Recent Weather, Soil Moisture, Snowpack and Drought Conditions In Colorado, An Update on ENSO, And the Latest Climate and Drought Outlooks

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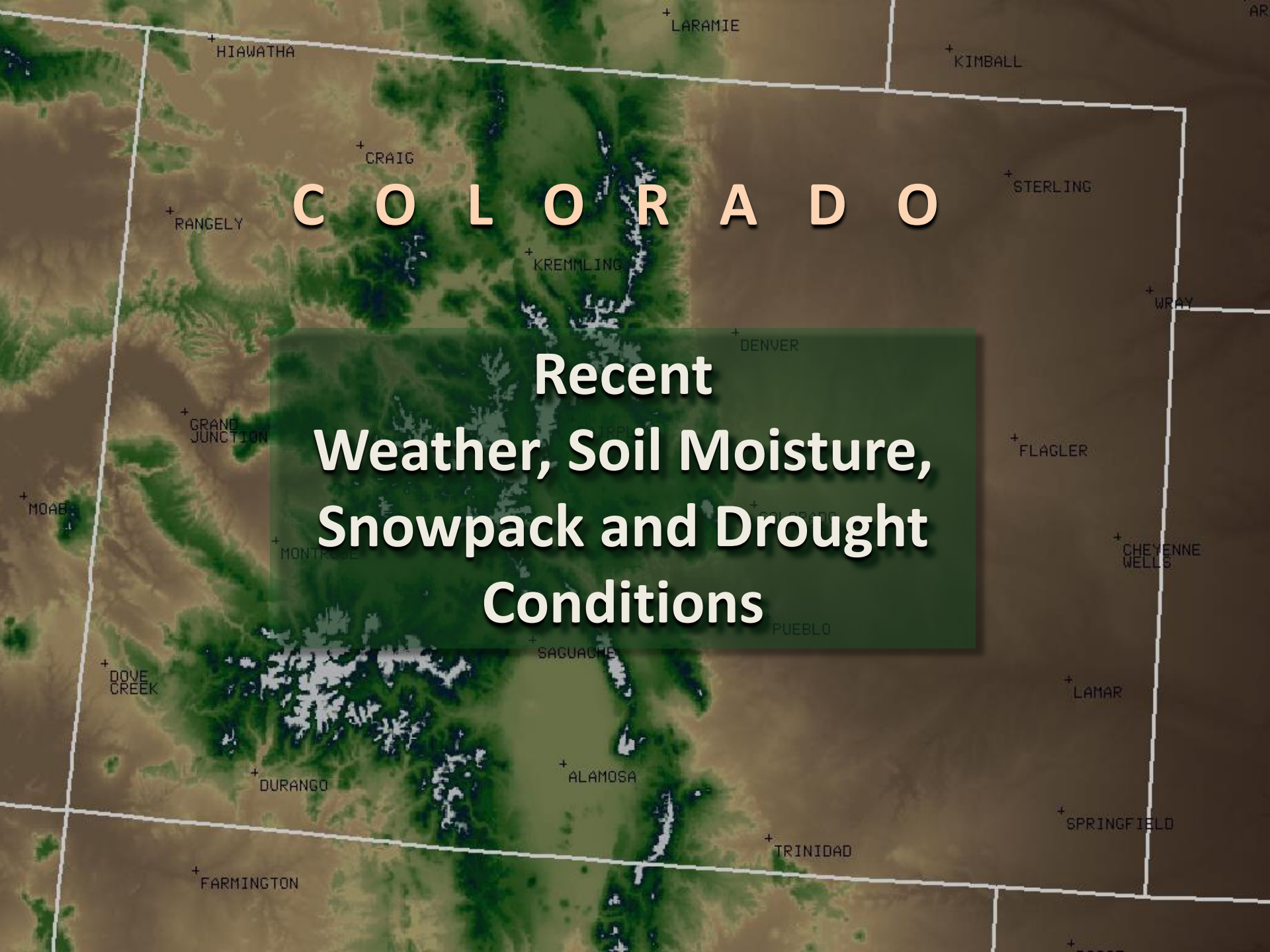
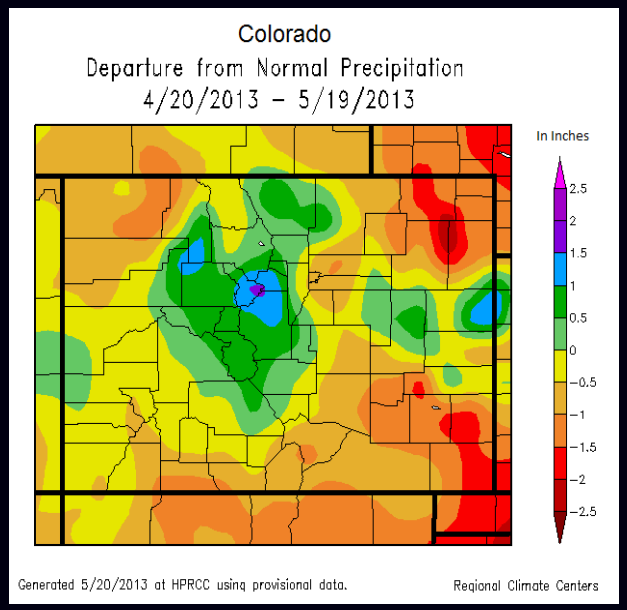
May 20, 2013

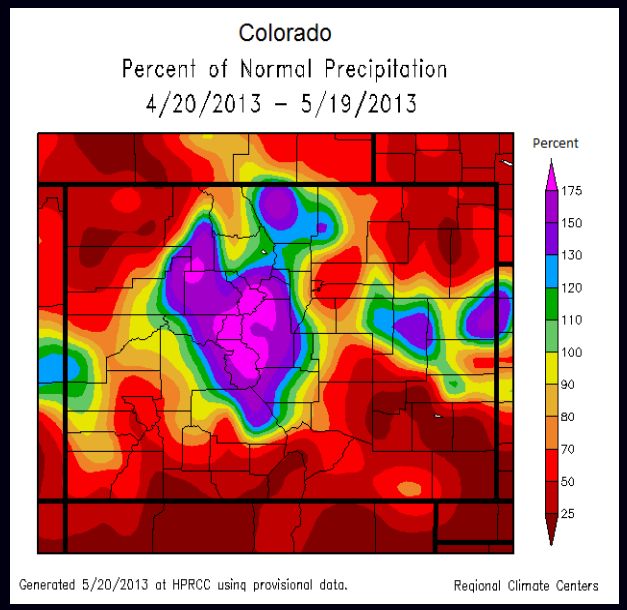
C O L O R A D O

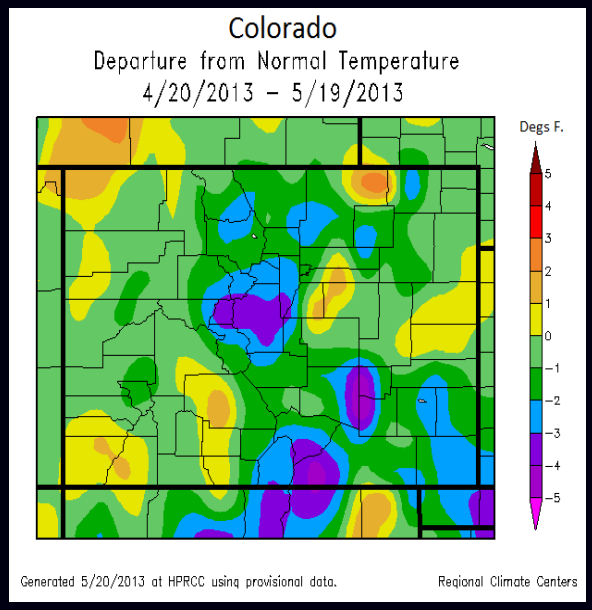
Recent Weather, Soil Moisture, Snowpack and Drought Conditions



