



“U.S. Monthly/Seasonal Forecasts and Seasonal Drought Outlook”

David Miskus

NOAA/NWS/NCEP/Climate Prediction Center

Summer 2013 National Drought Outlook

Thursday, May 16, 2013, 10:00am – 12:30pm EDT

Congressional Visitors Center (Senate), Room SVC-209-08

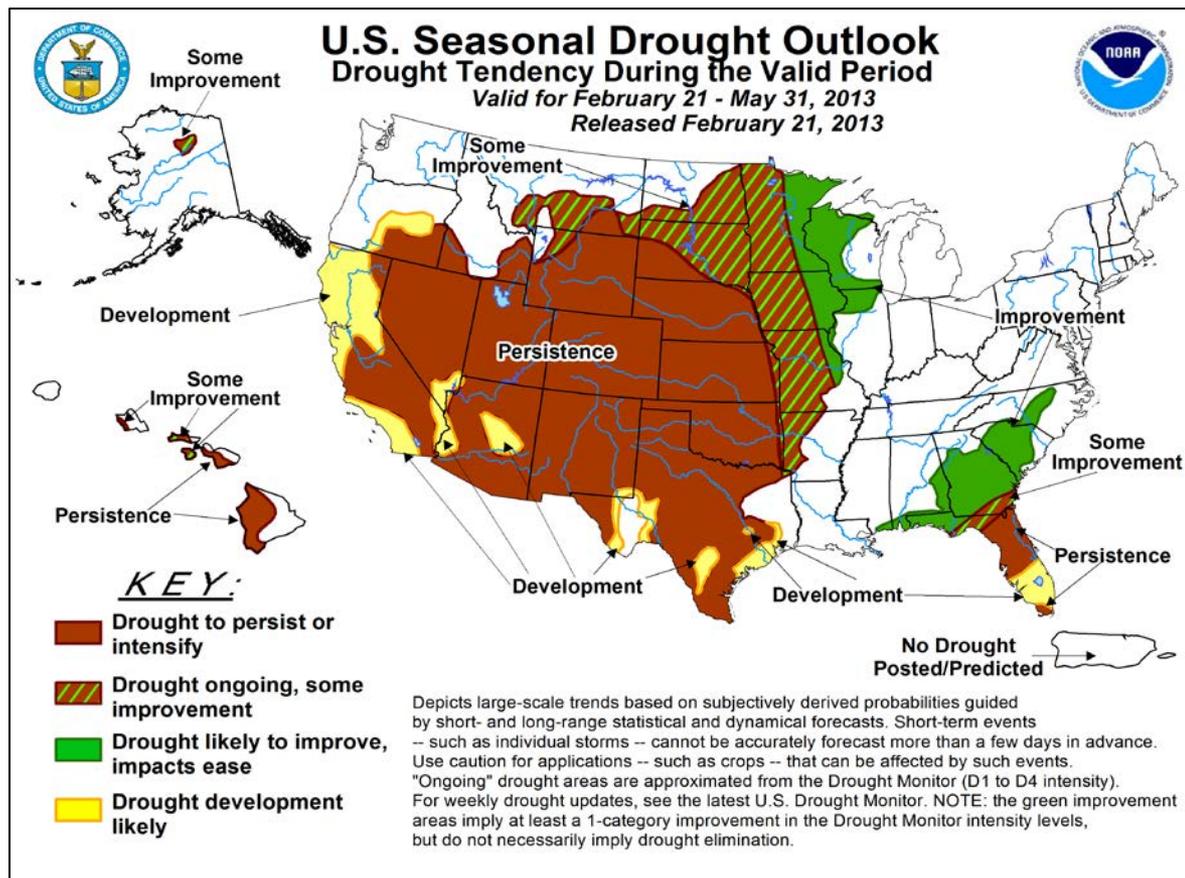
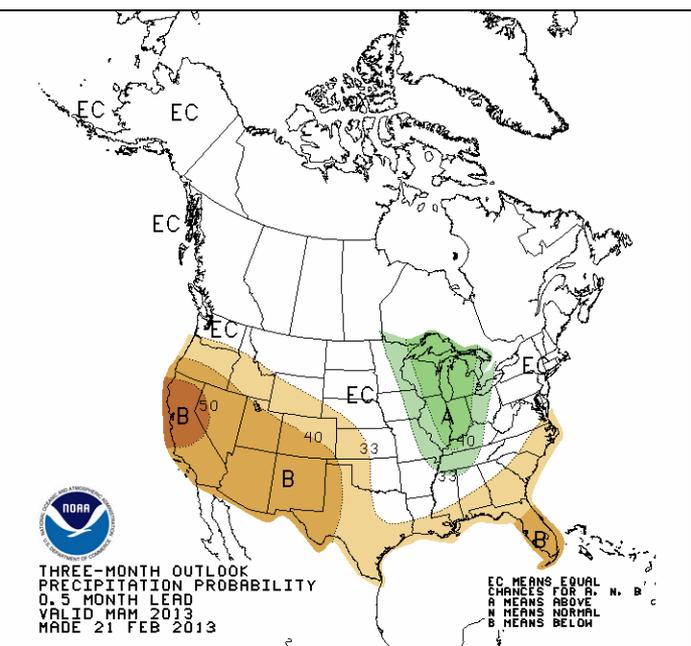
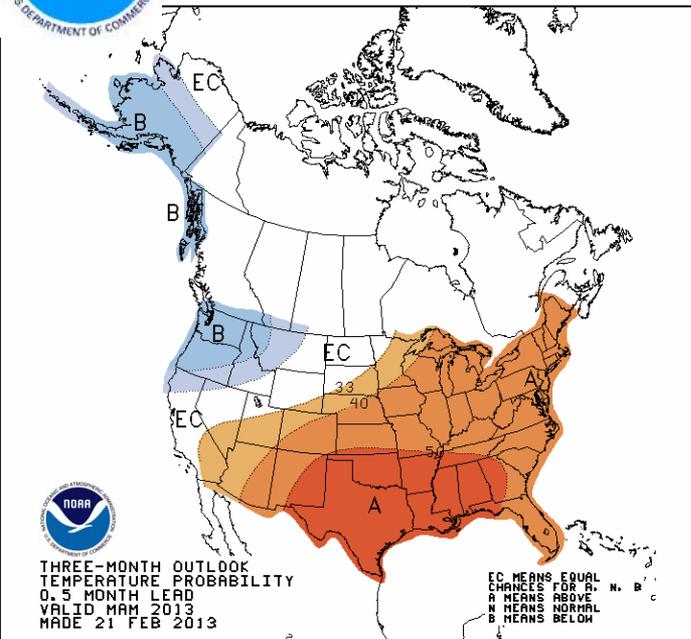
Washington, DC





Spring 2013 Temperature, Precipitation & Drought Outlooks

(Released 2/21)



Before I discuss the Summer (JJA) 2013 outlooks, how well did our Spring (MAM) forecasts verify?

There was some concern regarding the forecasts due to the lack of any ENSO signal (ENSO-Neutral). This left a large reliance on the dynamical & statistical models.

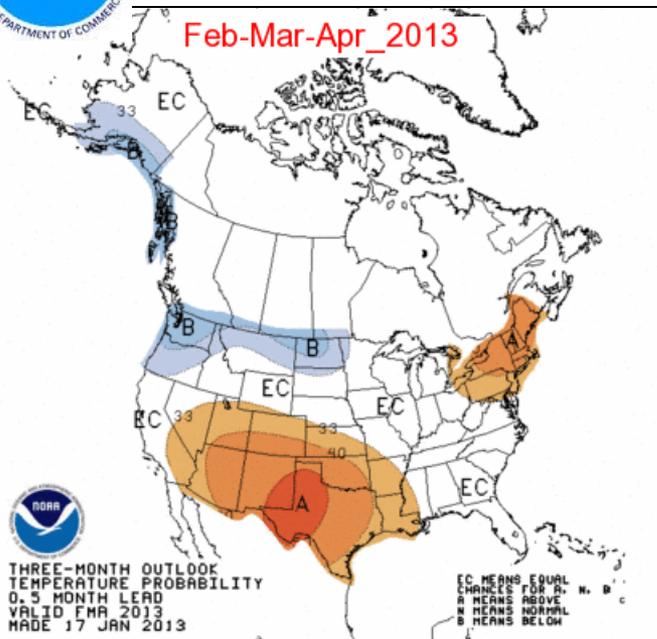


FMA 2013 Temperature, Precipitation, & Drought Outlooks

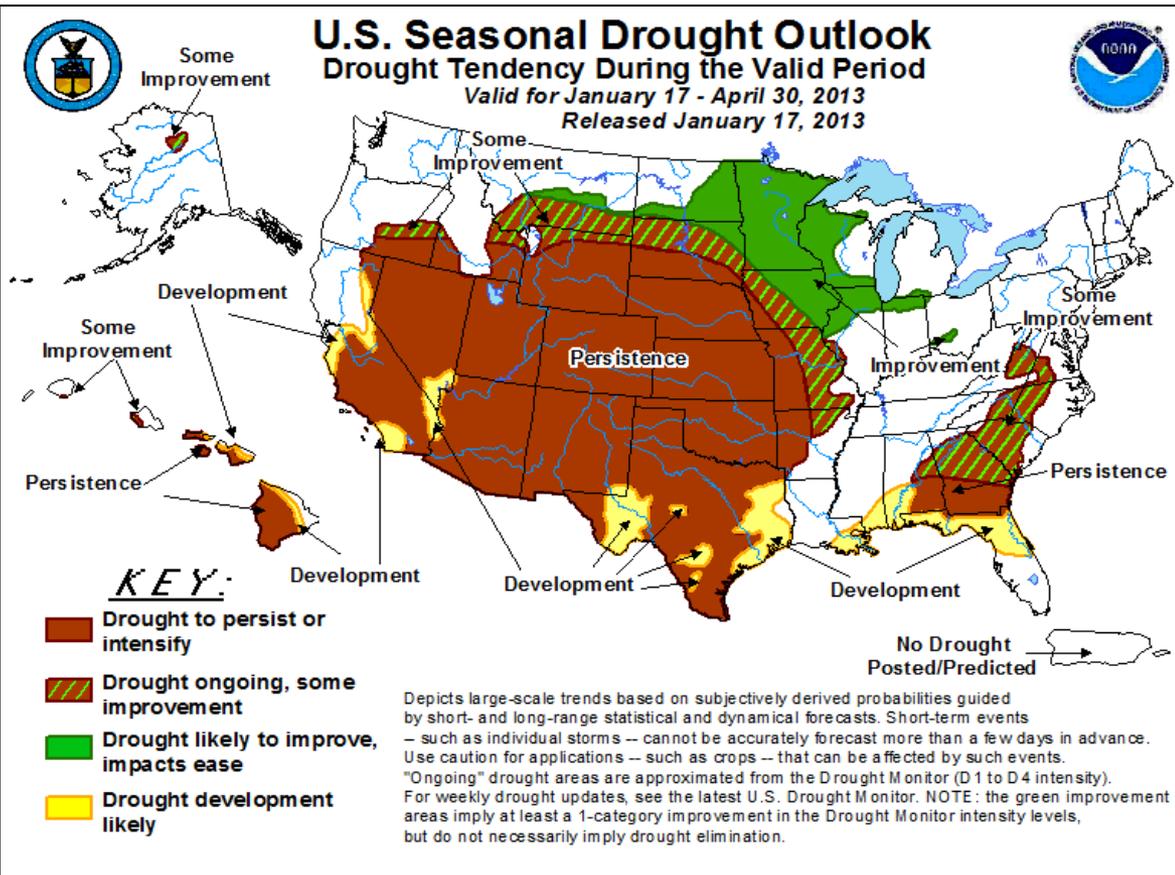
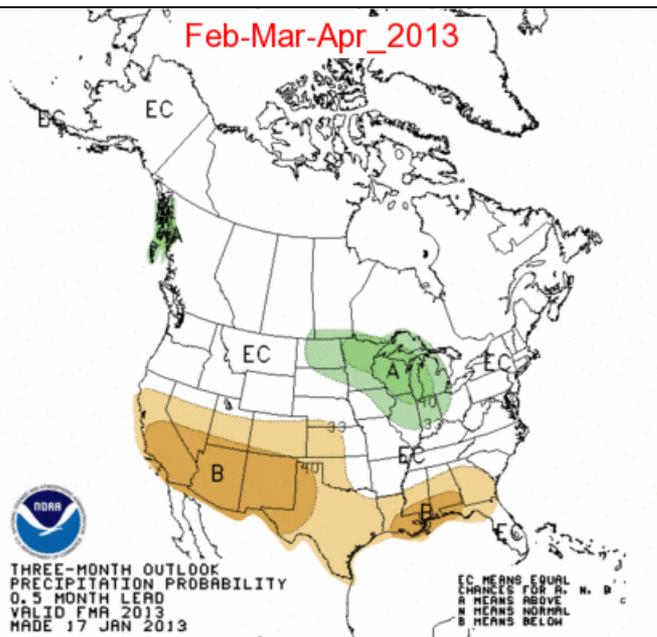
(Released 1/17)



Feb-Mar-Apr_2013



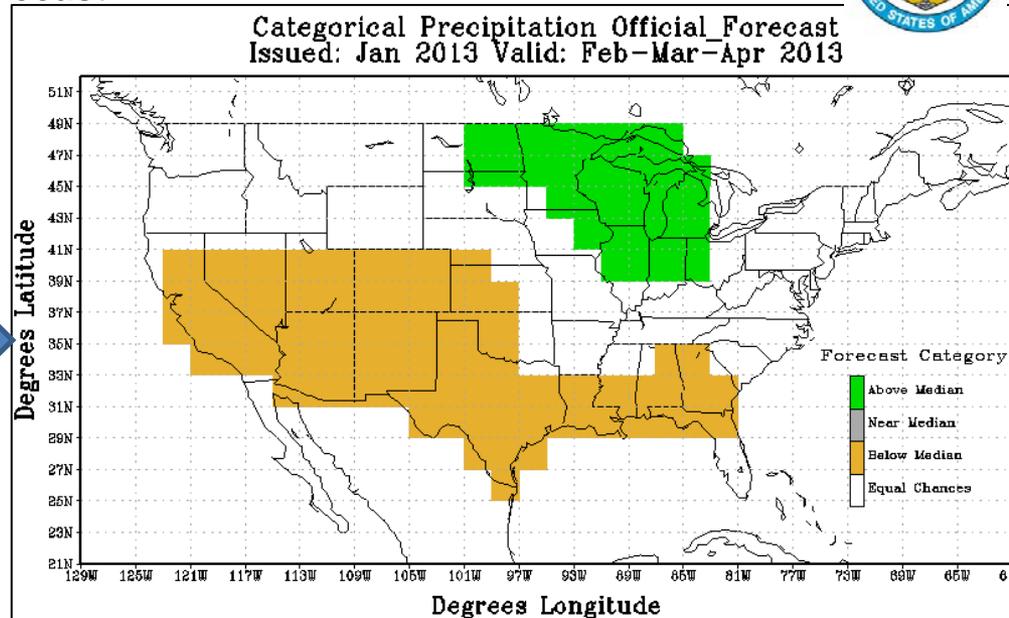
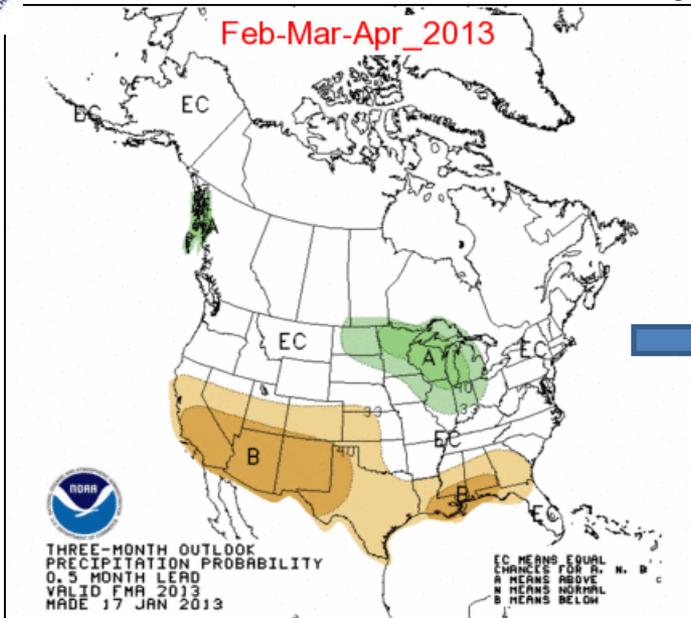
Feb-Mar-Apr_2013



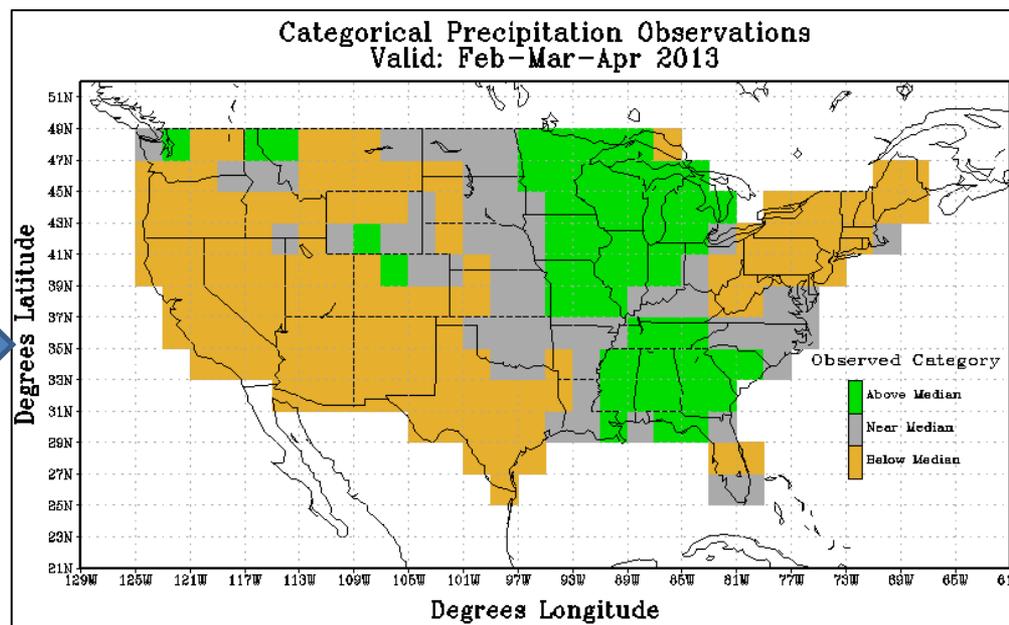
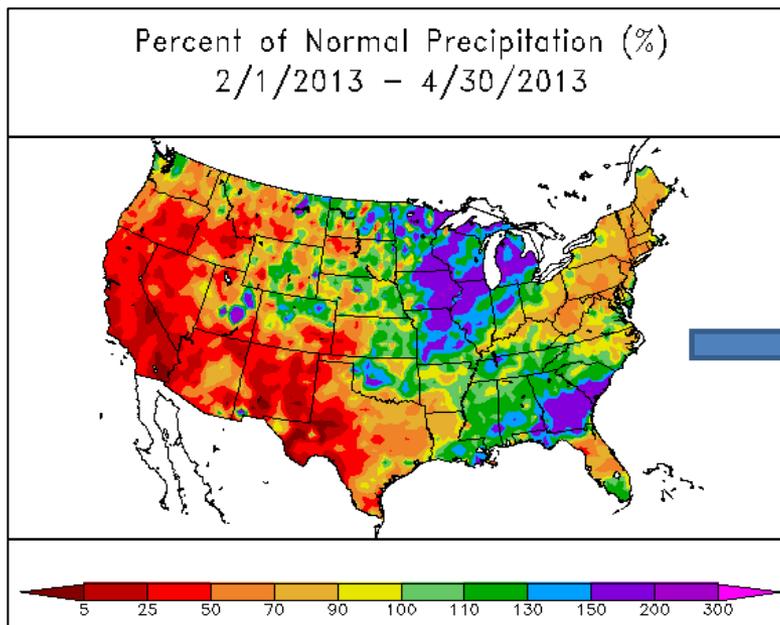
But since May is not yet completed, the most recent seasonal verifications are for FMA 2013 – which were similar to the MAM 2013 outlooks. They also relied greatly on the dynamical & statistical models as we were in ENSO-Neutral conditions.

