

# Governor's Drought Interagency Coordinating Group

Tuesday, May 5, 2015 - 10:00 - 12:00 p.m.

## Meeting Agenda

### **I. Welcome & Introductions**

*Tom Buschatzke (Co-chair), Arizona Department of Water Resources*

*Wendy Smith-Reeve (Co-chair), Arizona Division of Emergency Management*

### **II. Drought Status Update and Activities of the Monitoring Technical Committee**

*Nancy Selover, Arizona State University,*

### **III. Summer 2014 Outlook and Winter 15-16 Preview**

*Mark O'Malley, National Weather Service*

### **IV. Colorado River - Water Supply Update**

*Tom Buschatzke, Arizona Department of Water Resources*

### **V. Salt & Verde Watersheds- Water Supply Update**

*James Walter, Salt River Project*

### **VI. Wildfire Outlook**

*Jeff Whitney, Arizona State Forestry*

### **VII. Update on California Drought**

*Chris Harris, California Colorado River Board*

### **VIII. Drought Declaration Recommendation**

Action Item – Discussion and Recommendation to the Governor

*Tom Buschatzke (Co-chair), Arizona Department of Water Resources*

*Wendy Smith-Reeve (Co-chair), Arizona Division of Emergency Management*

### **IX. Call to the Public and Closing Remarks**

*Tom Buschatzke (Co-chair), Arizona Department of Water Resources*

*Wendy Smith-Reeve (Co-chair), Arizona Division of Emergency Management*

# Drought Monitoring Technical Committee Update

to the

Arizona Interagency Coordinating Group

May 5, 2015

Nancy J. Selover  
Arizona State Climate Office  
Arizona State University  
[azclimate.asu.edu](http://azclimate.asu.edu)



# Arizona Drought Monitoring Technical Committee

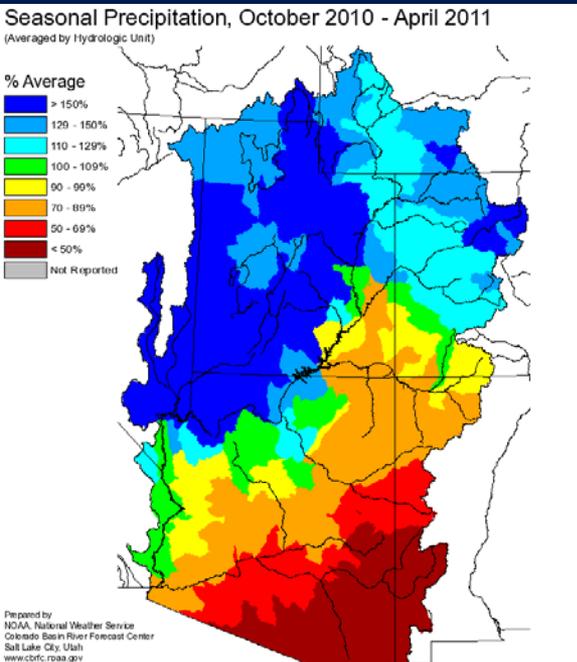


ARIZONA DIVISION OF  
EMERGENCY MANAGEMENT

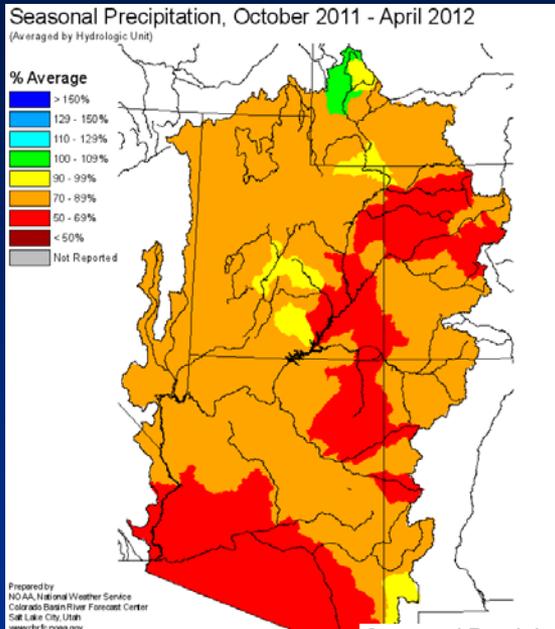


# Precipitation Comparison Colorado River Basin

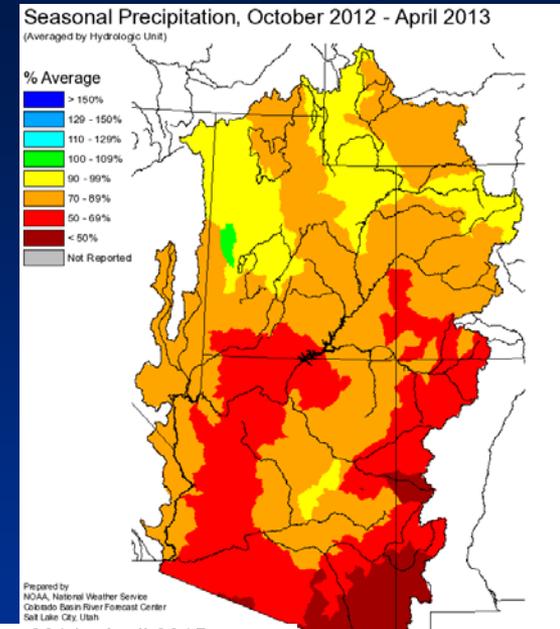
## WY 2011



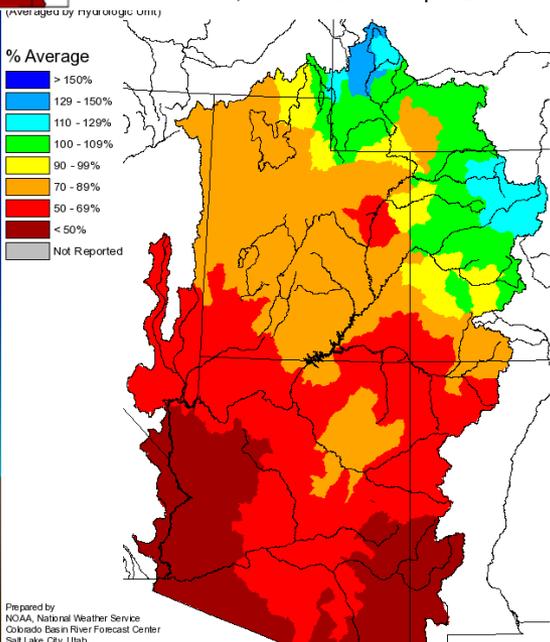
## WY 2012



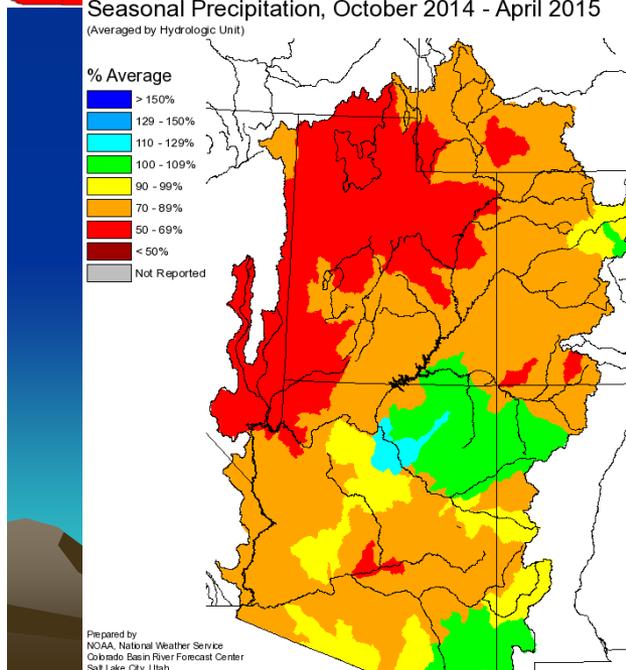
## WY 2013



## Season, October 2013 - April 2014



## Seasonal Precipitation, October 2014 - April 2015

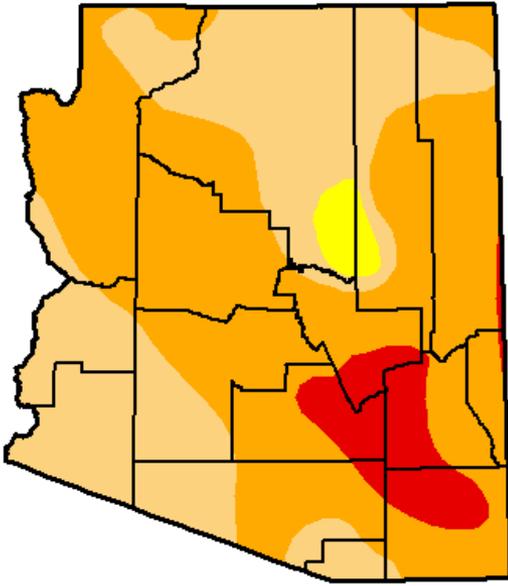


## WY 2014

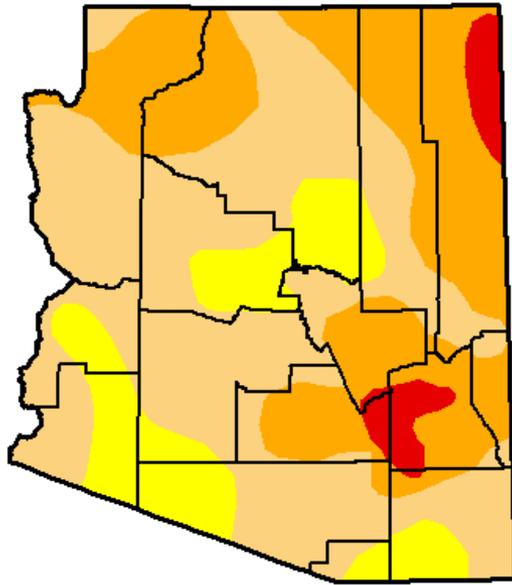
## WY 2015

# National Drought Monitor Comparison (Short-Term)

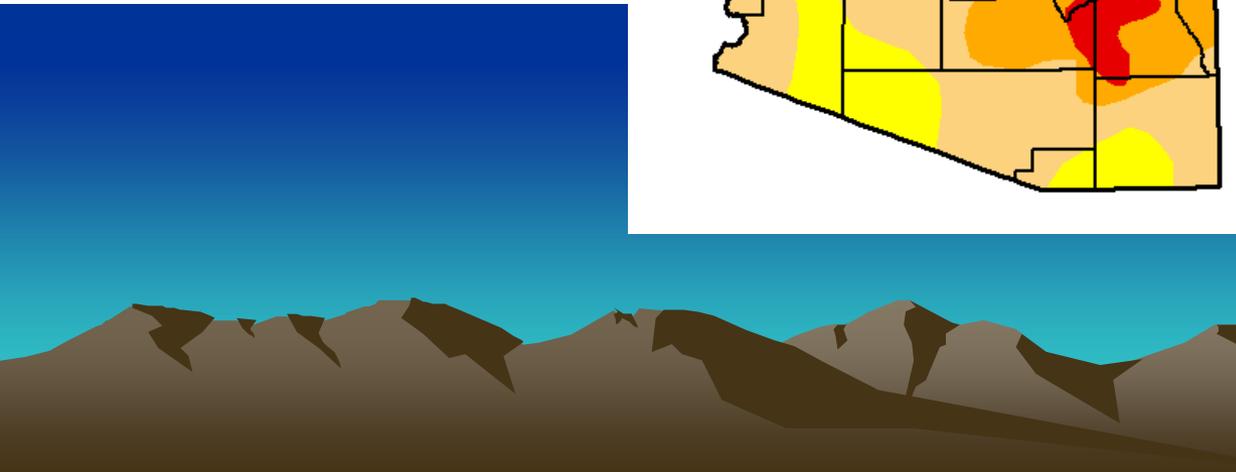
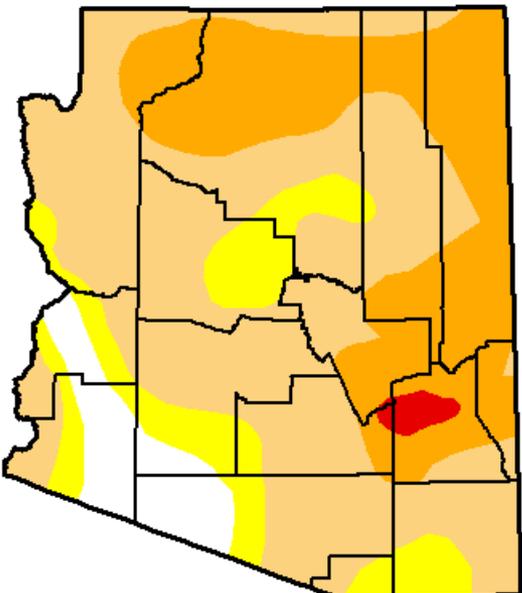
May 6, 2014



Nov 4, 2014



Apr 28, 2015

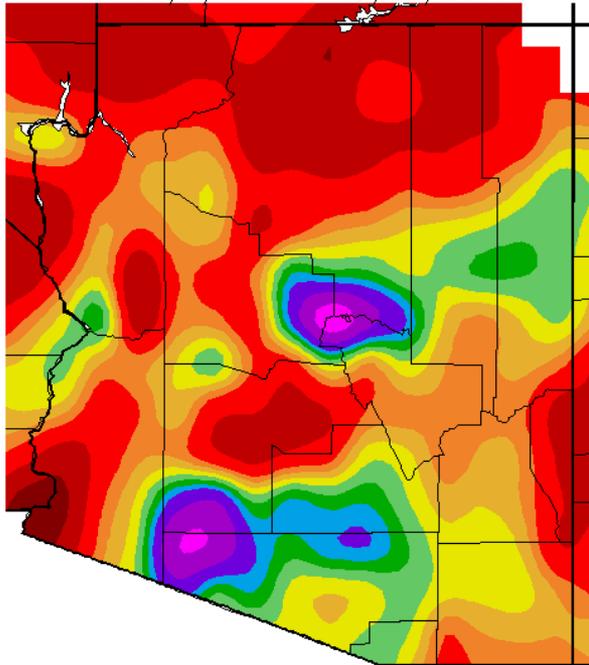


# WY 2015 Precipitation

## WY 2015

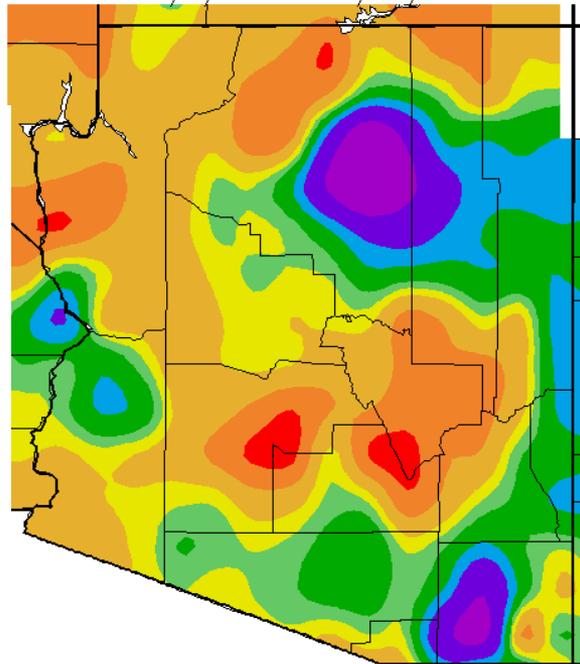
### Oct-Dec 2014

Percent of Average Precipitation (%)  
10/1/2014 - 12/31/2014

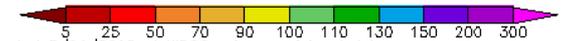
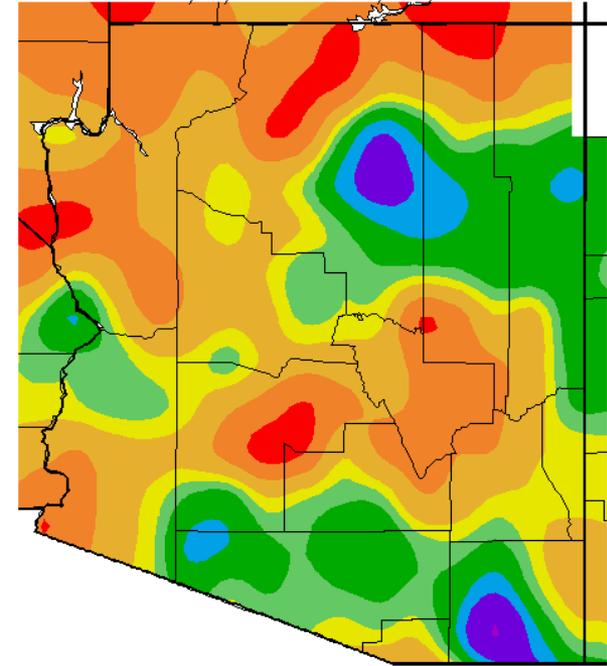


### Jan-Apr 2015

Percent of Average Precipitation (%)  
1/1/2015 - 4/30/2015



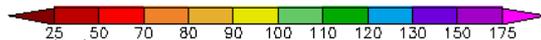
Percent of Average Precipitation (%)  
10/1/2014 - 4/30/2015



Generated 5/01/2015 at WRCC using provisional data.  
NOAA Regional Climate Centers



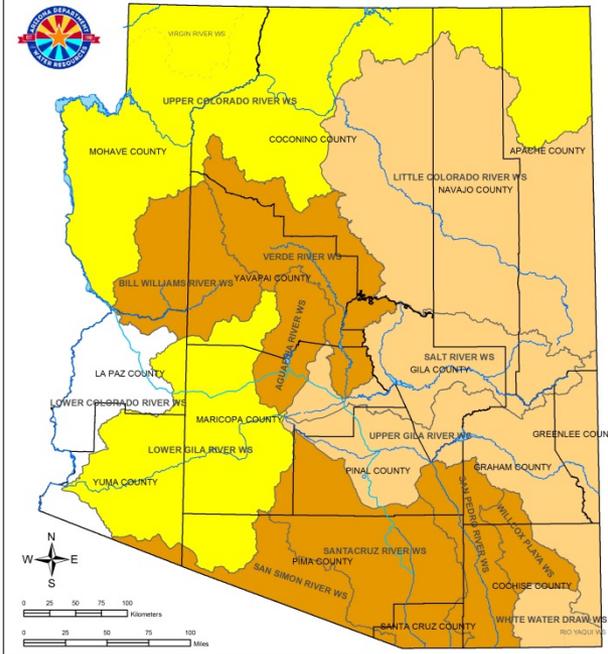
Generated 5/01/2015 at WRCC using provisional data.  
NOAA Regional Climate Centers



Generated 1/01/2015 at WRCC using provisional data.  
NOAA Regional Climate Centers

# Long Term Drought Status Comparison

Apr 2014



**April 2014 Long Term Drought Status**  
 Data Through March 31st, 2014

**Watershed Drought Level\*\***

- No Drought
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

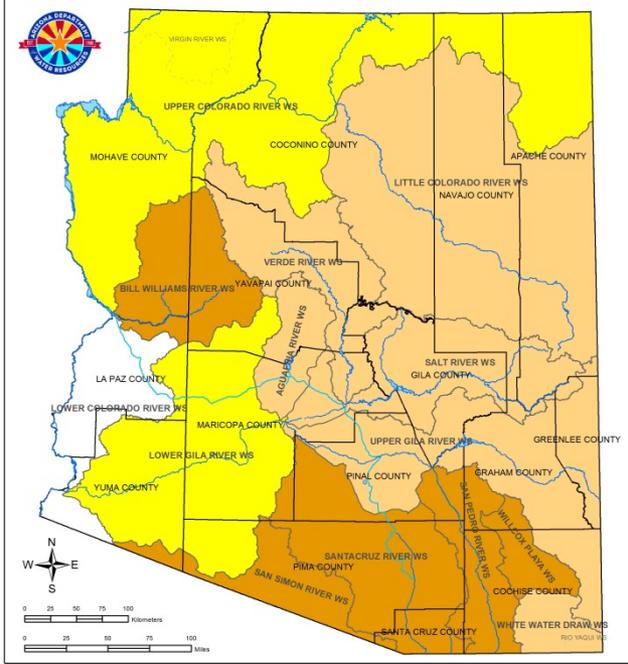
**Counties**

- Lakes
- Rivers
- CAP Aqueduct
- Merged Watershed\*

**Arizona Drought Preparedness Plan Monitoring Technical Committee**

\* Watershed merged due to limited data.  
 \*\* As of January 2011, drought categories have been adjusted to be consistent with the U.S. Drought Monitor.