Recent Precipitation and Temperature In Colorado



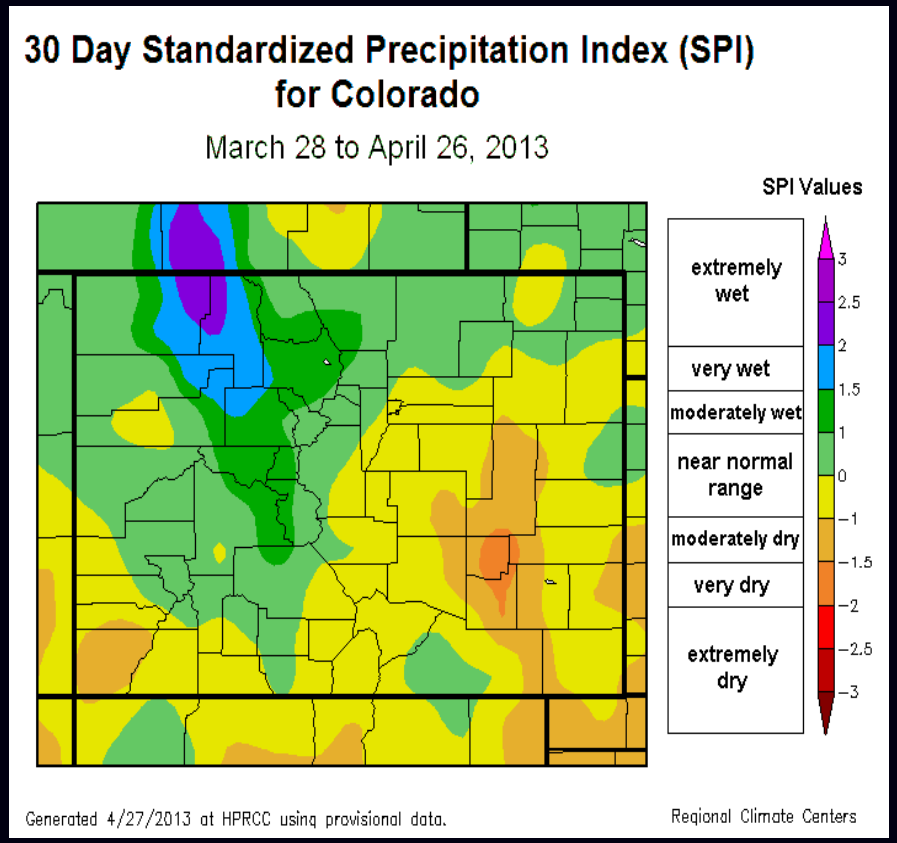


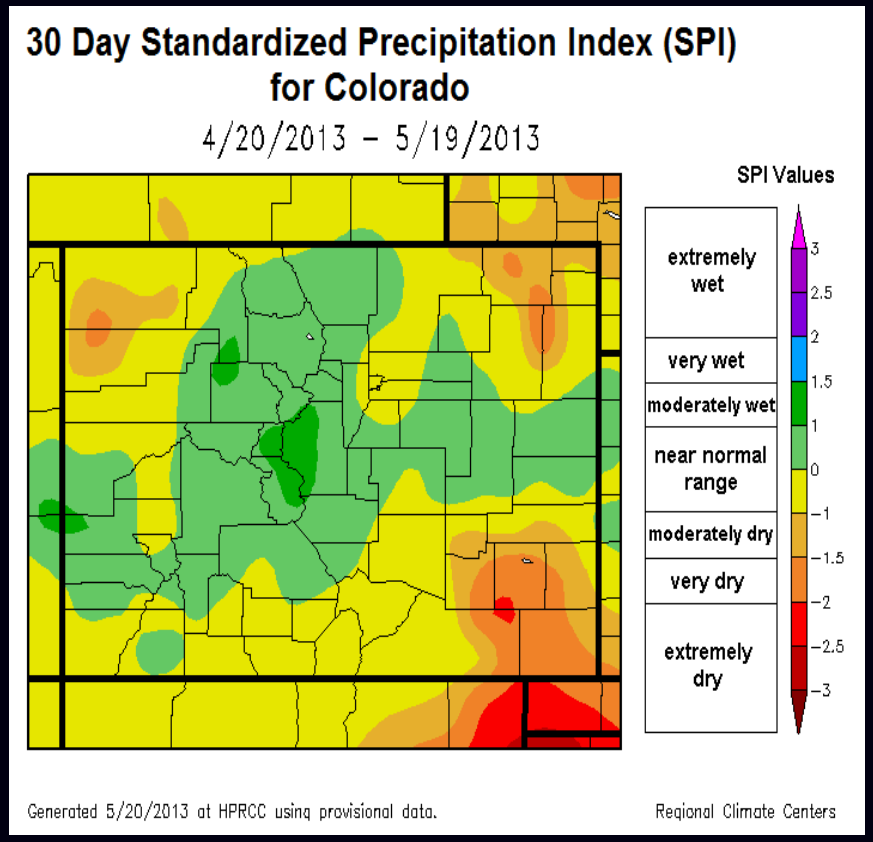


North central and east central Colorado saw near to above average precipitation in recent weeks, while much of the rest of the state recorded amounts below to well below average.

During the same 30 day period ending May 19th, Colorado generally experienced below average temperatures. This was even true in southeast Colorado where there was a significant lack of precipitation during the period.

Standardized Precipitation Index Across Colorado Since March 28, 2013



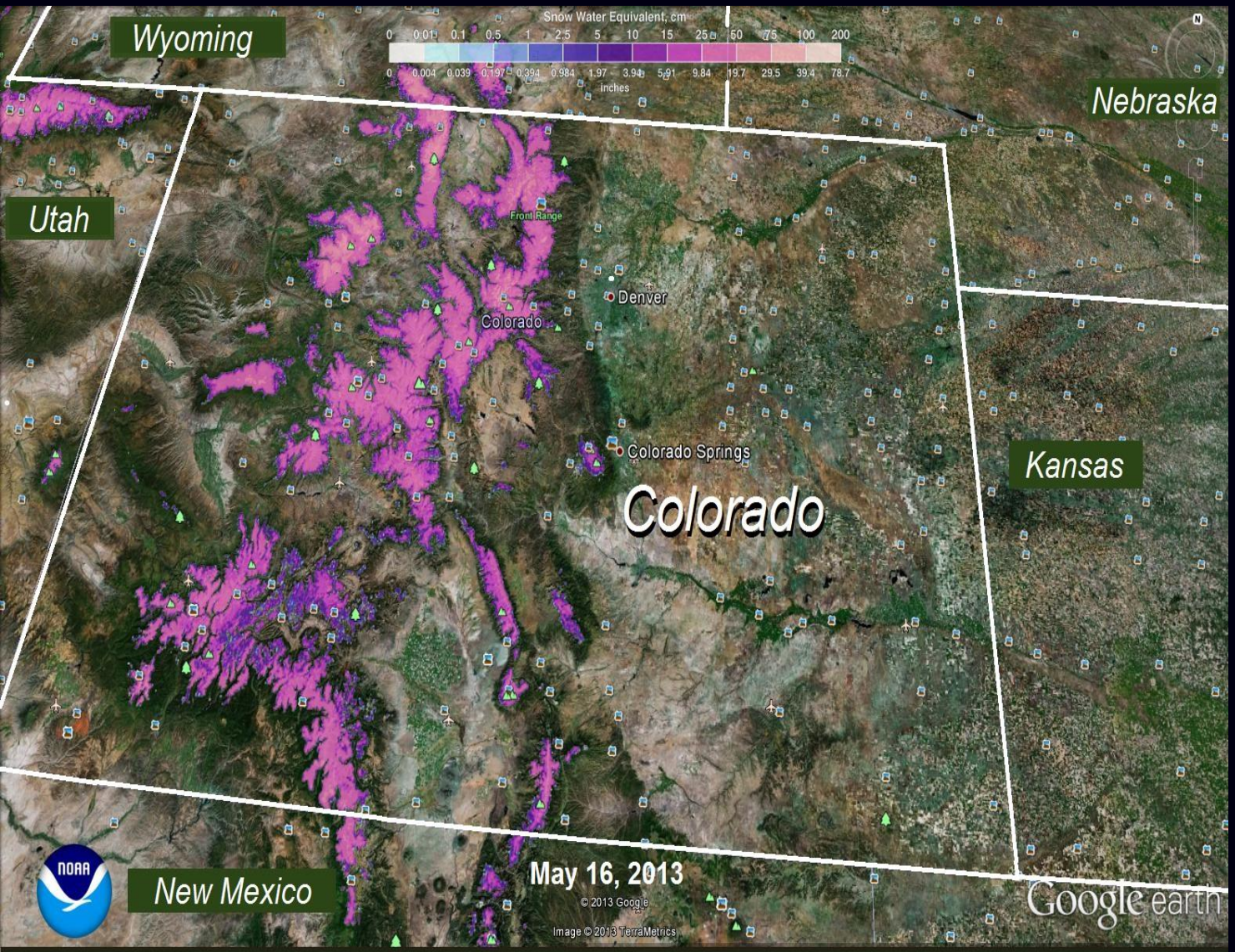


Since late April, soil moistures across Colorado have trended lower, particularly in northwest and southeast sections of the state. Soils have continued to remain at near normal moisture levels to moderately wet in the central and northern mountains and on the east central plains.

The SPI was developed to monitor potential short term agricultural and long-term hydrological drought conditions. The SPI is a probability index that considers only precipitation.

Colorado Snowpack

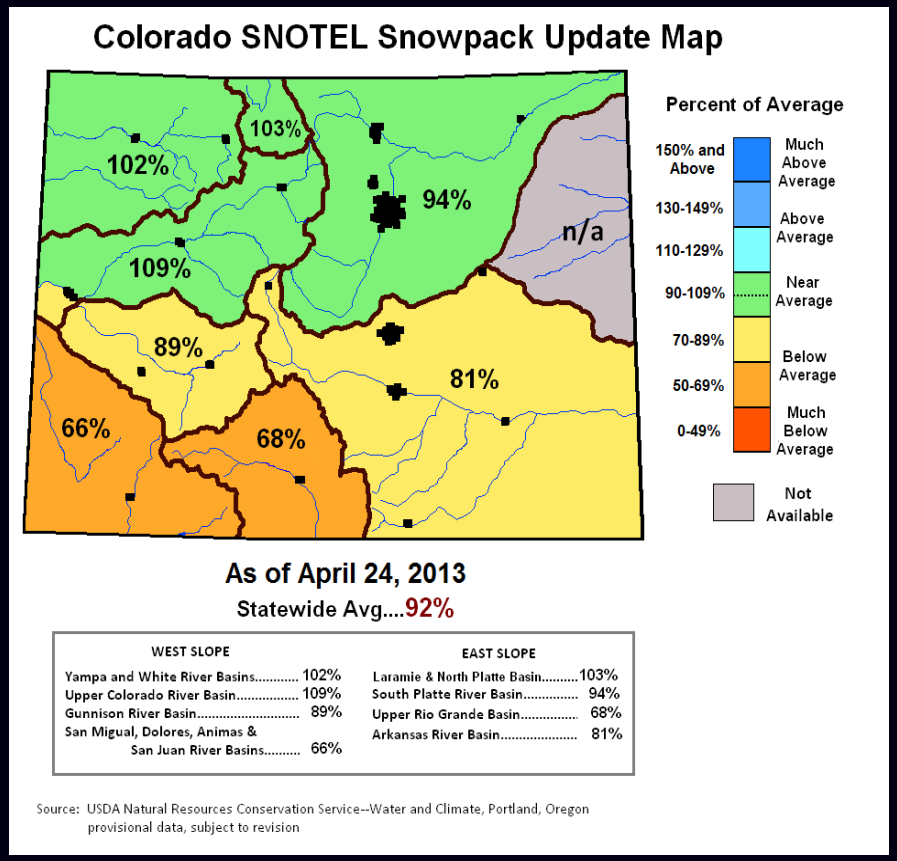
Snow Water Equivalent of Colorado's Snowpack
As of May 16, 2013