FMA 2013 Precipitation Verification & Skill Score (The Good)

FMA13 P Forecast

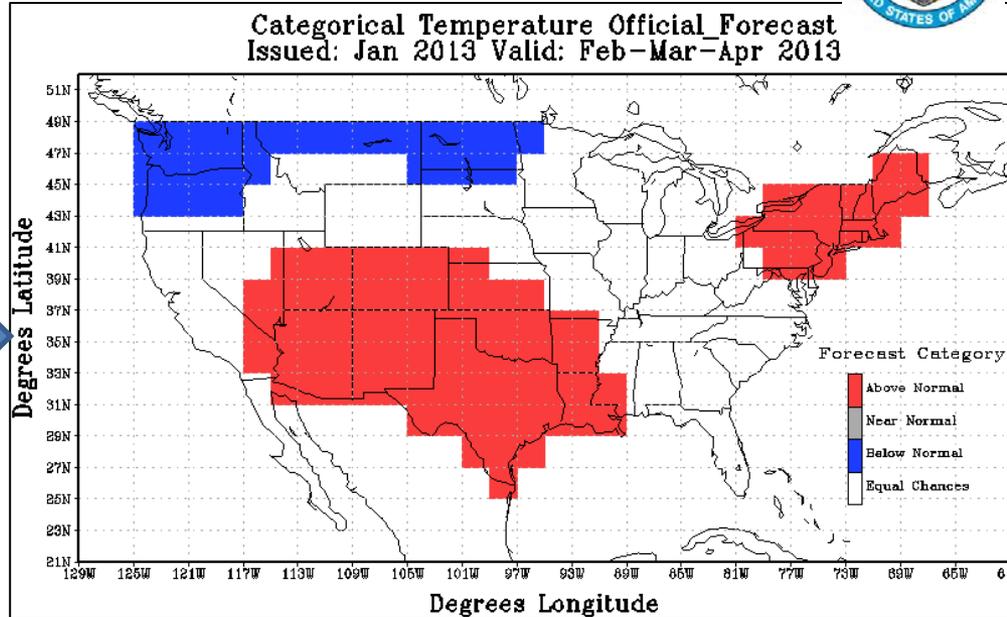
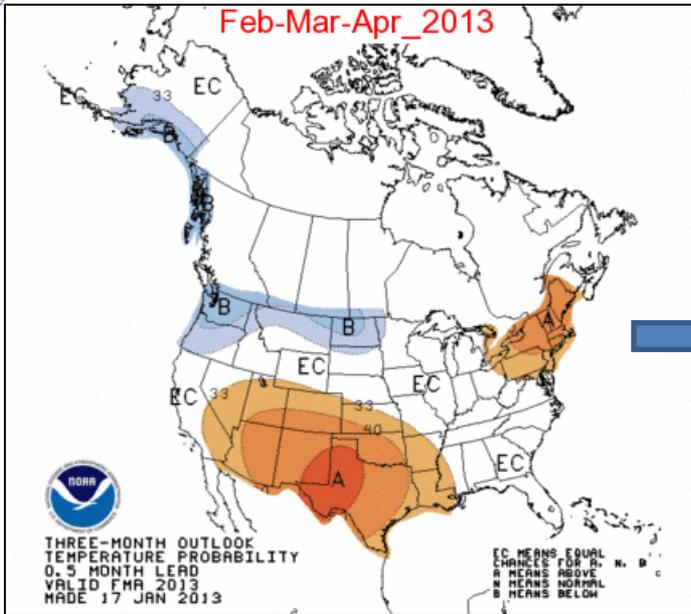


FMA13 P Observations

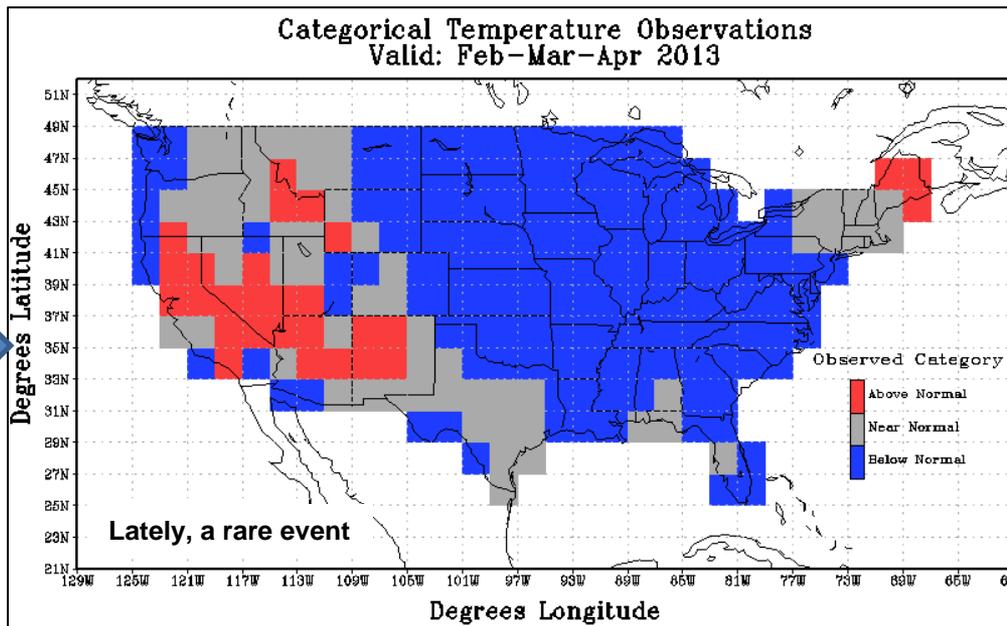
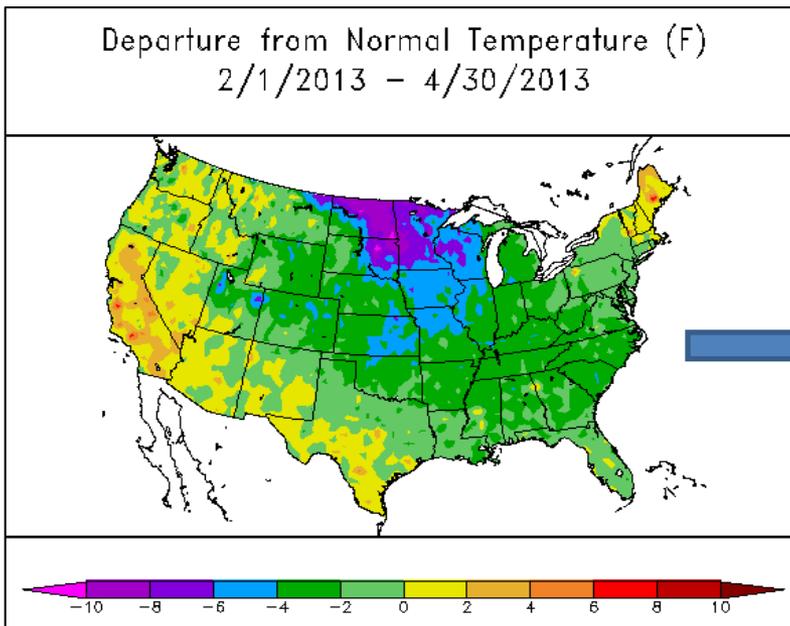


FMA 2013 Temperature Verification & Skill Score (The Bad)

FMA13 T Forecast



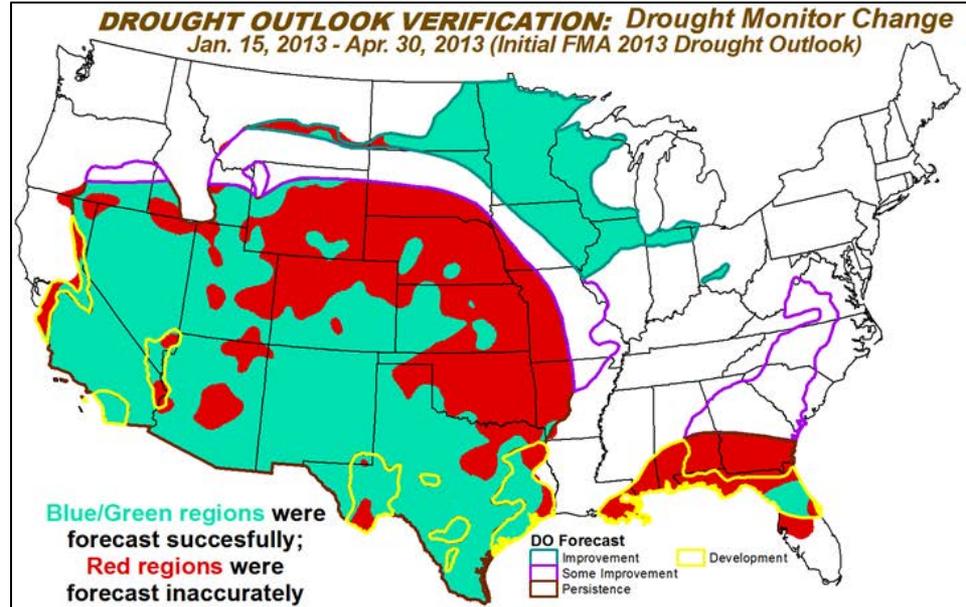
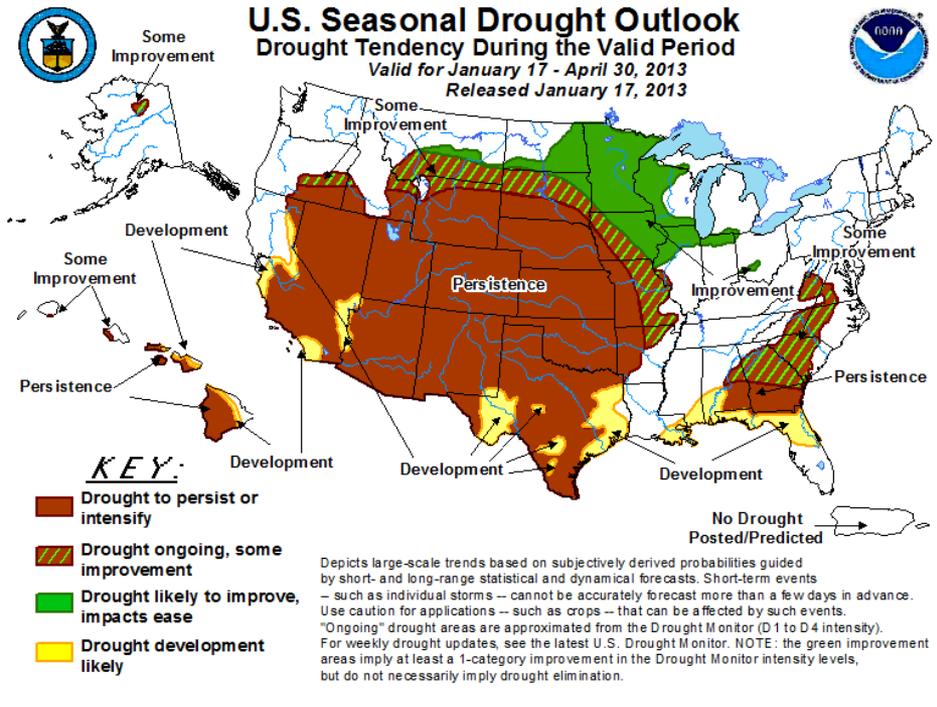
FMA13 T Observations





FMA 2013 Initial Drought Outlook Verification & Skill

(Released 1/17)



Heidke Skill Score – FMA13 Precipitation

Non-Equal Chance (non EC)	64.10
All forecasts	32.33
% Coverage not EC forecast	50.43

Heidke Skill Score – FMA13 Temperatures

Non-Equal Chance (non EC)	-9.57
All forecasts	-4.74
% Coverage not EC forecast	49.57

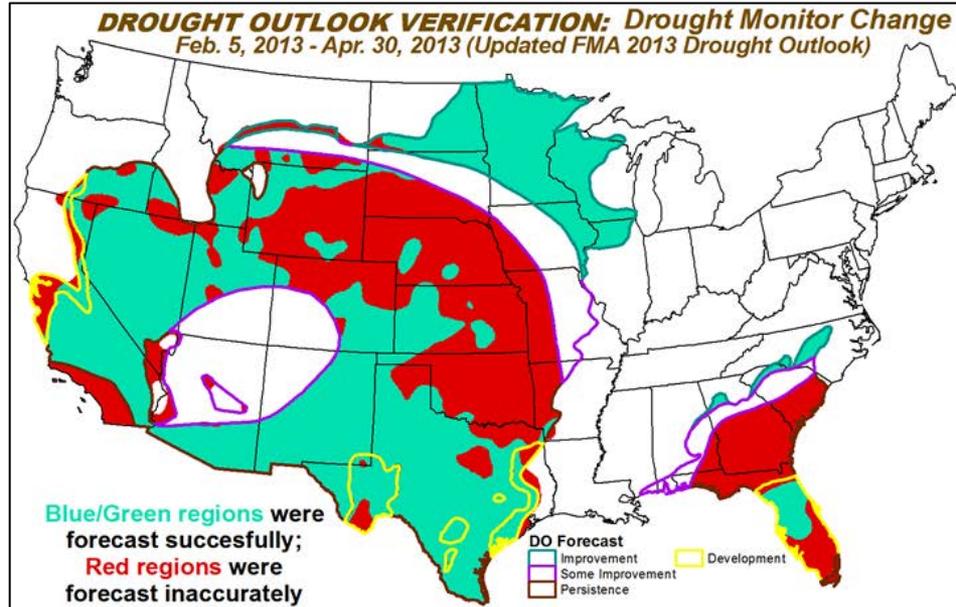
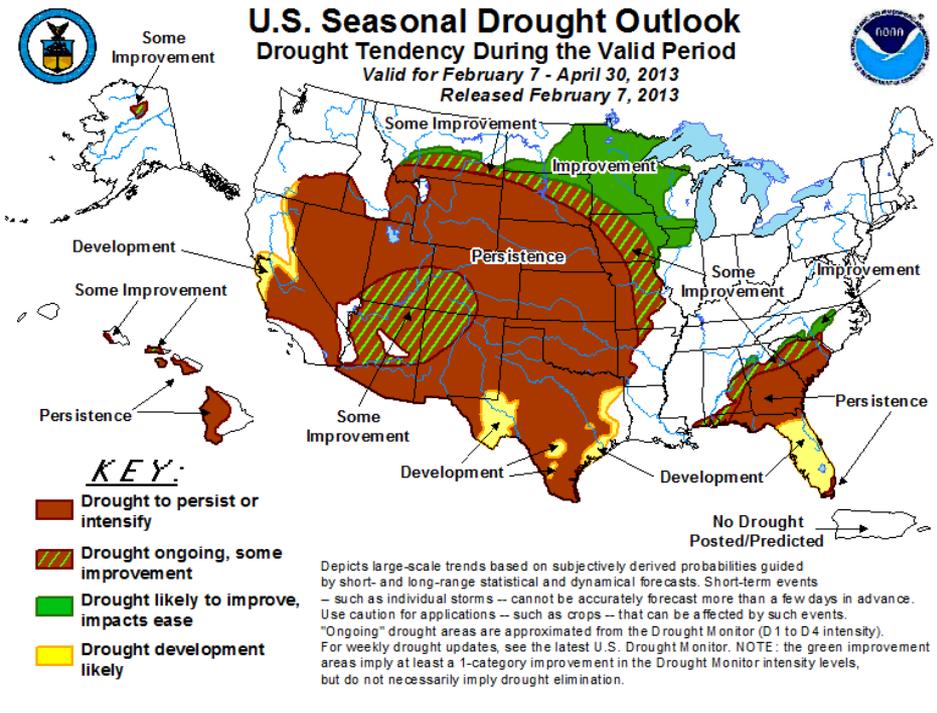
(Worst possible score = -50
 Best possible score = 100
 Climatology (All EC) = 0)

FORECAST	HIT	MISS
Improvement	34,869	1,589
Persistence	123,864	83,174
Development	13,583	13,476
TOTAL	172,316	98,239
SCORE	63.7	
PERSISTENCE FORECAST BASELINE	137,038	164,949
PERSISTENCE FORECAST SCORE	45.4	
"SKILL"	<i>(forecast score) minus (persistence score)</i>	
	+18.3	



FMA 2013 Updated Drought Outlook Verification & Skill (*The Semi-Ugly*)

(Released 2/7)

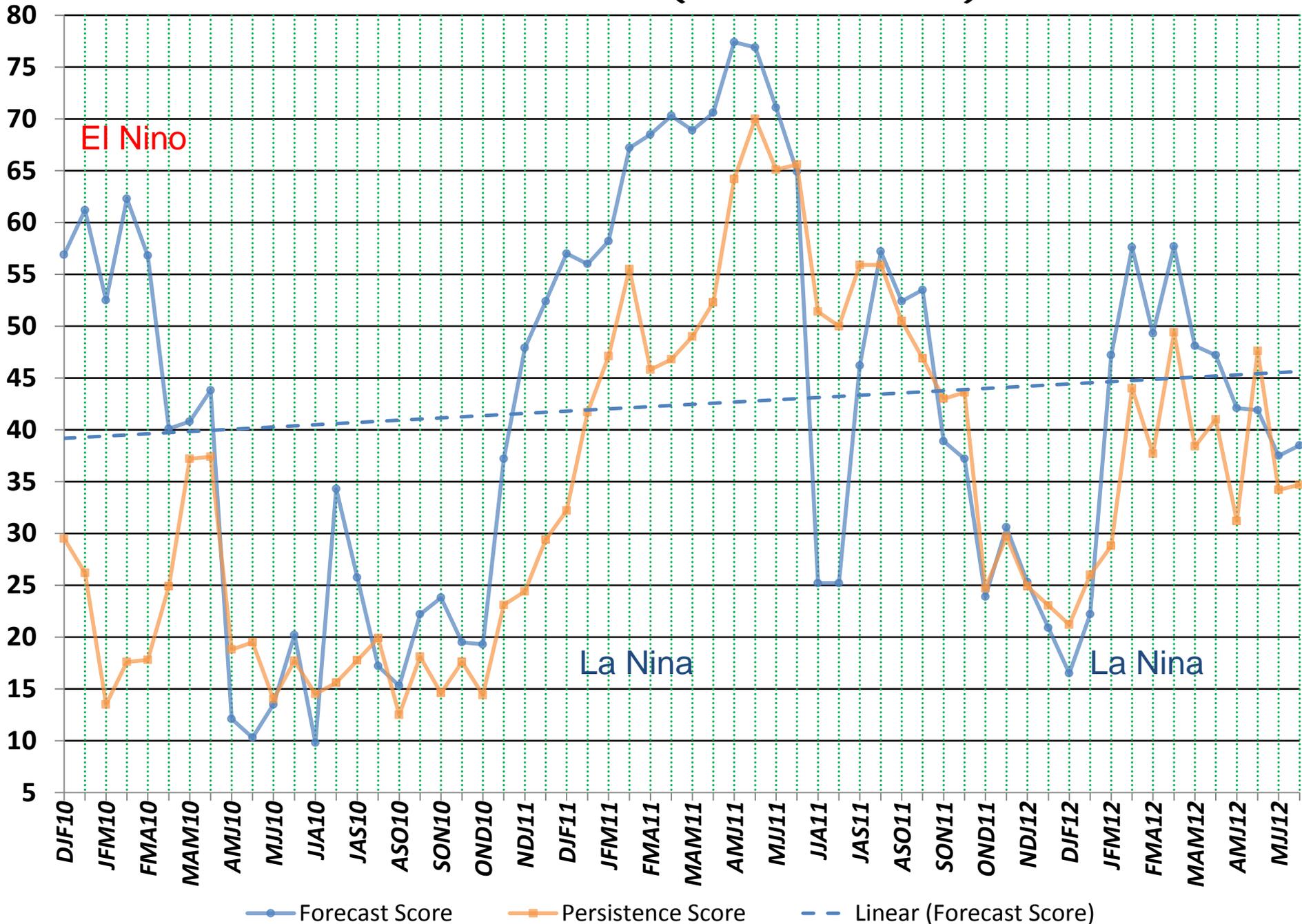


“Semi-Ugly” only because the Updated SDO should have a bit more skill in its forecast than the Initial SDO due to the updated 1-month T&P information incorporated at the end of the last month.

Overall, however, still good scores for both SDOs.

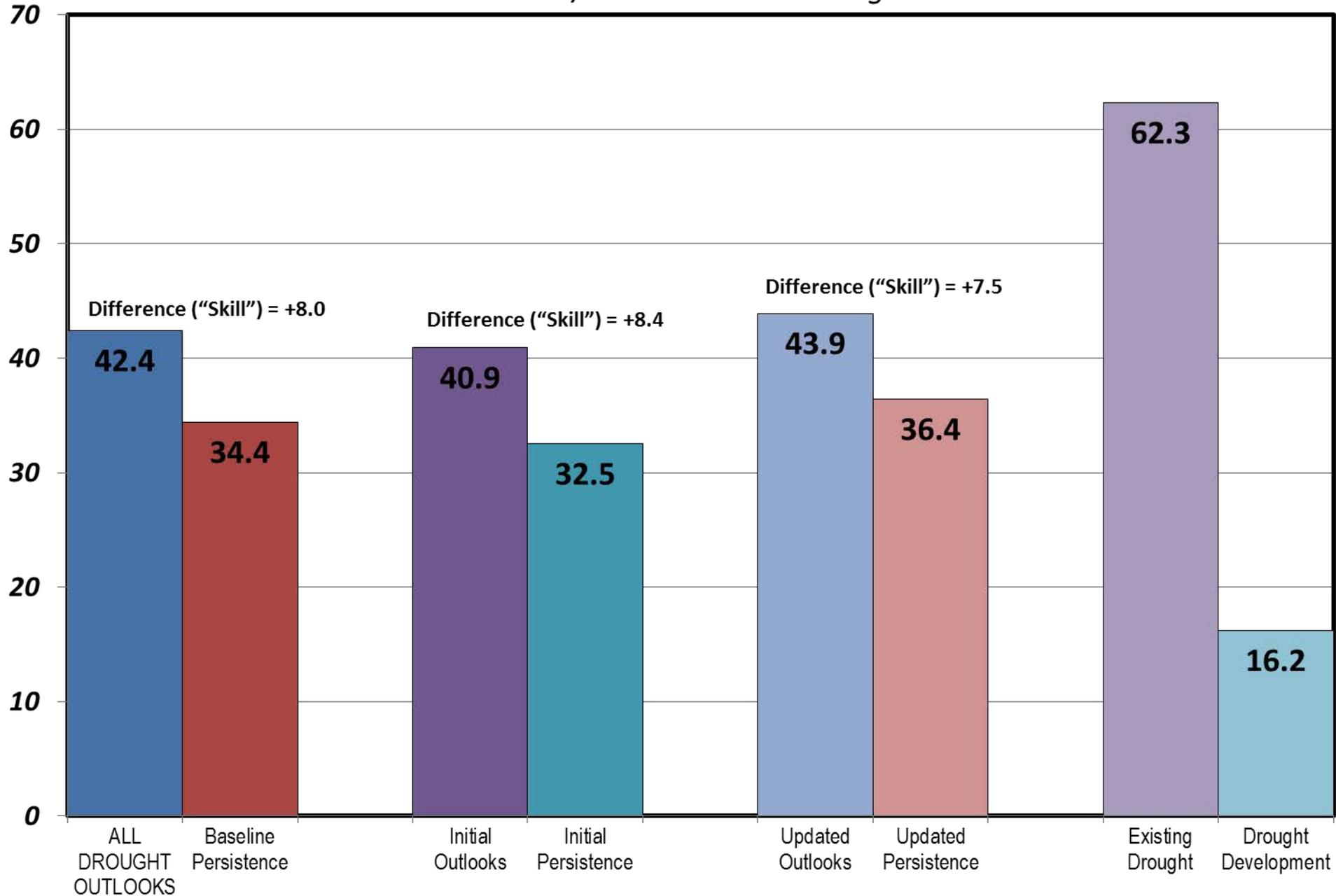
FORECAST	HIT	MISS
Improvement	30,119	1,479
Persistence	109,794	83,519
Development	10,475	13,397
TOTAL	150,388	98,395
SCORE	60.4	
PERSISTENCE FORECAST BASELINE	137,979	155,842
PERSISTENCE FORECAST SCORE	47.0	
“SKILL”	<i>(forecast score) minus (persistence score)</i>	
	+13.4	