Oct 2014



**October 2014 Long Term Drought Status**  
 Data Through September 30th, 2014

**Watershed Drought Level\*\***

- No Drought
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

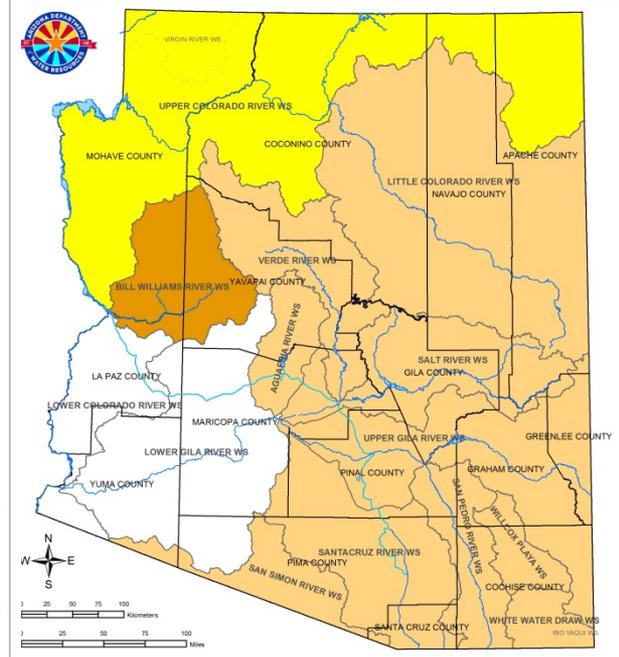
**Counties**

- Lakes
- Rivers
- CAP Aqueduct
- Merged Watershed\*

**Arizona Drought Preparedness Plan Monitoring Technical Committee**

\* Watershed merged due to limited data.  
 \*\* As of January 2011, drought categories have been adjusted to be consistent with the U.S. Drought Monitor.

Apr 2015



**April 2015 Long Term Drought Status**  
 Data Through March 31st, 2015

**Watershed Drought Level\*\***

- No Drought
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

**Counties**

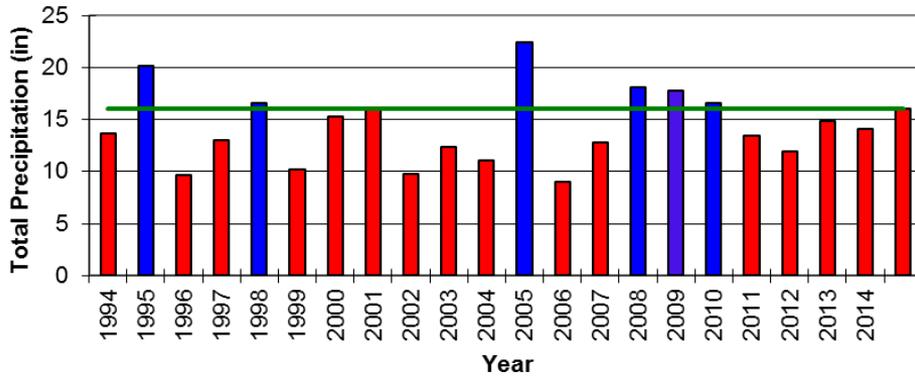
- Lakes
- Rivers
- CAP Aqueduct
- Merged Watershed\*

**Arizona Drought Preparedness Plan Monitoring Technical Committee**

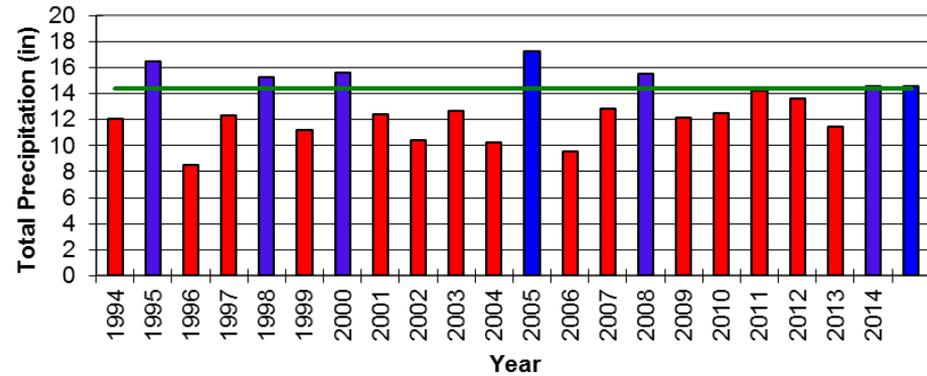
\* Watershed merged due to limited data.  
 \*\* As of January 2011, drought categories have been adjusted to be consistent with the U.S. Drought Monitor.

# Precipitation in Selected Watersheds for Past 22 Years

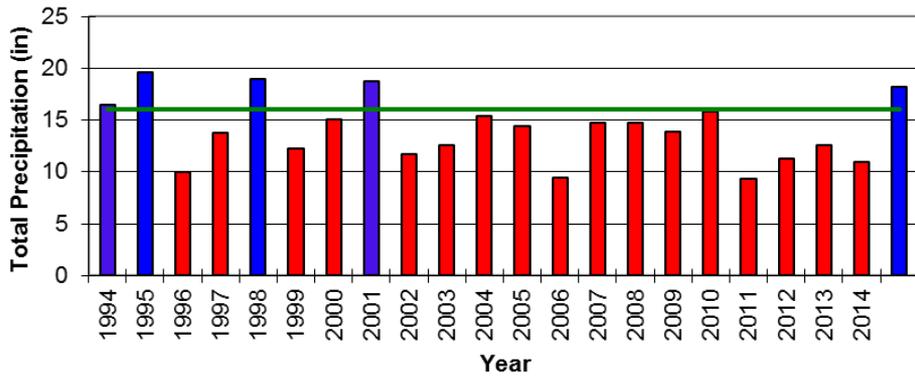
**Salt Watershed 12-month Precipitation  
(Oct-Sep) Mean 16.04"  
6 of last 22 years > mean**



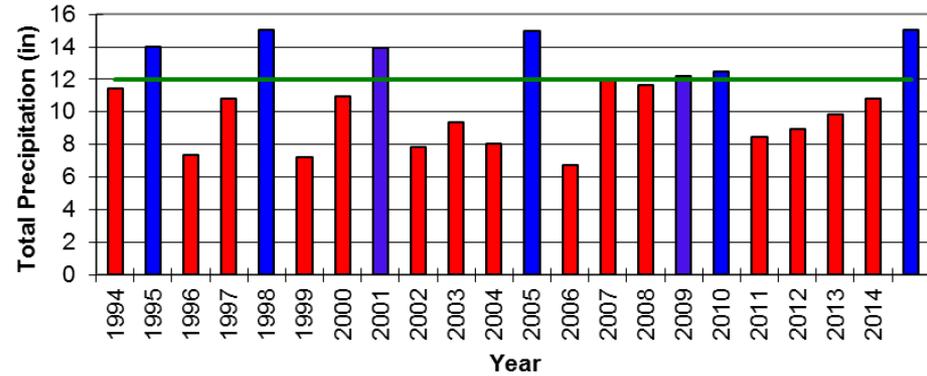
**Little Colorado Watershed 12-month Precipitation  
(Oct-Sep) Mean 14.36"  
7 of last 22 years > mean**



**Santa Cruz Watershed 12-month Precipitation  
(Oct-Sep) Mean 16.10"  
5 of last 25 years > mean**



**Upper Gila Watershed 12-month Precipitation  
(Oct-Sep) Mean 12.02"  
7 of last 22 years > mean**



**Thank you !**

**Questions ?**

**Nancy J. Selover  
Arizona State Climate Office  
Arizona State University**

**480-965-0580  
selover@asu.edu**

**<http://azclimate.asu.edu>**



# Summer 2015 Outlook Winter 2015-16 Preview

**Mark O'Malley**



**National Weather Service**

**Phoenix, AZ**

**[www.weather.gov/phoenix](http://www.weather.gov/phoenix)**



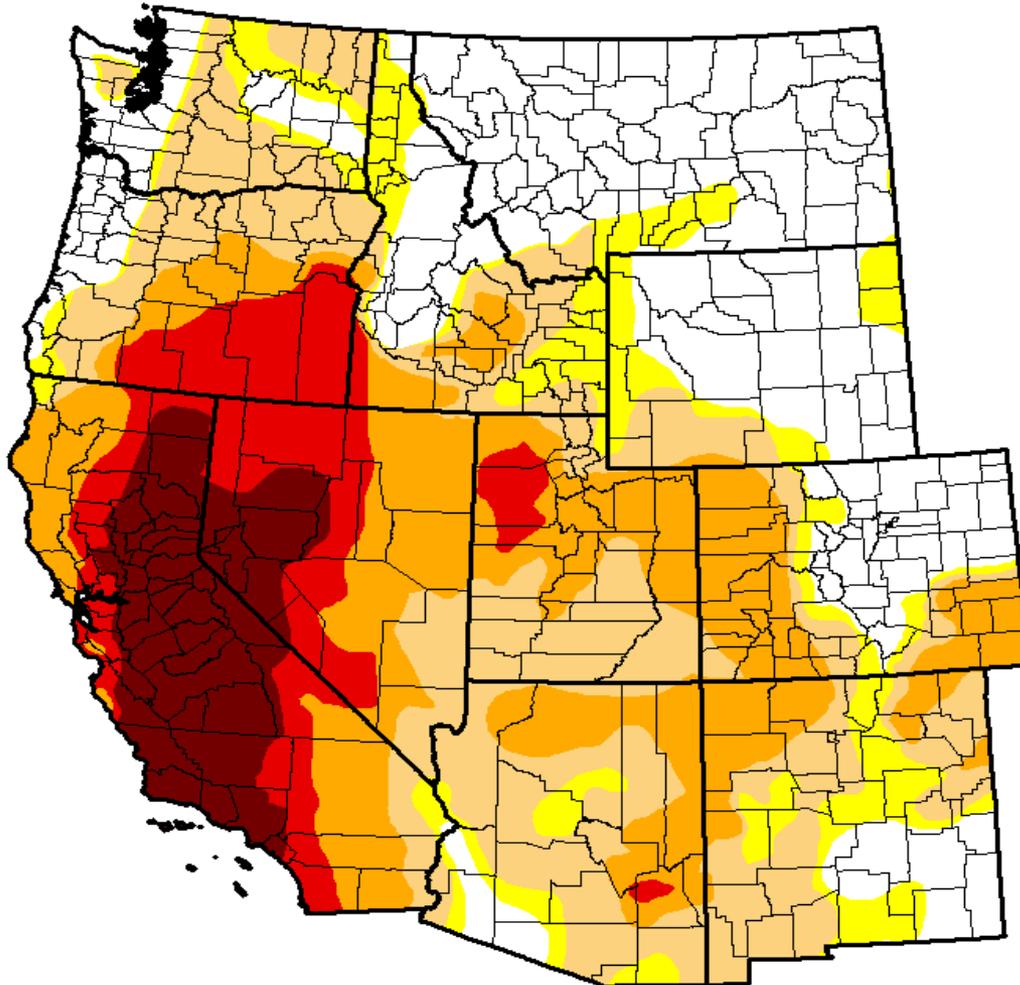
# Influences on SW Monsoon

- ▶ Position and persistence of subtropical High pressure
  - Dictates steering of moisture and disturbances into Arizona
  - Antecedent seasonal snow cover and drought
  
- ▶ El Nino
  - Tendency for later onset & drier monsoon seasons (however, there are many conflicting signals)
  
- ▶ Pacific Decadal Oscillation
  - “Warm phase” when combined with El Nino may hinder precipitation chances (especially early monsoon season, but weak correlation)



# SW Monsoon High Pressure

April 21, 2015



Clockwise circulation around the sub-tropical high pressure pulls moisture north

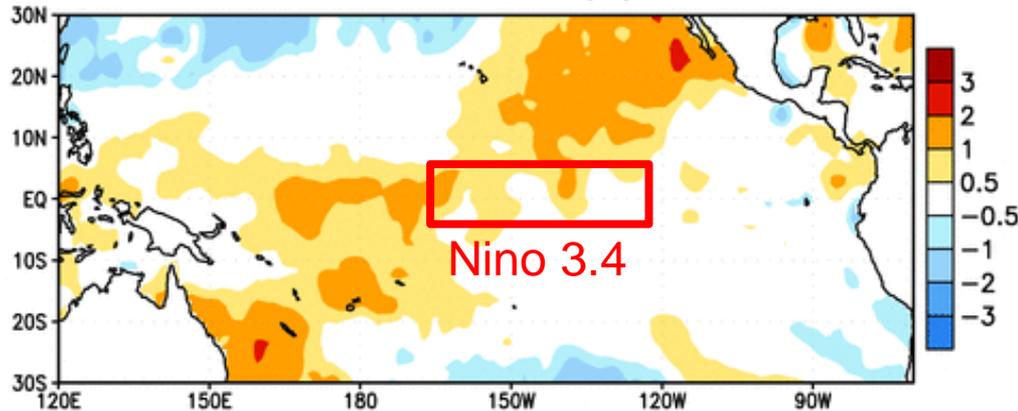
Inverse relationship between snow cover and preferred high pressure location

Areas of more intense drought can also be preferred set up for high pressure system

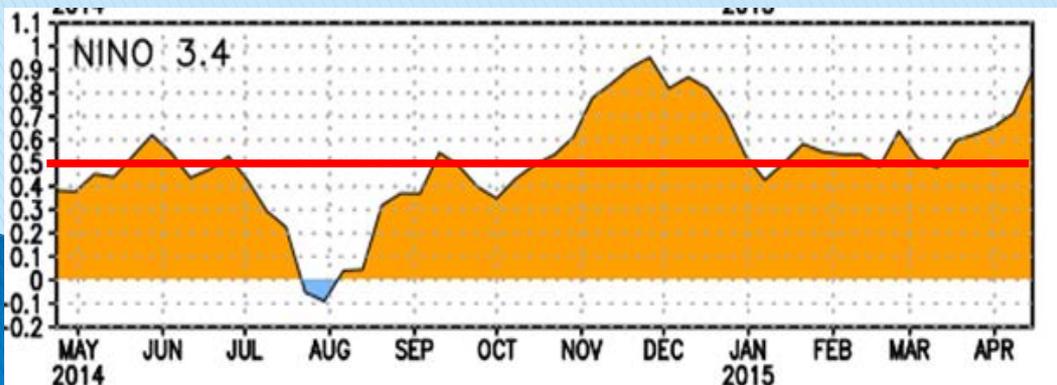


# Conditions in Tropical Pacific

Week centered on 28 JAN 2015  
SST Anomalies (°C)



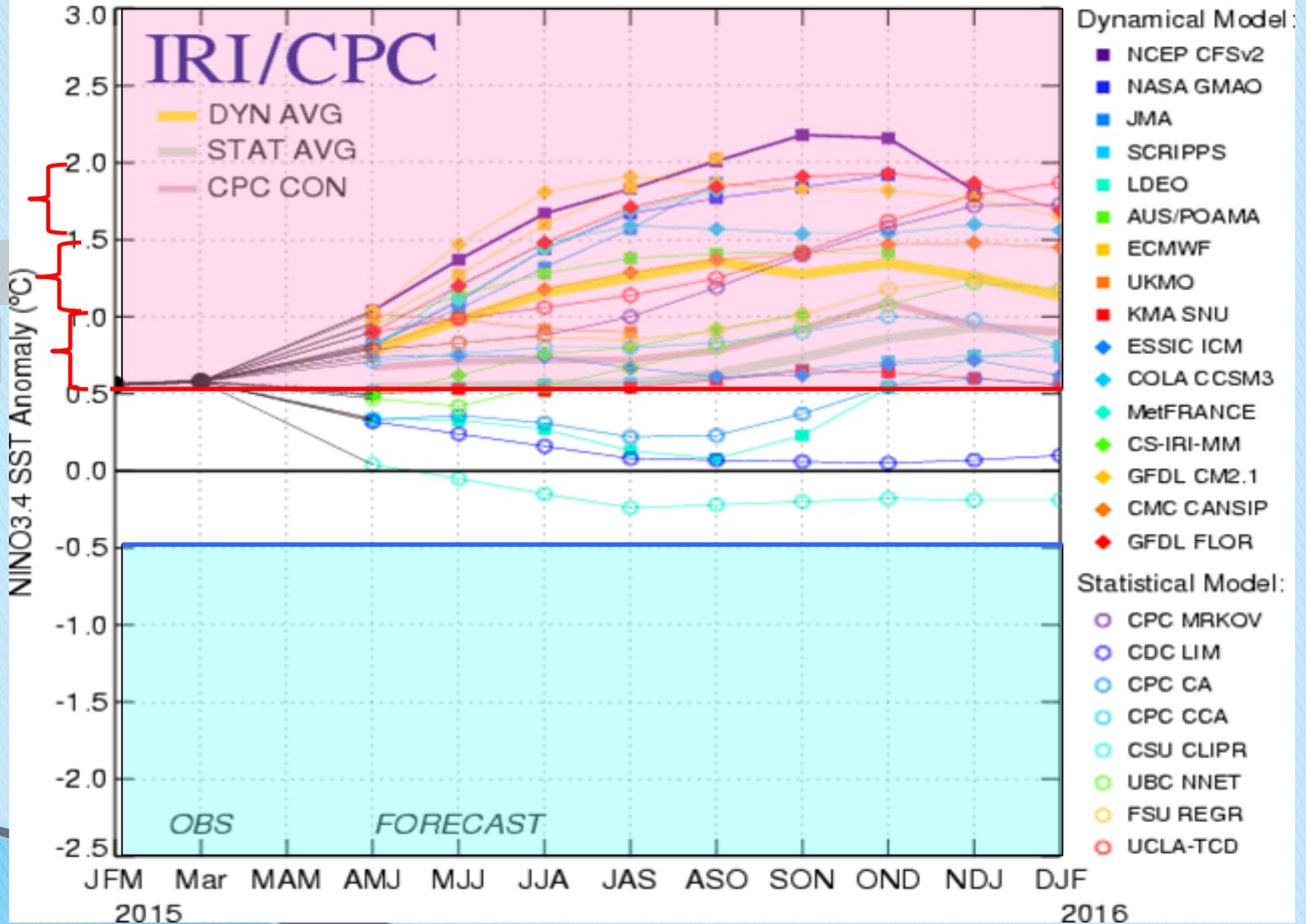
- ▶ Central equatorial Pacific waters have been slowly warming since March 2014
- ▶ After fluctuations, sea surface temperatures (SST) finally reached El Niño definition in Feb 2015
- ▶ El Niño conditions will persist through summer 2015, and likely into the upcoming winter





