking Ahead

- Provide real-time weather support to system operators.
- Renewable energy (solar, wind) support.
- Hydrological analysis and forecast (i.e. reservoir levels).

Long-Range Weather Forecasting

Process of Building a Long-Range Weather Forecast:

Basic Approach

- Work from large scale down to smaller scale.
- Pattern matching.

Oceanic Cycles

- Sea surface temperature patterns.
- El Nino-Southern Oscillation, Atlantic Multidecadal Oscillation, Pacific Decadal Oscillation, Arctic Oscillation, etc.

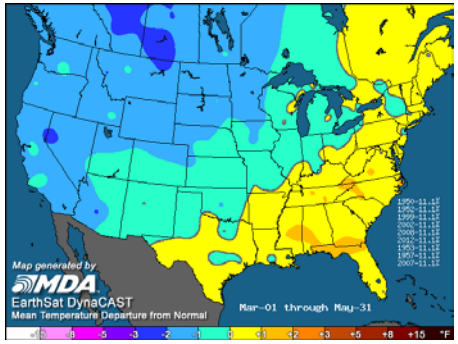
Recent Temperature and Precipitation Patterns

- Pattern match historical anomaly patterns.
- Recognize the effects of soil moisture on temperature.

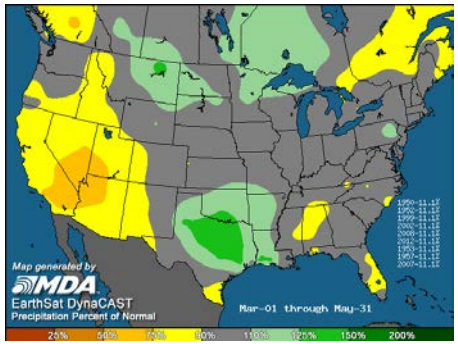
Other

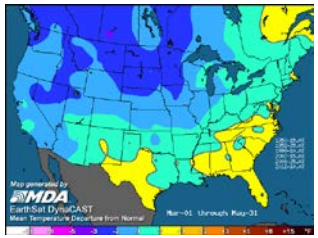
- 200 millibar pattern (upper level flow).
- Solar cycles.

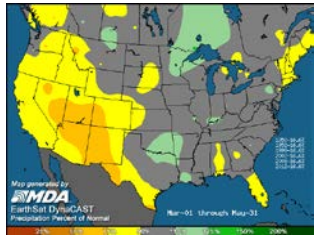
Long-Range Weather Forecasting

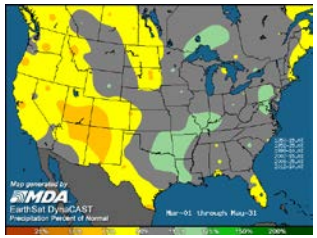


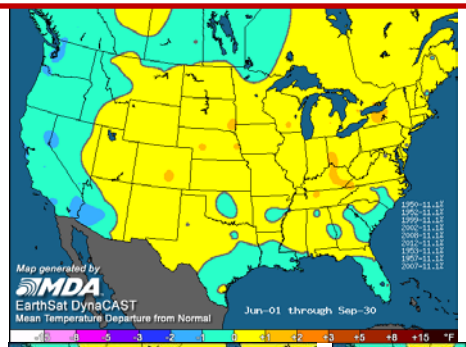
Spring



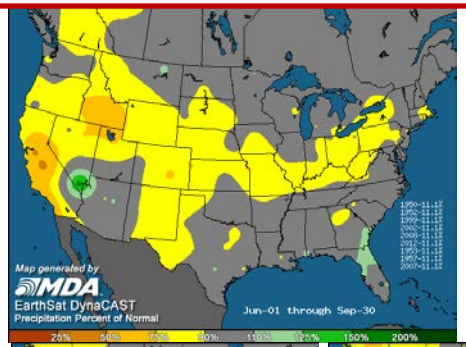


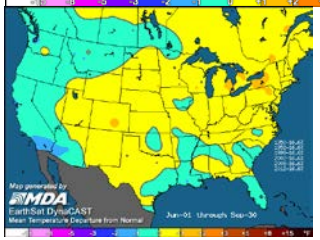


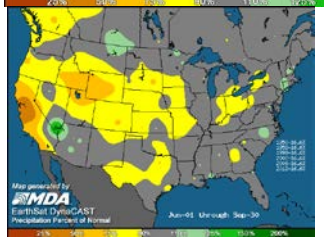


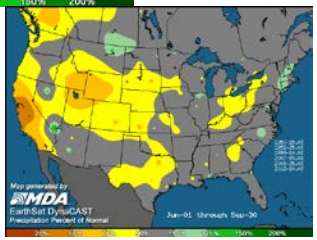


Summer









The following factors and analog years were the best predictors of this past winter; and may serve well moving forward.