D.O. Verification Scores (% of Pixels Hit)



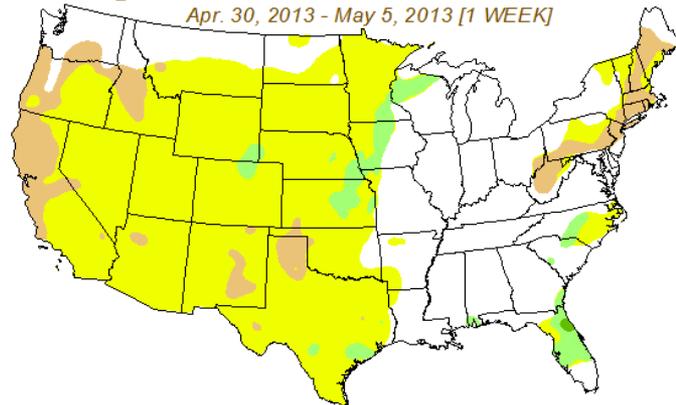
D.O. VERIFICATION: Percent of Area Accurately Forecast

DJF 2009/10 – MJJ 2012 Average

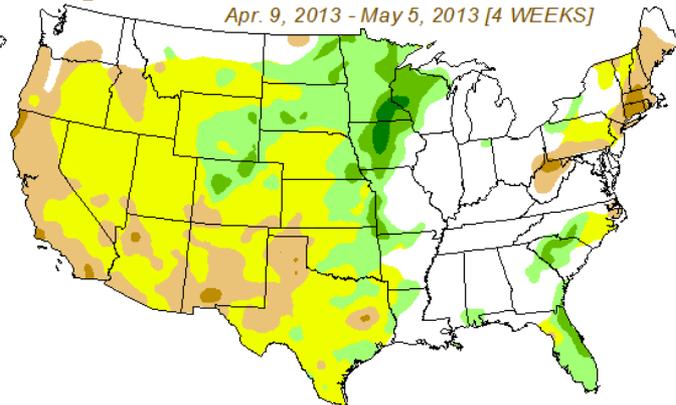


Drought Monitor Classification Changes for Selected Time Periods

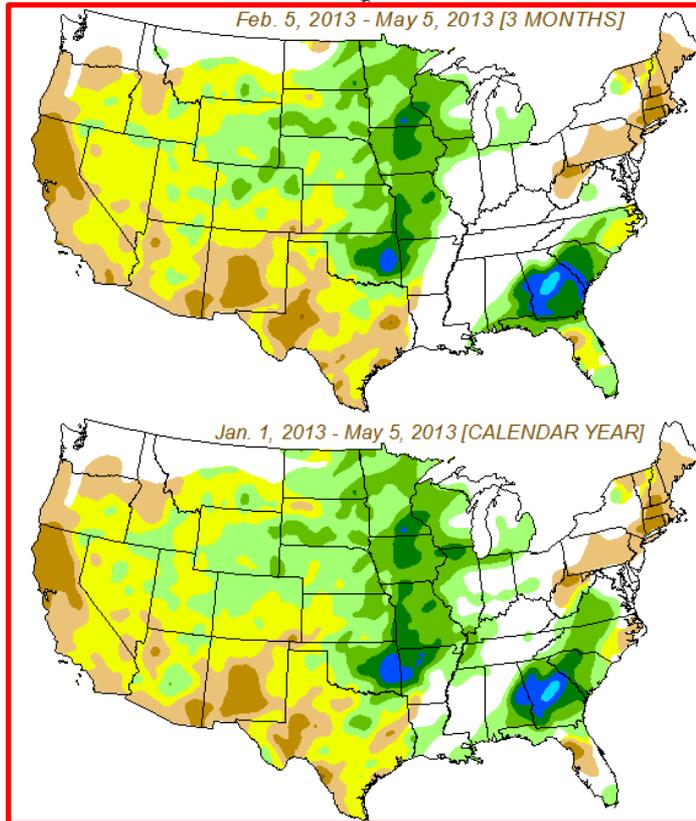
Apr. 30, 2013 - May 5, 2013 [1 WEEK]



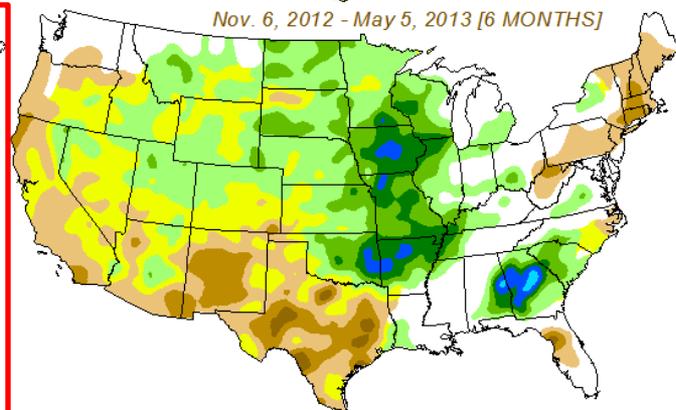
Apr. 9, 2013 - May 5, 2013 [4 WEEKS]



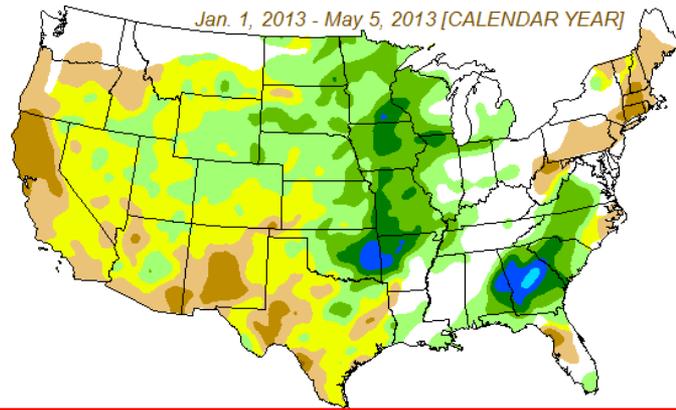
Feb. 5, 2013 - May 5, 2013 [3 MONTHS]



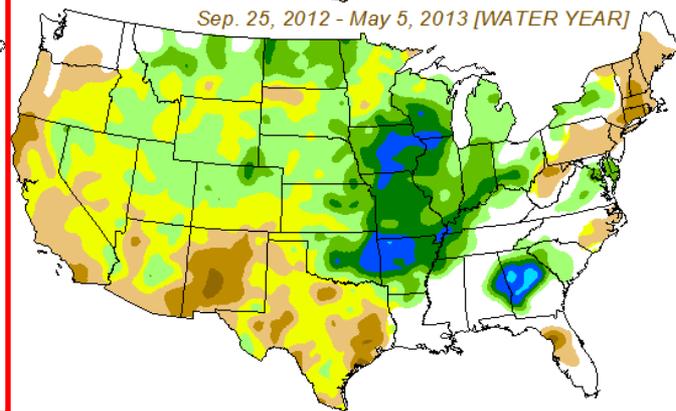
Nov. 6, 2012 - May 5, 2013 [6 MONTHS]



Jan. 1, 2013 - May 5, 2013 [CALENDAR YEAR]

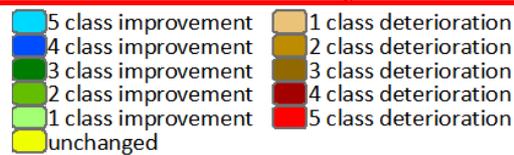


Sep. 25, 2012 - May 5, 2013 [WATER YEAR]



Updated
FMA13
USDO
(2/7)

Initial
FMA13
USDO
(1/17)



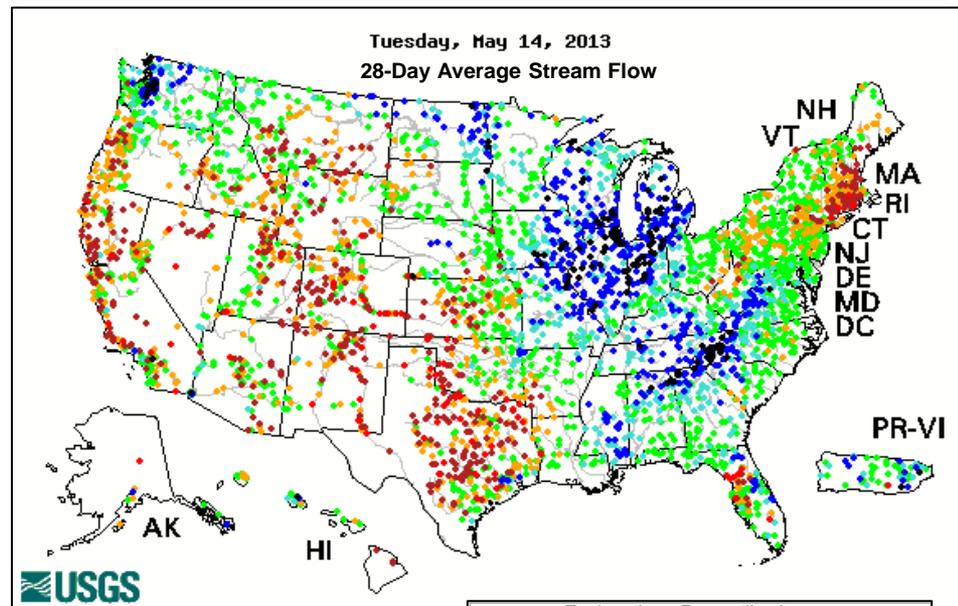
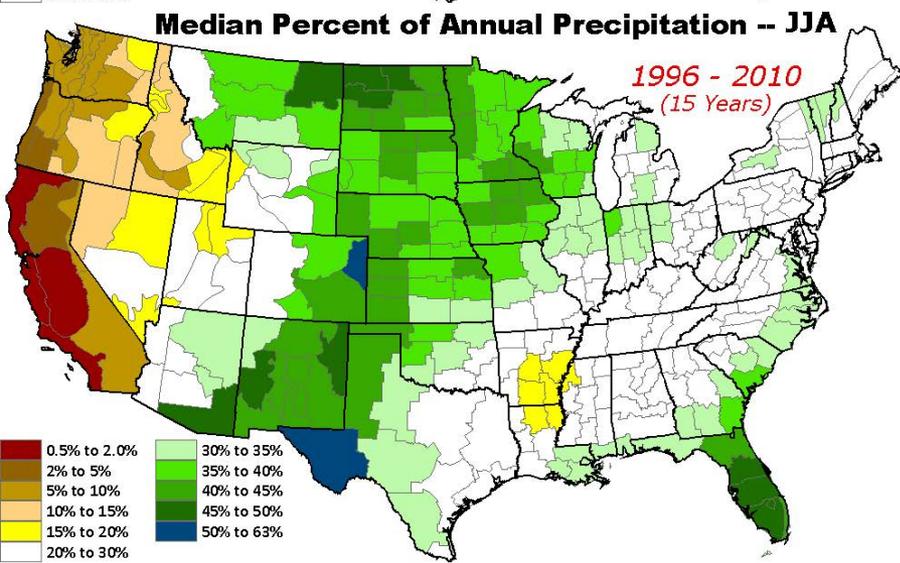
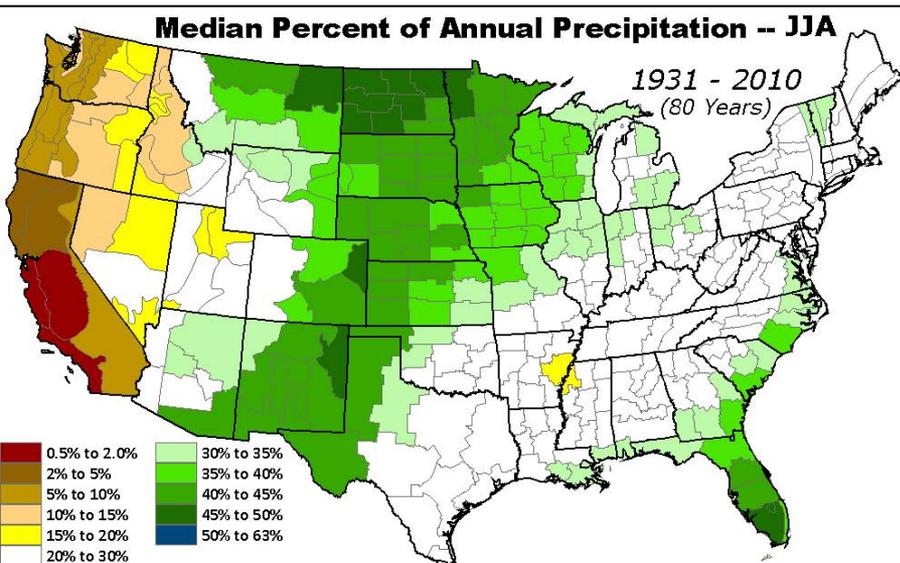
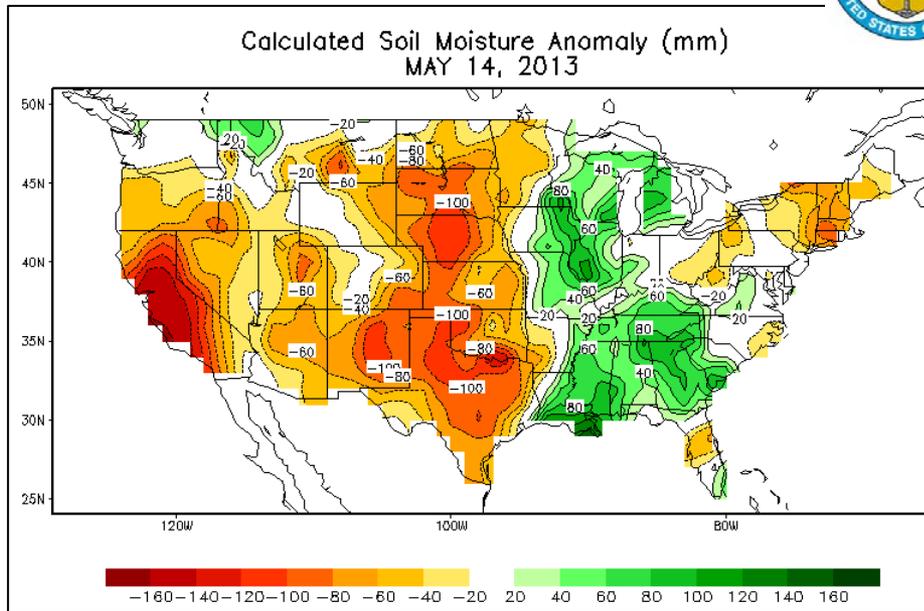
These maps depict approximate changes in drought intensity from selected initial times to the current week, with no consideration given to intervening weeks. The change calculations are based on interpolated 4 km grids of the Drought Monitor depiction, and as a result, will be smoother than if based on the published version.



Current Conditions (Soil Moisture & 28-Day Average Stream Flow)



The late spring and summer months are climatologically wet in the Nation's midsection. This is the time when major drought relief should most likely occur.



Explanation - Percentile-classes

●	●	●	●	●	●	●
<10	10-24	25-75	76-90	>90		
Low	Much below normal	Below normal	Normal	Above normal	Much above normal	High





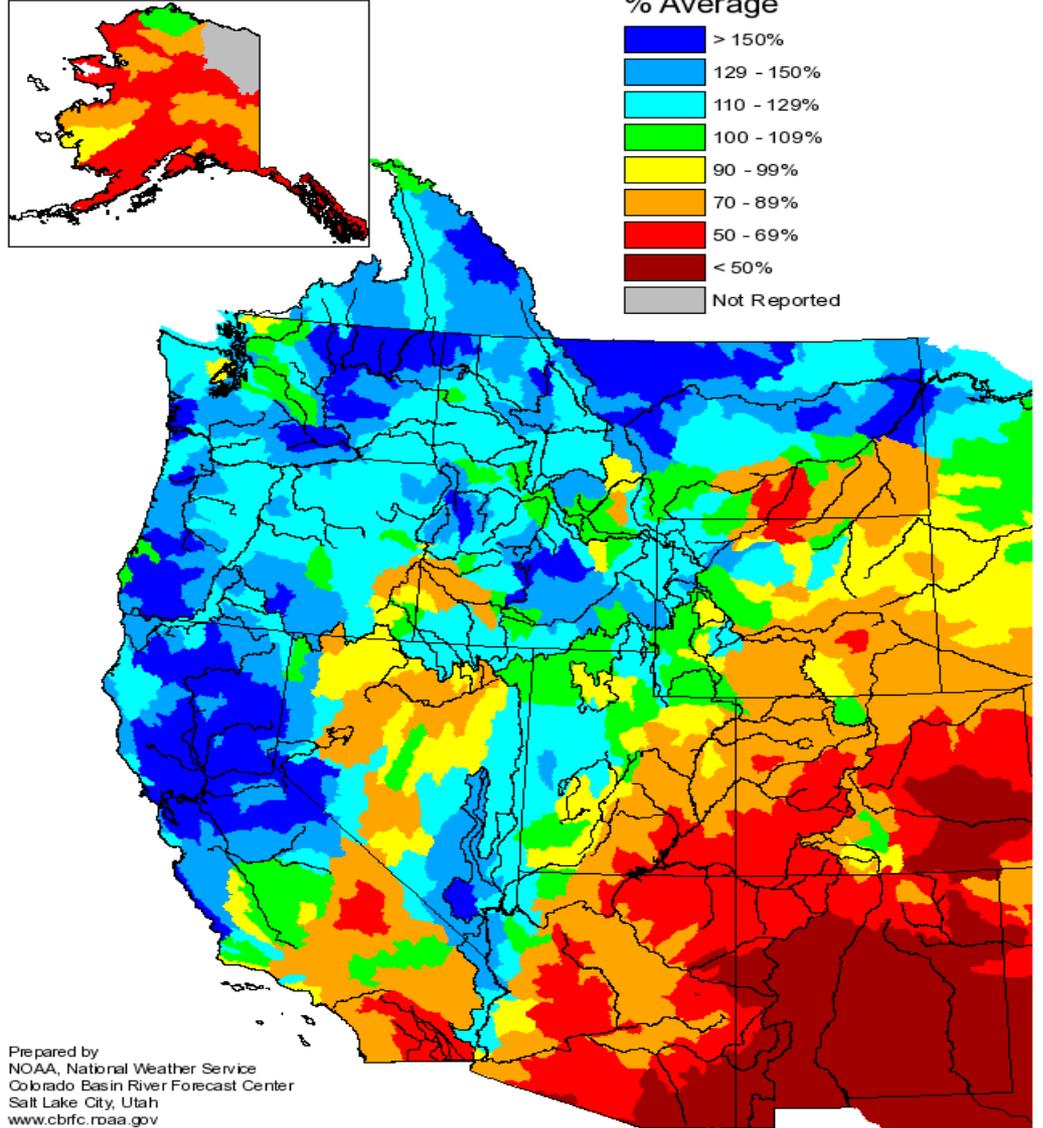
Current Conditions (West)

After a very wet November and December across most of the West, record to near-record January-April dryness negated the excellent start to the 2012-13 Water Year.