# El Nino Outlook

Mid-Apr 2015 Plume of Model ENSO Predictions



Strong

Moderate

Weak



# Jul-Aug-Sep El Nino Precipitation Distribution (in) for Arizona

## KEY

Upper  
1/3 cases

Middle  
1/3 cases

Lower  
1/3 cases

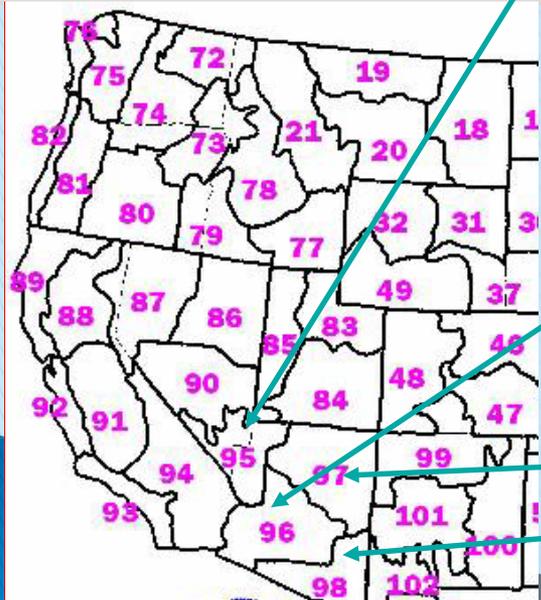
90%tile

67%tile

Median

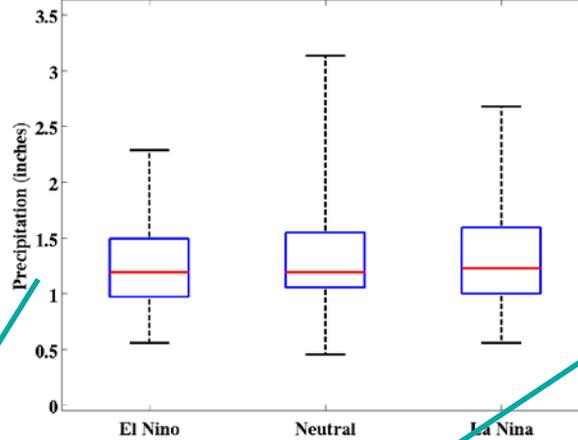
33%tile

10%tile



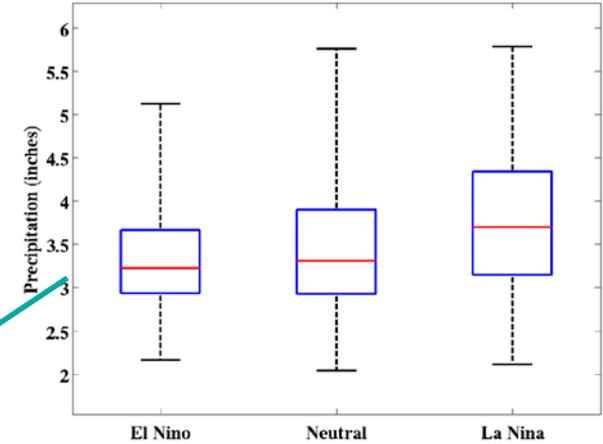
## Climate Division 95

JAS Precipitation Distribution for Climate Div. #095



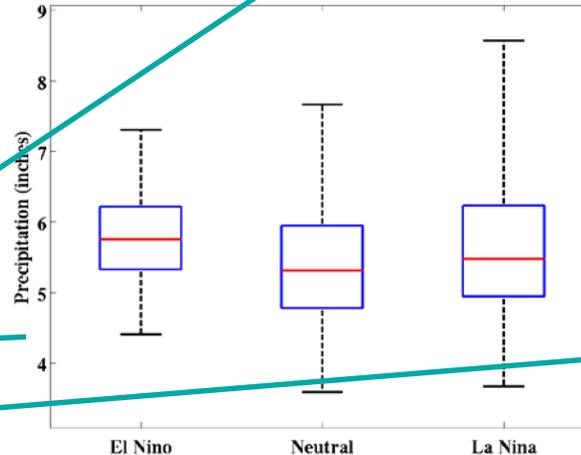
## Climate Division 96

JAS Precipitation Distribution for Climate Div. #096



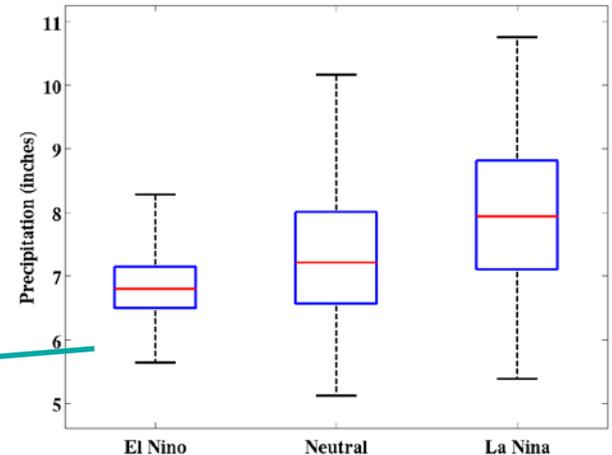
## Climate Division 97

JAS Precipitation Distribution for Climate Div. #097



## Climate Division 98

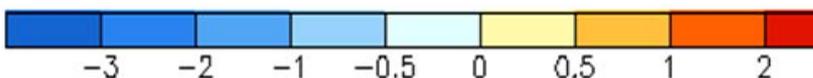
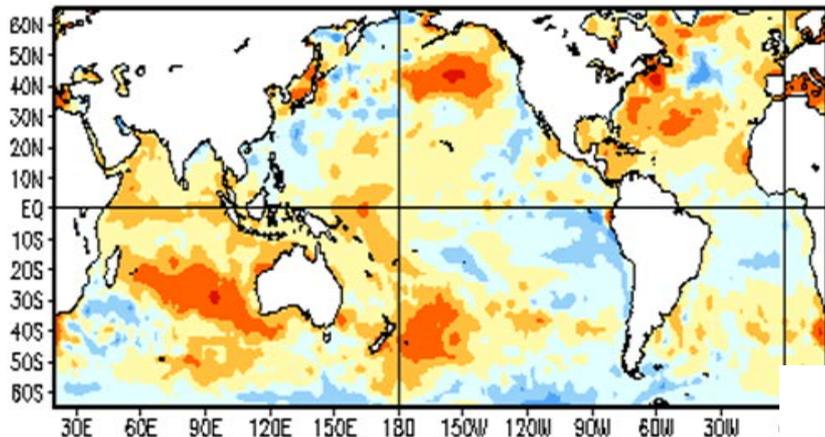
JAS Precipitation Distribution for Climate Div. #098





# Latest Ocean Temperatures

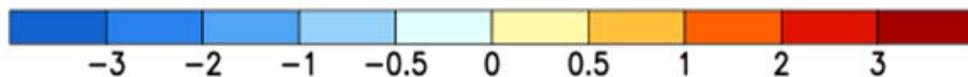
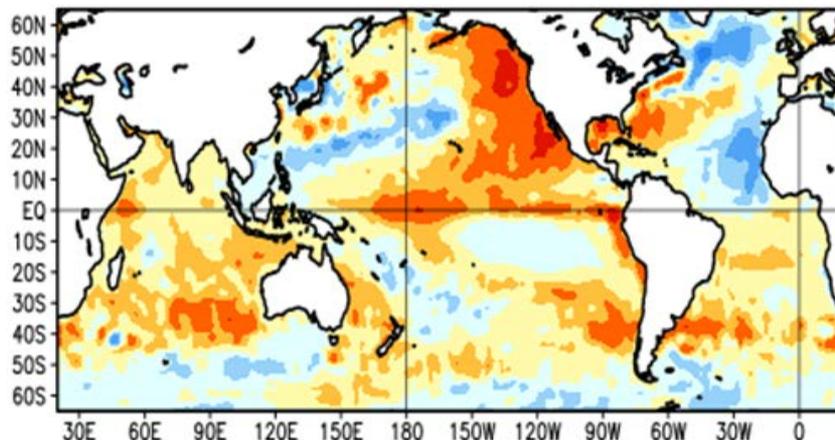
Average SST Anomalies  
27 OCT 2013 – 23 NOV 2013



▶ November 2013: Negative PDO

- Colder than normal water hugging U.S. West coast
- Warmer than normal water over North Central Pacific

Average SST Anomalies  
29 MAR 2015 – 25 APR 2015



▶ April 2015: Positive PDO

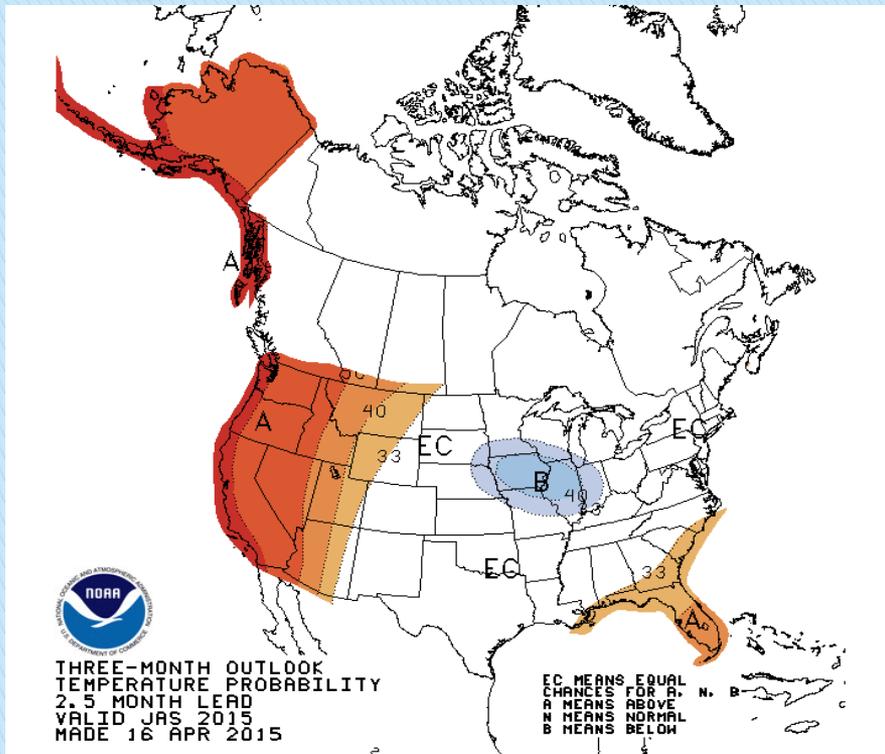
- Warmer than normal water hugging U.S. West coast
- Colder than normal water over the Central Pacific



# Outlook: Jul/Aug/Sep 2015

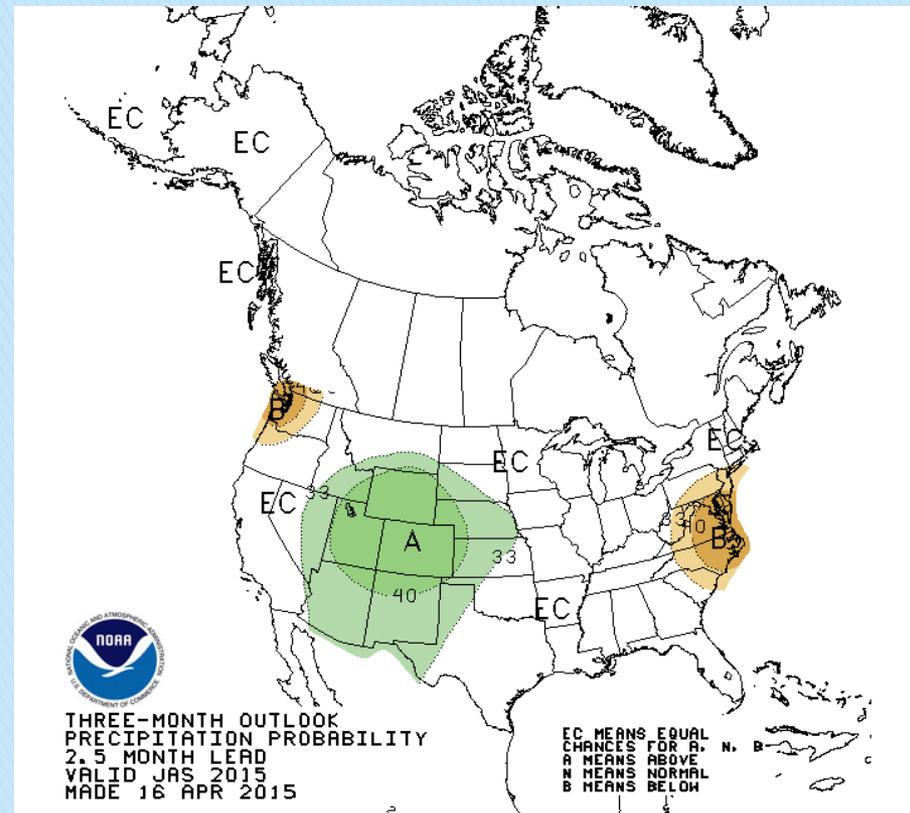
Three-month averages

Shading indicates chances of above or below normal



Slightly better odds for above normal temperatures

Slightly better odds of above average precipitation

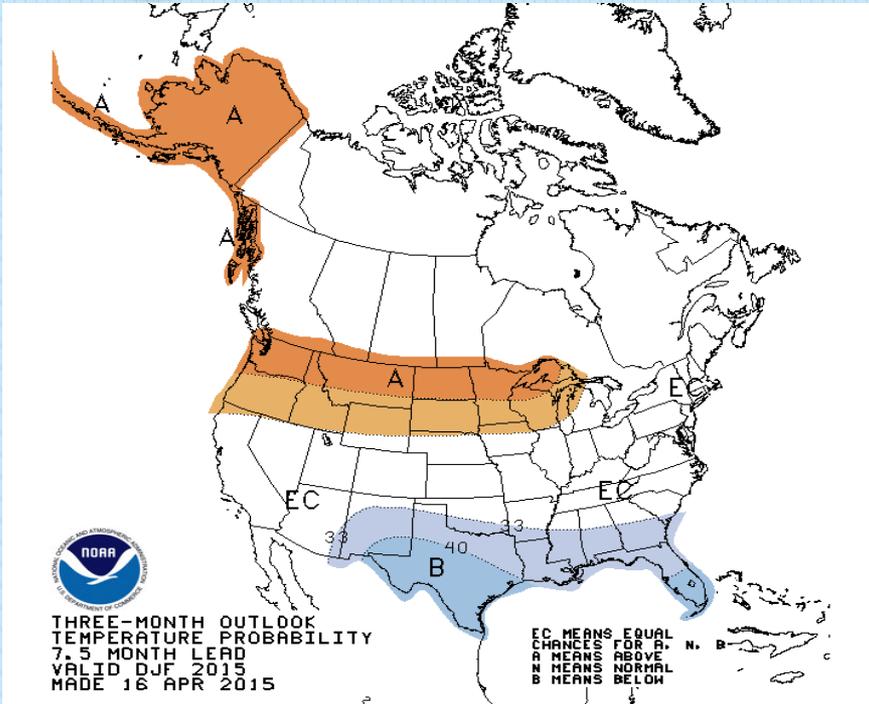




# Outlook: Dec/Jan/Feb 2015-16

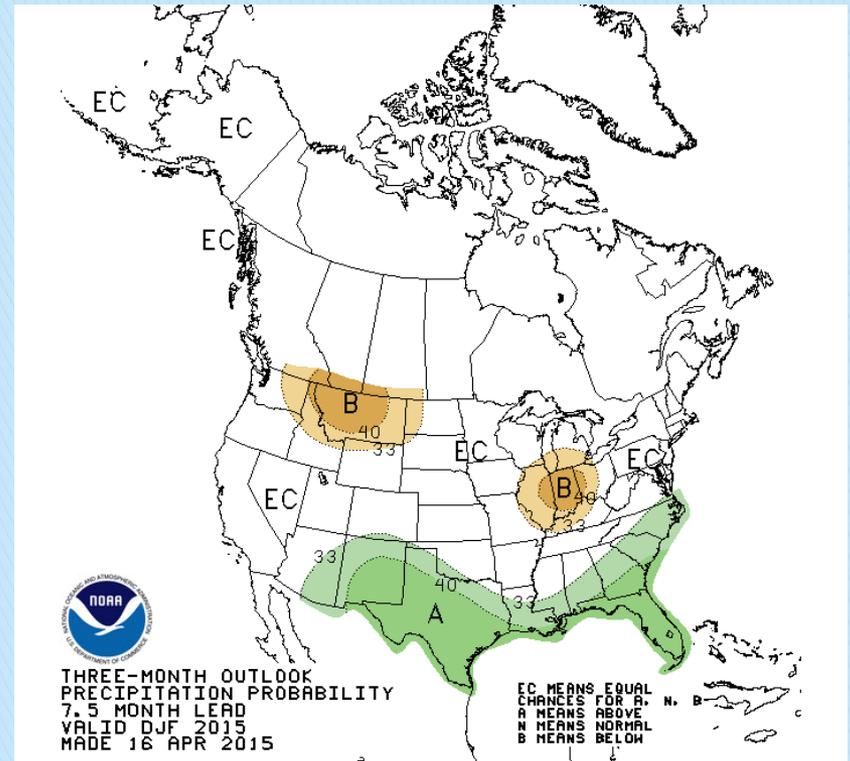
Three-month averages

Shading indicates chances of above or below normal



Equal chances temperatures will be above, below, or near normal

Only very slight chance of above normal precipitation





# Summary

- ▶ Better than a 70% chance El Nino continues through the summer
- ▶ Weak correlation of El Nino monsoon seasons starting later and providing less rainfall
- ▶ However, mixed signals with lack of snow cover, drought, and potential active East Pacific hurricane season
- ▶ At least a 60% chance El Nino persists into early winter, with some chance of moderate to strong El Nino. However, limited model skill this time of year