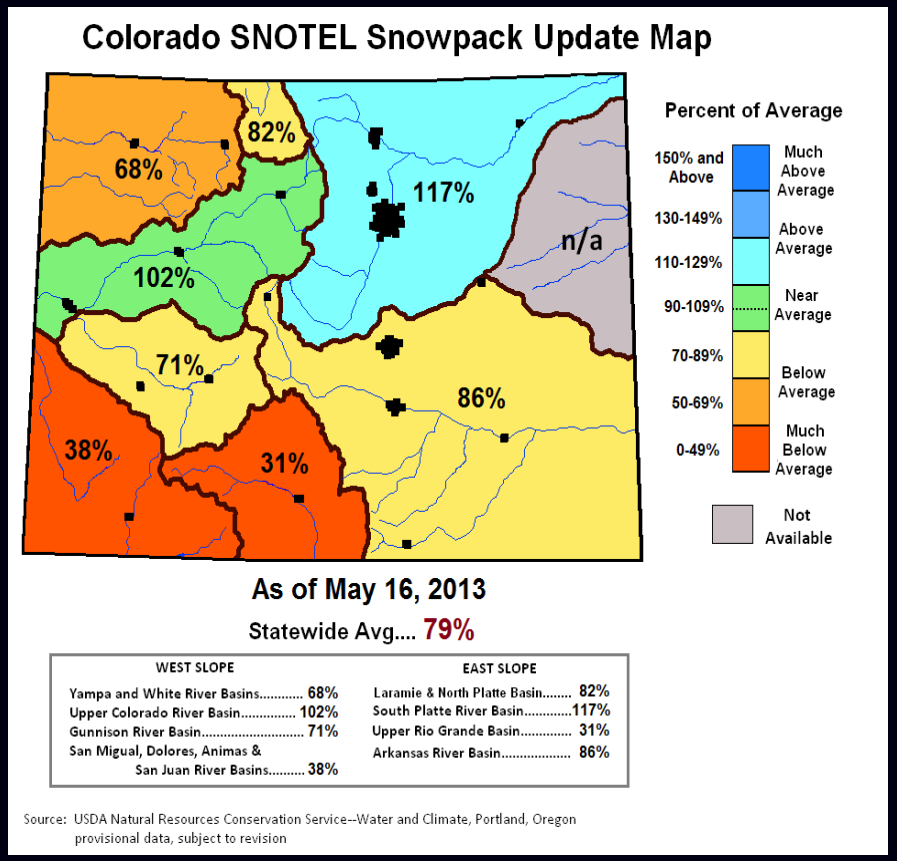


NOAA - National Operational Hydrologic Remote Sensing Center

Snow water equivalents (SWE) were greatest on Colorado's northern and central mountain ranges. This includes parts of the northern Front Range, the Park Range and the Flat Tops Mountain Range. The SWE in these areas was up around 28 inches.

Changing Snow Pack In Colorado
April 24th and May 16th, 2013

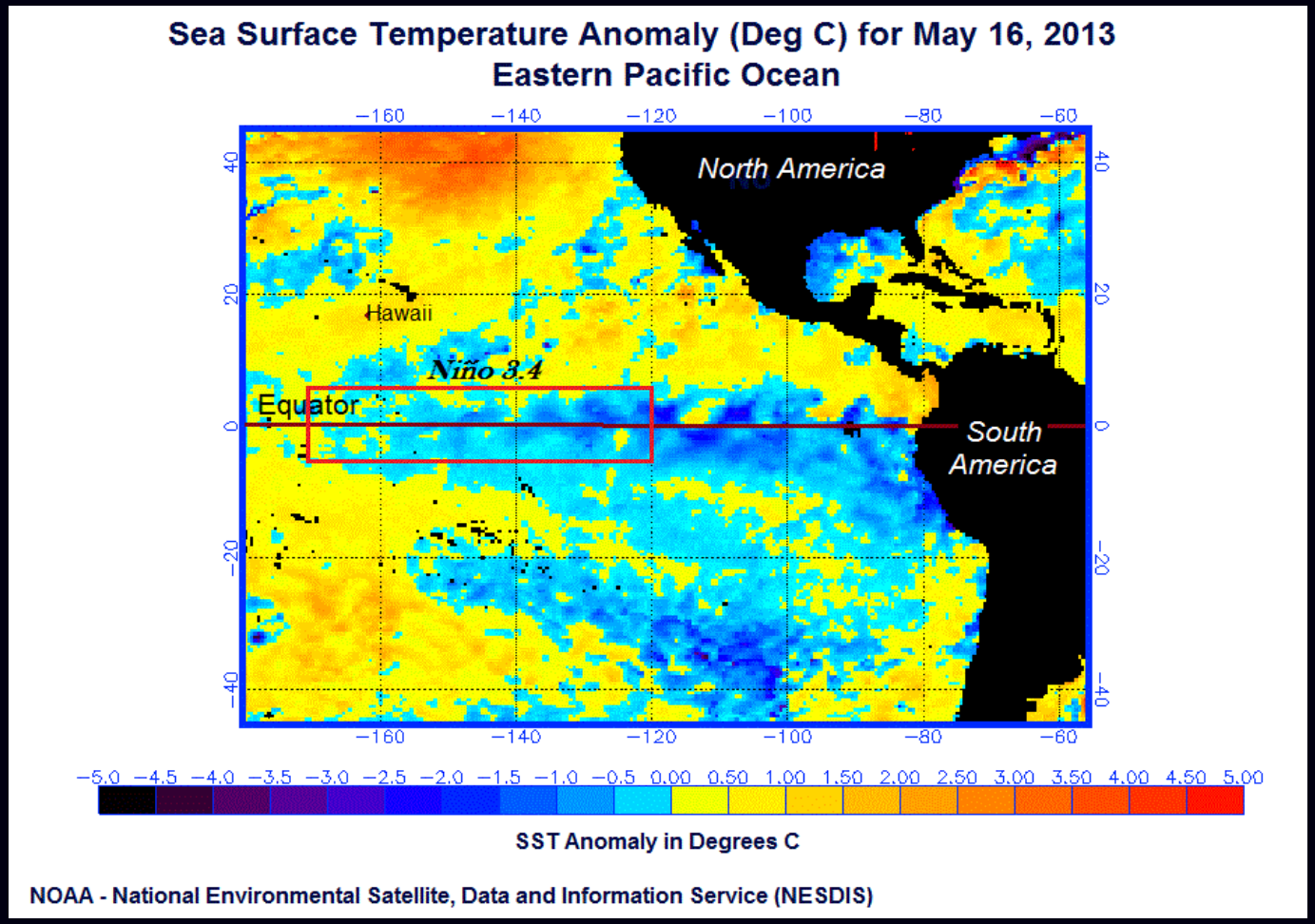




The snowpack in Colorado continues to diminish in the Colorado High Country, especially across southern portions of the state where there has been a severe lack of precipitation in recent weeks. Between April 24th and May, 16th, there was a 13 percent reduction in the state's overall snowpack. Although the average basin snowpack remains above average in the Upper Colorado River Basin (102 percent) and South Platte River Basin (117 percent).