PDO/AMO/ ENSO/200mb

A: 1952, 2008
B: 1950, 2002
C: 1999, 2011, 2012
D: 1953, 1957, 2007

Spring 2013 Weather Outlook

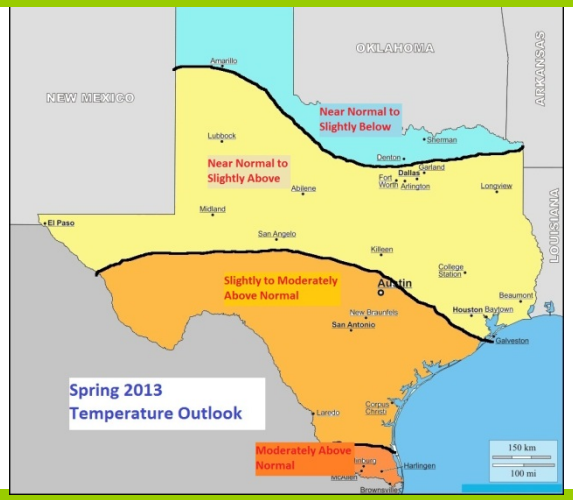
Temperature Outlook

- Best opportunity for slightly cooler than normal temperatures this spring will be found over northern Texas; best opportunity for warmer than normal temperatures will be over southern portions of the state.
- 1952, 1953, 2002 were the primary historical years selected. 1956, 1957, 1999, 2007, and 2011 were secondary.
- While the forecast is calling for the majority of Texas to experience normal to above normal temperatures for the season as a whole, there will likely be some cooler opportunities minimizing the potential for prolonged periods of extreme heat mid-to-late spring.
- March and April present below normal temperature opportunities mostly confined to North Texas. May historical matches show a stronger potential for the below normal temperatures to be more widespread over the state.

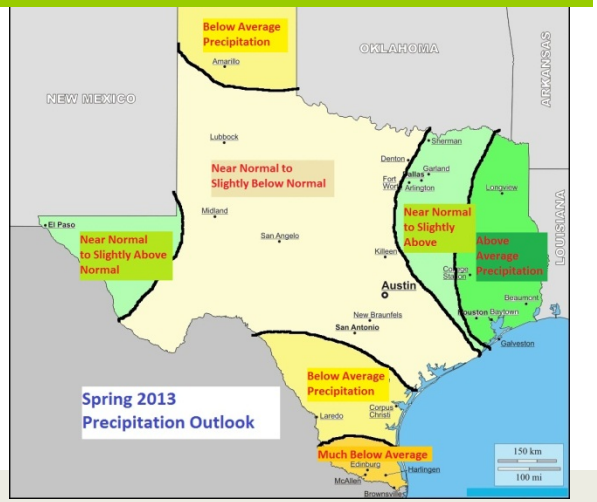
Precipitation Outlook

- Best opportunity for wetter than normal precipitation this spring will be found over northeastern Texas; best opportunity for drier than normal precipitation will be over southern portions of the state.
- There is a wetter potential (compared to the current forecast) across North Central Texas. The risk drier is over southern and western regions in the state.
- April provides more opportunity for widespread rainfall. May shows a tendency to confine the best precipitation chances to the East.

Spring 2013
Temperature Outlook



Spring 2013
Precipitation Outlook



Preliminary Summer 2013 Weather Outlook

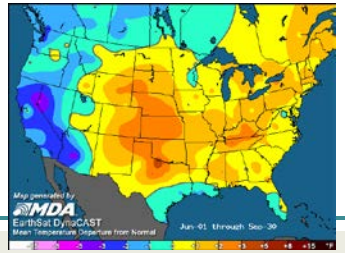
Temperature Outlook

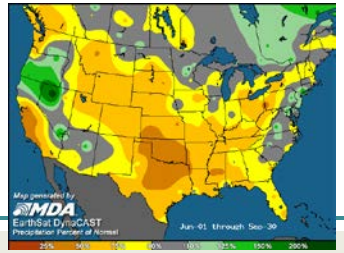
- The maps on the right are composites of 1950, **1952**, 1999, 2002, 2008, and 2012.
- Northern and western sections of Texas have the greatest likelihood of above normal temperatures.
- The Coast, South Central, and Southern regions show a slightly cooler than normal look; however, ongoing drought conditions in the Central and South support a warmer pattern. Houston has more opportunity for a milder summer.