# Questions? Contact us!

Telephone: 602-275-0073

Home page: [www.weather.gov/phoenix](http://www.weather.gov/phoenix)

Facebook: [www.facebook.com/NWSPhoenix](http://www.facebook.com/NWSPhoenix)

Twitter: [www.twitter.com/NWSPhoenix](http://www.twitter.com/NWSPhoenix)

E-mail: [mark.omalley@noaa.gov](mailto:mark.omalley@noaa.gov)

# Governor's Drought Interagency Coordinating Group

**Thomas Buschatzke, Director**

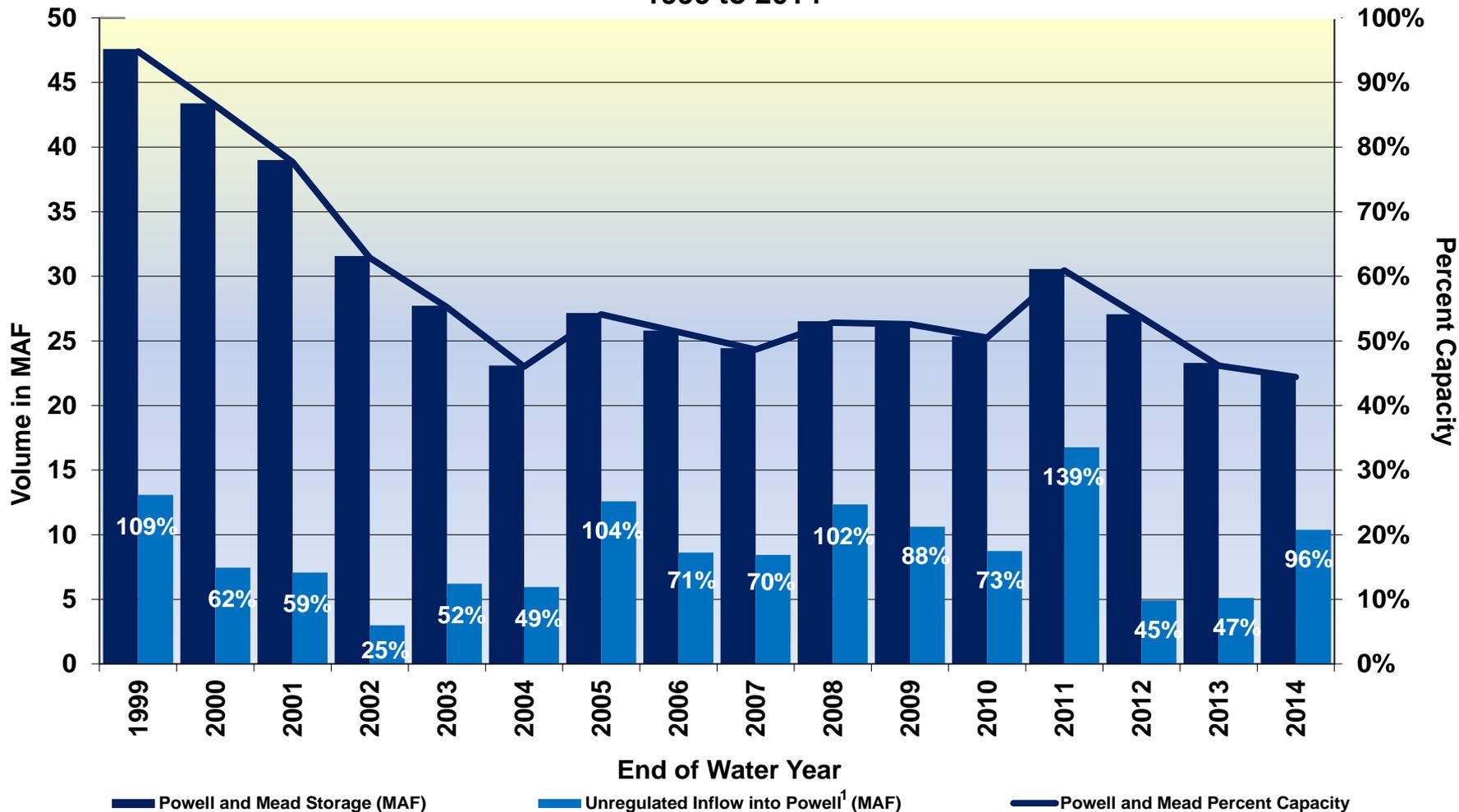
**Arizona Department Of Water Resources**

**May 5, 2015**



**PROTECTING  
ARIZONA'S WATER SUPPLIES  
for ITS NEXT CENTURY**

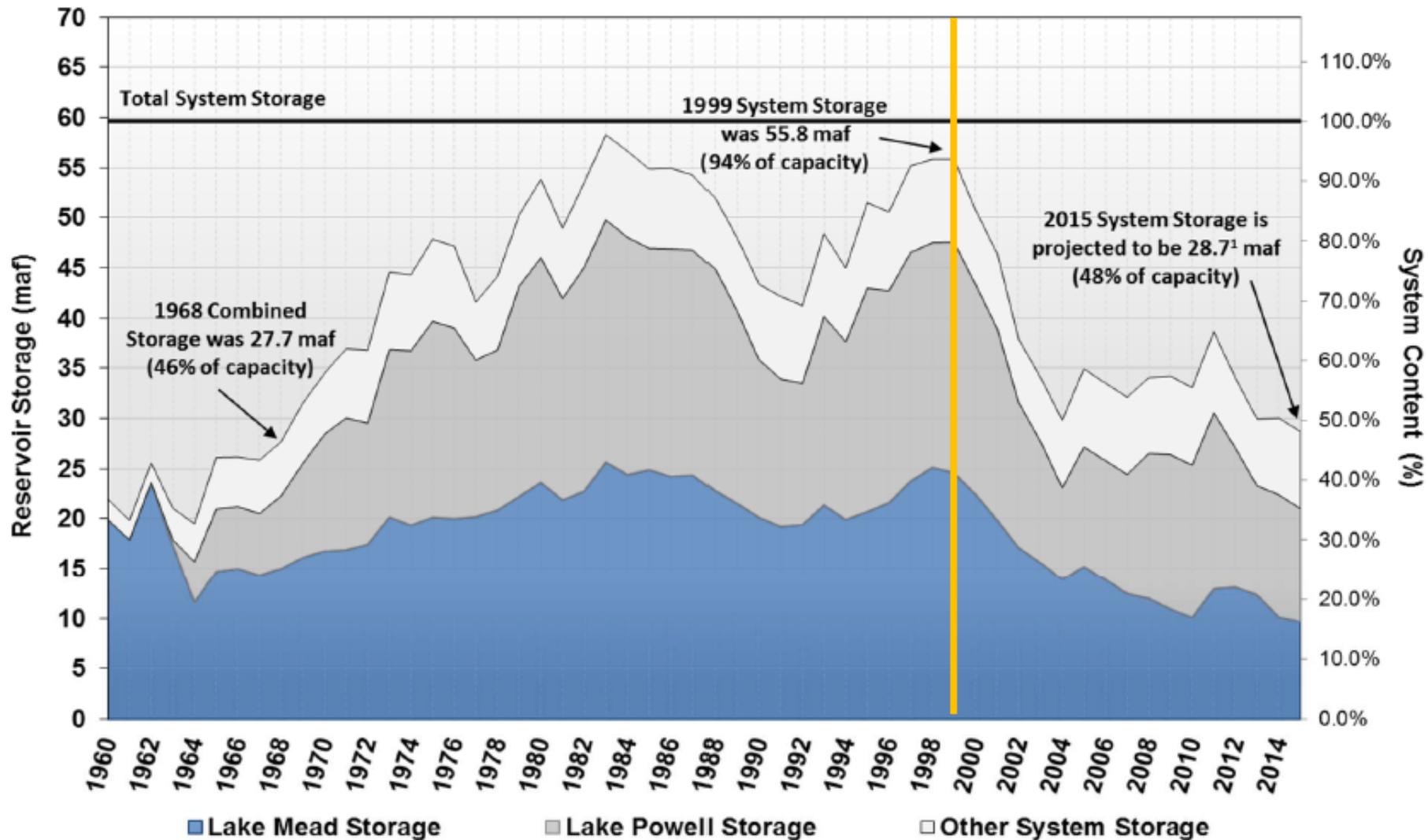
## Lake Powell and Lake Mead Storage and Percent of Capacity and Unregulated Inflow Into Lake Powell 1999 to 2014



<sup>1</sup>Percentages at the top of the light blue bars represent percent of average unregulated inflow into Lake Powell for a given water year. Water years 1999-2011 are based on the 30-year average from 1971 to 2000. Water years 2012-2014 are based on the 30-year average from 1981-2010.

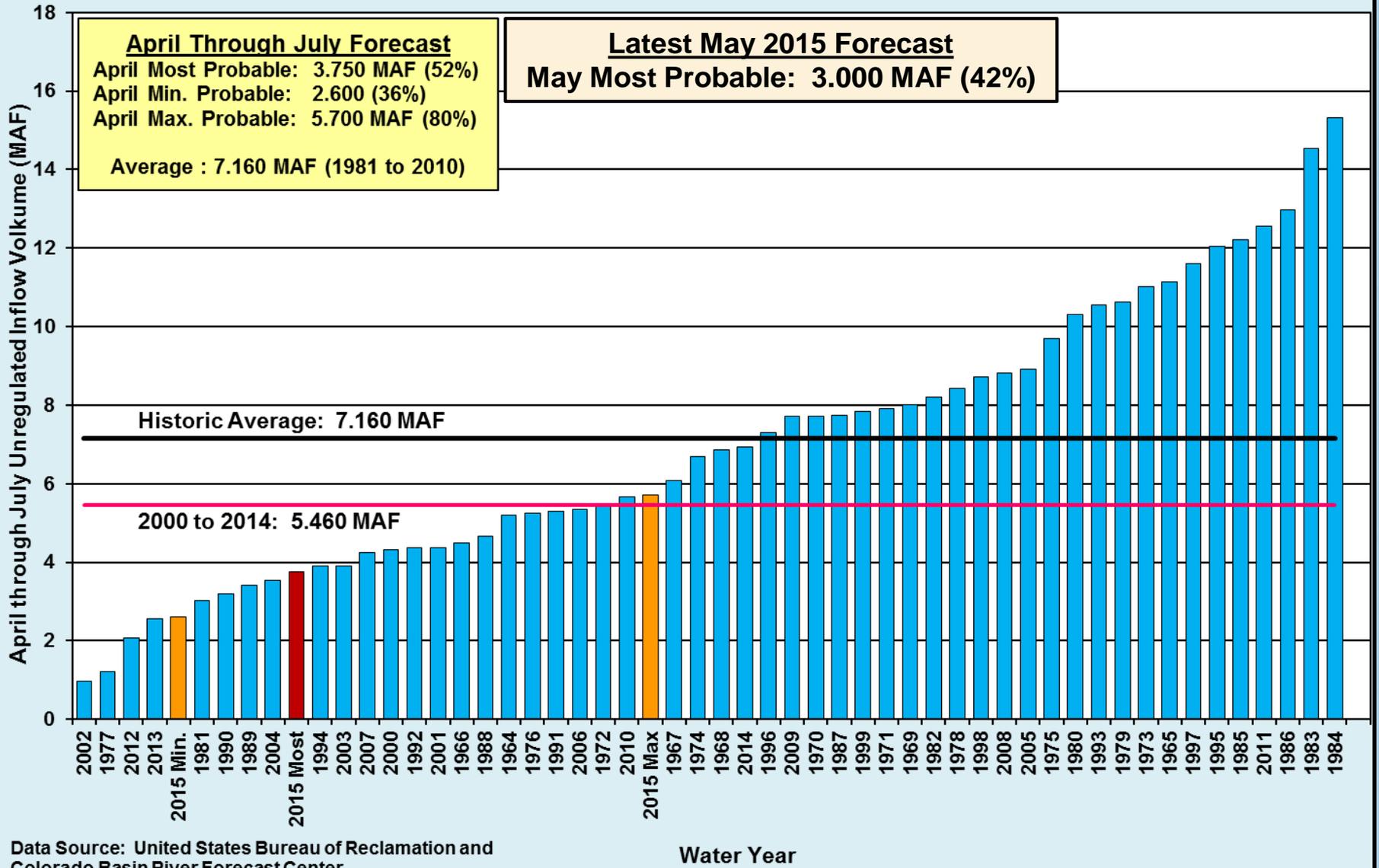
# System Storage - End of Water Year Total Volumes

Water Years 1960 - 2015<sup>1</sup>



<sup>1</sup> End of Water Year 2015 storage is based on projections from the March 2015 Most Probable 24-Month Study.

**Lake Powell Unregulated Inflow**  
**April through July 2015 (issued April 2015)**  
*Comparison With History*



Data Source: United States Bureau of Reclamation and Colorado Basin River Forecast Center

Water Year

# Lake Powell and Lake Mead Operational Table

Operational Tiers for Water/Calendar Year 2015 Determined from Reclamation's August 2014 24-Month Study

Lake Powell			Lake Mead		
Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) <sup>1</sup>	Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf) <sup>1</sup>
3,700	<b>Equalization Tier</b> Equalize, avoid spills or release 8.23 maf	24.3	1,220	<b>Flood Control Surplus or Quantified Surplus Condition</b> Deliver > 7.5 maf	25.9
3,636 - 3,666 (2008-2026)	<b>Upper Elevation Balancing Tier<sup>3</sup></b> Release 8.23 maf; if Lake Mead < 1,075 feet, <b>3,597.75 Ft.</b> balance contents with <b>Jan. 2015 Actual</b> a min/max release of 7.0 and 9.0 maf	15.5 - 19.3 (2008-2026)	1,200 (approx.) <sup>2</sup>	<b>Domestic Surplus or ICS Surplus Condition</b> Deliver > 7.5 maf	22.9 (approx.) <sup>2</sup>
3,575			1,145	<b>Normal or ICS Surplus Condition</b> Deliver ≥ 7.5 maf	15.9
	<b>Mid-Elevation Release Tier</b> Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf	9.5	1,105	<b>1,087.79 Ft.</b> <b>Jan. 2015 Actual</b>	11.9
			1,075	<b>Shortage Condition</b> Deliver 7.167 <sup>4</sup> maf	9.4
3,525	<b>Lower Elevation Balancing Tier</b> Balance contents with a min/max release of 7.0 and 9.5 maf	5.9	1,050	<b>Shortage Condition</b> Deliver 7.083 <sup>5</sup> maf	7.5
3,490			1,025	<b>Shortage Condition</b> Deliver 7.0 <sup>6</sup> maf Further measures may be undertaken <sup>7</sup>	5.8
3,370			1,000	4.3	
		0	895		0

Diagram not to scale

<sup>1</sup> Acronym for million acre-feet

<sup>2</sup> This elevation is shown as approximate as it is determined each year by considering several factors including Lake Powell and Lake Mead storage, projected Upper Basin and Lower Basin demands, and an assumed inflow.

<sup>3</sup> Subject to April adjustments which may result in a release according to the Equalization Tier

<sup>4</sup> Of which 2.48 maf is apportioned to Arizona, 4.4 maf to California, and 0.287 maf to Nevada

<sup>5</sup> Of which 2.40 maf is apportioned to Arizona, 4.4 maf to California, and 0.283 maf to Nevada

<sup>6</sup> Of which 2.32 maf is apportioned to Arizona, 4.4 maf to California, and 0.280 maf to Nevada

<sup>7</sup> Whenever Lake Mead is below elevation 1,025 feet, the Secretary shall consider whether hydrologic conditions together with anticipated deliveries to the Lower Division States and Mexico is likely to cause the elevation at Lake Mead to fall below 1,000 feet. Such consideration, in consultation with the Basin States, may result in the undertaking of further measures, consistent with applicable Federal law.