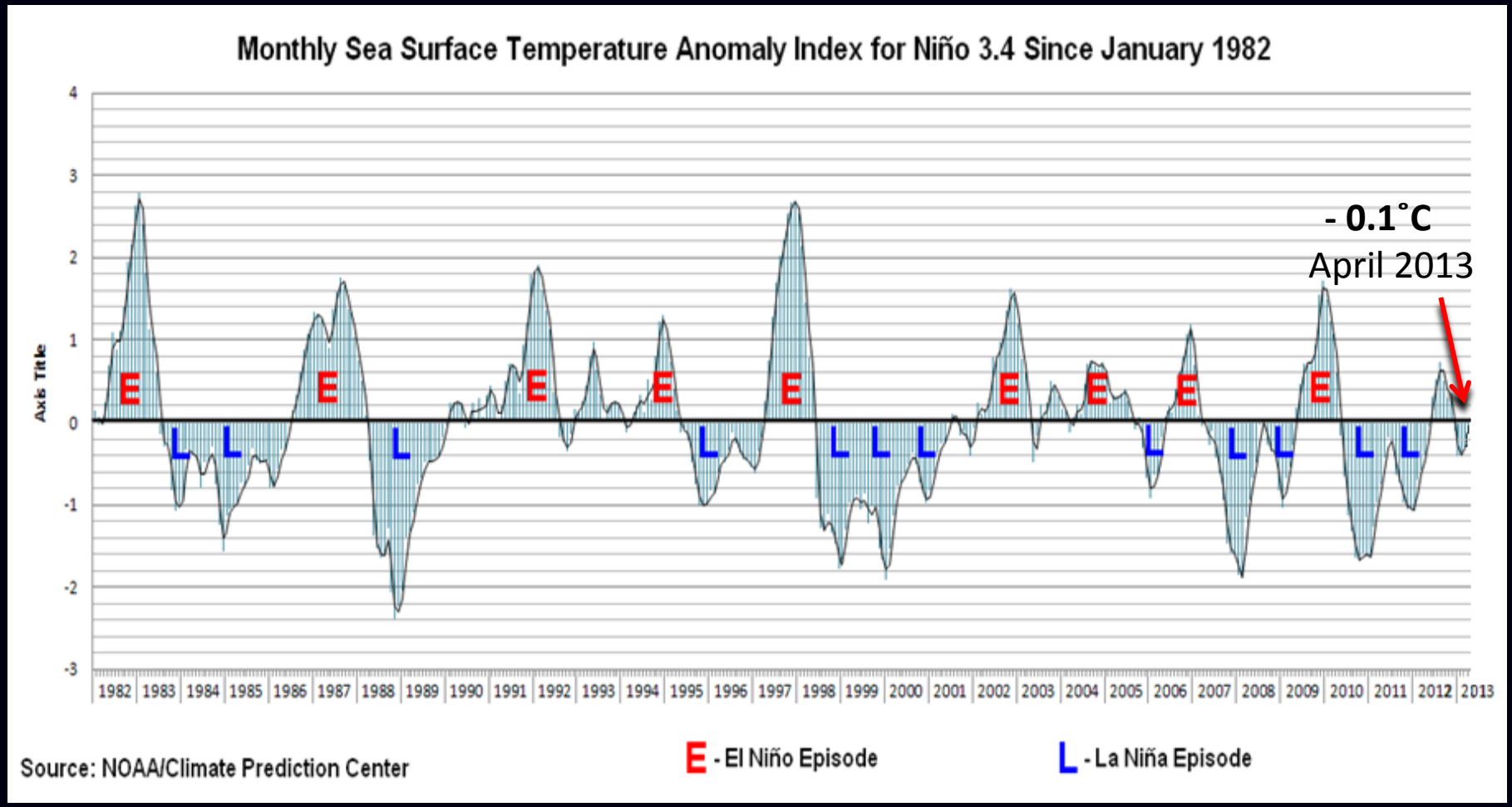
The average snow pack in the Four Corners area of southwest Colorado continue to steadily decrease where they have fallen well below 50 percent of what they should be for this time of year.

Latest on ENSO



Sea surface temperatures across the equatorial Pacific Ocean remain slightly below average during the third week in May. This section of the Pacific Ocean includes the region known as Niño 3.4.

Niño 3.4 (designated by the red box) is the principal region in the eastern equatorial Pacific Ocean used by NOAA's Climate Prediction Center (CPC) for monitoring, assessing and predicting the interseasonal climate phenomena called El Niño/Southern Oscillation (ENSO).



The monthly SST anomaly index for ENSO 3.4 as of April 2013 remains in negative territory (-0.1 deg C) for the fifth month in a row. This does not indicate La Niña conditions, but rather neutral ENSO conditions since the index has not meet the threshold for 5 consecutive months below -0.45.

The Oceanic Niño Index (ONI) for Niño 3.4

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2001	-0.7	-0.6	-0.5	-0.4	-0.2	-0.1	0.0	0.0	-0.1	-0.2	-0.3	-0.3
2002	-0.2	0.0	0.1	0.3	0.5	0.7	0.8	0.8	0.9	1.2	1.3	1.3
2003	1.1	0.8	0.4	0.0	-0.2	-0.1	0.2	0.4	0.4	0.4	0.4	0.3
2004	0.3	0.2	0.1	0.1	0.2	0.3	0.5	0.7	0.8	0.7	0.7	0.7
2005	0.6	0.4	0.3	0.3	0.3	0.3	0.2	0.1	0.0	-0.2	-0.5	-0.8
2006	-0.9	-0.7	-0.5	-0.3	0.0	0.1	0.2	0.3	0.5	0.8	1.0	1.0
2007	0.7	0.3	-0.1	-0.2	-0.3	-0.3	-0.4	-0.6	-0.8	-1.1	-1.2	-1.4
2008	-1.5	-1.5	-1.2	-0.9	-0.7	-0.5	-0.3	-0.2	-0.1	-0.2	-0.5	-0.7
2009	-0.8	-0.7	-0.5	-0.2	0.2	0.4	0.5	0.6	0.8	1.1	1.4	1.6
2010	1.6	1.3	1.0	0.6	0.1	-0.4	-0.9	-1.2	-1.4	-1.5	-1.5	-1.5
2011	-1.4	-1.2	-0.9	-0.6	-0.3	-0.2	-0.2	-0.4	-0.6	-0.8	-1.0	-1.0
2012	-0.9	-0.6	-0.5	-0.3	-0.2	0.0	0.1	0.4	0.5	0.6	0.2	-0.3
2013	-0.6	-0.7	**-0.4**									

NOAA/CPC Last Update 05-06-13

The ONI for the latest complete three month climate season (February, March, April) is -0.4.

El Niño : ONI higher than +0.45
Neutral ENSO : ONI of -0.45 to +0.45
La Niña: ONI lower than -0.45

The ONI is based on sea surface temperature (SST) departures from average in the Niño 3.4 region of the eastern tropical Pacific Ocean. It is the principal measure used by NOAA's Climate Prediction Center (CPC) for monitoring, assessing and predicting El Niño/Southern Oscillation (ENSO.)

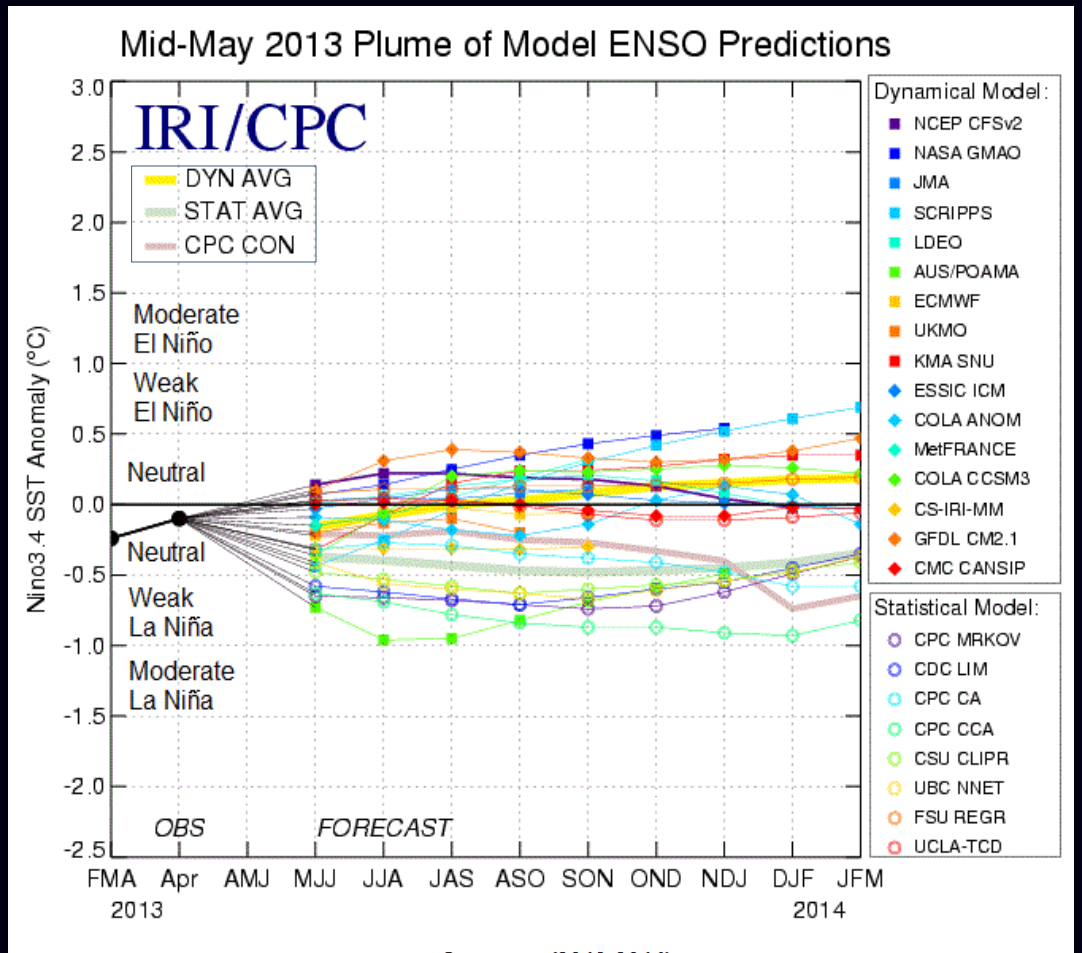
ONI is defined as the three-month running mean SST departures in the Niño 3.4 region of the Pacific.

ONI is used to place current ENSO and non-ENSO events into a historical perspective.

CPC's operational definitions of El Niño and La Niña are keyed to the ONI index.

For historical purposes, warm and cold phases of ENSO (the red and blue colored numbers) are defined when the threshold is met for a minimum of 5 consecutive over-lapping 3-month seasons.