Precipitation Outlook

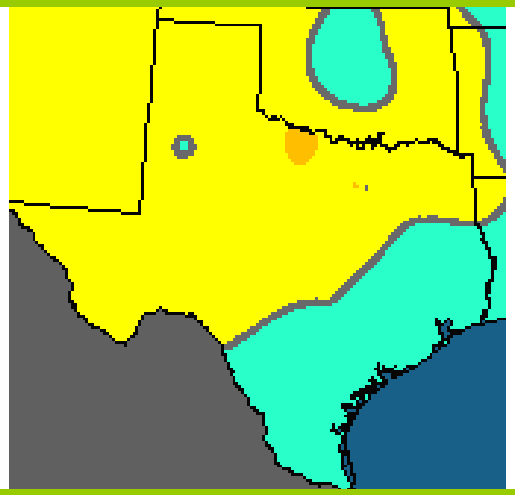
- This map is absent any clearly above normal regions, though the historical years of reference do allow for some wetter periods (especially South) mid-summer. The preferred historical match, 1952, was drier than normal throughout Texas.
- This outlook would support continued drought concerns for most of ERCOT.

1952:

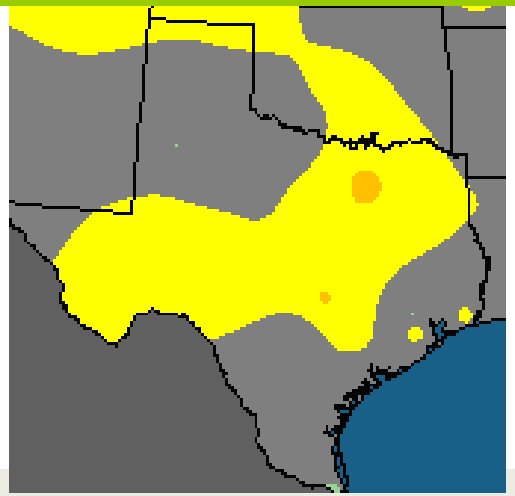




Summer 2013 (Jun-Sep)
Temperature Outlook



Summer 2013 (Jun-Sep)
Precipitation Outlook



Texas Drought Conditions

U.S. Drought Monitor

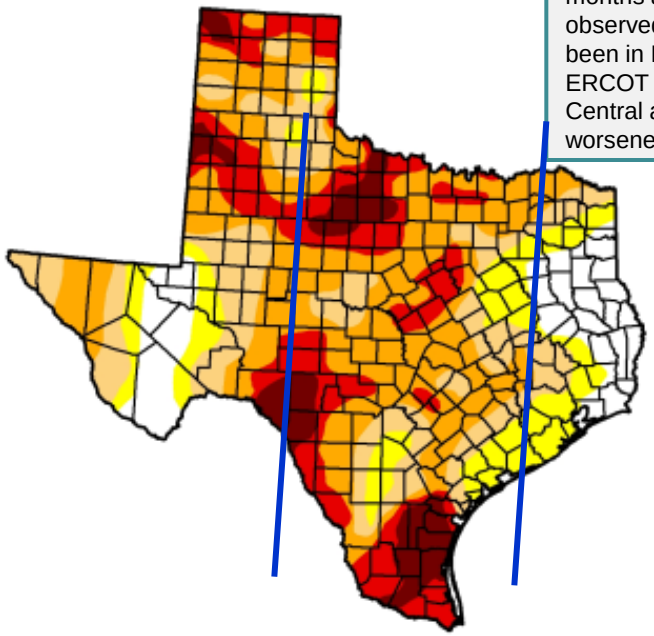
Texas

March 5, 2013
Valid 7 a.m. EST

Overall drought conditions have generally improved compared to one year ago. However, compared to six months ago, a mix of trends have been observed. Most improvements have been in East, Far West, and the non-ERCOT portion of the Panhandle. Central and South regions have mostly worsened.