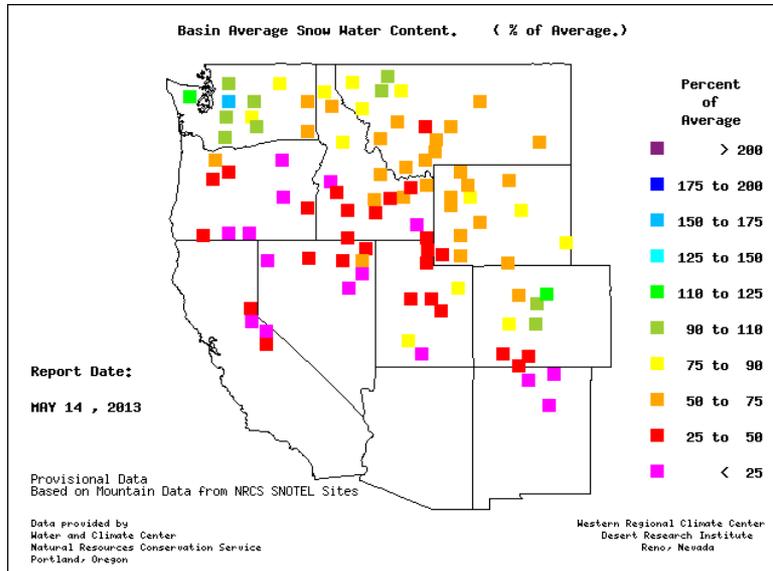
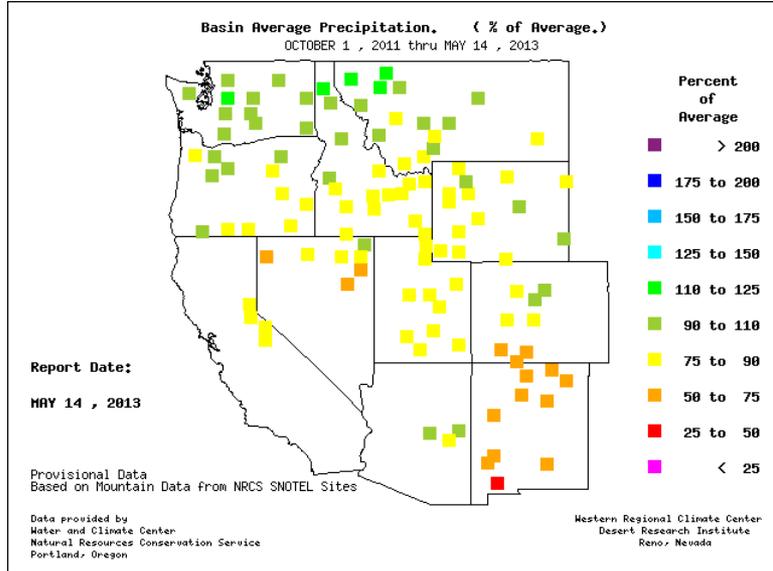


Seasonal Precipitation, October 2012 - December 2012

(Averaged by Hydrologic Unit)



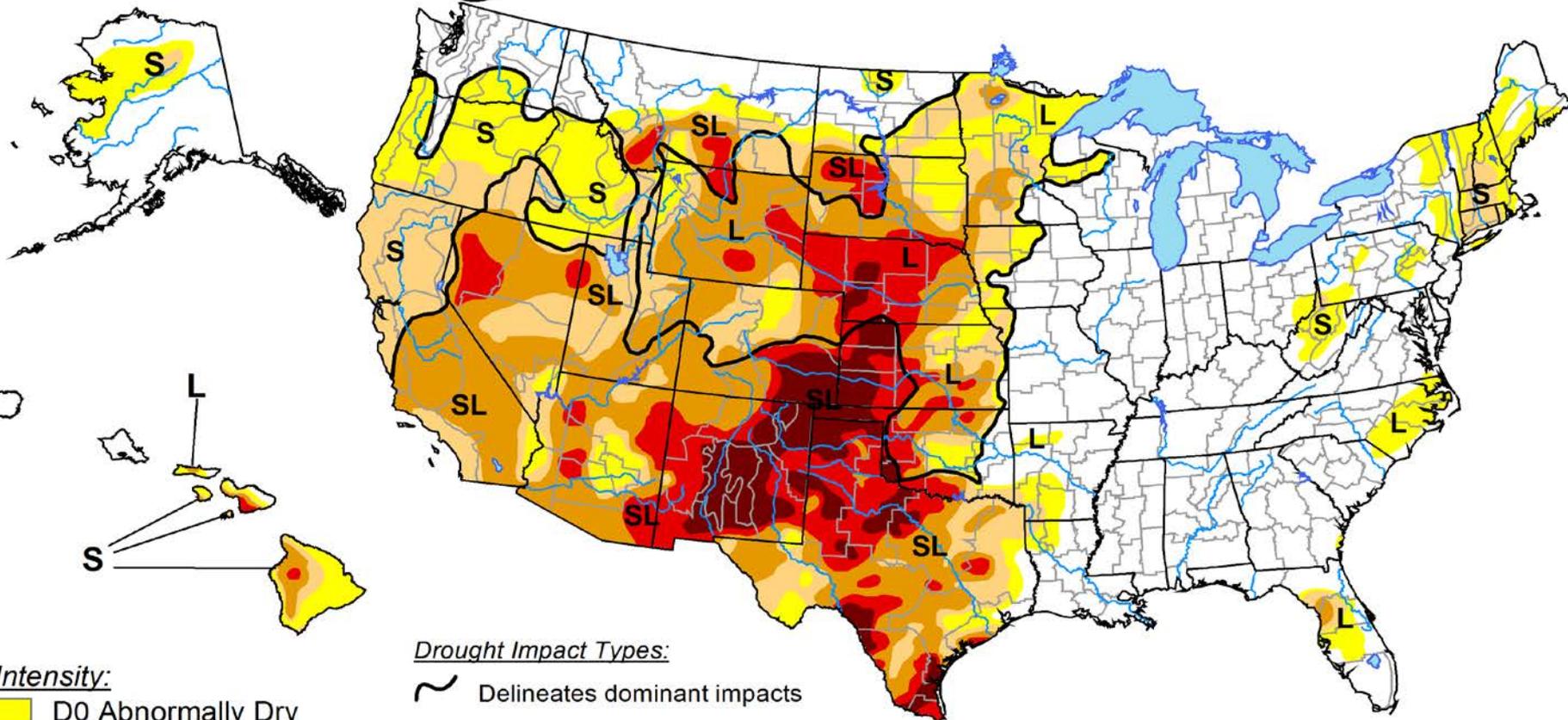
Prepared by NOAA, National Weather Service Colorado Basin River Forecast Center Salt Lake City, Utah www.cbifc.noaa.gov



U.S. Drought Monitor

May 14, 2013

Valid 8 a.m. EDT



Intensity:

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

Drought Impact Types:

-  Delineates dominant impacts
- S = Short-Term, typically <6 months
(e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months
(e.g. hydrology, ecology)

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

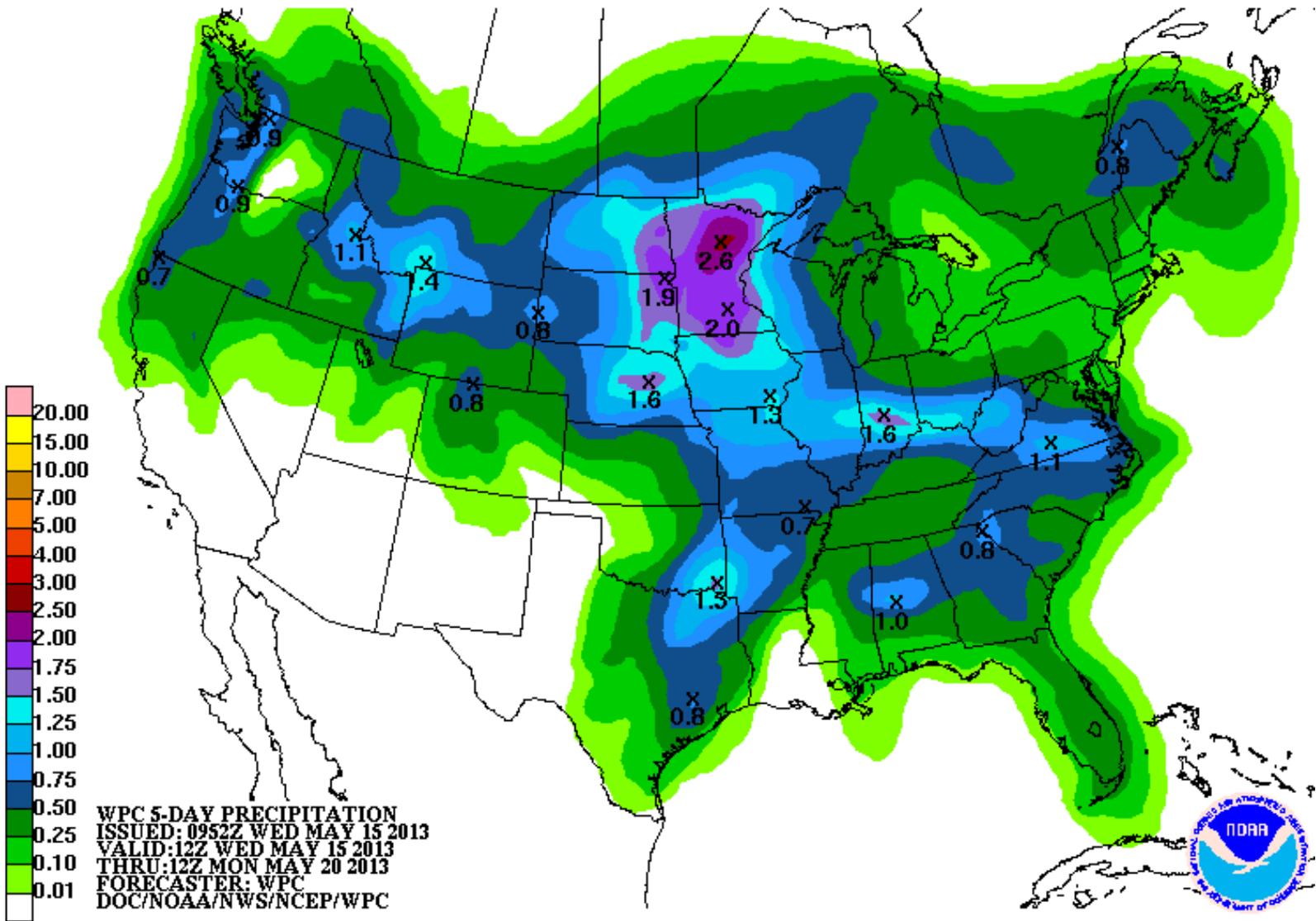
<http://droughtmonitor.unl.edu/>



Released Thursday, May 16, 2013

Author: Rich Tinker, NOAA/NWS/NCEP/CPC

Current Forecasts (5-Day Total Precipitation)



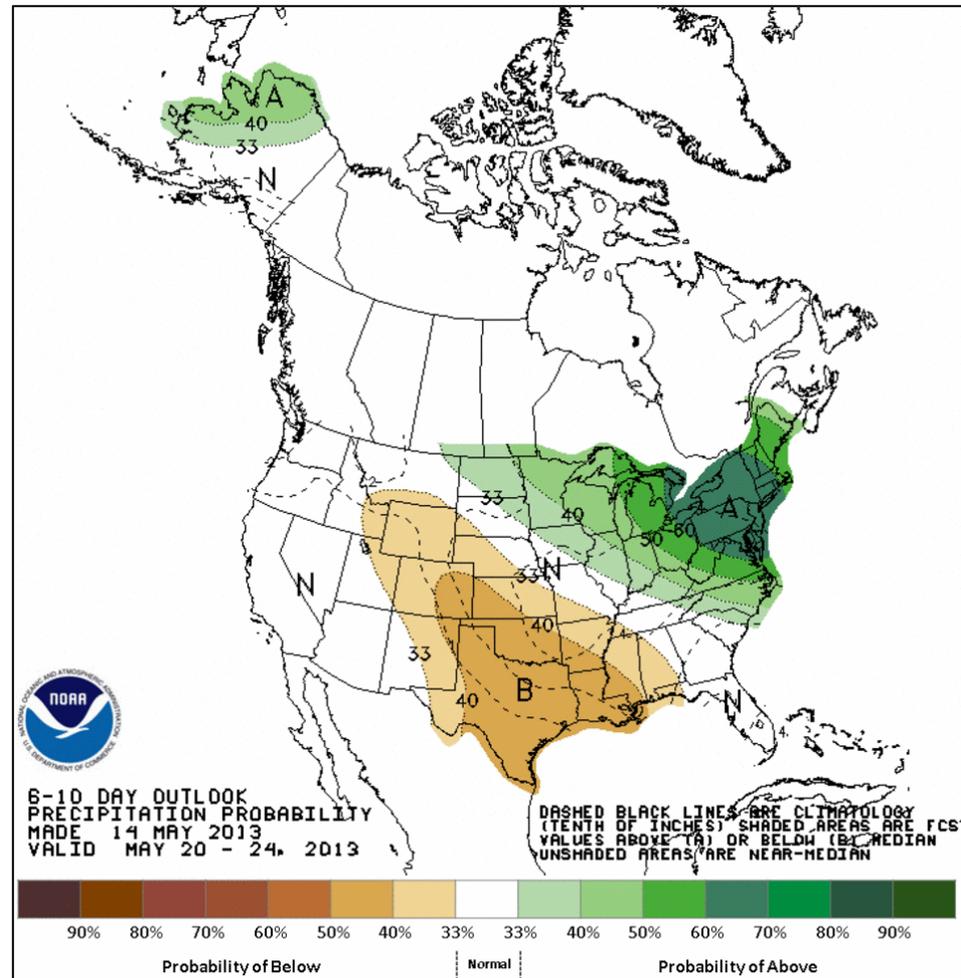
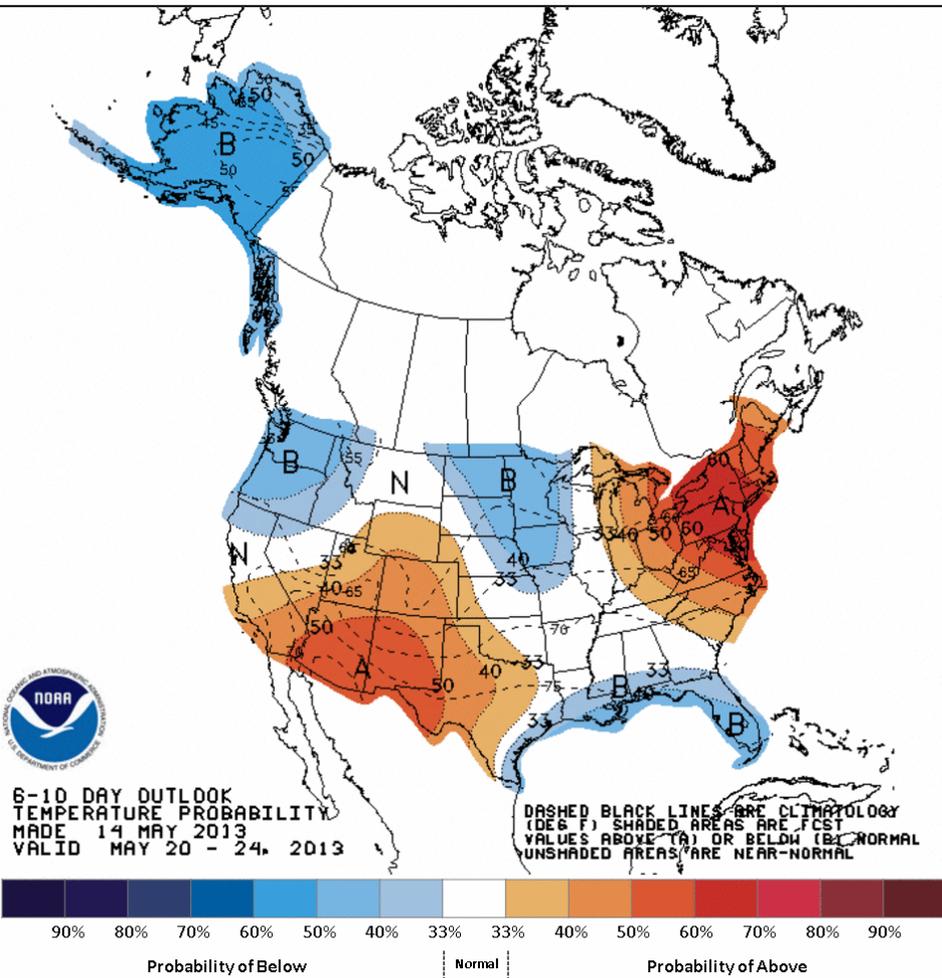
After turning dry recently, widespread moderate to heavy precipitation is expected in the northern Rockies and Plains and upper Midwest. Unfortunately, the Southwest should remain mostly dry.



Current Forecasts (6-10 Day Outlooks)



Odds are favorable for decent precipitation in the northeastern quarter of the U.S. during May 20-24, with a tilt toward drier weather in the southern & central Plains and western half of the Gulf Coast. The Southwest & Northeast should be warm while Pacific Northwest, upper Midwest, and immediate Gulf Coast is cool.

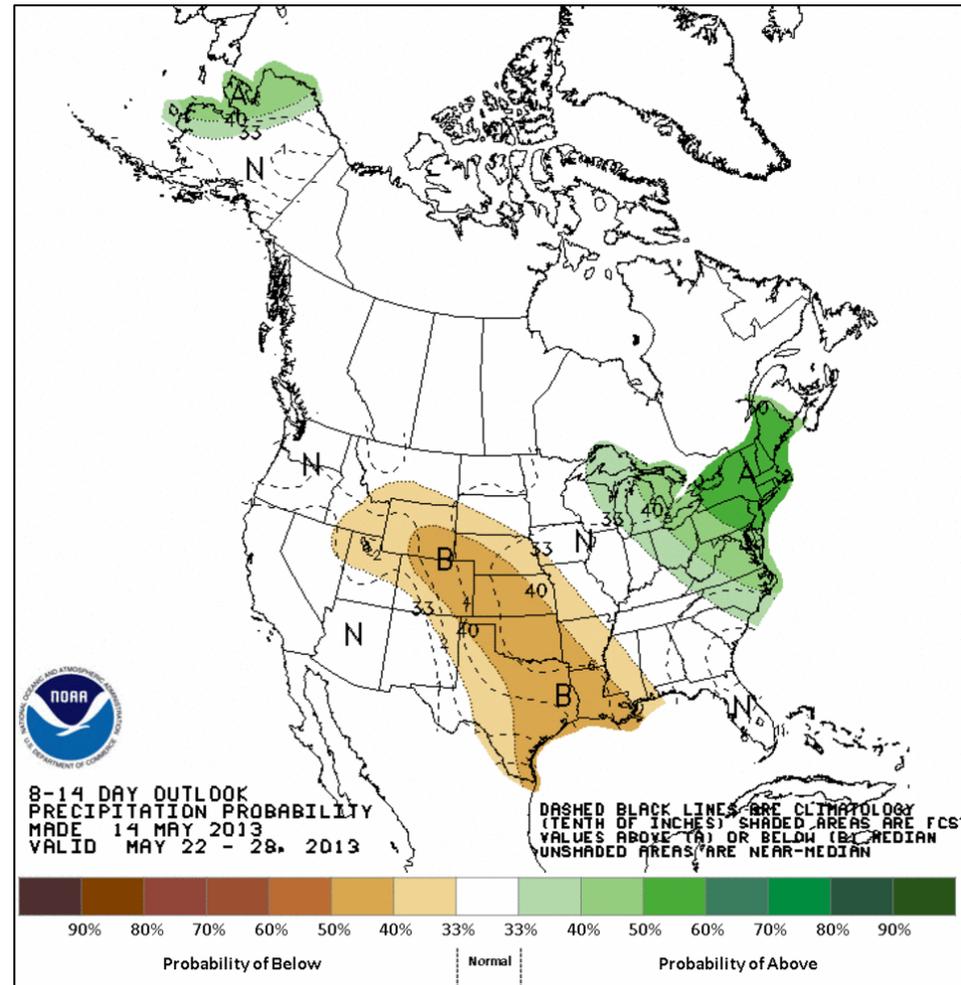
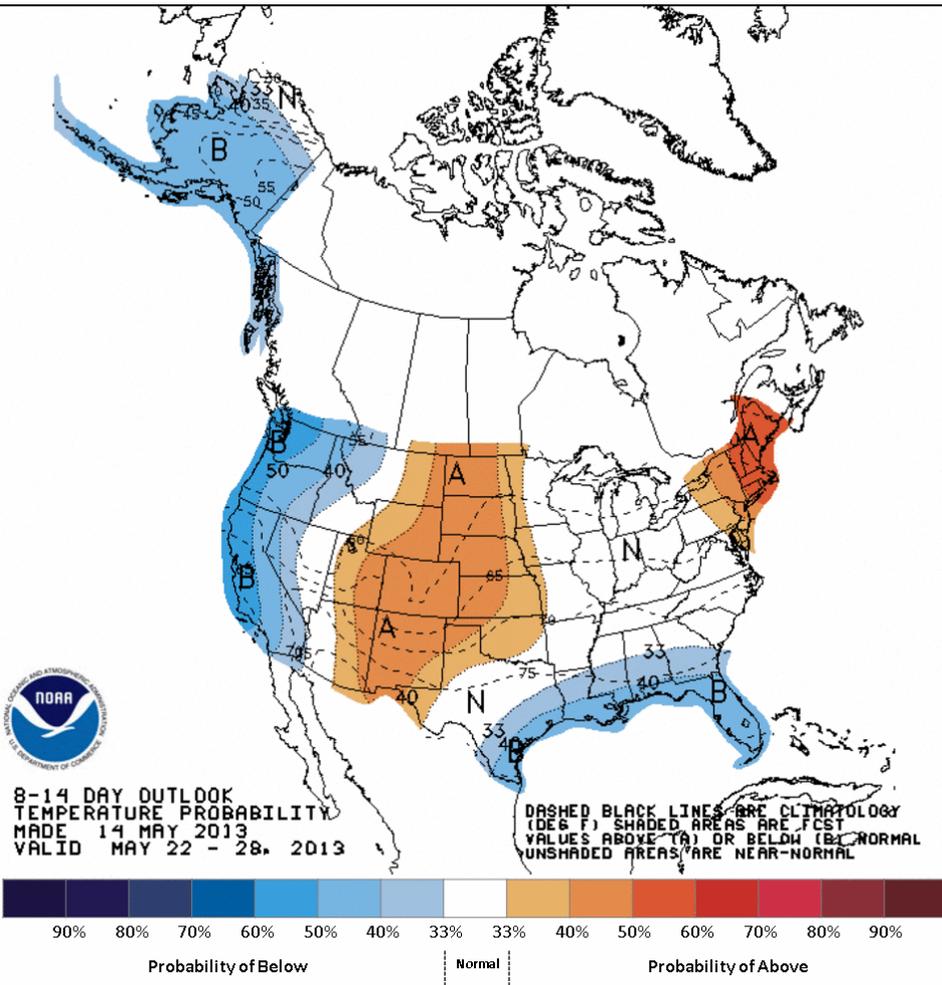




Current Forecasts (8-14 Day Outlooks)



Chances are favorable for decent precipitation in the Northeast during May 22-28, with drier weather probable in the central & southern Plains and western half of the Gulf Coast. Temperatures should average below median in the Far West and immediate Gulf Coast while the Rockies, High Plains, and New England is warm.