The Forecast for ENSO



Seasons (2013-2014)

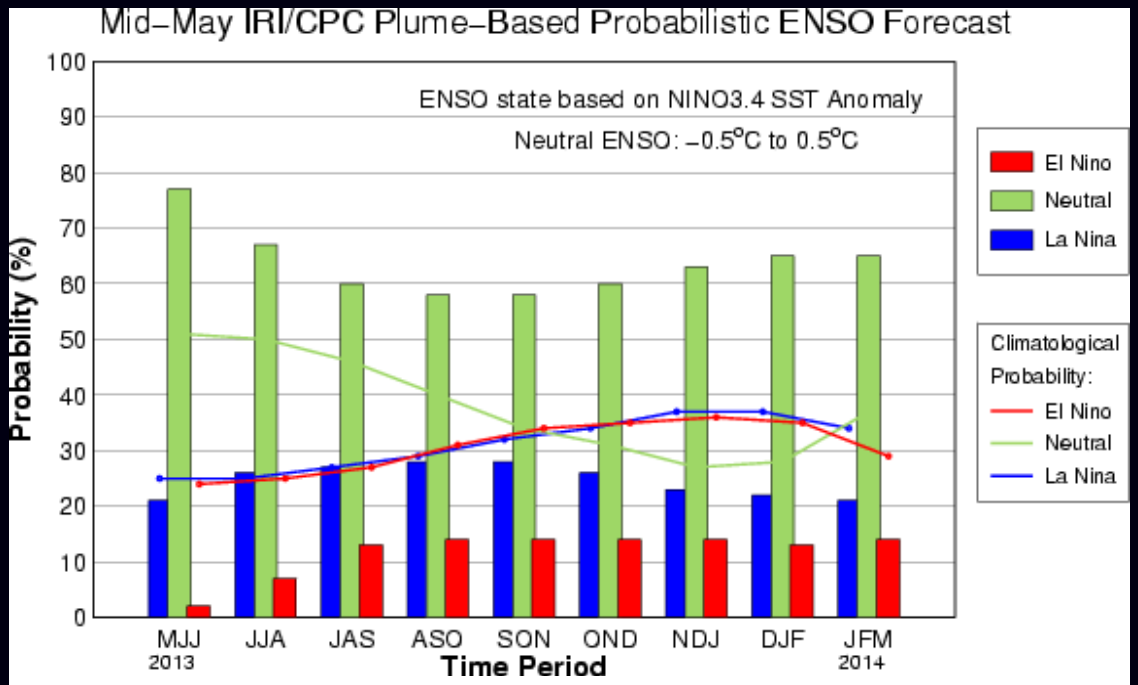
Models	MJJ	JJA	JAS	ASO	SON	OND	NDJ	DJF	JFM
Average, dynamical models	-0.2	-0.1	0	0	0.1	0.2	0.2	0.2	0.2
Average, statistical models	-0.4	-0.4	-0.4	-0.5	-0.5	-0.5	-0.5	-0.4	-0.3
Average, all models	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1

Source: International Research Institute for Climate and Society (IRI) – May 17 2013

A majority of the 17 dynamical climate models (listed at left) predict neutral or non-ENSO conditions will continue through the summer of 2013. Many of them also predict that similar conditions will exist through the autumn of 2013. Whereas, the 8 statistical models (listed at left) split nearly evenly between neutral and La Niña conditions for the same time period.

The table at the lower left contains the cumulative average of sea surface temperature anomalies (SSTa) for all 25 models for overlapping 3-month climate seasons through the January-March (JFM) 2014. A SSTa above -0.45˚C and below +0.45˚C indicates neutral conditions, and a SSTa below -0.45˚C indicated La Niña conditions. The cumulative average for all 25 models indicates neutral ENSO conditions through JFM 2014 climate season.

Probabilistic ENSO Forecast Through January-March 2014



IRI Probabilistic ENSO Prediction for NINO 3.4 Region

Season	La Niña	Neutral	El Niño
MJJ 2013	21%	77%	2%
JJA 2013	26%	67%	7%
JAS 2013	27%	60%	13%
ASO 2013	28%	58%	14%
SON 2013	28%	58%	14%
OND 2013	26%	60%	14%
NDJ 2014	23%	63%	14%
DJF 2014	22%	65%	13%
JFM 2014	21%	65%	14%

Source: International Research Institute for Climate and Society (IRI) – May 17 2013

The bar chart shows the probability of El Niño, neutral and La Niña conditions beginning with the May-July (MJJ) climate season and ending with the January-March (JFM) 2014 climate season.

Neutral conditions have the highest probability of occurrence during the nine overlapping climate seasons. However, note the slight increase in the probability that La Niña conditions will develop late this summer and fall.

Current Drought Conditions In Colorado

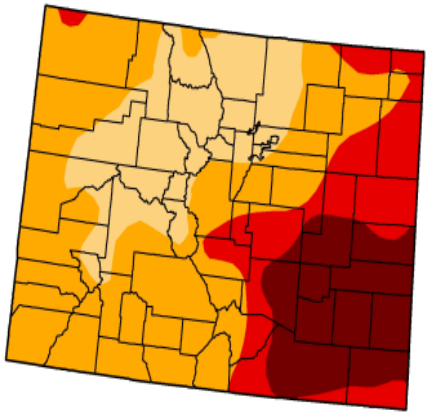
U.S. Drought Monitor

April 23, 2013
Valid 7 a.m. EST

Colorado

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	78.08	32.19	16.24
Last Week (04/16/2013 map)	0.00	100.00	100.00	84.78	38.37	13.63
3 Months Ago (01/22/2013 map)	0.00	100.00	100.00	100.00	58.64	13.50
Start of Calendar Year (01/01/2013 map)	0.00	100.00	100.00	95.06	53.47	13.48
Start of Water Year (09/25/2012 map)	0.00	100.00	100.00	100.00	61.75	16.89
One Year Ago (04/17/2012 map)	5.17	94.83	59.85	25.93	0.00	0.00



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, April 25, 2013
Eric Luebehusen, U.S. Department of Agriculture

As of April 23 ,2013

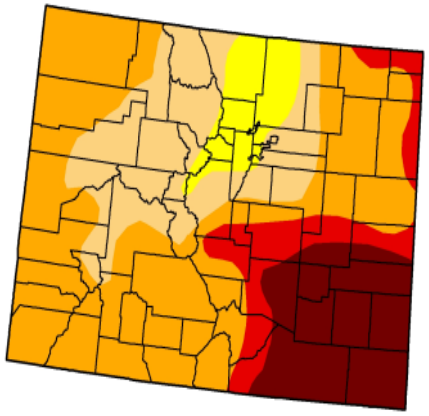
U.S. Drought Monitor

May 14, 2013
Valid 7 a.m. EST

Colorado

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	93.18	71.71	24.53	15.84
Last Week (05/07/2013 map)	0.00	100.00	95.49	75.99	26.97	17.93
3 Months Ago (02/12/2013 map)	0.00	100.00	100.00	91.30	50.99	24.92
Start of Calendar Year (01/01/2013 map)	0.00	100.00	100.00	95.06	53.47	13.48
Start of Water Year (09/25/2012 map)	0.00	100.00	100.00	100.00	61.75	16.89
One Year Ago (05/08/2012 map)	5.13	94.87	61.81	29.40	0.00	0.00



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

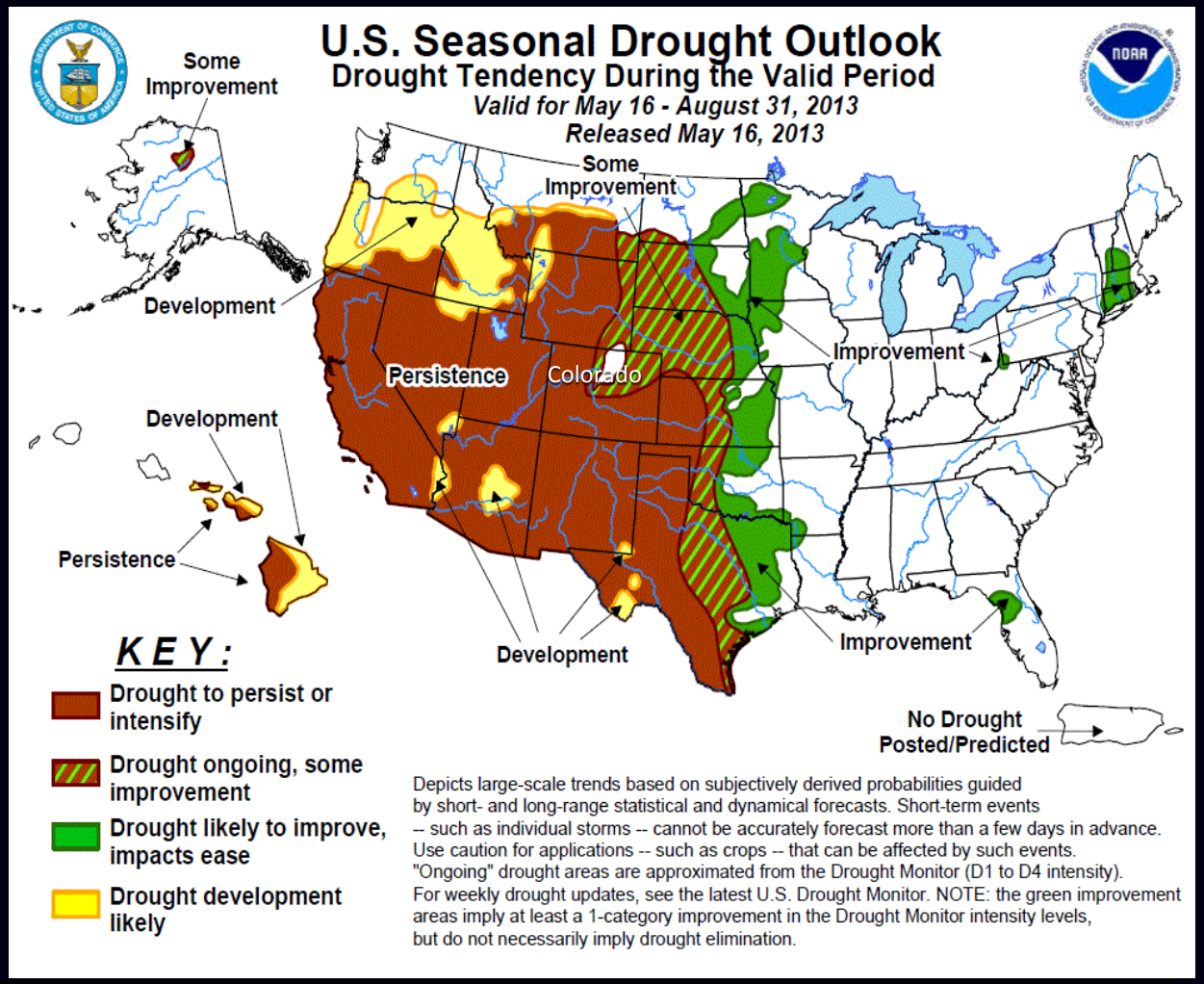
http://droughtmonitor.unl.edu

Released Thursday, May 16, 2013
Rich Tinker, Climate Prediction Center/NCEP/NWS/NOAA