# Potential For Shortages

- **Current 2015 water year release expected to be 9.0 MAF from Lake Powell in 2015 (based on April 2014 adjustment to 9.0 MAF)**
- **Reclamation will monitor hydrologic conditions and inflow into Lake Powell and may reduce releases to be less than 9.0 MAF**
- **Probability of 7.48 MAF release from Lake Powell in water year 2016 is 57%**
- **33% probability of Tier 1 shortage in the Lower Basin in 2016 (with a 9.00 MAF release in water year 2015)**
- **75% probability of Tier 1 shortage in the Lower Basin in 2017 (with 9.00 MAF release in water year 2015 and with 7.48 MAF release in water years 2016)**



**Based on Reclamation's April 2015 Colorado River modeling.**

# PROBABILITIES OF LOWER BASIN SHORTAGE

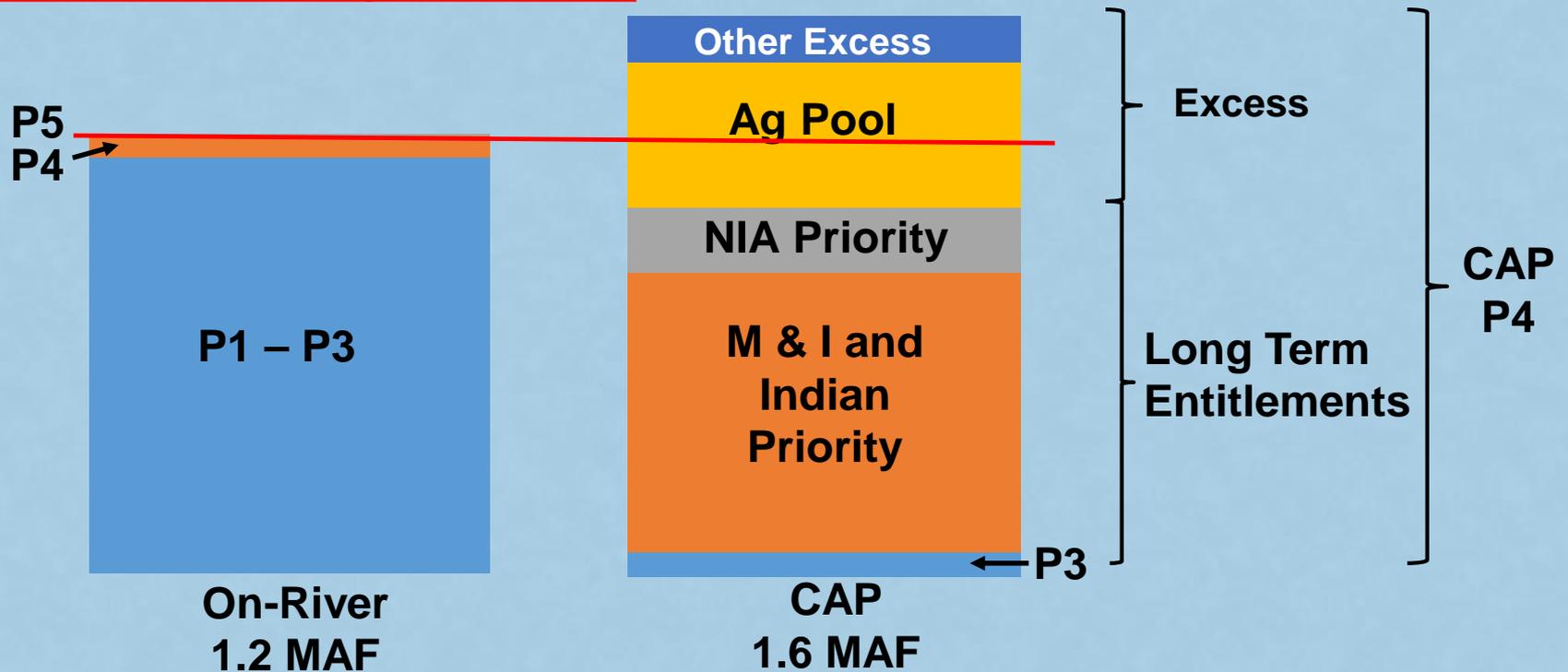
	2016	2017	2018	2019	2020
<b>Probability of any level of shortage (Mead <math>\leq</math> 1,075 ft.)</b>	<b>33</b>	<b>75</b>	<b>74</b>	<b>70</b>	<b>66</b>
1 <sup>st</sup> level shortage (Mead $\leq$ 1,075 and $\geq$ 1,050 ft)	33	71	45	36	29
2 <sup>nd</sup> level shortage (Mead $<$ 1,050 and $\geq$ 1,025 ft)	0	4	28	24	23
3 <sup>rd</sup> level shortage (Mead $<$ 1,025)	0	0	1	10	14

From Bureau of Reclamation April 2015 Colorado River modeling projections for 2016 through 2020.



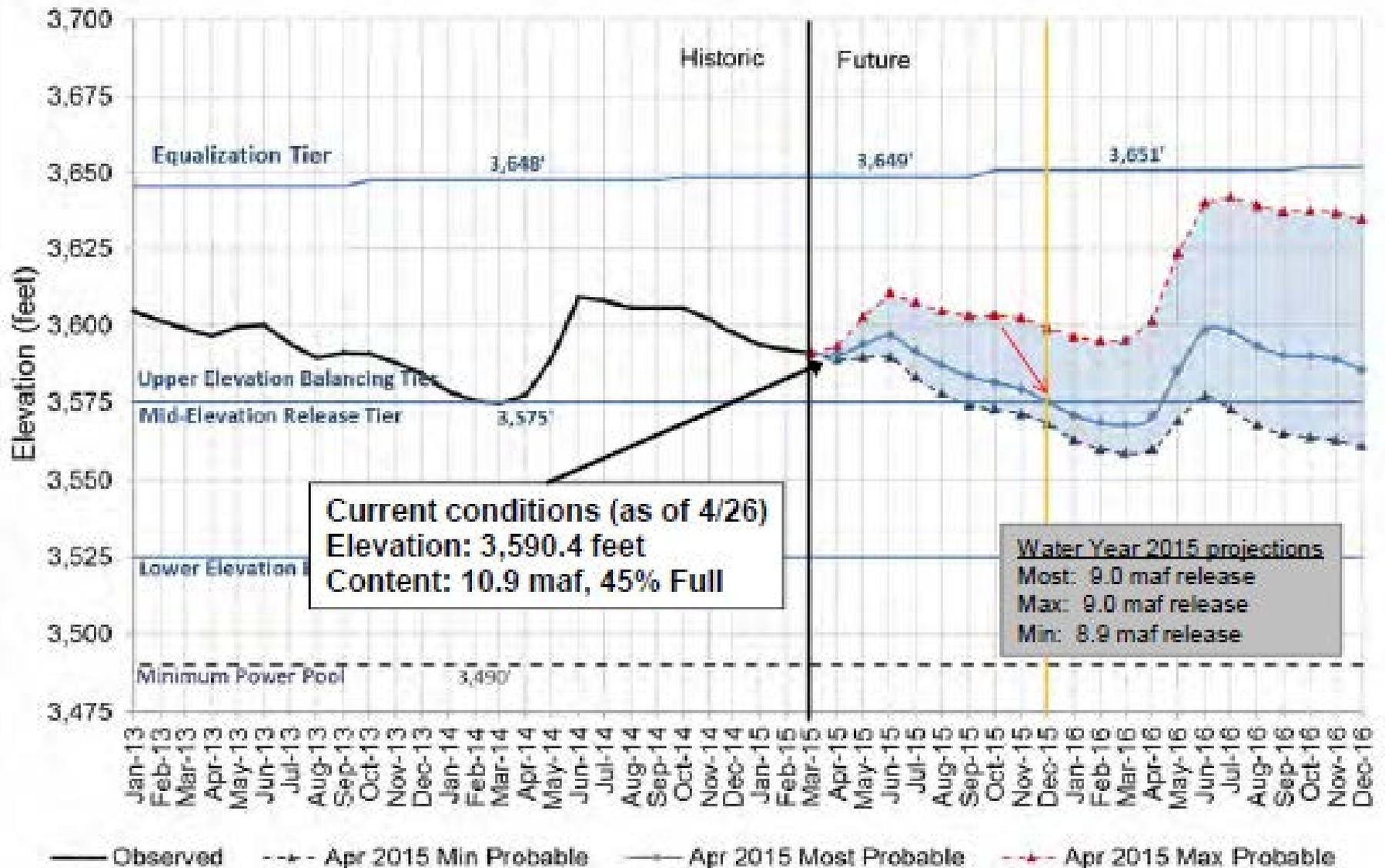
# ARIZONA PRIORITIES – 2.8 MAF TOTAL

2016 Tier 1 Shortage = 320 KAF



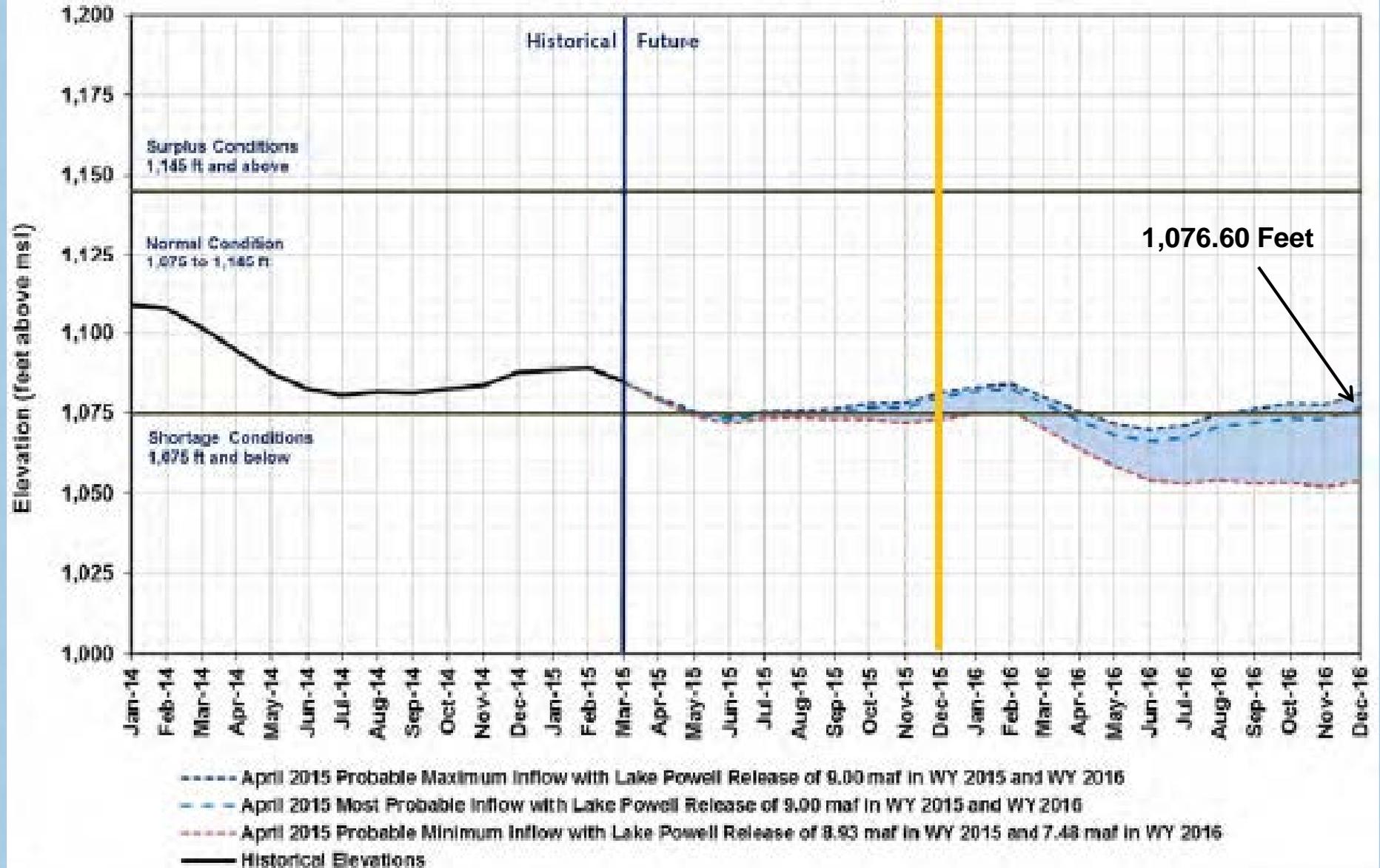
# Lake Powell End of Month Elevations

Historic and projected based on April 2015 modeling



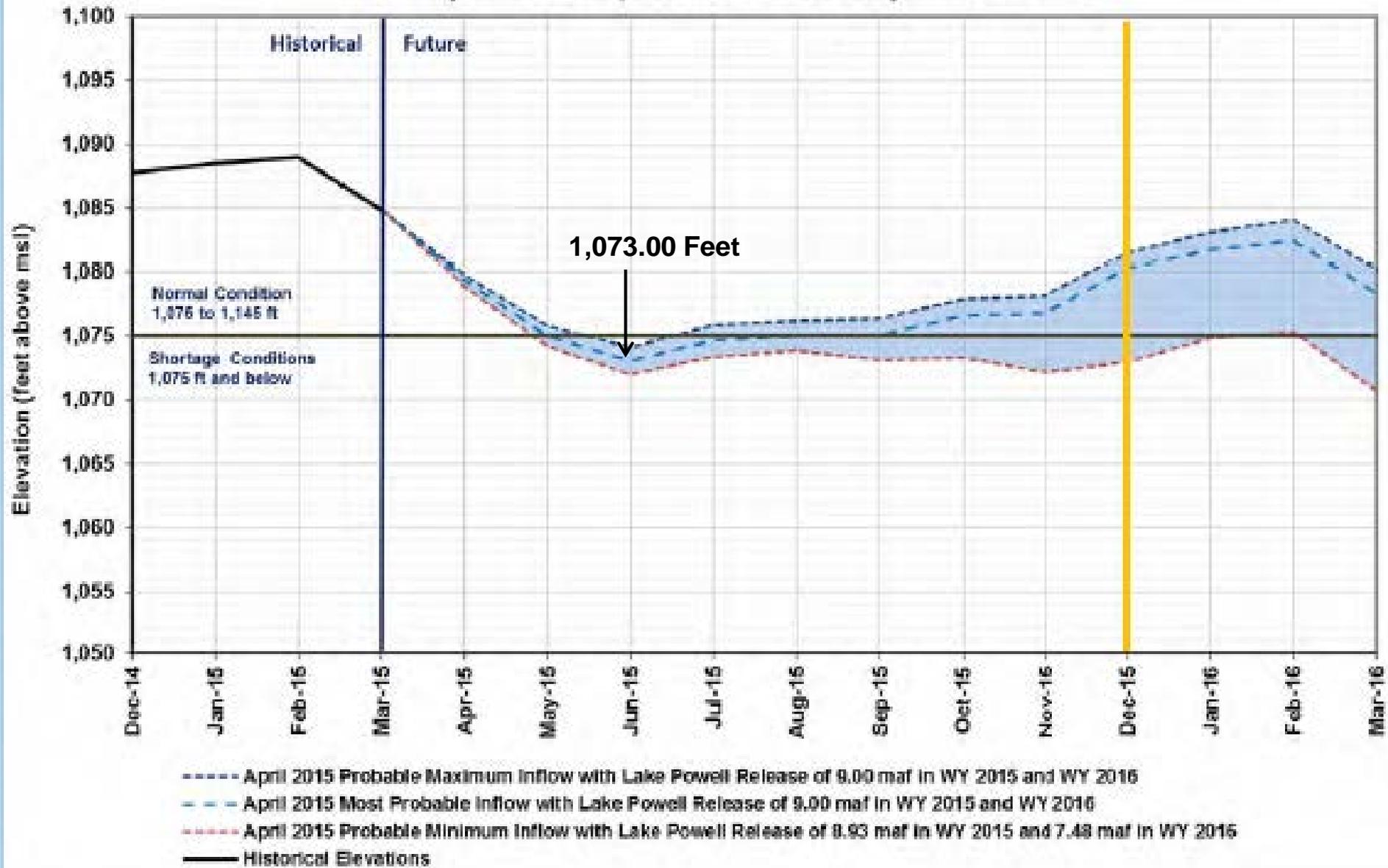
# Lake Mead End of Month Elevations

Projections from April 2015 24-Month Study Inflow Scenarios

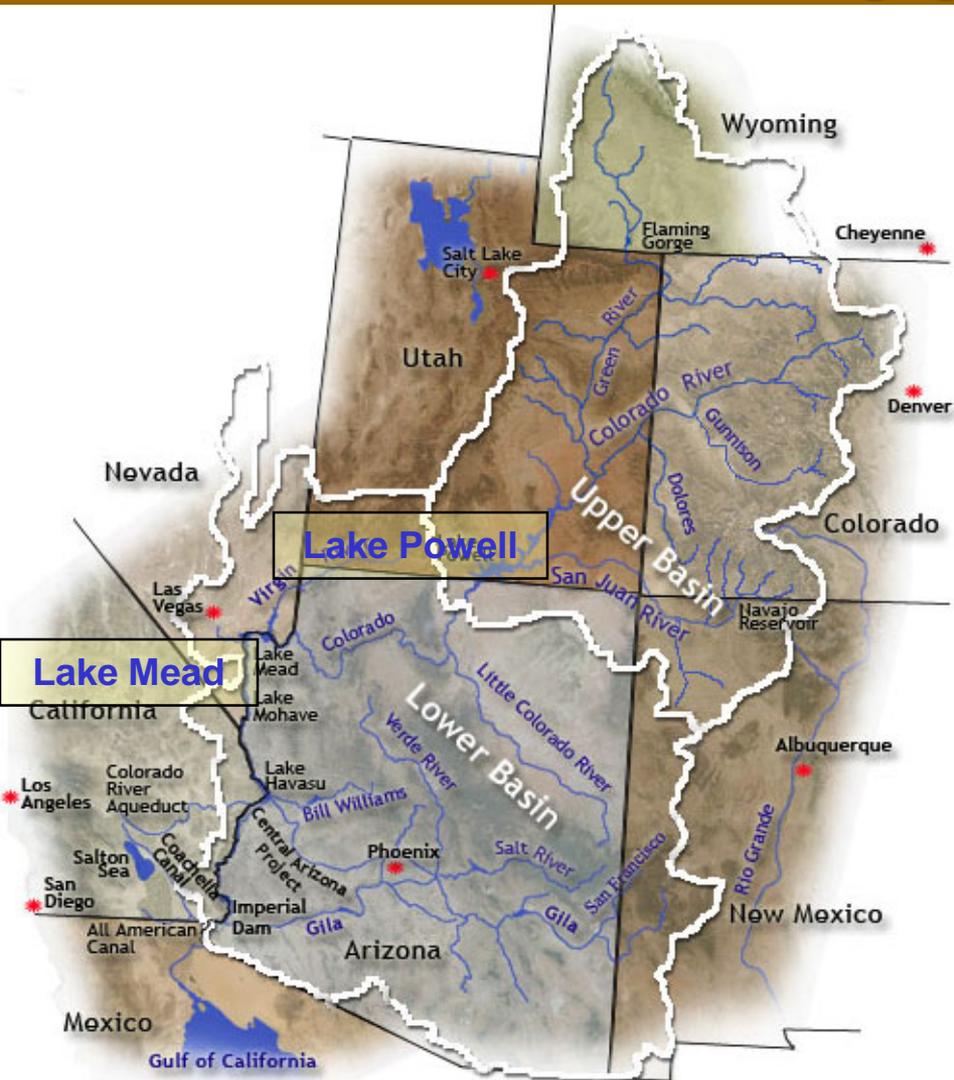


# Lake Mead End of Month Elevations (Detail)

Projections from April 2015 24-Month Study Inflow Scenarios



# Colorado River Basin Water Supply Outlook



**Total Reservoir System Contents:**  
**28.319 MAF or 47%**  
**(As of May 1, 2015)**

**Total Reservoir System Contents  
Last Year:**  
**28.086 MAF or 47%**

***This is a change of + 0.233 MAF***

# Colorado River Basin Water Supply Outlook

**LAKE POWELL**  
Capacity – 24.5 MAF  
05/03/2015 – 44% full  
Contents 10.82 MAF  
Elevation – 3,590.03

Source: United States Bureau of Reclamation

Glen Canyon  
Dam

Page

© 2010 Europa Technologies  
© 2010 Google  
Image USDA Farm Service Agency  
Image © 2010 DigitalGlobe