Recent Conditions (3-Month running ONI)



Recent Pacific warm (red) and cold (blue) episodes based on a threshold of +/- 0.5 °C for the Oceanic Nino Index (ONI) [3 month running mean of ERSST.v3b SST anomalies in the Nino 3.4 region (5N-5S, 120-170W)]. For historical purposes El Niño and La Niña episodes are defined when the threshold is met for a minimum of 5 consecutive over-lapping seasons. The complete table going back to DJF 1950 can be found by clicking: [Historical ONI Values](#)

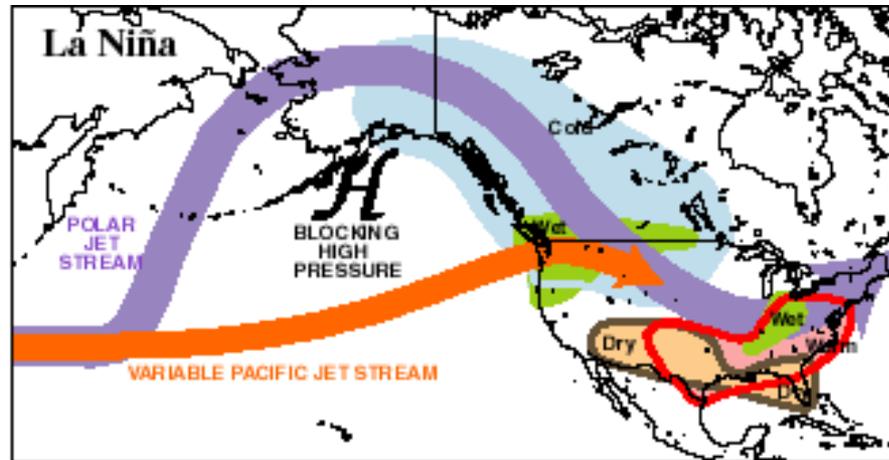
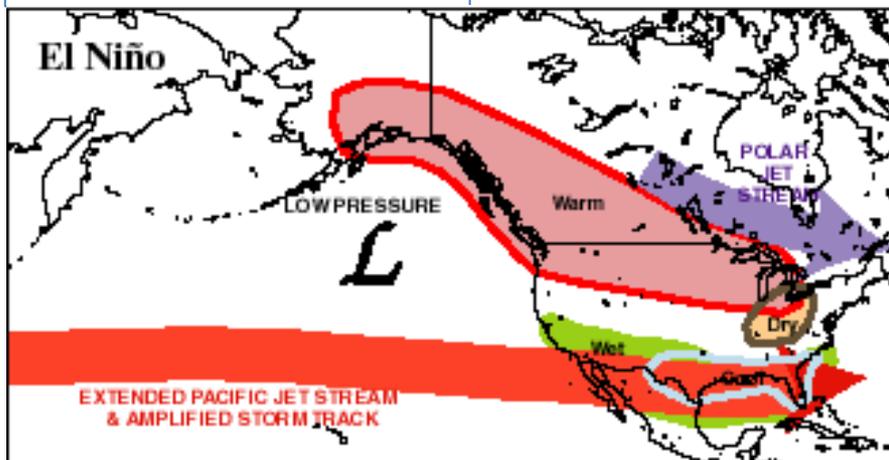
Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2002	-0.2	0.0	0.1	0.3	0.5	0.7	0.8	0.8	0.9	1.2	1.3	1.3
2003	1.1	0.8	0.4	0.0	-0.2	-0.1	0.2	0.4	0.4	0.4	0.4	0.3
2004	0.3	0.2	0.1	0.1	0.2	0.3	0.5	0.7	0.8	0.7	0.7	0.7
2005	0.6	0.4	0.3	0.3	0.3	0.3	0.2	0.1	0.0	-0.2	-0.5	-0.8
2006	-0.9	-0.7	-0.5	-0.3	0.0	0.1	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									
2014												

Blue = La Nina

Red = El Niño

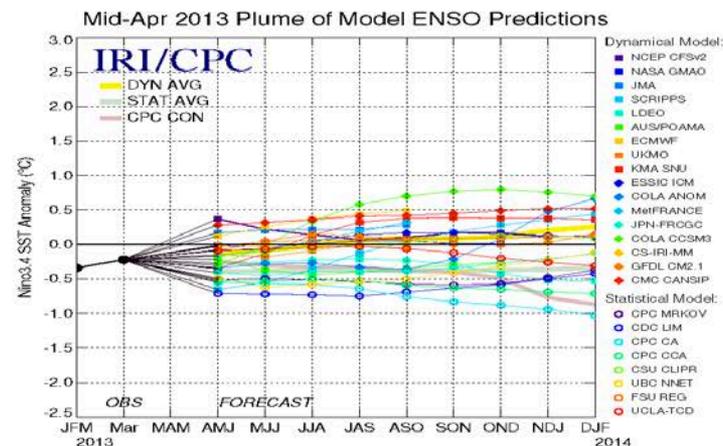
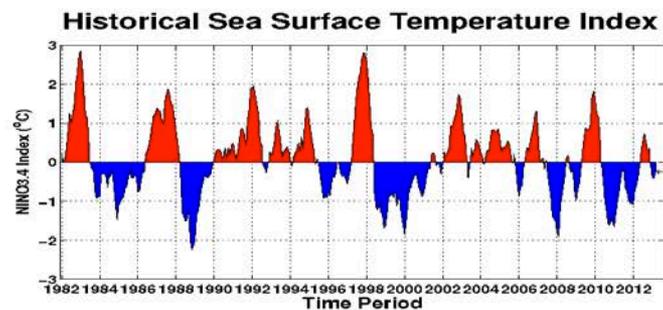
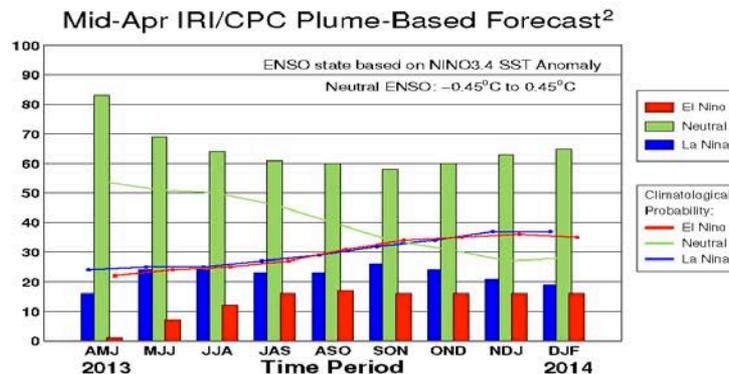
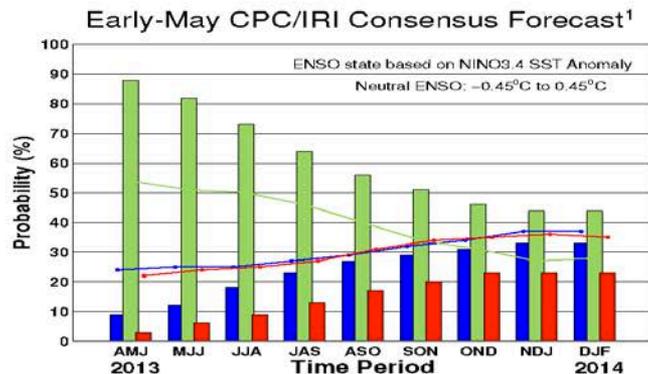
Black = ENSO Neutral

Winter & early spring months:



ENSO QUICK LOOK May 9, 2013 A monthly summary of the status of El Niño, La Niña and the Southern Oscillation, or “ENSO”, based on NINO3.4 index (120-170W, 5S-5N)

During March through April the observed ENSO conditions remained in the neutral ENSO condition. Most of the ENSO prediction models indicate a continuation of neutral ENSO into northern autumn, but a few statistical models call for cooling toward weak La Niña conditions and an even smaller set of dynamical models predict warming toward borderline El Niño conditions.



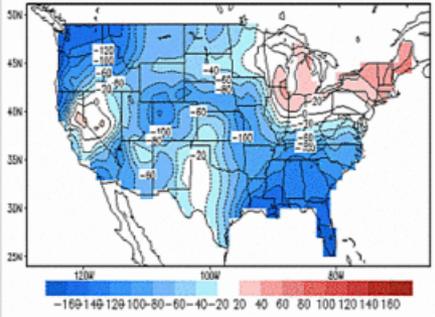
Historically Speaking

Since we are at and expected to be at ENSO-Neutral conditions for a while, then what are our outlooks based upon? Empirical (Statistical) and Dynamical models.

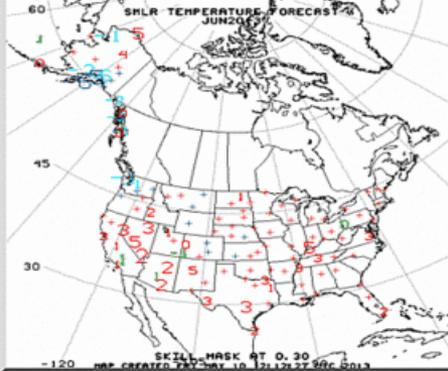
JUN 2013 [Temperature]

CAS

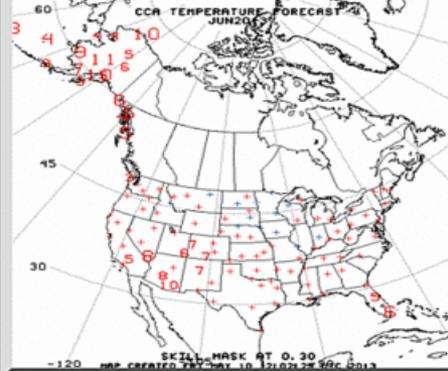
Lagged Averaged Temperature Outlook for JUN 2013
units: anomaly (sdX100), SM data ending at 20130508



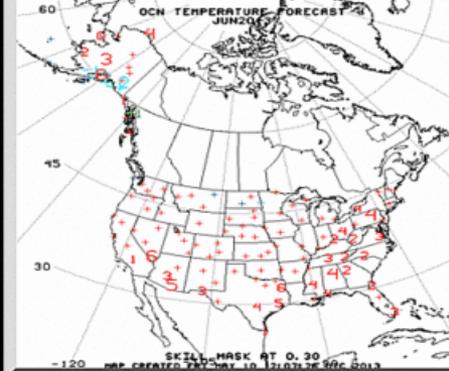
SMLR



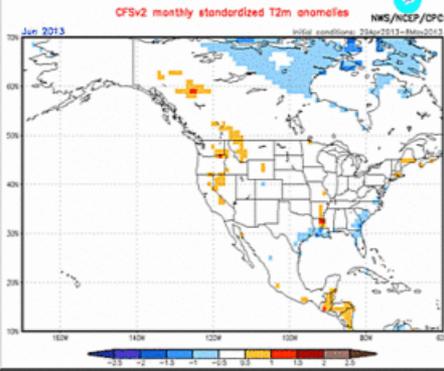
CCA



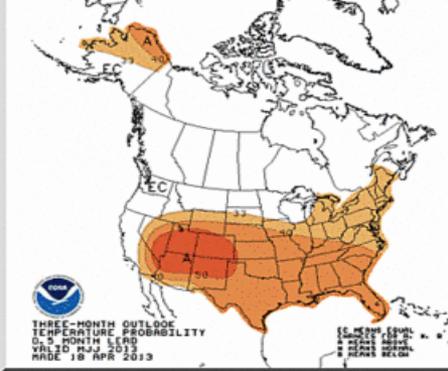
OCN



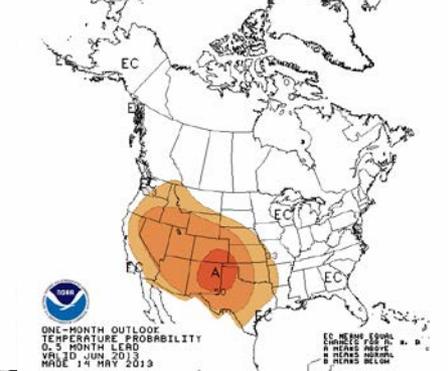
CFSv2 (Standardized)



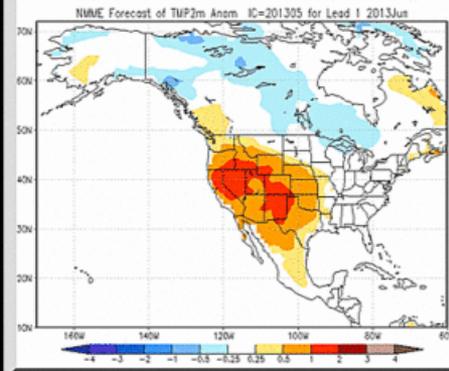
PREV-SNL



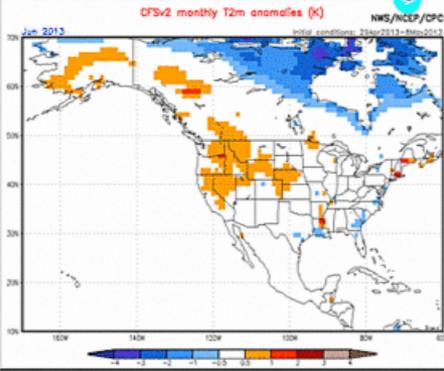
** NEW-OTLK **



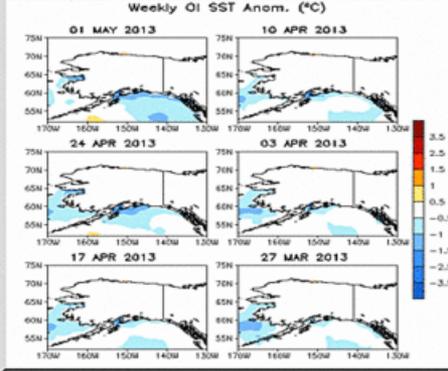
NMME



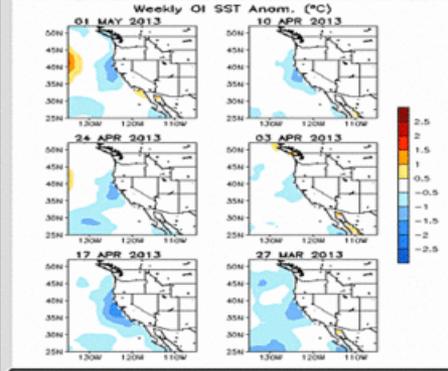
CFSv2



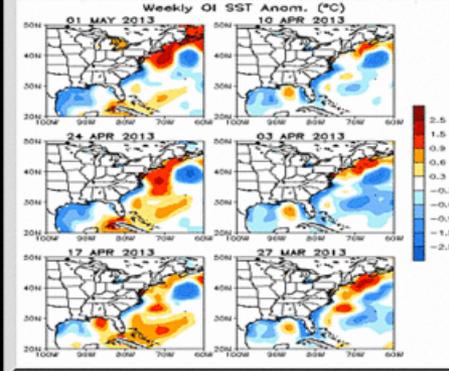
WEEKLY SSTs



WEEKLY SSTs

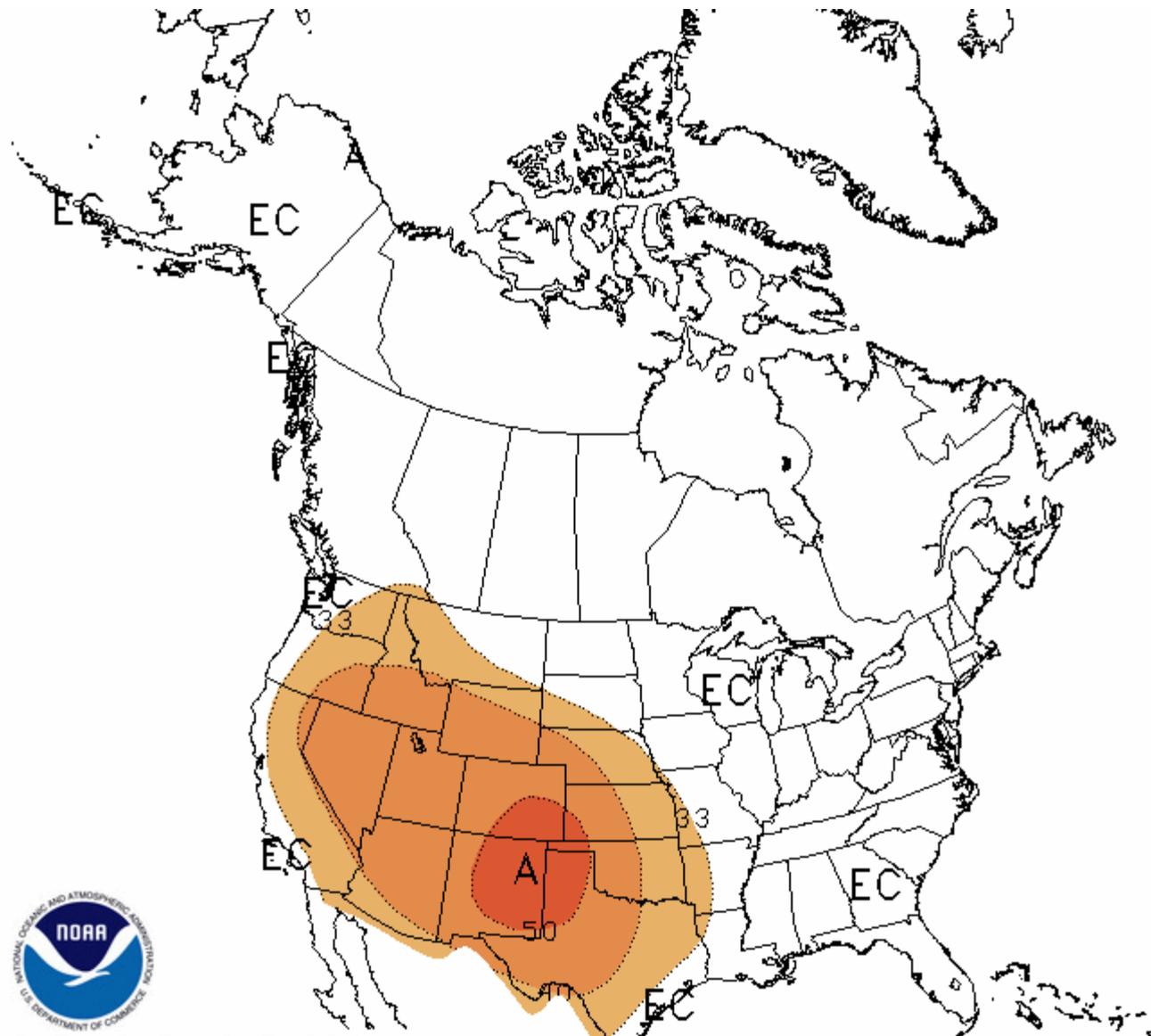


WEEKLY SSTs





Current Forecasts (1-Month [June13] Temperature Outlook)



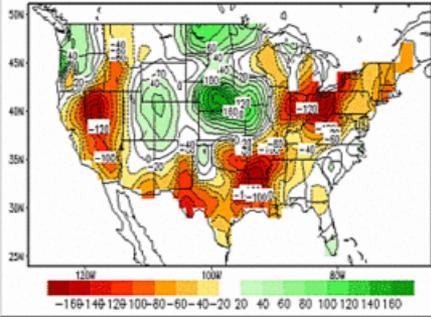
ONE-MONTH OUTLOOK
 TEMPERATURE PROBABILITY
 0.5 MONTH LEAD
 VALID JUN 2013
 MADE 14 MAY 2013

EC MEANS EQUAL
 CHANCES FOR A, N, B
 A MEANS ABOVE
 N MEANS NORMAL
 B MEANS BELOW

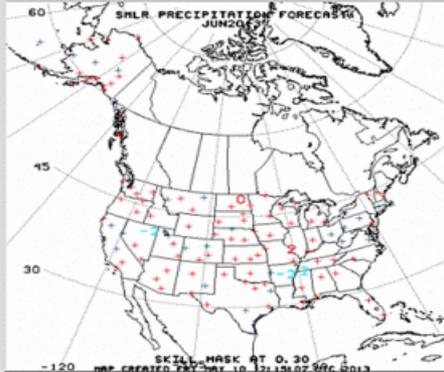
JUN 2013 [Precipitation]

CAS

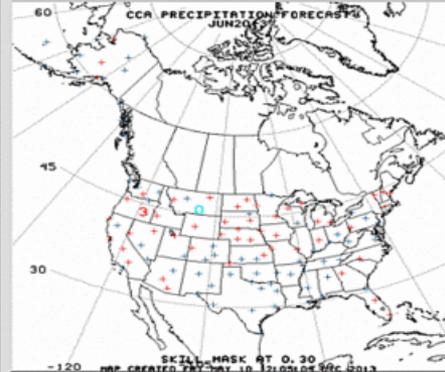
Logged Averaged Precipitation Outlook for JUN 2013
units: anomaly (sdX100), SM data ending at 20130508



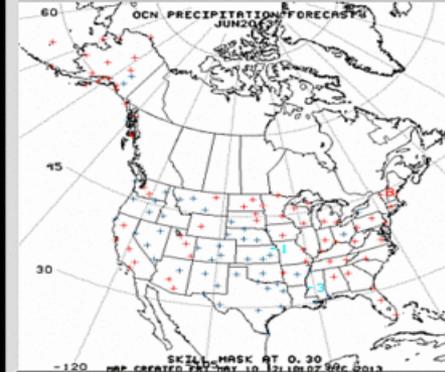
SMLR



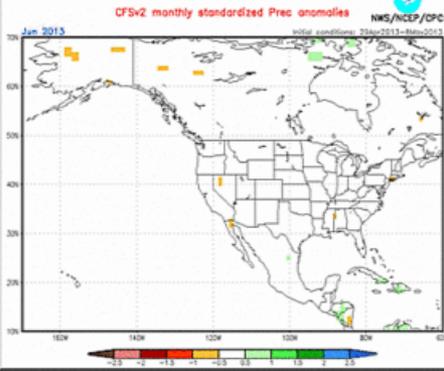
CCA



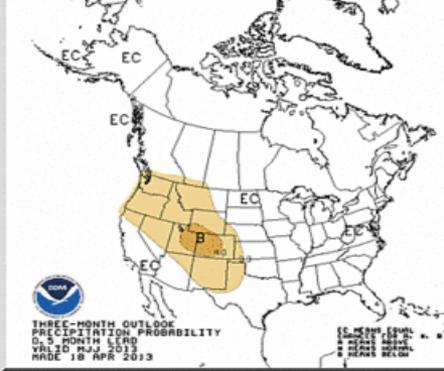
OCN



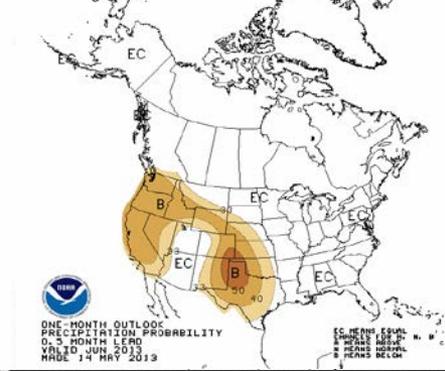
CFSv2 (Standardized)