As of May 14 ,2013

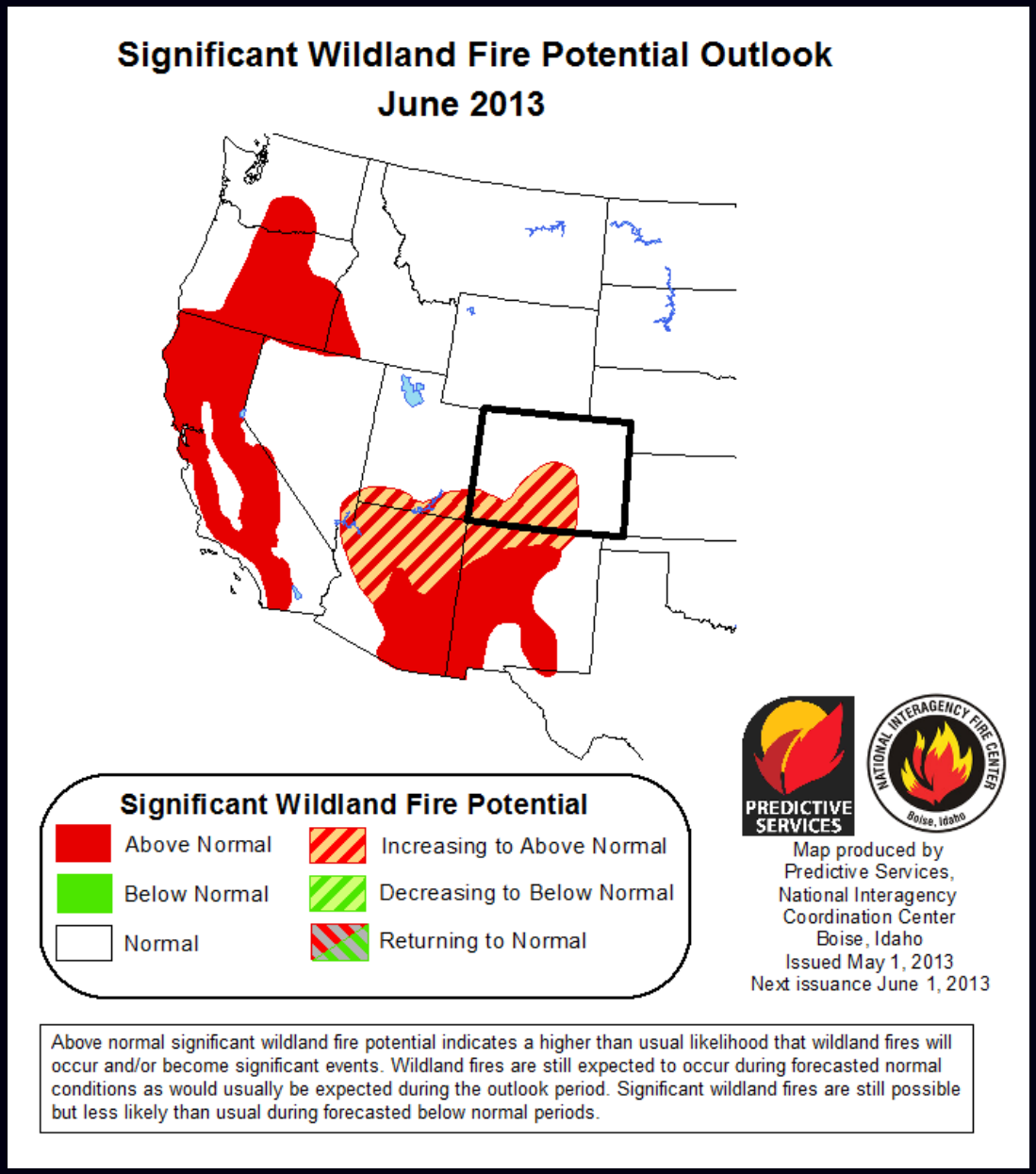
Exceptional drought conditions (D4) continue to plague the southeastern counties of Colorado. By comparison, the drought has eased considerably along the northern Front Range of Colorado where conditions are now classified as only abnormally dry (D0).

The Latest 3 Month Drought Outlook



www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.gif.

The latest three month drought outlook issued by NOAA's Climate Prediction Center valid for the period May 16 to August 31, 2013 calls for some improvement in the drought conditions in northeast Colorado. Unfortunately, the outlook also calls for drought conditions to persist for the remainder of the state.



The potential for significant wildland fire in Colorado during June is predicted to increase to above average across southwest and south central Colorado.

This is according to Predictive Services at the National Interagency Coordination Center in Boise, Idaho.

Their next update will be issued June 1, 2013.

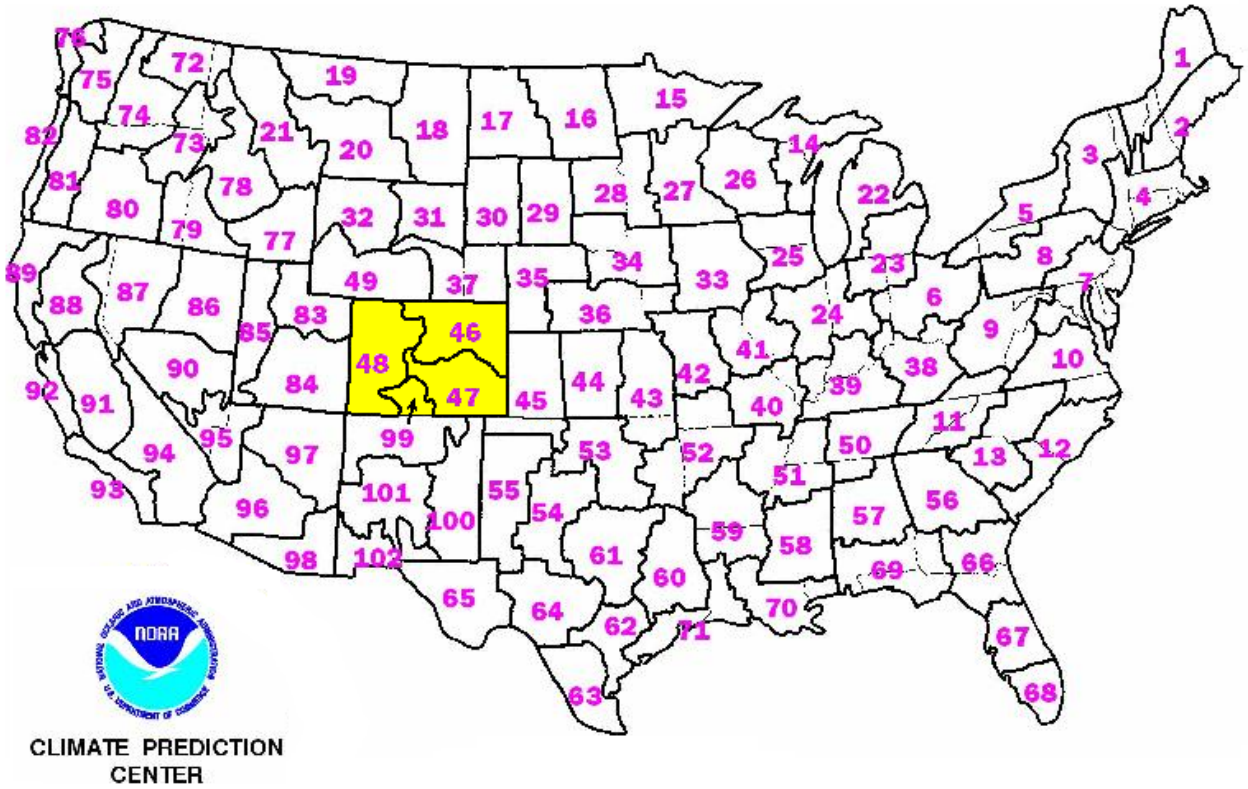
June-July-August
2013
Temperature and Precipitation Outlooks for Colorado Issued by the Climate Prediction Center