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	11.15	88.85	76.29	55.62	23.86	7.41
Last Week (02/26/2013 map)	11.29	88.71	75.11	49.85	22.02	5.17
3 Months Ago (12/04/2012 map)	6.16	93.84	82.20	59.27	27.40	8.45
Start of Calendar Year (01/01/2013 map)	3.04	96.96	87.00	65.39	35.03	11.96
Start of Water Year (09/25/2012 map)	9.13	90.87	78.73	57.41	24.91	5.18
One Year Ago (02/28/2012 map)	6.05	93.95	85.21	67.48	38.68	14.75



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

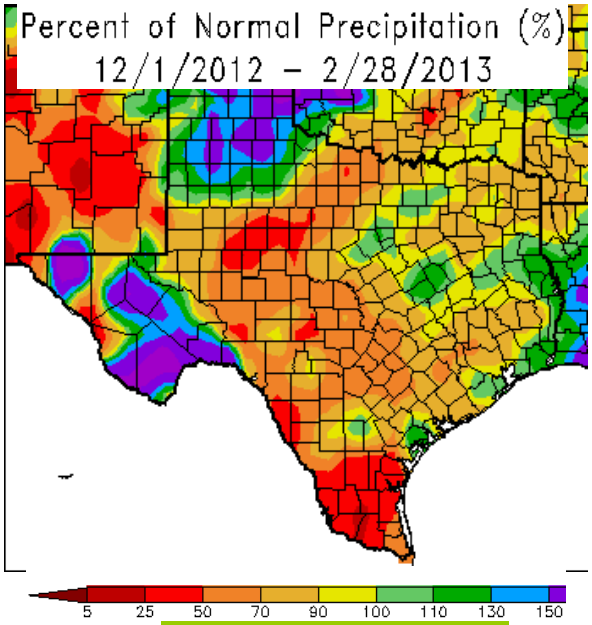
http://droughtmonitor.unl.edu

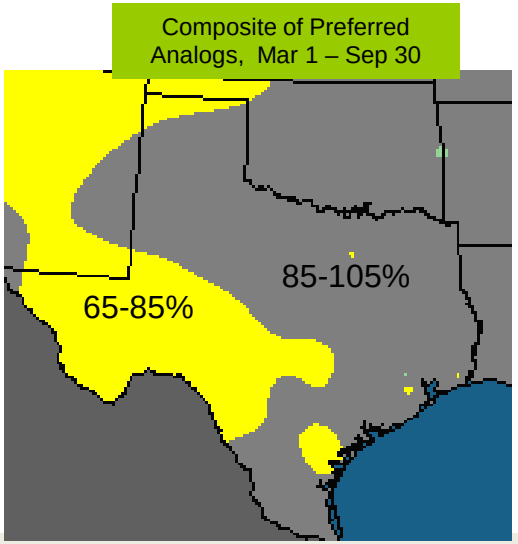
Released Thursday, March 7, 2013
Matthew Rosencrans, NOAA/NWS/NCEP/Climate Prediction Center

Drought Outlook

Drought Outlook

- Winter precipitation showed a very dry pattern for most of Texas. Early-January was the lone exception for a widespread, wet period.
- The spring and summer precipitation forecasts continue to lean dry for most of Texas.
- Summer shows a greater likelihood of dry weather for most of the state than does spring.
- A wet spring is possible for portions of the state; East Texas with the best chance.
- A wet spring does not necessarily suggest an end to the drought, nor indicate a wet summer. The top two analogs from the 1950s both featured a normal to wet spring over portions of Texas (especially East). But even with the wet spring, summer was widespread below normal precipitation for all of the state (in a period of long-term drought).
- The analog composite map (below, right) would more likely trend drier than wetter as some of the historical matches were not experiencing drought conditions to influence future weather.
- Based on the ERCOT forecast, the Coast and East regions have the best potential for minimal to no drought concerns over the next few months. The West, Far West, South Central, and South regions are most likely to experience worsening conditions.





Conclusions

Spring and Summer Weather and Drought

- An overall hot and dry (warmer than normal, drier than normal) scenario is forecast over the next six months, in particular the summer season.
- A repeat of 2011 is unlikely.
- More likely to be similar to 2010 (13th hottest on record, 1895-current, for the state of Texas). However, if spring trends hotter and especially drier than forecast, 2010 could be topped (hotter and drier).
- Drought concerns will continue for most of the ERCOT region through the summer months. West, South Central, and South regions signal a tendency toward the greatest concerns for worsening conditions.