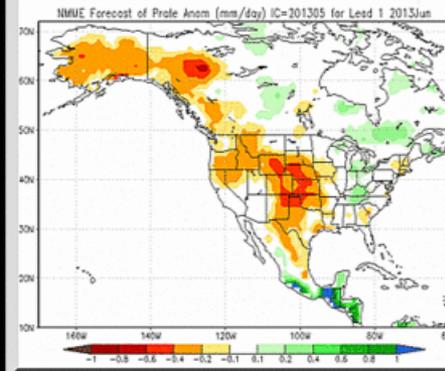
PREV-SNL



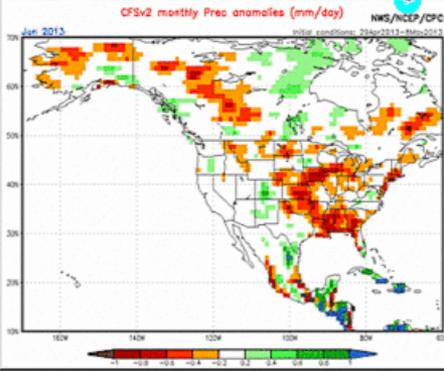
** NEW-OTLK **



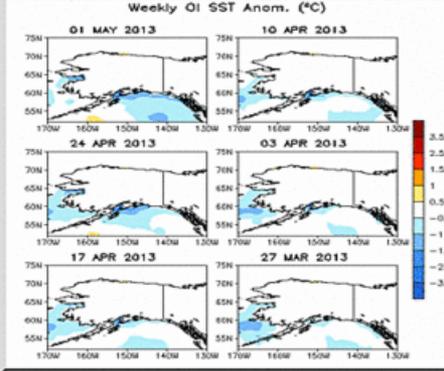
NMME



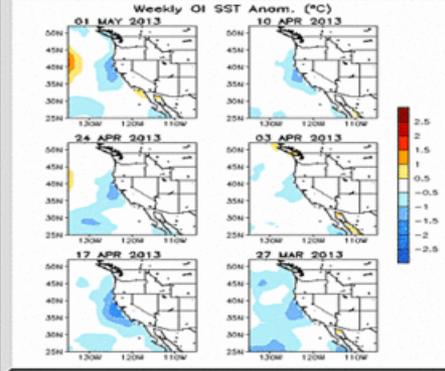
CFSv2



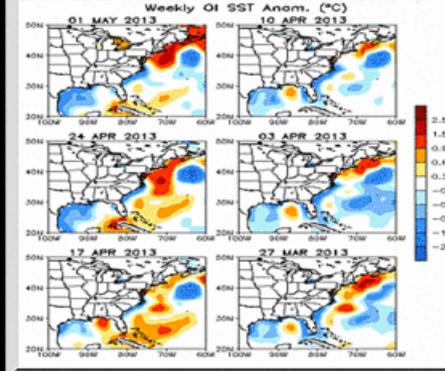
WEEKLY SSTs



WEEKLY SSTs

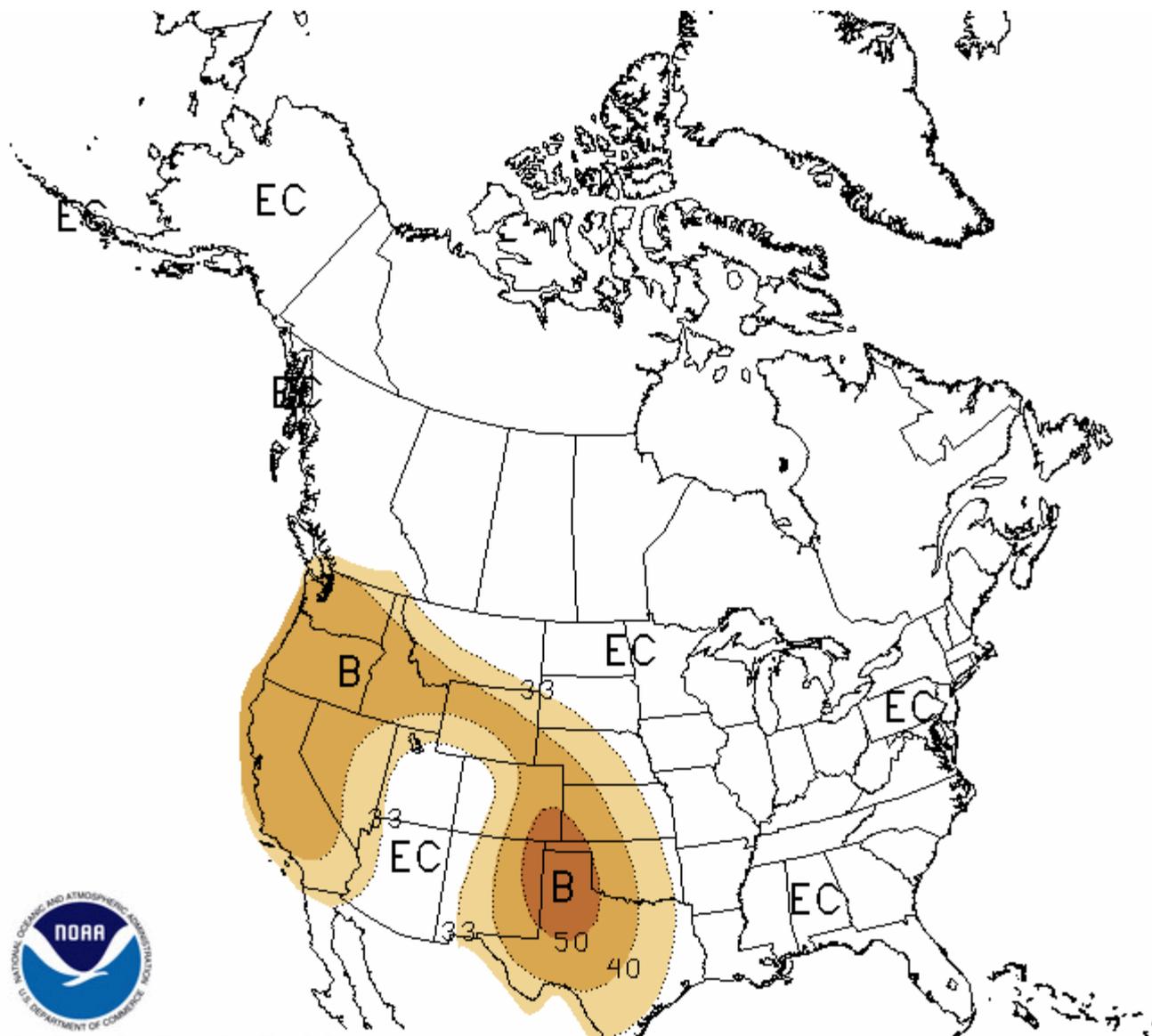


WEEKLY SSTs





Current Forecasts (1-Month [June13] Precipitation Outlook)



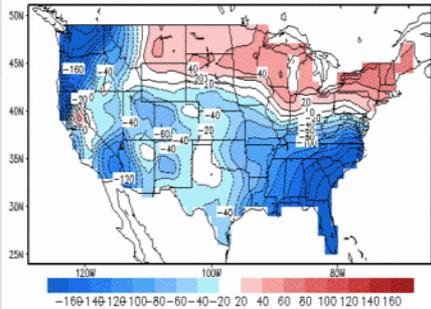
ONE-MONTH OUTLOOK
 PRECIPITATION PROBABILITY
 0.5 MONTH LEAD
 VALID JUN 2013
 MADE 14 MAY 2013

EC MEANS EQUAL
 CHANCES FOR A, N, B
 A MEANS ABOVE
 N MEANS NORMAL
 B MEANS BELOW

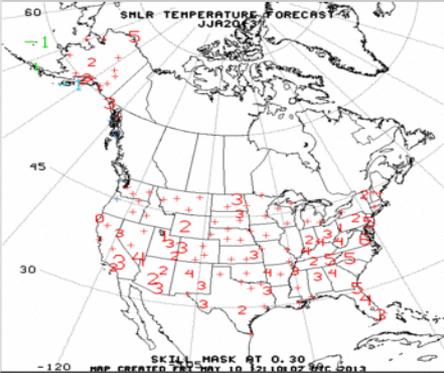
JJA Season [Temperature]

CAS

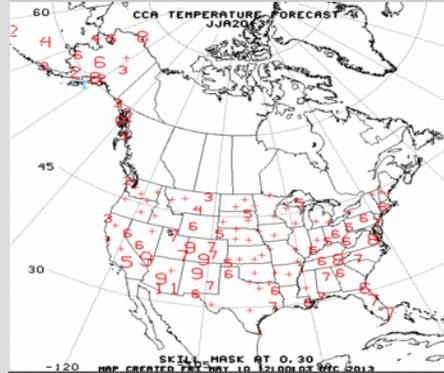
Lagged Averaged Temperature Outlook for JJA 2013
units: anomaly (sdX100), SM data ending at 20130508



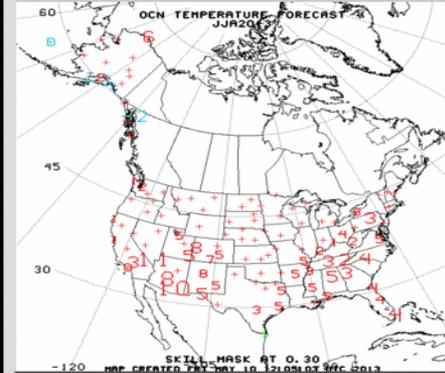
SMLR



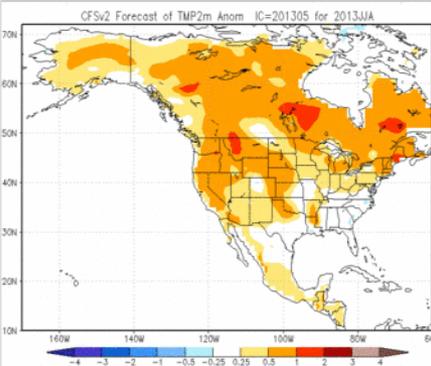
CCA



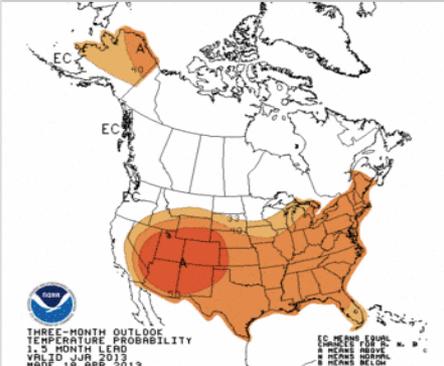
OCN



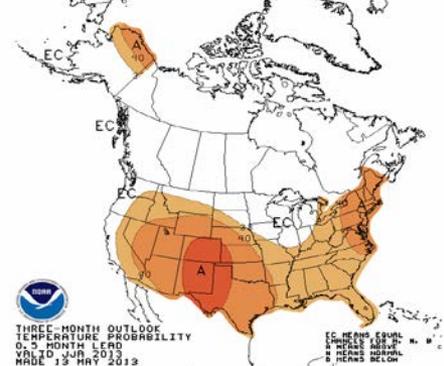
CFSv2



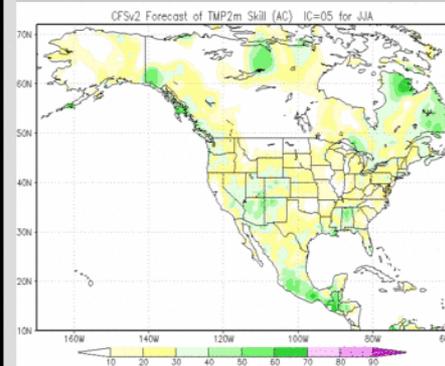
OLD OUTLOOK



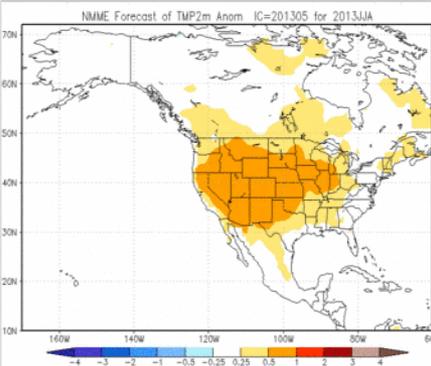
** NEW OUTLOOK **



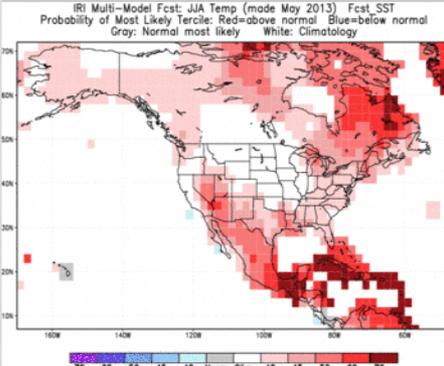
CFSv2 (skill)



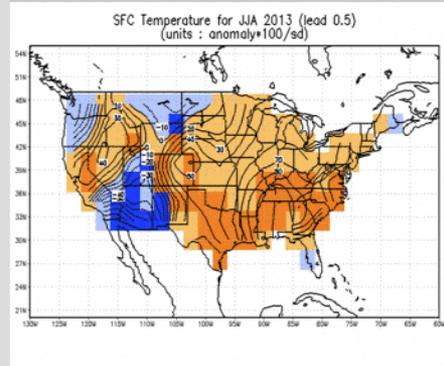
NMME



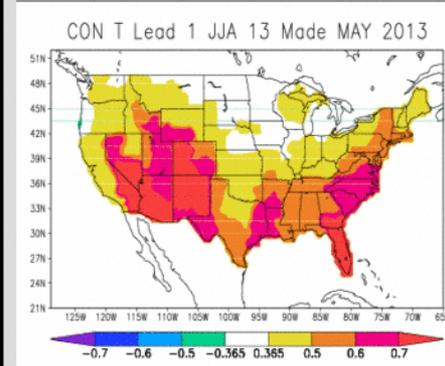
IRI



ENSEMBLE CCA (ECCA)

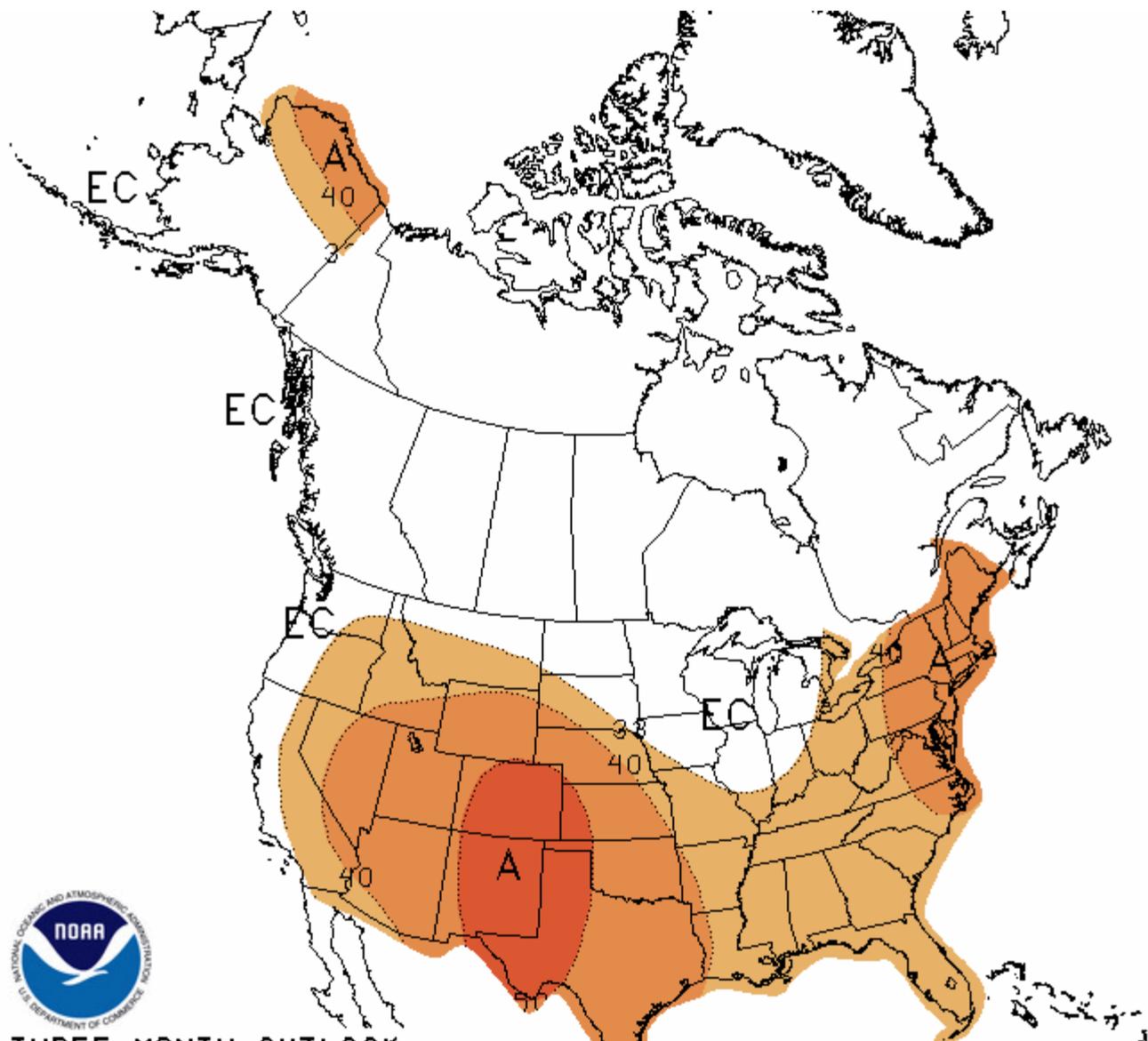


CONSOLIDATION





Current Forecasts (3-Month [JJA13] Temperature Outlook)



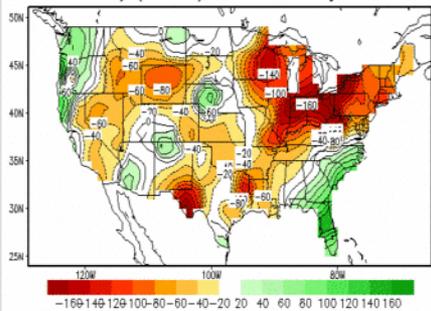
THREE-MONTH OUTLOOK
TEMPERATURE PROBABILITY
0.5 MONTH LEAD
VALID JJA 2013
MADE 14 MAY 2013

EC MEANS EQUAL
CHANCES FOR A, N, B
A MEANS ABOVE
N MEANS NORMAL
B MEANS BELOW

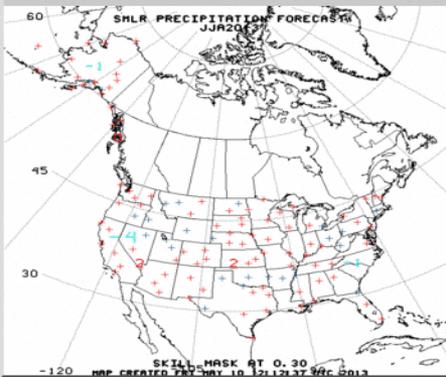
JJA Season [Precipitation]

CAS

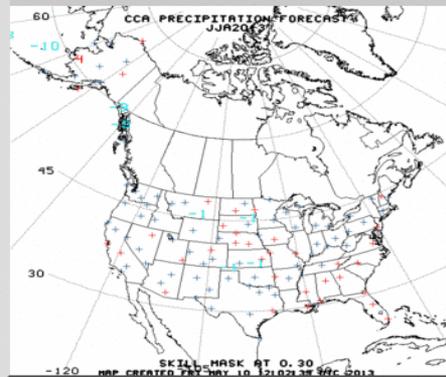
Lagged Averaged Precipitation Outlook for JJA 2013
units: anomaly (sdX100), SM data ending at 20130508