Climate Prediction Center Seasonal Outlooks

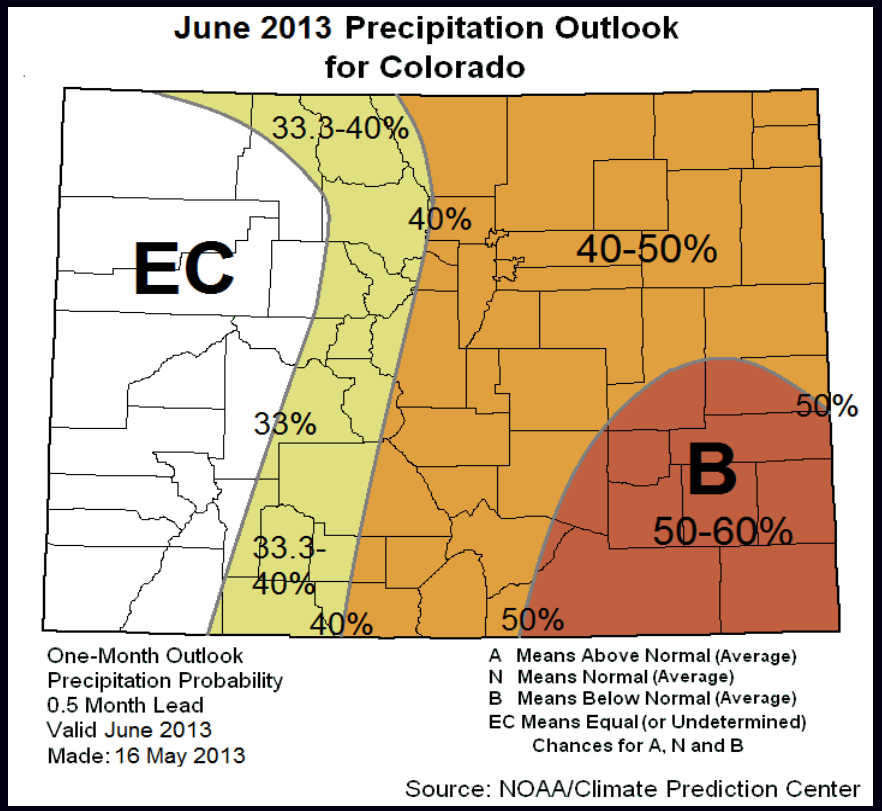
The National Weather Service Seasonal Climate Outlooks predict the probability of conditions being among the warmest/coldest or wettest/driest terciles of years compared to the period of record 1981-2010.

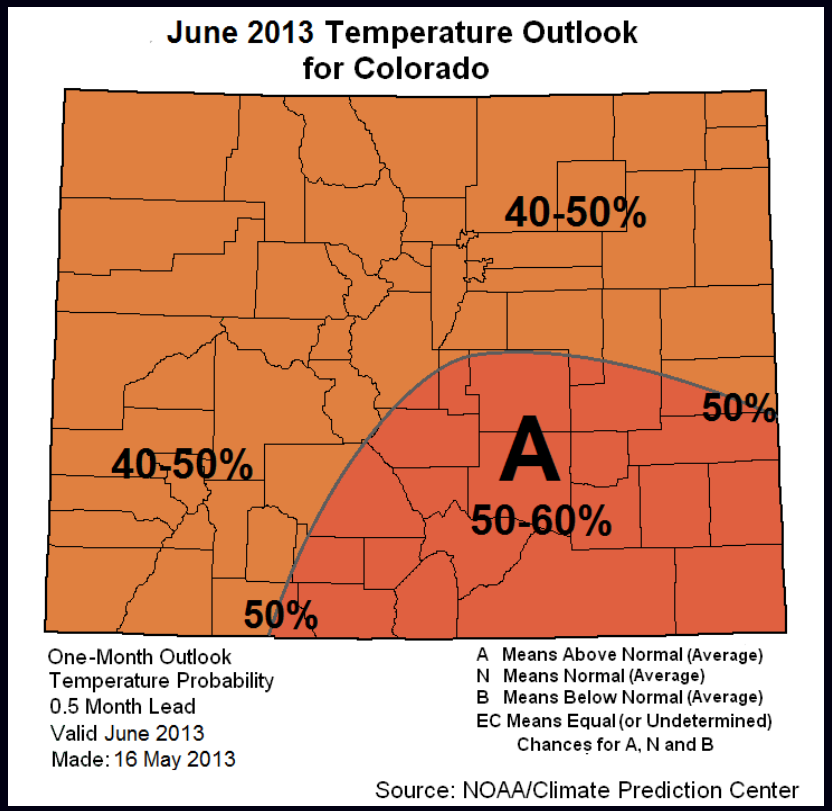
The outlooks indicate probability of being in three specific categories in reference to the 30-year climatology from 1981-2010. They are above, below and average.

Remember, Climate Predicition Center (CPC) outlooks are made at the scale of the climate megadividions (see the map below).



30 Day Precipitation and Temperature Outlooks For Colorado

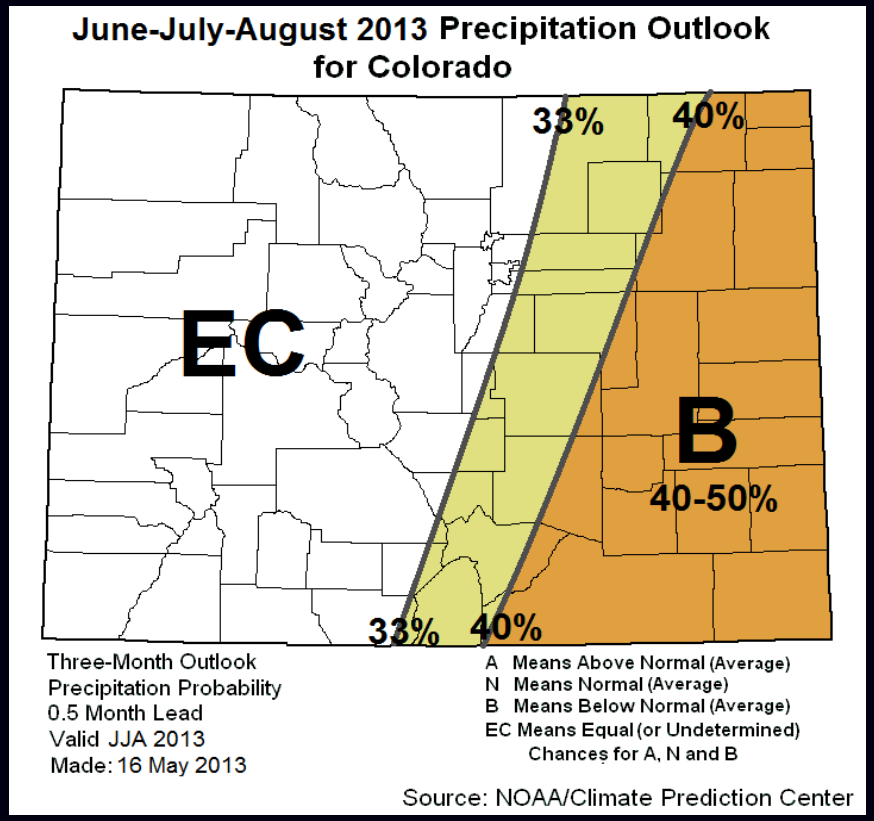


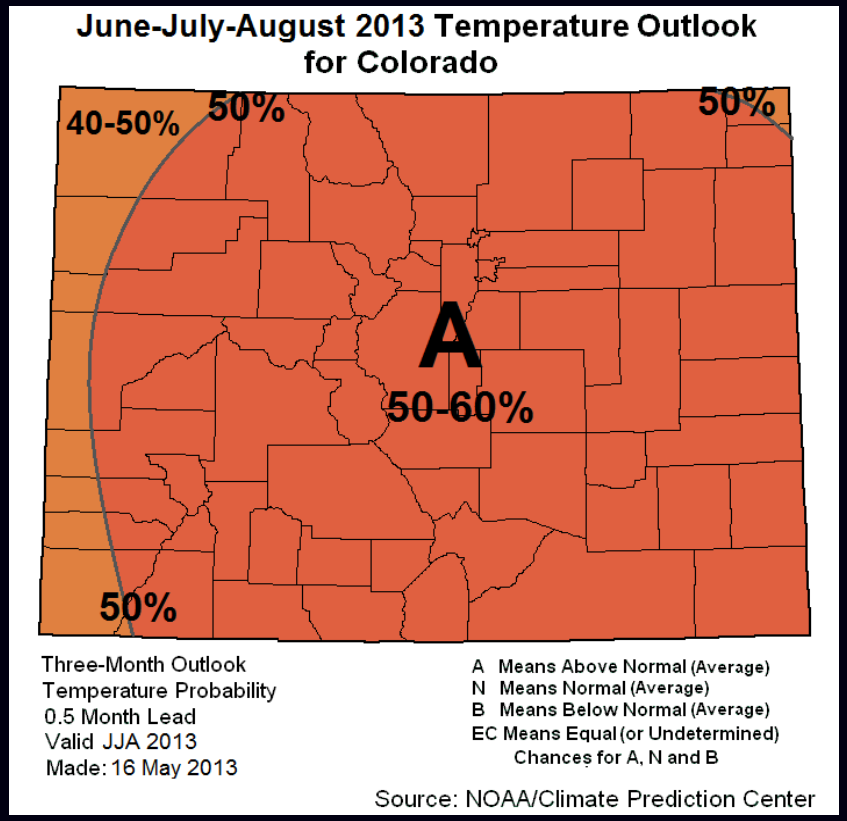


For June, there is at least a 33.3 percent chance of below average precipitation in the eastern two thirds Colorado, and an equal or undeterminable chance for above, near and below average precipitation for the remainder of the state.

The Climate prediction Center is calling for at least a 40 percent chance for above average temperature during June for all of Colorado. Odds are even greater that we'll see above average temperatures across the southeast corner of the state.