© 2009 Google

Imagery Dates: Jun 8, 2007 - Jun 23, 2009

37°01'38.17" N 111°22'56.22" W elev 3887 ft

Eye alt 37.88 mi

# Colorado River Basin Water Supply Outlook

**LAKE MEAD**  
Capacity - 26 MAF  
05/03/2015 - 38% full  
Contents - 9.92 MAF  
Elevation - 1,078.95'

Source: United States Bureau of Reclamation

Las Vegas

Hoover Dam

Image U.S. Geological Survey  
© 2010 Google  
Image USDA Farm Service Agency  
Image © 2010 DigitalGlobe

©2009 Google

Imagery Date: Jun 8, 2007

36°07'44.40" N 114°31'18.60" W elev 1309 ft

Eye alt 46.71 mi



**PROTECTING  
ARIZONA'S WATER SUPPLIES**  
*for ITS NEXT CENTURY*

# Questions?

[www.azwater.gov](http://www.azwater.gov)

General Number:

602-771-8500



Roosevelt Lake and Dam, AZ

## **SRP – Winter Recap 2015**

**James Walter**

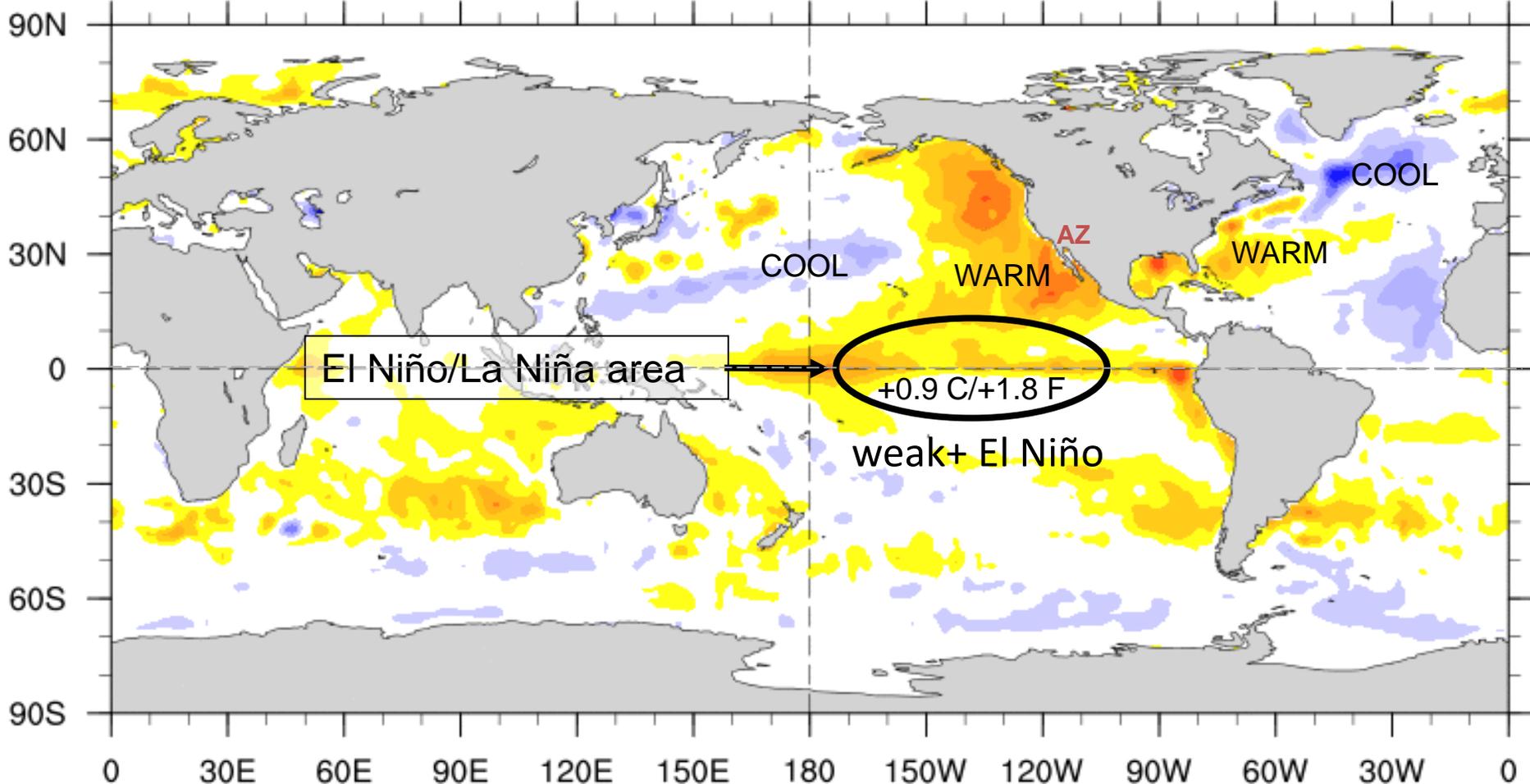
Meteorologist, Water Resource Operations,  
Salt River Project, Phoenix, Arizona

# Sea Surface Temperature Anomalies

## APRIL 2015

Monthly SST Anomaly

2015/03/29 - 2015/04/25

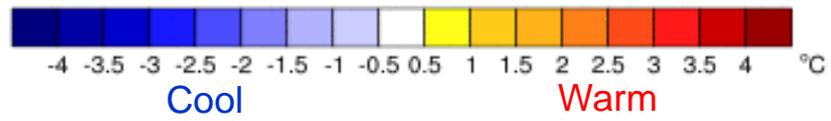


El Niño/La Niña area

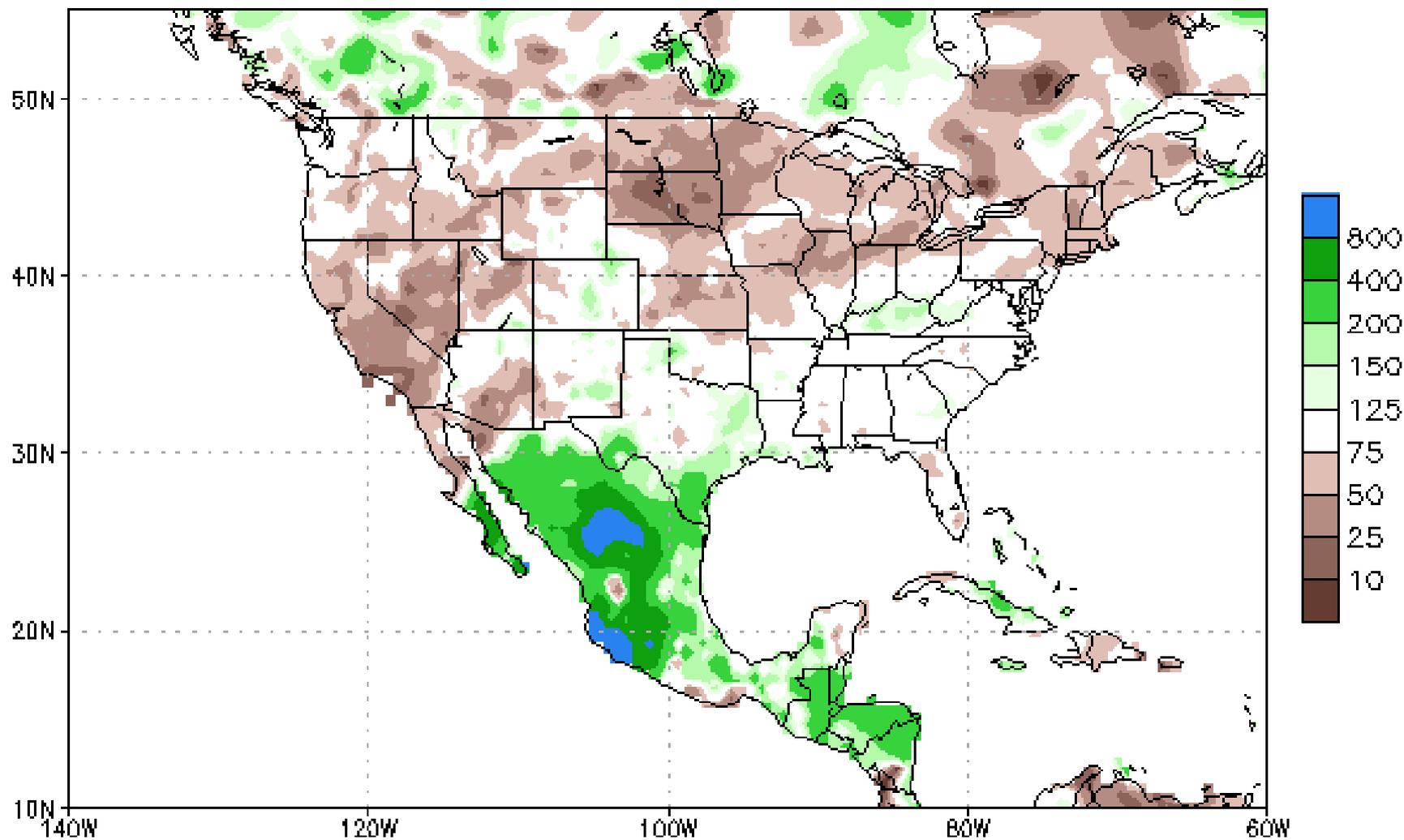
+0.9 C/+1.8 F  
weak+ El Niño

NOAA/ESRL/PSD

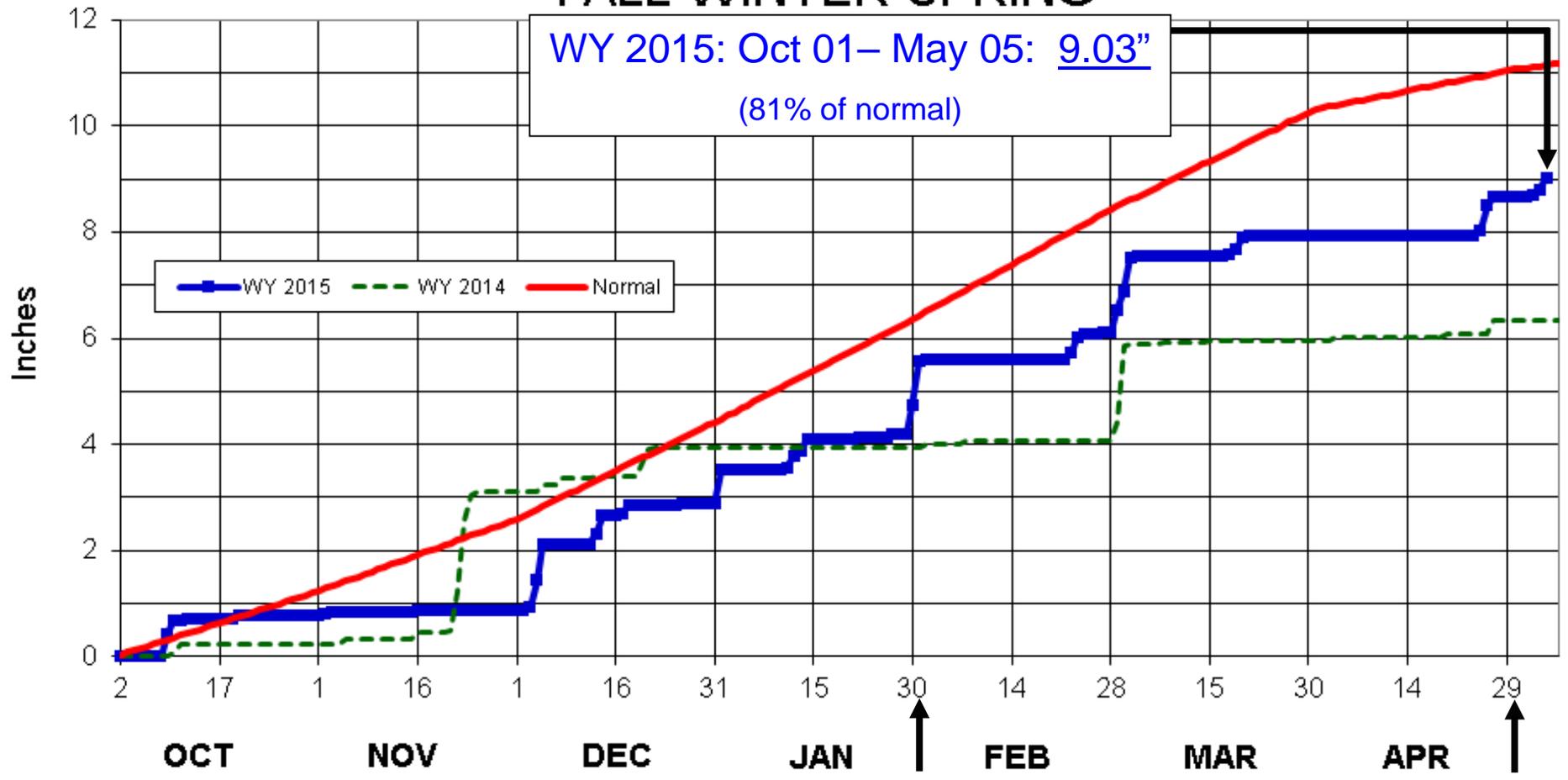
Base Period: 1981-2010



90-day Accumulated Prep % of Normal 03FEB2015-03MAY2015



# Cumulative Watershed Precipitation FALL-WINTER-SPRING



FEB '15: 0.92"  
(normal=1.9")

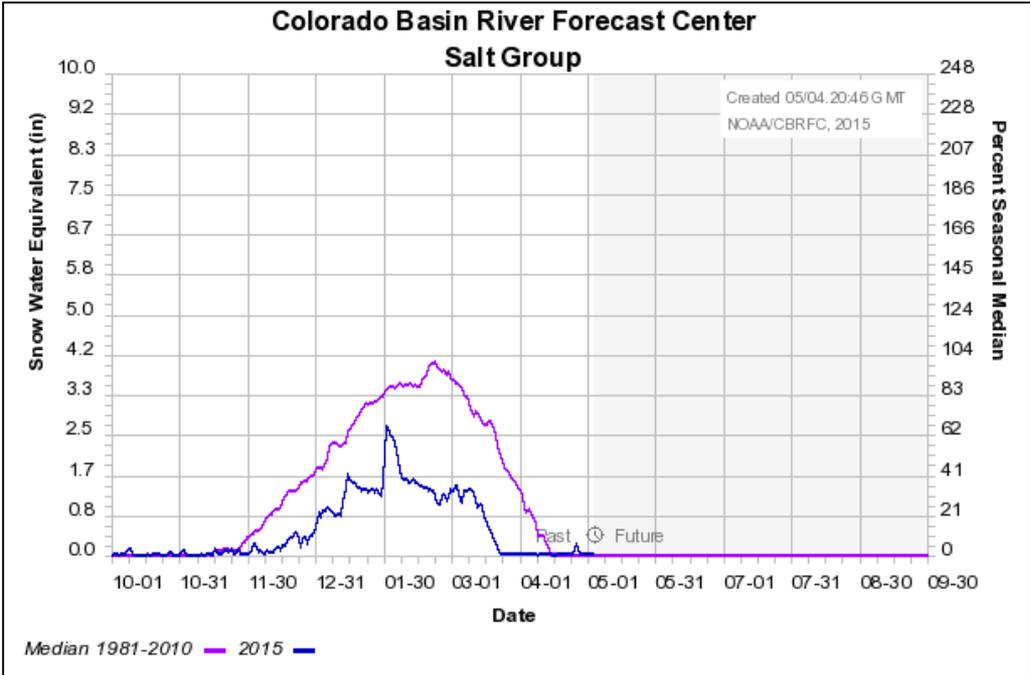
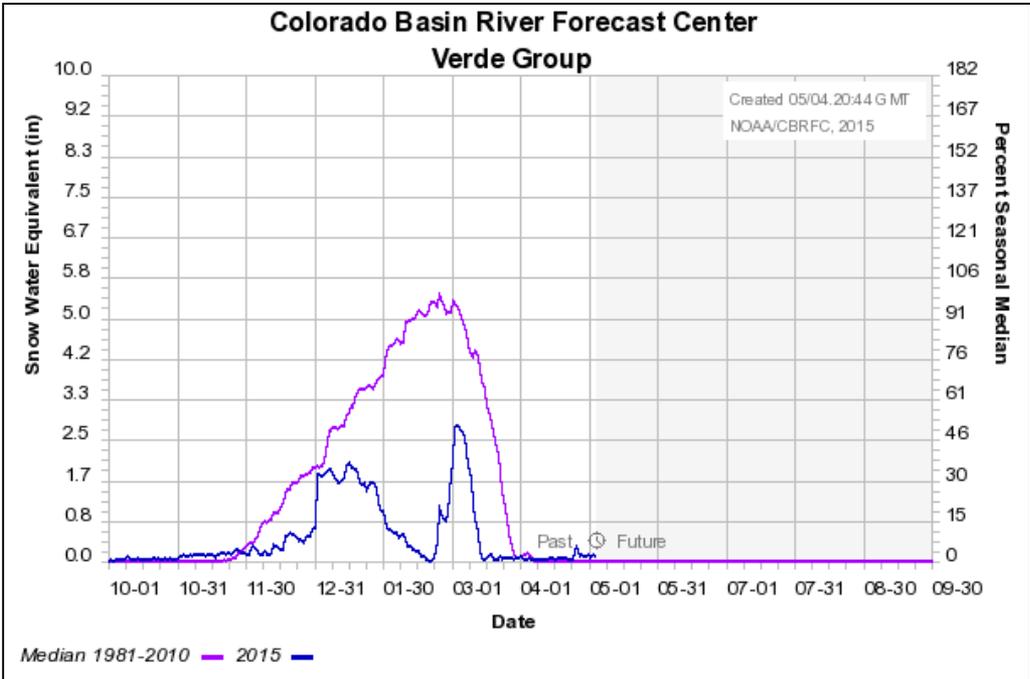
MAR '15: 1.42"  
(normal=1.9")

APR '15: 0.73"  
(normal=0.8")