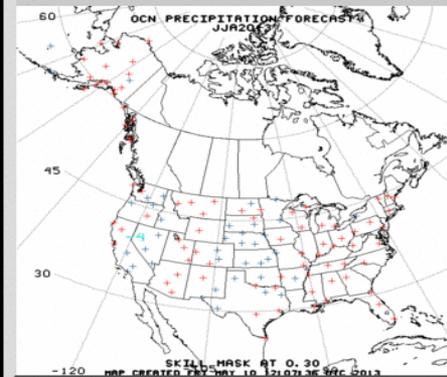
SMLR



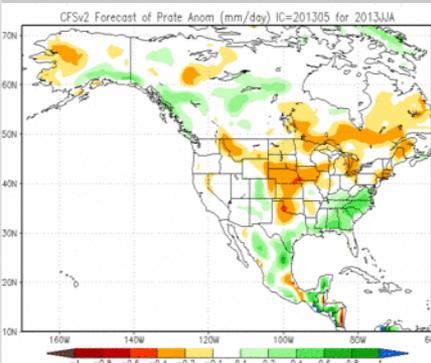
CCA



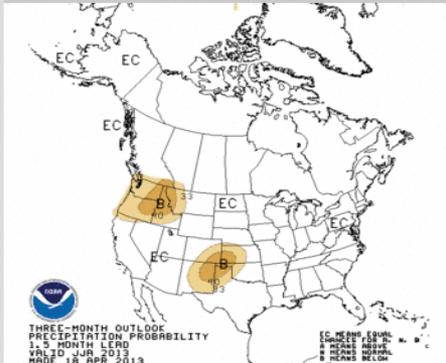
OCN



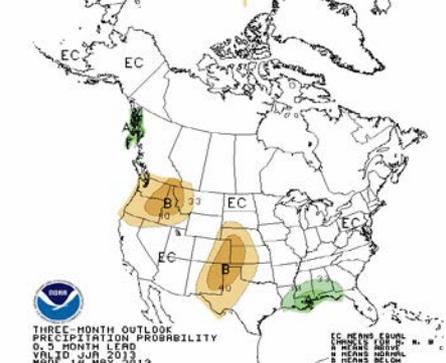
CFSv2



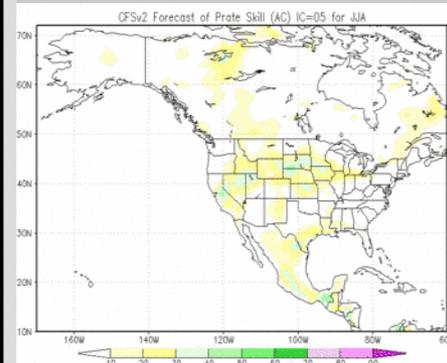
OLD OUTLOOK



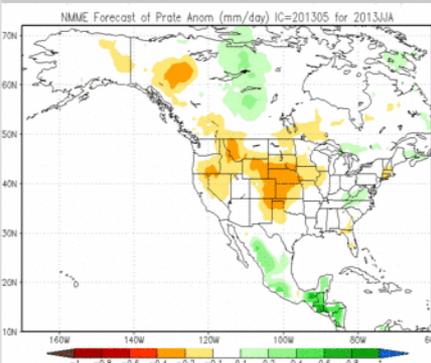
** NEW OUTLOOK **



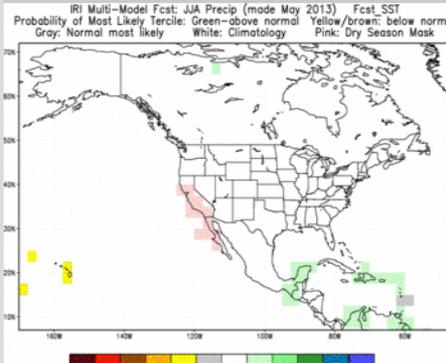
CFSv2 (skill)



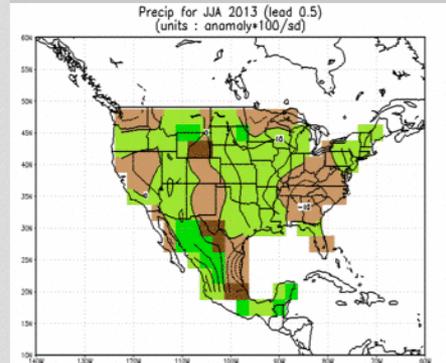
NMME



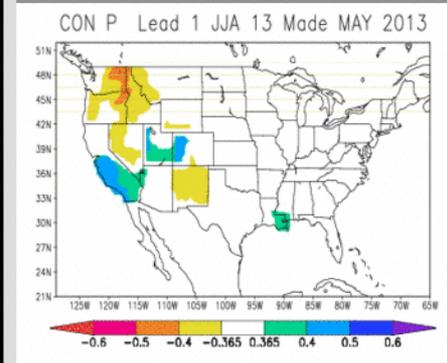
IRI



ENSEMBLE CCA (ECCA)

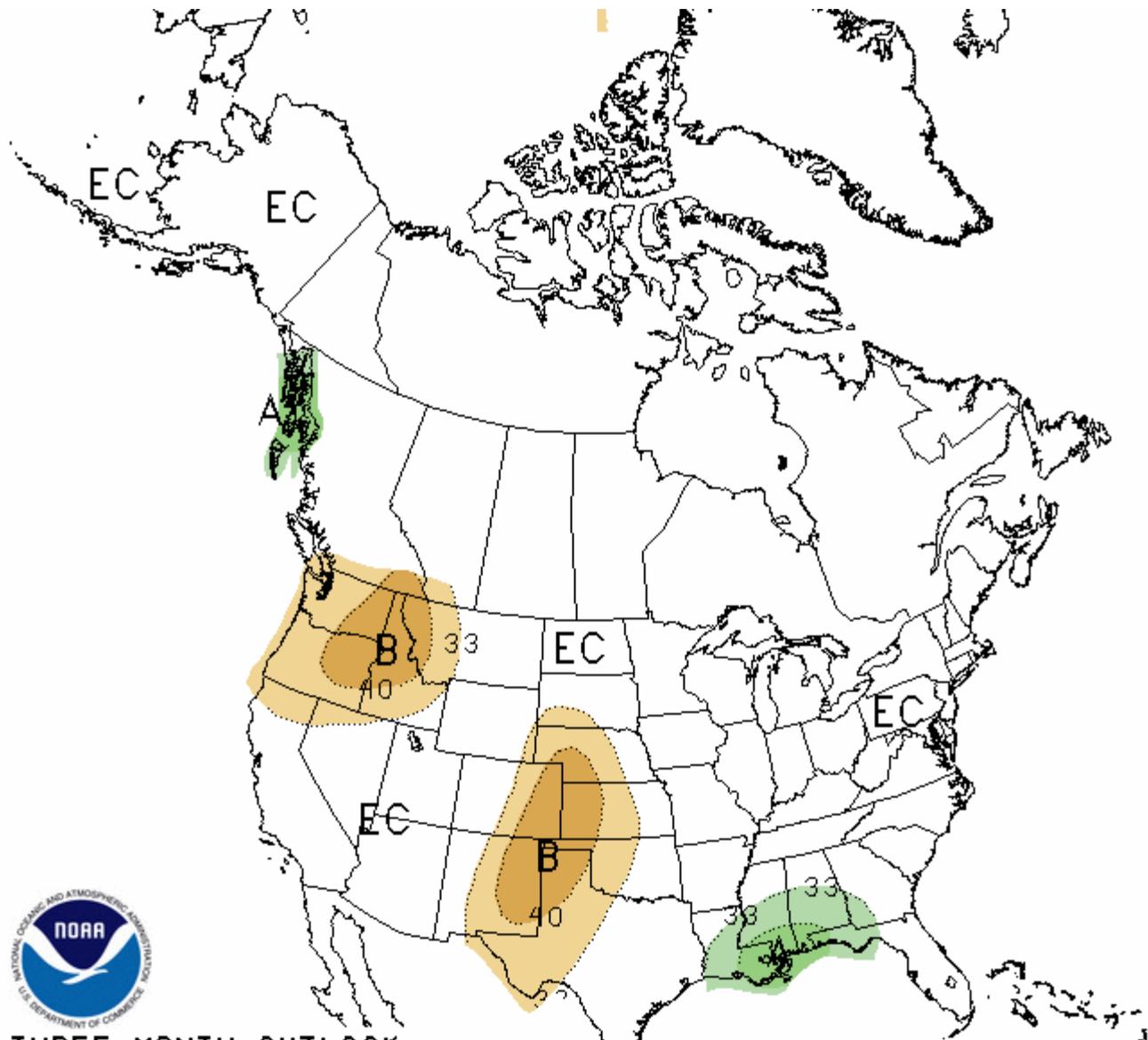


CONSOLIDATION





Current Forecasts (3-Month [JJA13] Precipitation Outlook)



THREE-MONTH OUTLOOK
 PRECIPITATION PROBABILITY
 0.5 MONTH LEAD
 VALID JJA 2013
 MADE 14 MAY 2013

EC MEANS EQUAL
 CHANCES FOR A, N, B
 A MEANS ABOVE
 N MEANS NORMAL
 B MEANS BELOW



U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for May 16 - August 31, 2013

Released May 16, 2013



Some Improvement

Some Improvement

Development

Persistence

Improvement

Development

Persistence

Development

Improvement

No Drought Posted/Predicted

KEY:

-  Drought to persist or intensify
-  Drought ongoing, some improvement
-  Drought likely to improve, impacts ease
-  Drought development likely

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor. NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.



Forecast Summary:



1- & 3-Month Summer (June & JJA) Temperature & Precipitation Outlooks

- *No clear ENSO signal to draw upon (ENSO-Neutral conditions);*
- *Summer precipitation challenging to forecast (tropics, convective nature of rain, localized summer weather events (MCCs) versus large-scale winter weather patterns);*
- *Only fair agreement between Empirical (Statistical) & Dynamical models at both monthly and seasonal time frames - not as clear-cut as the Spring (MAM) models (more uncertainty);*

❖ **Temperature Outlooks:** Odds favor

- **June:** Above-normal median values in the western half of U.S. and
- **Summer:** Most of lower 48 States except Far West, northern Plains & upper Midwest;

❖ **Precipitation Outlooks:** Odds favor

- **June:** Below-average median values in southern & central High Plains and the West and
- **Summer:** Southern & central High Plains and Pacific Northwest with **above-normal median rainfall along central Gulf Coast;**
- Southwest monsoon (JJA) - dry in east (NM), EC to the west (AZ);

❖ **Summer Drought Outlook (May 16-August 31):**

- *Late spring & summer months will be critical to make or break (improve or persist) Plains drought since this region receives a majority of their normal Annual precipitation May-August;*
- **Improvement** or **Some Improvement** in upper Midwest, eastern areas of the Great Plains, Florida, and the Northeast;
- **Persistence** in much of Southwest & California, southern two-thirds of the Rockies, southern half of the High Plains, and southern Hawaiian Islands leeward sides;
- **Development** possible in Oregon & Idaho, remaining non-drought areas of Southwest and southern Plains, and windward sides of southern Hawaiian Islands;

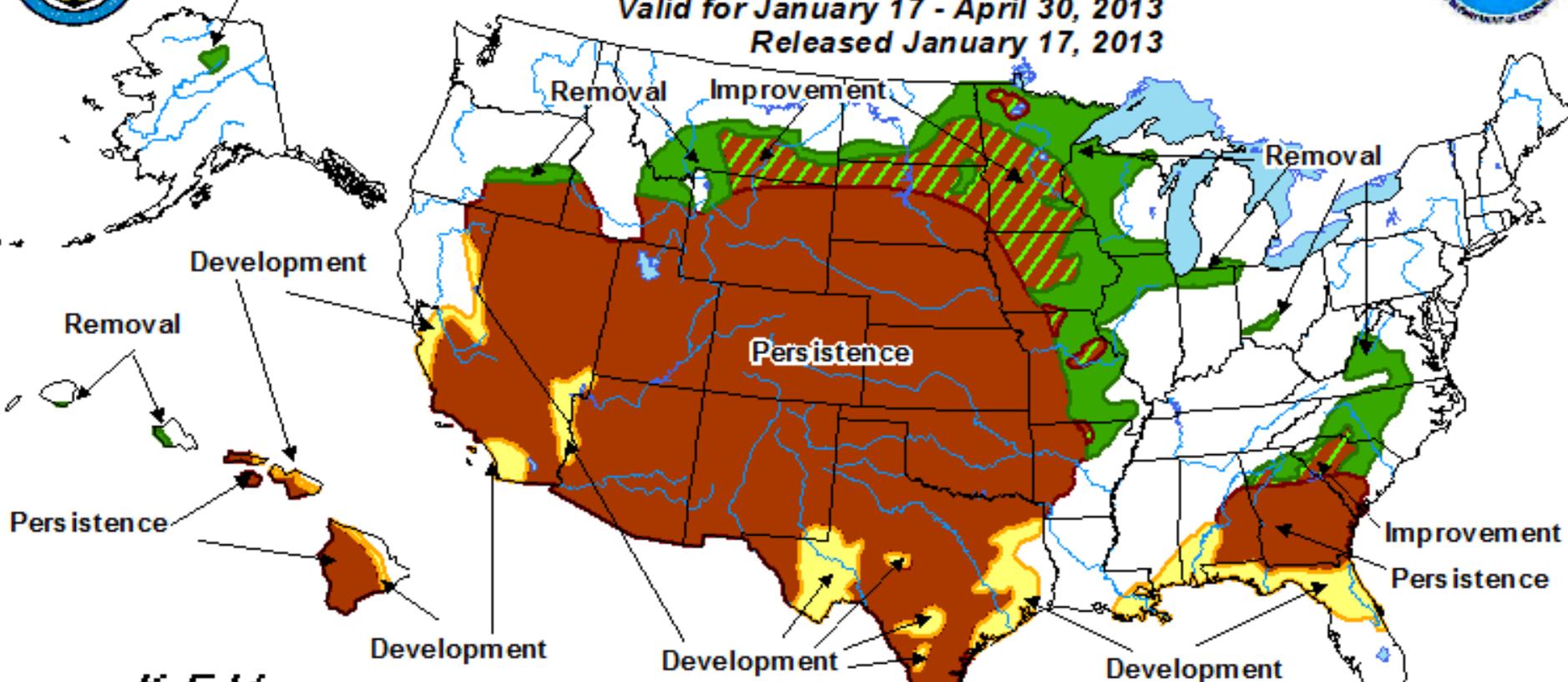


U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for January 17 - April 30, 2013

Released January 17, 2013



KEY:

-  Drought persists or intensifies
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely

COMING June 20
(with new categories)

No Drought
Posted/Predicted 

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events – such as individual storms – cannot be accurately forecast more than a few days in advance. Use caution for applications – such as crops – that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor.

NOTE: The Green and Brown hatched areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period although drought will remain. The Green areas imply drought removal by the end of the period (D0 or none)

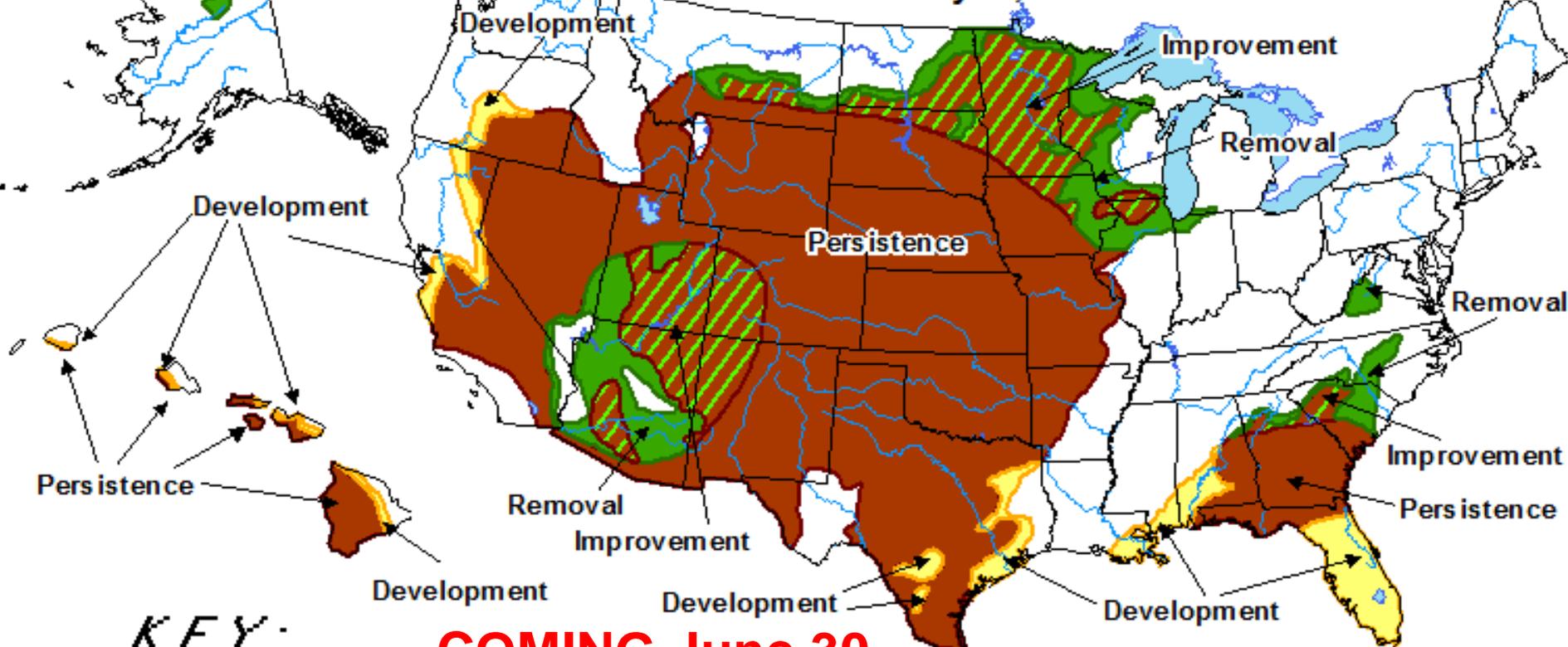


U.S. Monthly Drought Outlook

Drought Tendency During the Valid Period

Valid for February 28, 2013

Released January 31, 2013



KEY:

-  Drought persists or intensifies
-  Drought remains but improves
-  Drought removal likely
-  Drought development likely

COMING June 30
(replaces Updated SDO)

No Drought
Posted/Predicted

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events – such as individual storms – cannot be accurately forecast more than a few days in advance. Use caution for applications – such as crops – that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor.

NOTE: The Green and Brown hatched areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period although drought will remain. The Green areas imply drought removal by the end of the period (D0 or none)



THANK YOU!

Any Questions, contact:

David.Miskus@noaa.gov
(301) 683-3453

Climate Prediction Center:

<http://www.cpc.ncep.noaa.gov/>

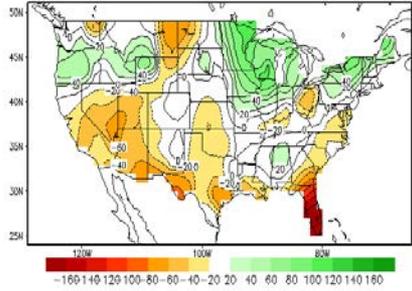
EXTRA SLIDES

- o Mar13 & MAM13 T&P Tools;

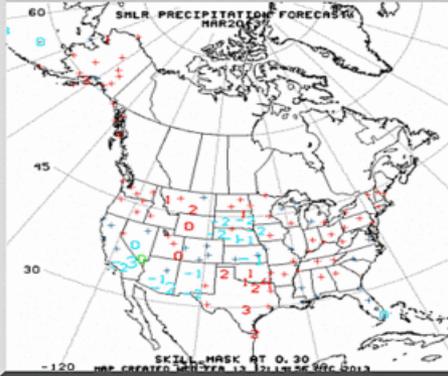
MAR 2013 [Precipitation]

CAS

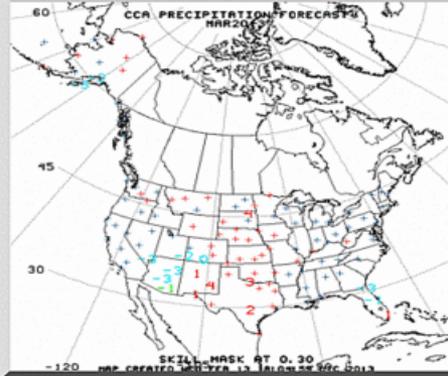
Lagged Averaged Precipitation Outlook for MAR 2013
units: anomaly (sdX100), SM data ending at 20130218



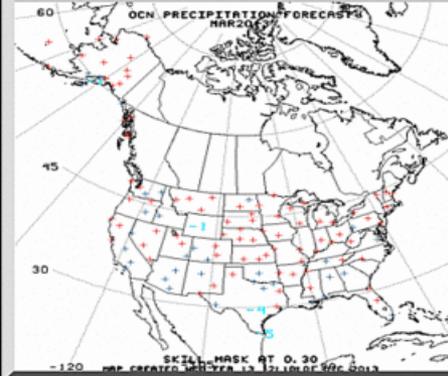
SMLR



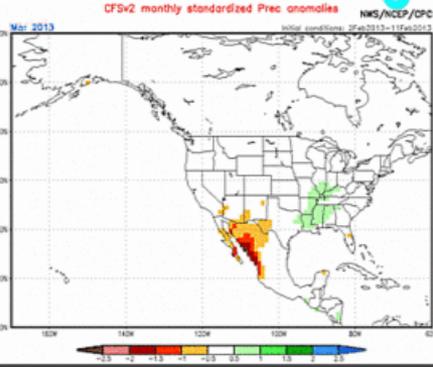
CCA



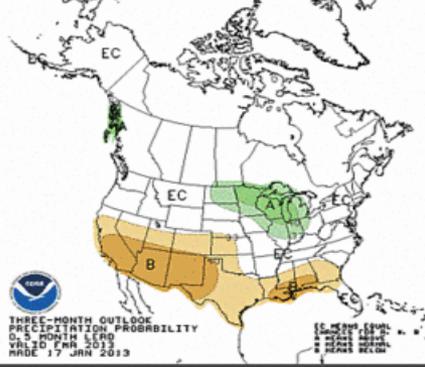
OCN



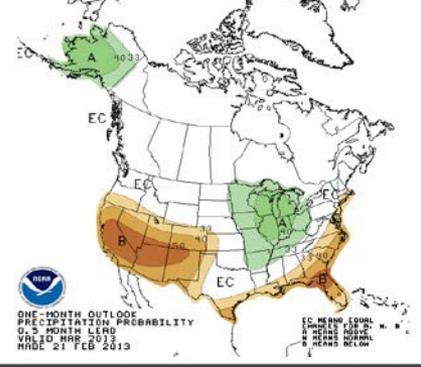
CFSv2 (Standardized)