90 Day Precipitation and Temperature Outlooks for Colorado



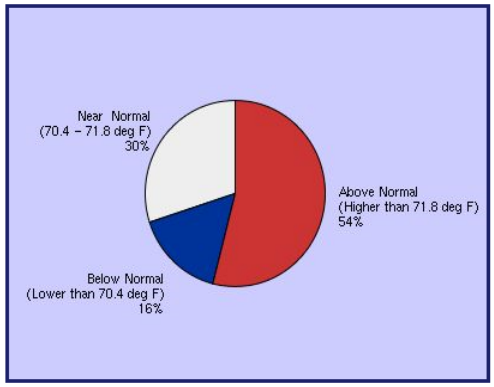


The 90 day outlook from CPC calls for at least a 33 percent chance for below average precipitation in eastern Colorado, and an equal or undeterminable chance for above, near and below precipitation for the remainder of the state.

Lastly, CPC is calling for at least a 40 percent chance for above average temperatures across all of Colorado during the 3-month season of June, July and August.

Three Month Temperature Outlooks for Specific Locations in Northeast Colorado

Three Category Temperature Outlook for June-July-August 2013



There is a 54.0% chance for the average temperature during this 3-month period to be higher than 71.8 Deg F.

There is a 30.0% chance for the average temperature during this 3-month period to be between 70.4 and 71.8 Deg F.

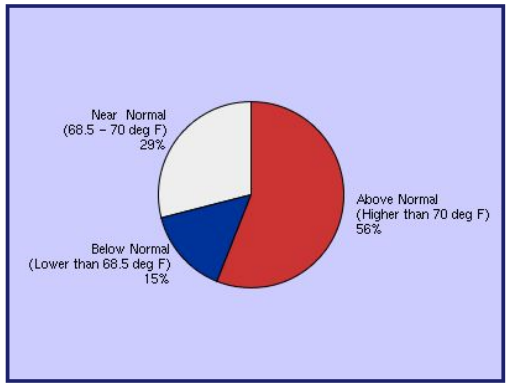
There is a 16.0% chance for the average temperature during this 3-month period to be lower than 70.4 Deg F.

Denver, CO - Elevation 5286 Feet

Outlooks are calculated using the 1981-2010 climatological reference period.

Source: Climate Prediction Center

Three Category Temperature Outlook for June-July-August 2013



There is a 56.0% chance for the average temperature during this 3-month period to be higher than 70.0 Deg F.

There is a 29.0% chance for the average temperature during this 3-month period to be between 68.5 and 70.0 Deg F.

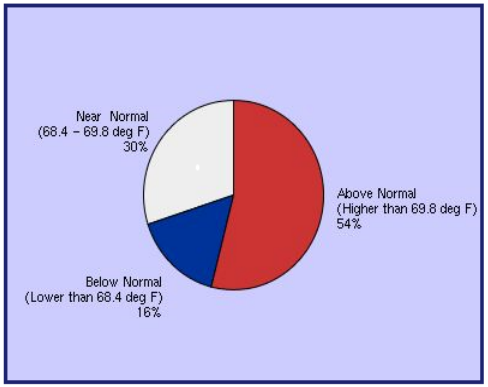
There is a 15.0% chance for the average temperature during this 3-month period to be lower than 68.5 Deg F.

Fort Collins, CO - Elevation 5004 Feet

Outlooks are calculated using the 1981-2010 climatological reference period.

Source: Climate Prediction Center

Three Category Temperature Outlook for June-July-August 2013



There is a 54.0% chance for the average temperature during this 3-month period to be higher than 69.8 Deg F.

There is a 30.0% chance for the average temperature during this 3-month period to be between 68.4 and 69.8 Deg F.

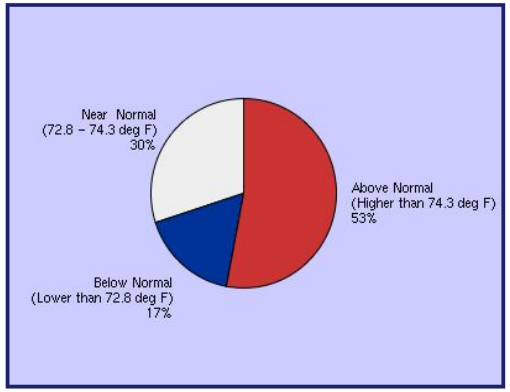
There is a 16.0% chance for the average temperature during this 3-month period to be lower than 68.4 Deg F.

Boulder, CO - Elevation 5484 Feet

Outlooks are calculated using the 1981-2010 climatological reference period.

Source: Climate Prediction Center

Three Category Temperature Outlook for June-July-August 2013



There is a 53.0% chance for the average temperature during this 3-month period to be higher than 74.3 Deg F.

There is a 30.0% chance for the average temperature during this 3-month period to be between 72.8 and 74.3 Deg F.

There is a 17.0% chance for the average temperature during this 3-month period to be lower than 72.8 Deg F.

Sterling, CO - Elevation 3933 Feet

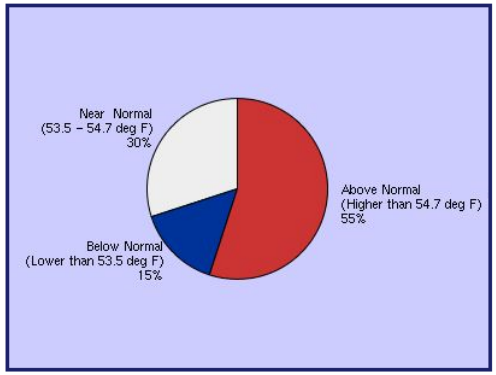
Outlooks are calculated using the 1981-2010 climatological reference period.

Source: Climate Prediction Center

Source: NOAA's Climate Prediction Center

Three Month Temperature Outlooks for Specific Locations in North Central Colorado

Three Category Temperature Outlook for June-July-August 2013



There is a 55.0% chance for the average temperature during this 3-month period to be higher than 54.7 Deg F.

There is a 30.0% chance for the average temperature during this 3-month period to be between 53.5 and 54.7 Deg F.

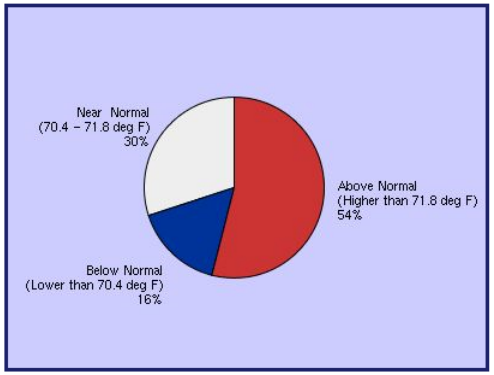
There is a 15.0% chance for the average temperature during this 3-month period to be lower than 53.5 Deg F.

DILLON, CO - Elevation 9065 Feet

Outlooks are calculated using the 1981-2010 climatological reference period.

Source: Climate Prediction Center

Three Category Temperature Outlook for June-July-August 2013



There is a 52.0% chance for the average temperature during this 3-month period to be higher than 62.2 Deg F.

There is a 31.0% chance for the average temperature during this 3-month period to be between 61.0 and 62.2 Deg F.

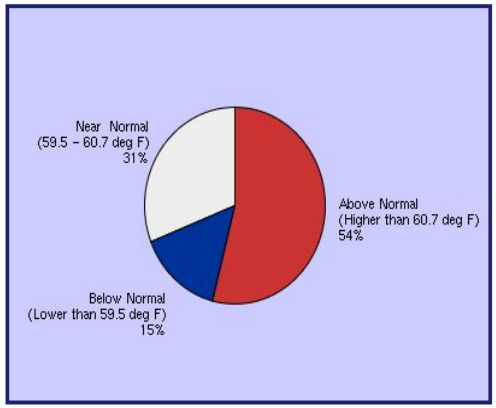
There is a 17.0% chance for the average temperature during this 3-month period to be lower than 61.0 Deg F.

Evergreen, CO - Elevation 6985 Feet

Outlooks are calculated using the 1981-2010 climatological reference period.

Source: Climate Prediction Center

Three Category Temperature Outlook for June-July-August 2013



There is a 54.0% chance for the average temperature during this 3-month period to be higher than 60.7 Deg F.

There is a 31.0% chance for the average temperature during this 3-month period to be between 59.9 and 60.7 Deg F.

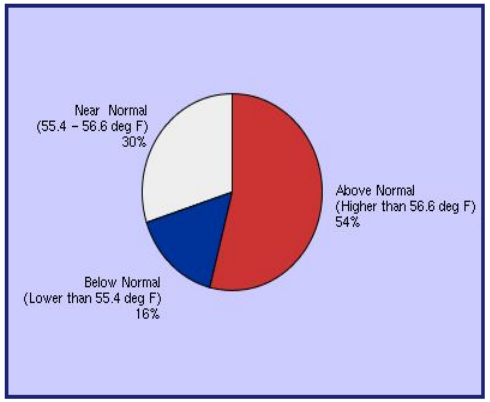
There is a 15.0% chance for the average temperature during this 3-month period to be lower than 59.5 Deg F.

Kremmling, CO - Elevation 7460 Feet

Outlooks are calculated using the 1981-2010 climatological reference period.

Source: Climate Prediction Center

Three Category Temperature Outlook for June-July-August 2013



There is a 54.0% chance for the average temperature during this 3-month period to be higher than 56.6 Deg F.

There is a 30.0% chance for the average temperature during this 3-month period to be between 55.4 and 56.6 Deg F.

There is a 16.0% chance for the average temperature during this 3-month period to be lower than 55.4 Deg F.

Walden, Co - Elevation 8056 Feet

Outlooks are calculated using the 1981-2010 climatological reference period.

Source: Climate Prediction Center

Source: NOAA's Climate Prediction Center