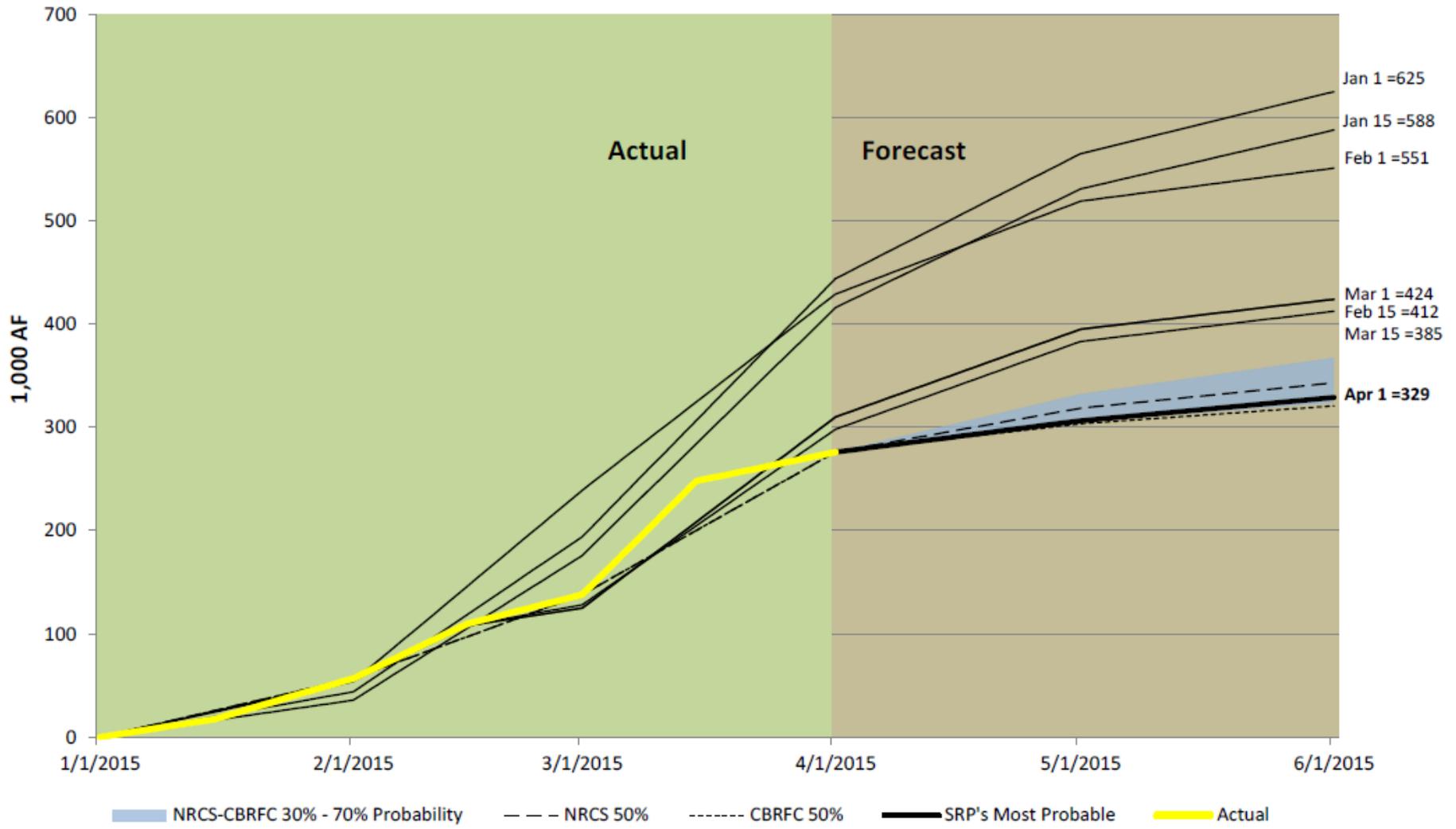


FEB-MAR-APR '15: 3.07"  
(normal=4.6")

DEC-JAN-FEB-MAR '15: 7.07"  
(normal=7.6")

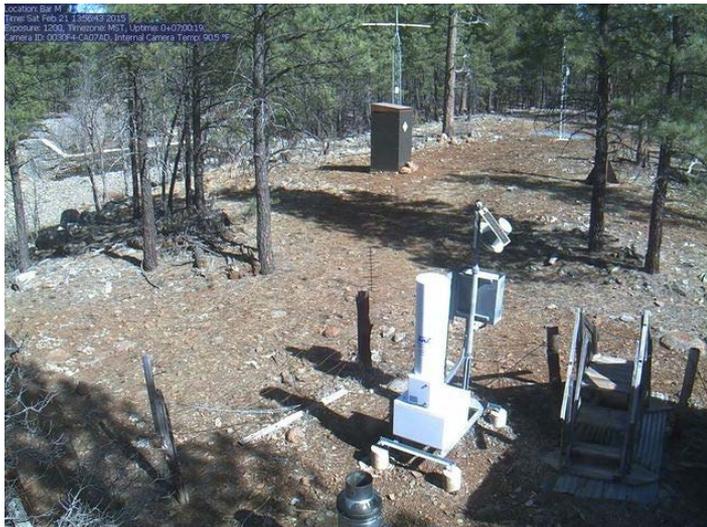


# April 1, 2015 - Salt, Tonto, and Verde Runoff Forecast



Year	Jan-May Inflow (AF)	May 1 Storage (AF)	May 1 Percent Full
2010	1,419,000	2,311,000	100
2011	223,000	2,006,000	87
2012	196,000	1,512,000	66
2013	449,000	1,453,000	63
2014	148,000	1,300,000	56
2015	*329,000	1,314,000	57

\* Projected – Winter (Jan-May) Inflow. Driest consecutive 5 year period.

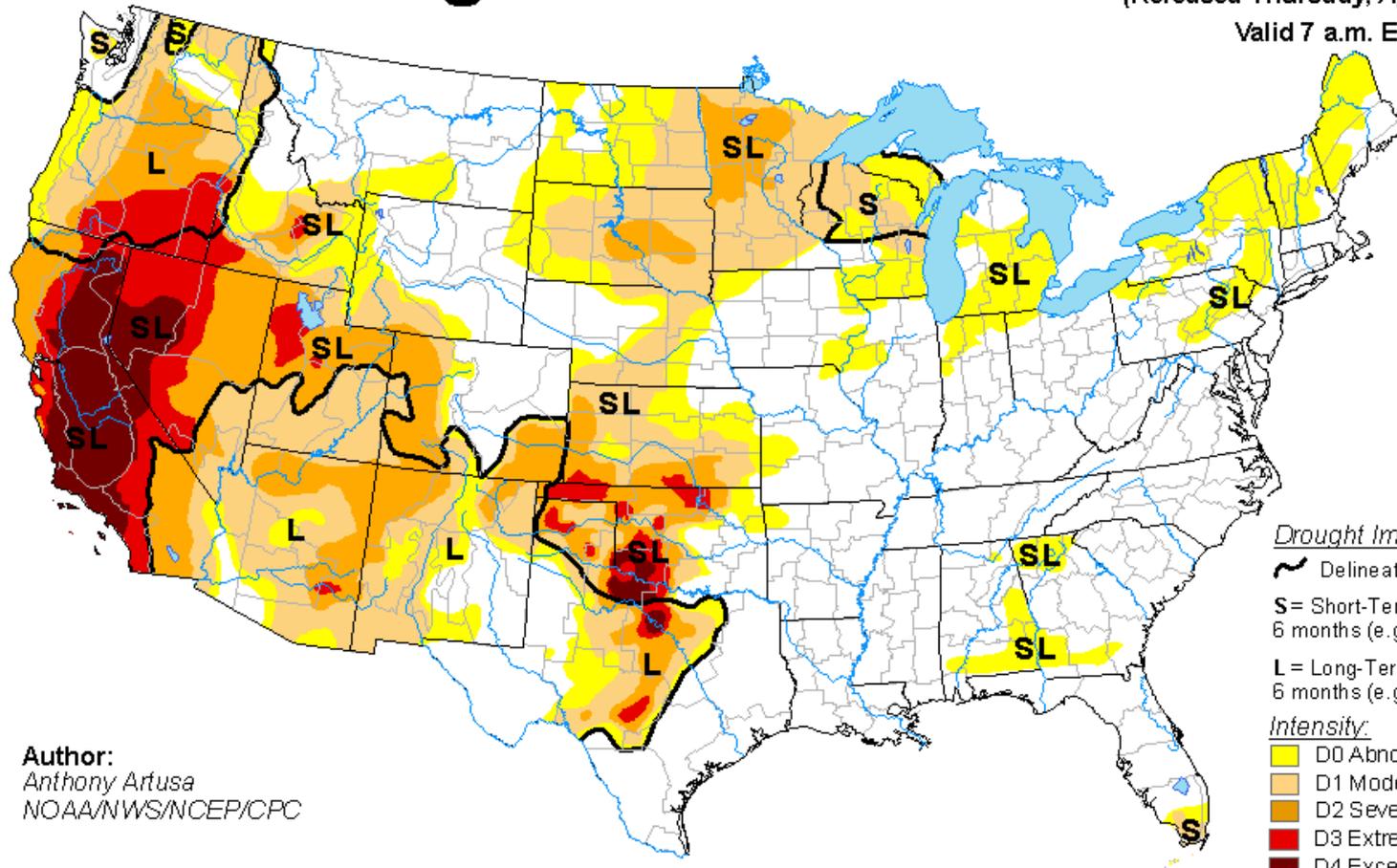


# U.S. Drought Monitor

April 28, 2015

(Released Thursday, Apr. 30, 2015)

Valid 7 a.m. EST



Author:  
Anthony Artusa  
NOAA/NWS/NCEP/CPC

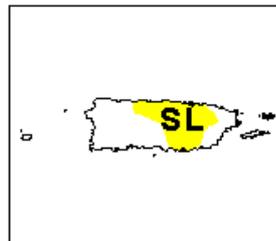
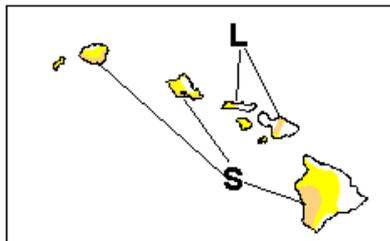
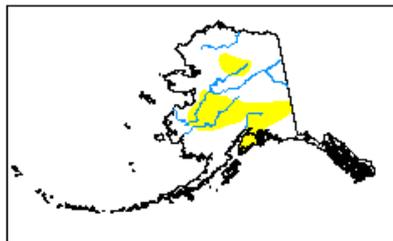
### Drought Impact Types:

- ~ Delineates dominant impacts
- S= Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L= Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

### Intensity:

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

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



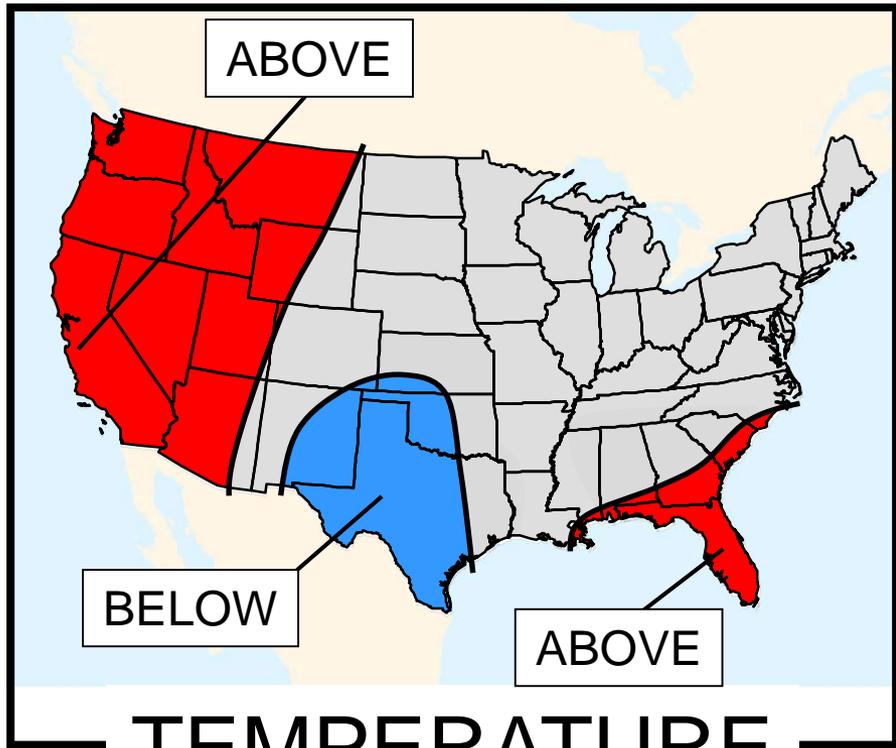
<http://droughtmonitor.unl.edu/>

# National Weather Service OUTLOOK

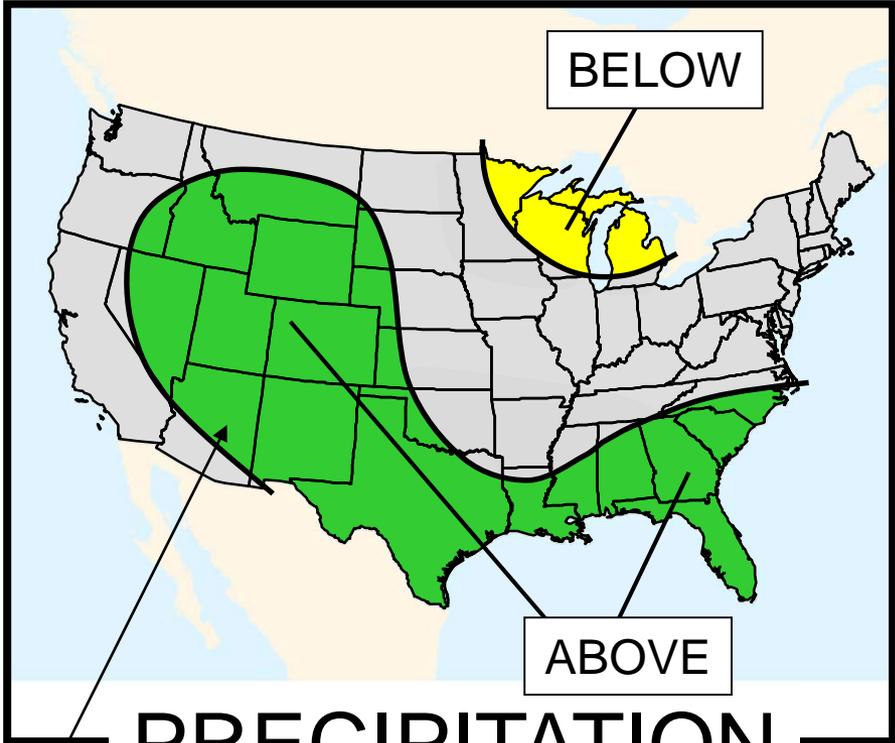
For **MAY-JUN-JUL 2015**, issued 16 April 2015



Watershed Thresholds: WET > 3.5", DRY < 2.5"



TEMPERATURE



PRECIPITATION

Probability of: WET 38%, normal 33%, DRY 29%

Source: NOAA/NWS/NCEP/ Climate Prediction Center

# Mid-Apr 2015 Plume of Model ENSO Predictions

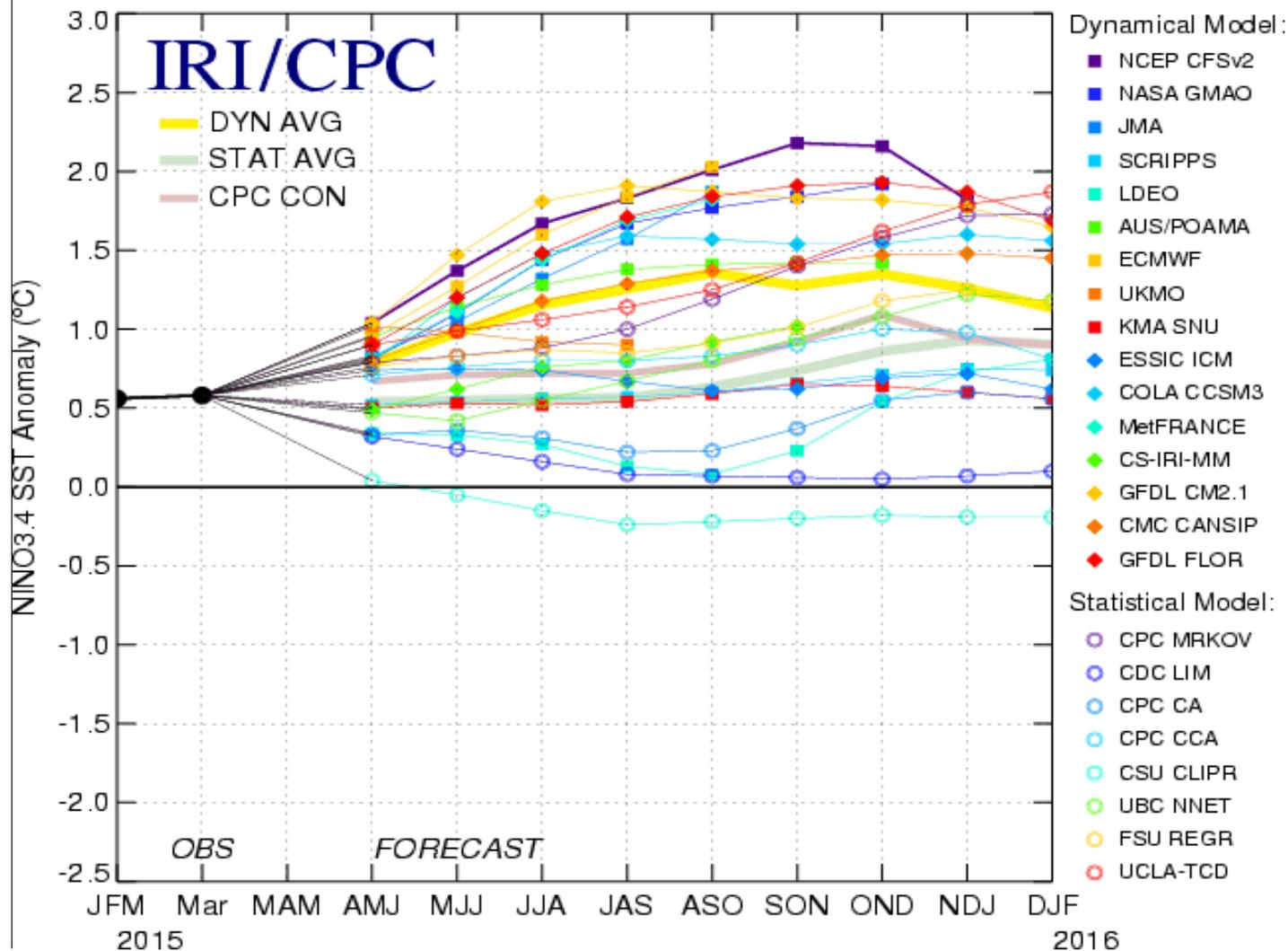


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 14 April 2015).