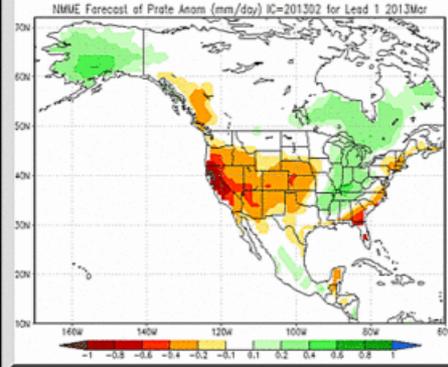
PREV-SNL



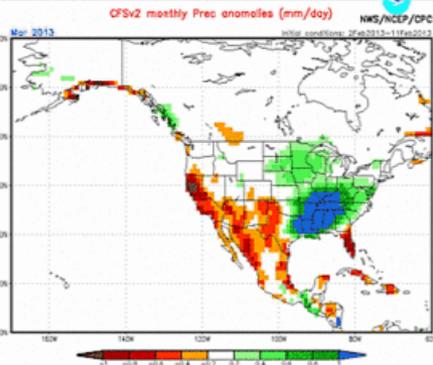
** NEW-OTLK **



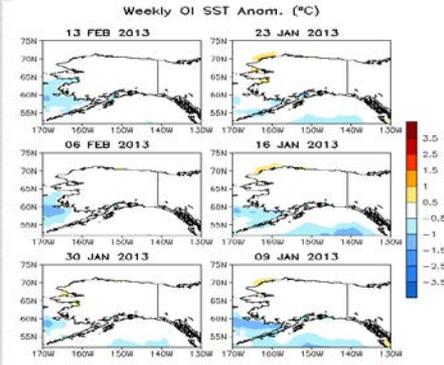
NMME



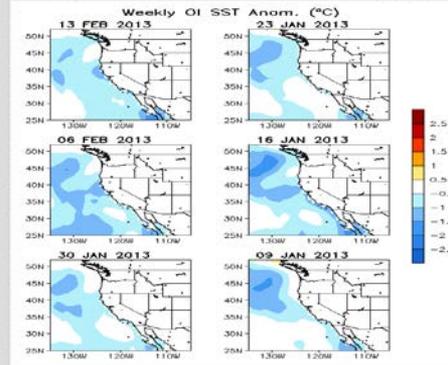
CFSv2



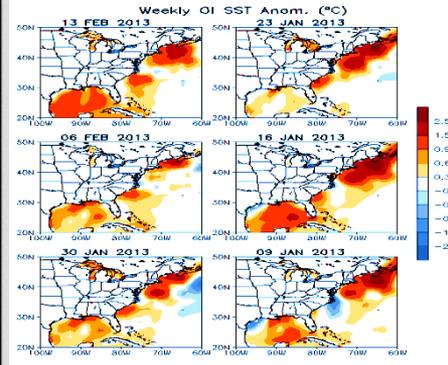
WEEKLY SSTs



WEEKLY SSTs



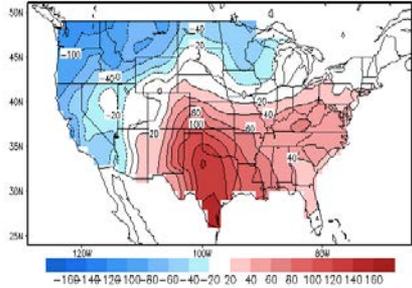
WEEKLY SSTs



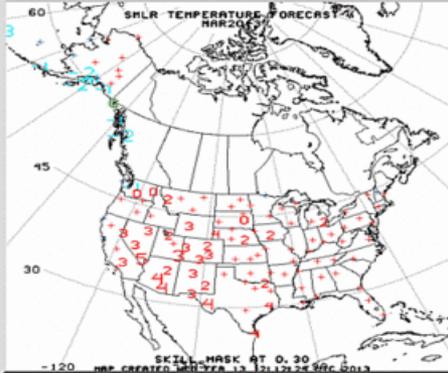
MAR 2013 [Temperature]

CAS

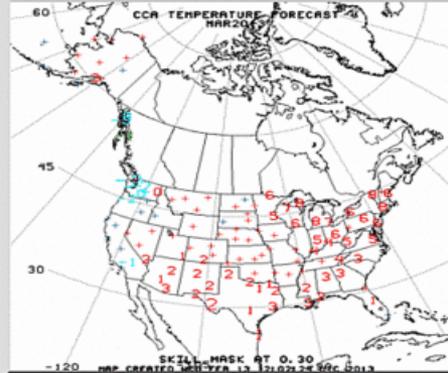
Lagged Averaged Temperature Outlook for MAR 2013
units: anomaly (sdX100), SM data ending at 20130218



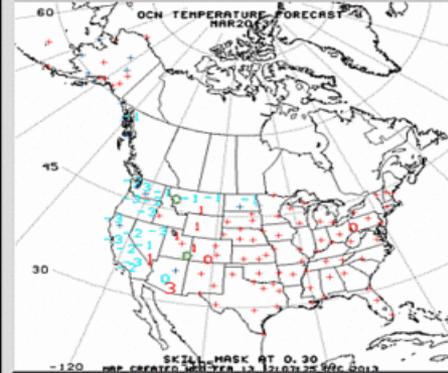
SMLR



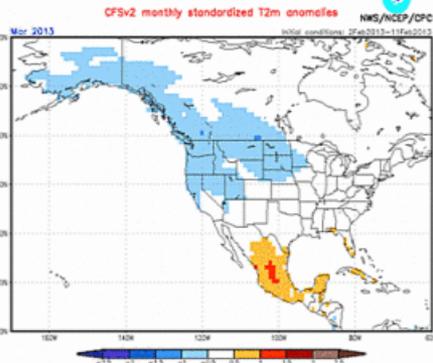
CCA



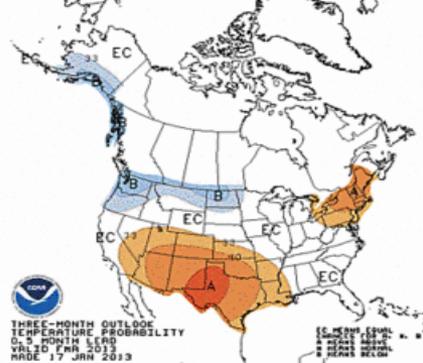
OCN



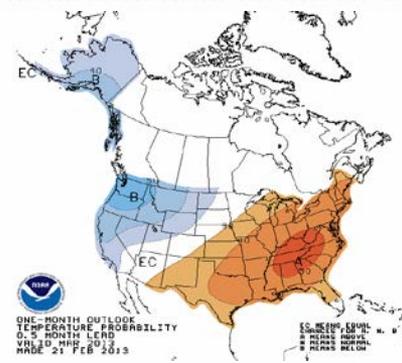
CFSv2 (Standardized)



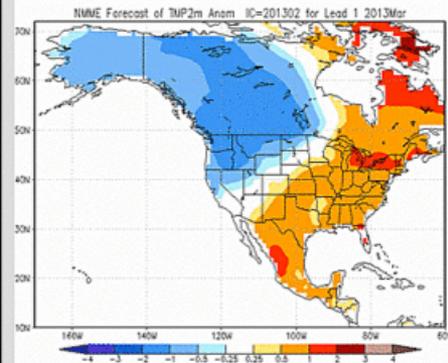
PREV-SNL



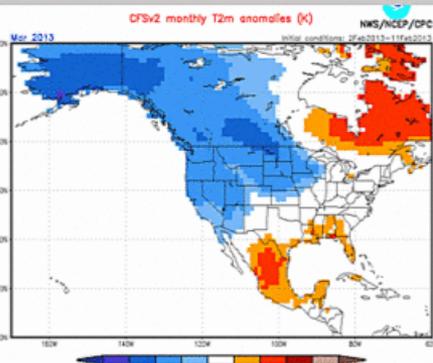
** NEW-OTLK **



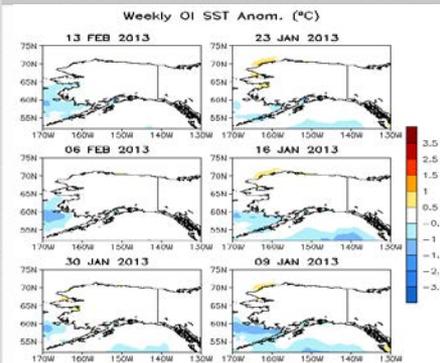
NMME



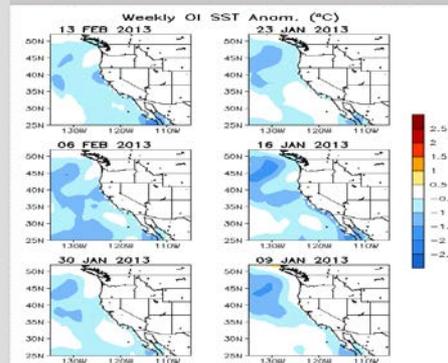
CFSv2



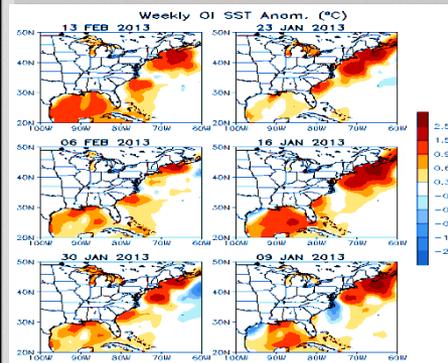
WEEKLY SSTs



WEEKLY SSTs



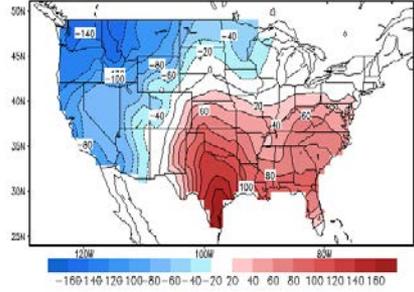
WEEKLY SSTs



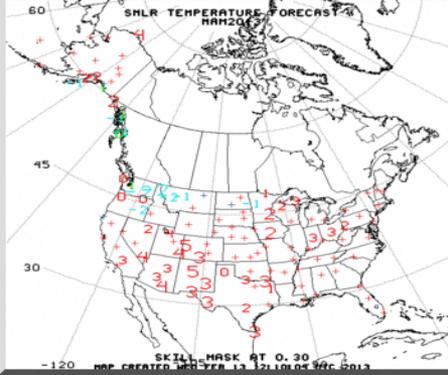
MAM Season [Temperature]

CAS

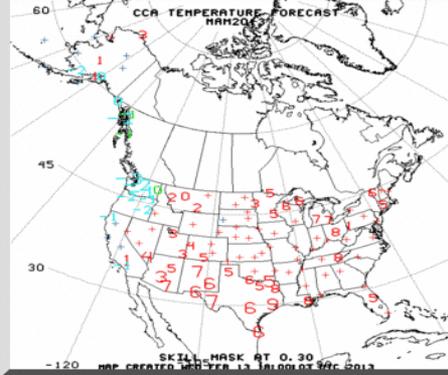
Lagged Averaged Temperature Outlook for MAM 2013
units: anomaly (sdX100), SM data ending at 20130218



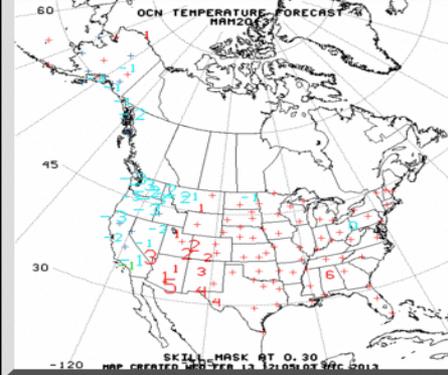
SMLR



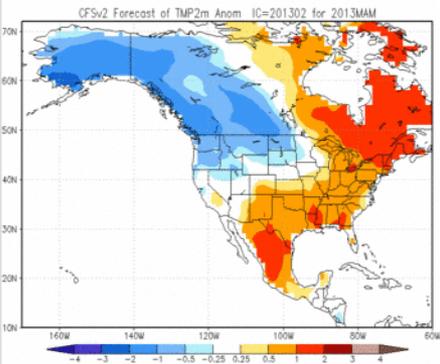
CCA



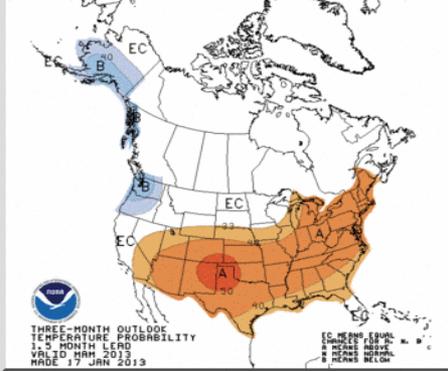
OCN



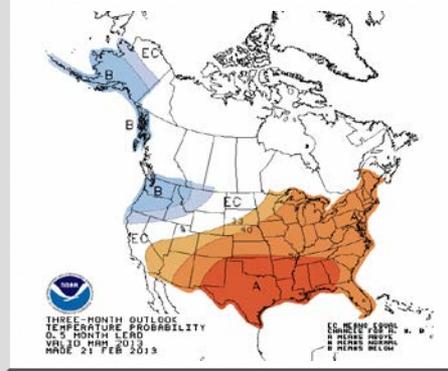
CFSv2



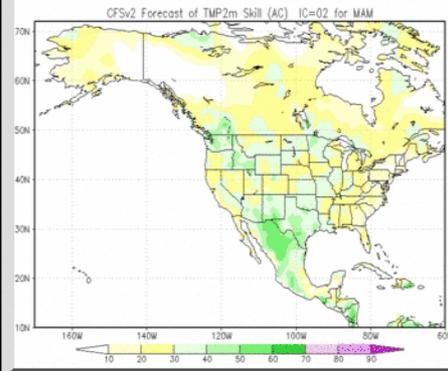
OLD OUTLOOK



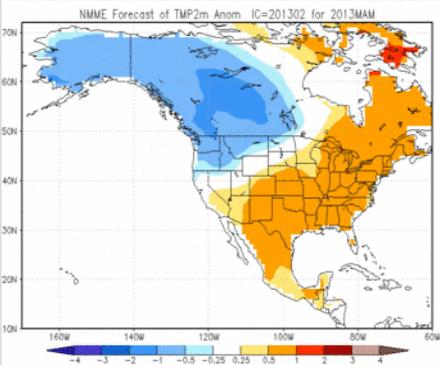
** NEW OUTLOOK **



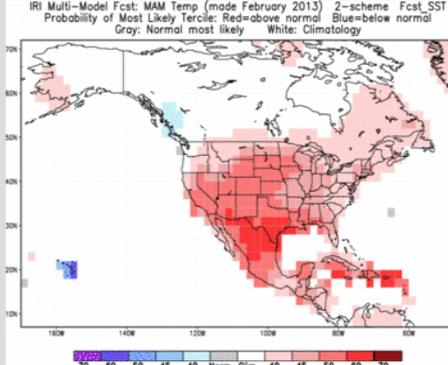
CFSv2 (skill)



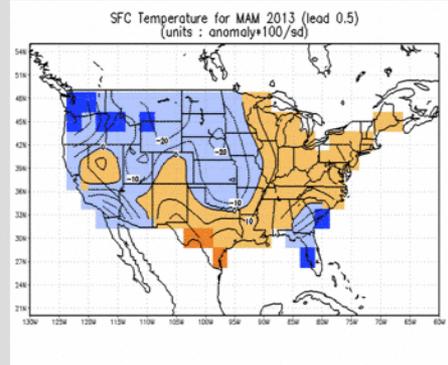
NMME



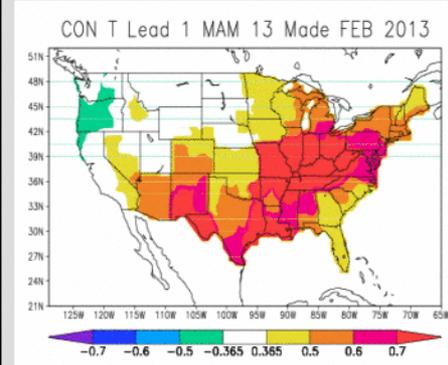
IRI



ENSEMBLE CCA (ECCA)



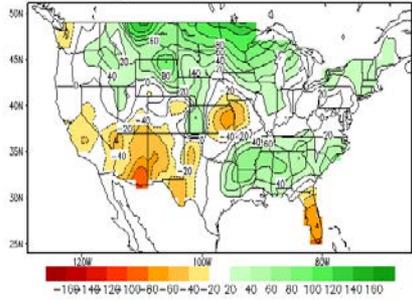
CONSOLIDATION



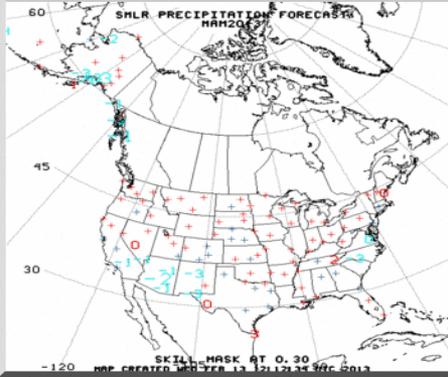
MAM Season [Precipitation]

CAS

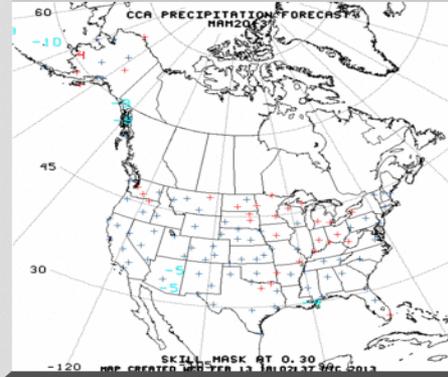
Logged Averaged Precipitation Outlook for MAM 2013
units: anomaly (sdX100), SM data ending at 20130218



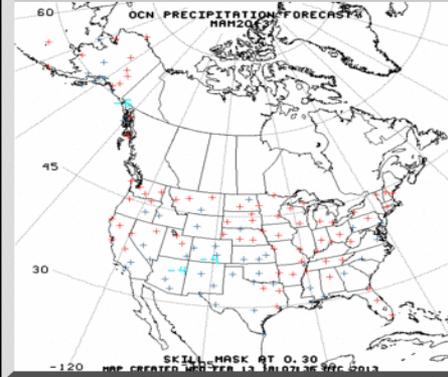
SMLR



CCA

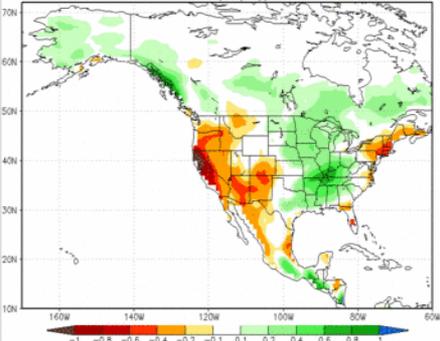


OCN

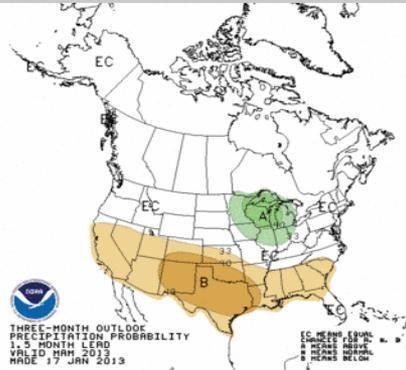


CFSv2

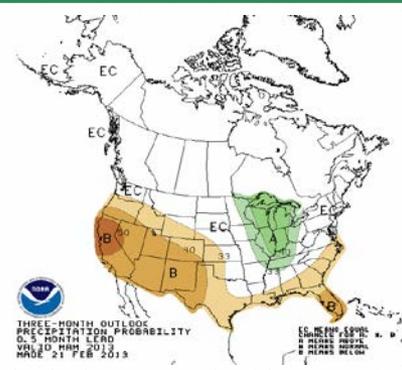
CFSv2 Forecast of Prate Anom (mm/day) IC=201302 for 2013MAM



OLD OUTLOOK

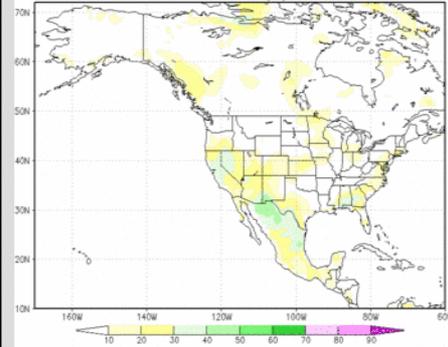


** NEW OUTLOOK **



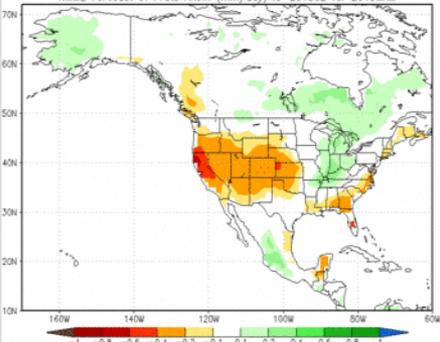
CFSv2 (skill)

CFSv2 Forecast of Prate Skill (AC) IC=02 for MAM



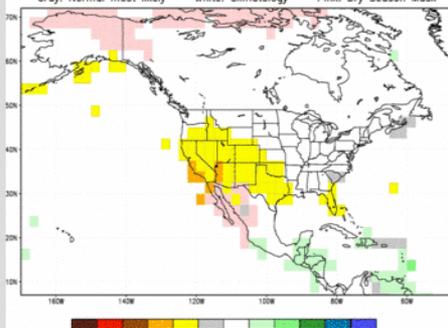
NMME

NMME Forecast of Prate Anom (mm/day) IC=201302 for 2013MAM



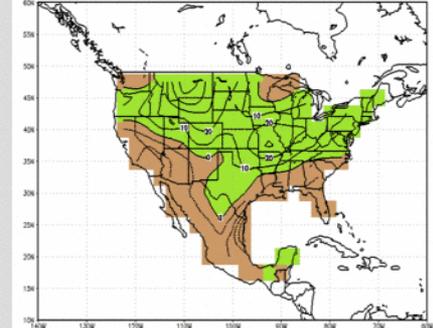
IRI

IRI Multi-Model Fcst: MAM Precip (mode February 2013) 2-scheme Fcst_SST
Probability of Most Likely Tercile: Green=above normal Yellow/brown: below normal
Gray: Normal most likely White: Climatology Pink: Dry Season Mask



ENSEMBLE CCA (ECCA)

Precip for MAM 2013 (lead 0.5)
(units : anomaly+100/sd)



CONSOLIDATION

CON P Lead 1 MAM 13 Made FEB 2013