# 2015 WILDFIRE SEASON

Governor's Executive Briefing

April 30, 2015

Arizona State Forestry

Jeff Whitney, State Forester



# *Briefing Topics*

- Emergency Management
- Fire Season Factors
- 2015 Wildfire Assessment



# *Factors Affecting Fire Potential*

48

- Drought
- Fine Fuel Condition
- Seasonal Temperature and Precipitation
- Spring and Early Summer Weather
- Monsoon

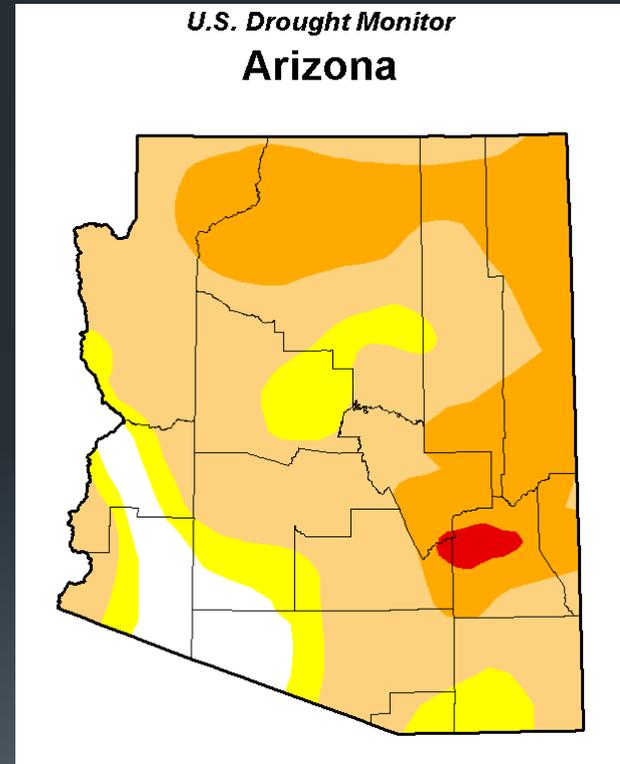
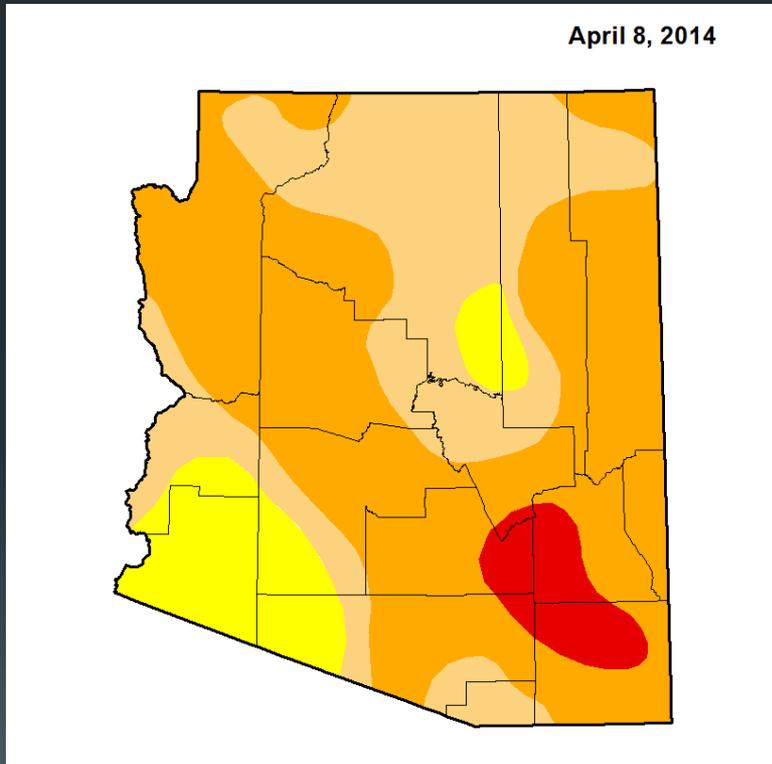
# Fire Season 2015: Drought

- Severe+ long term drought still ongoing across much of the region, despite some relief from a fairly robust monsoon
- Drought outlook calls for drought to persist, develop or worsen through the spring
- Long term drought impacts now semi-permanent in our outlook methodology
- Best we can hope for is temporary mitigation of drought impacts with any wetter periods
- “Increased severity & volatility during fire season”

# Drought

## April 2014

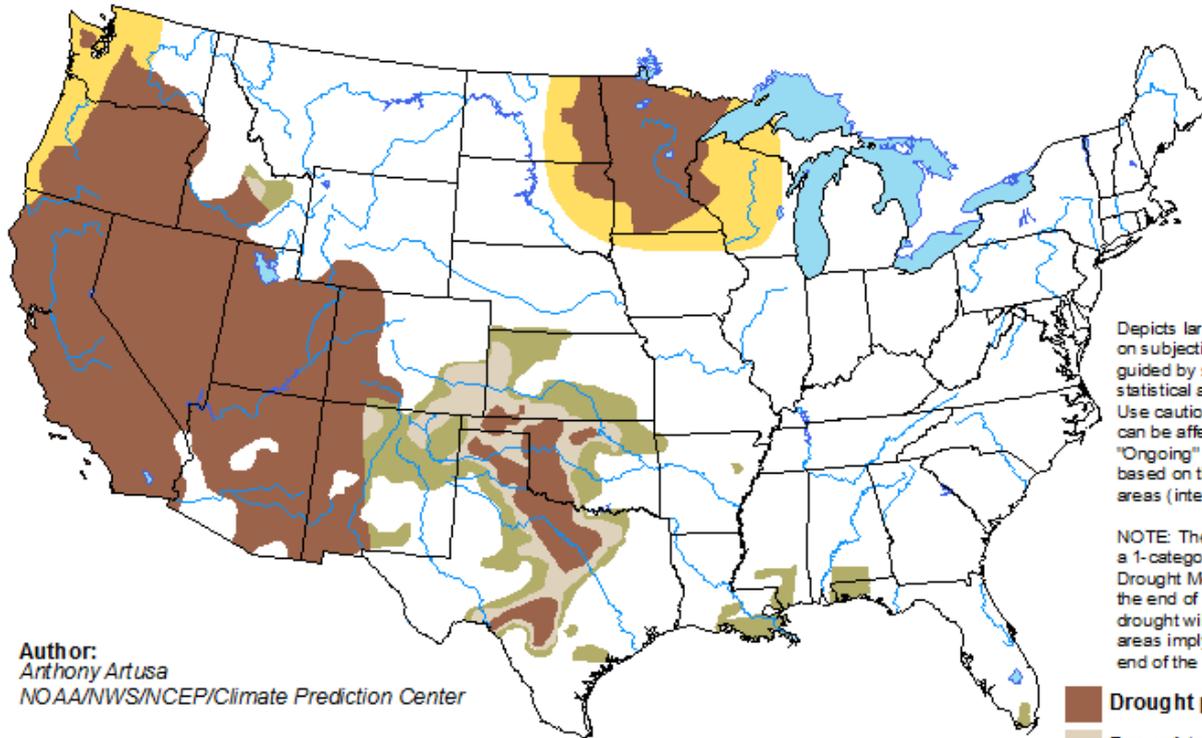
## April 2015



# Drought Persistence

## U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

Valid for March 19 - June 30, 2015  
Released March 19, 2015

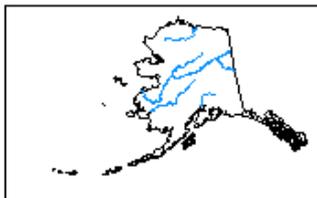


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan 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).

Author:  
Anthony Artusa  
NOAA/NWS/NCEP/Climate Prediction Center

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



<http://go.usa.gov/hHTe>

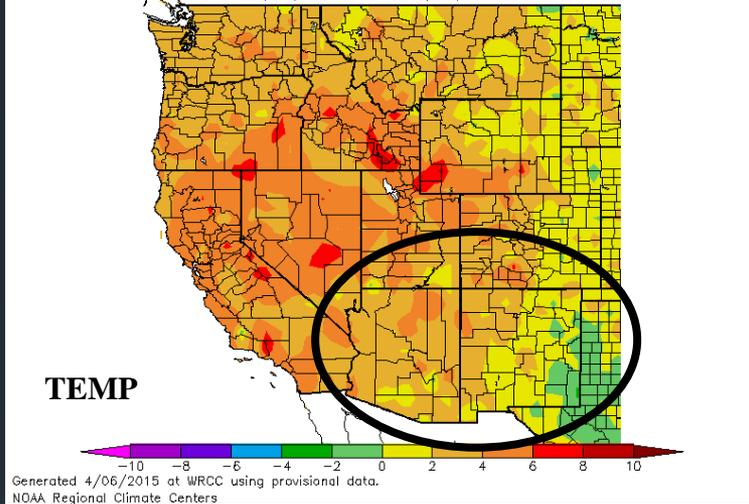
# Fine Fuel Conditions

- Overall drought means not a lot of excessive, continuous fine fuels in general within the desert areas
- Non-desert areas have higher than normal fine fuel loads
- Dealing with areas of residual fine fuels from 2 previous monsoon seasons
- Winter and Spring moisture added more fine fuels

# Fire Season 2015: Oct-Apr 2015

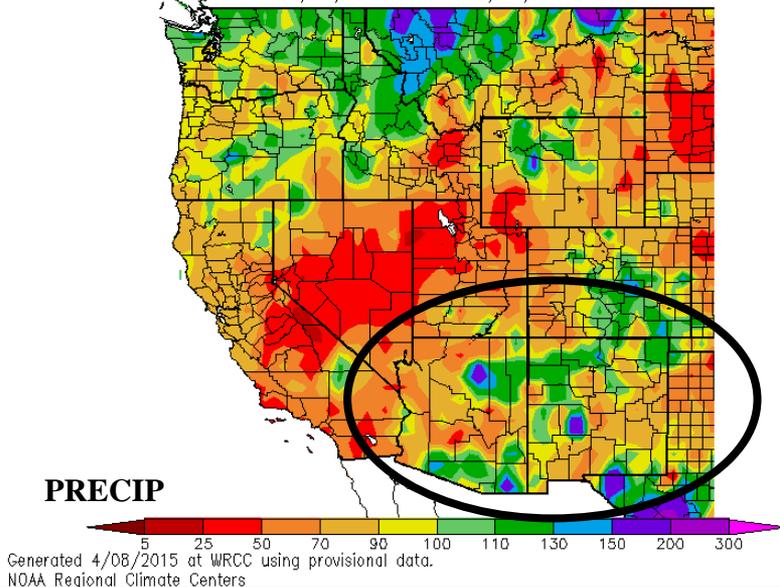
## Temperature & Precipitation

Ave. Temperature dep from Ave (deg F)  
10/1/2014 - 4/5/2015

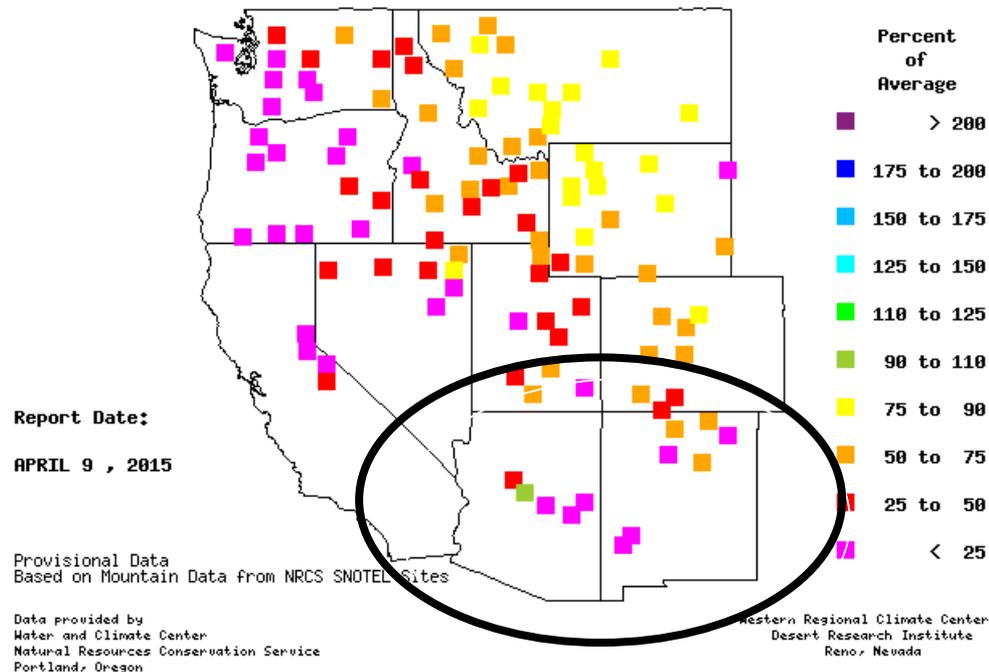


- Dry, with warmth west and coolness east.
- Snowpack well below normal.
- Ongoing dryness a likely contributor to the seasonal drought outlook shown previously.

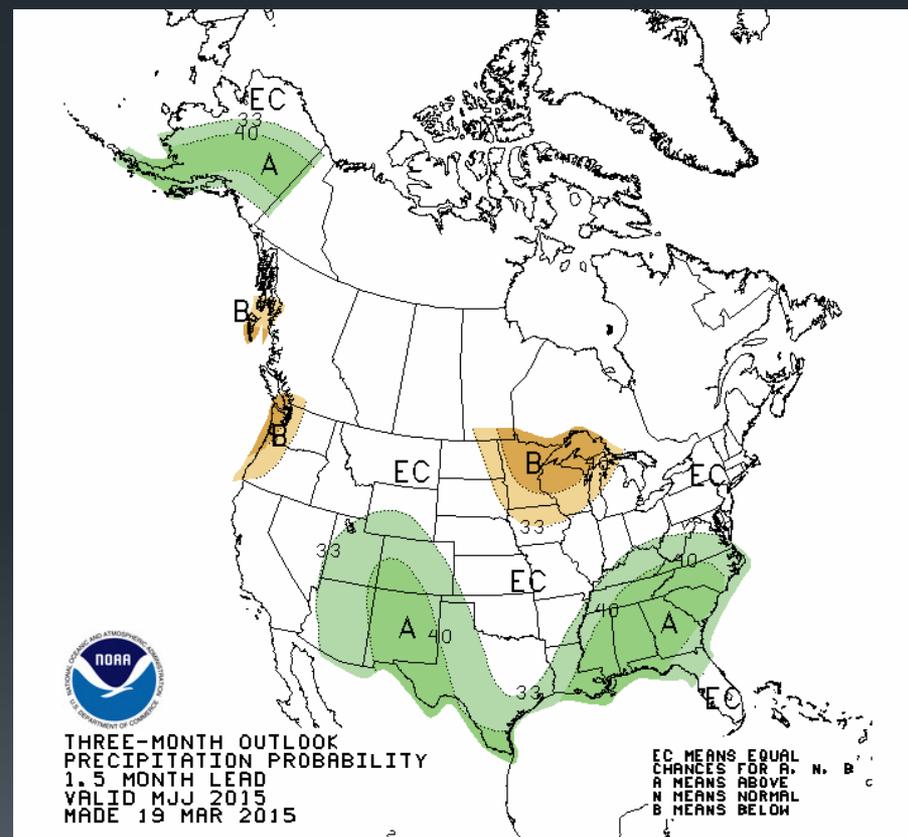
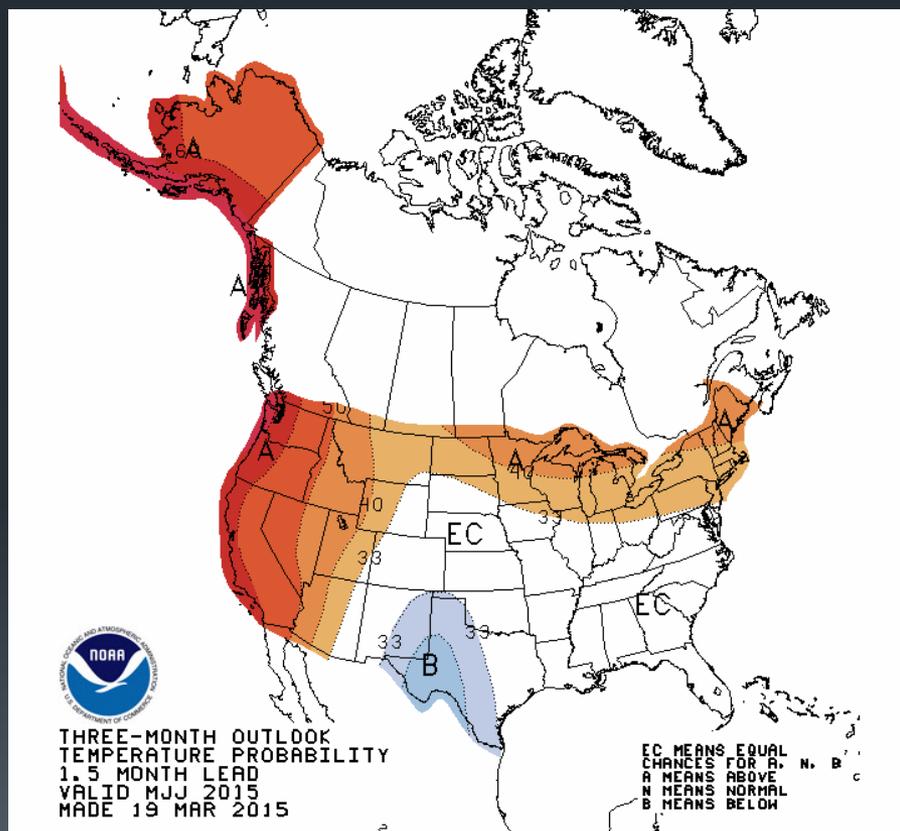
Percent of Average Precipitation (%)  
10/1/2014 - 4/7/2015



Basin Average Snow Water Content. (% of Average.)

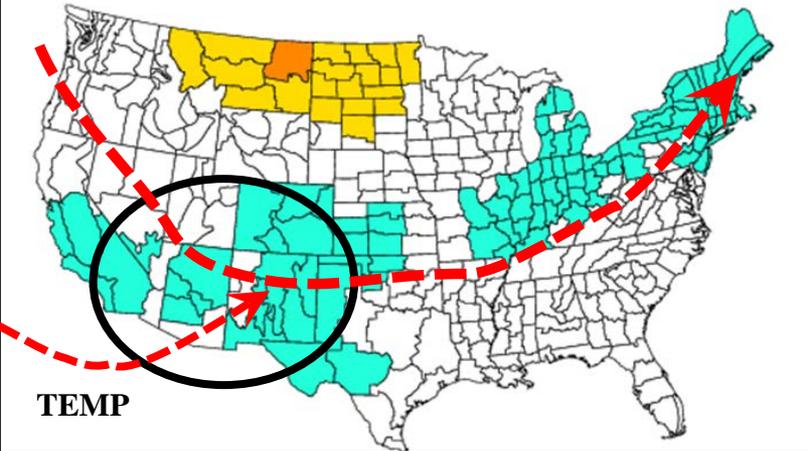


# Temperature and Precipitation 2015 Spring/Summer Forecast



# Fire Season 2015: APR-MAY Temperature & Precipitation

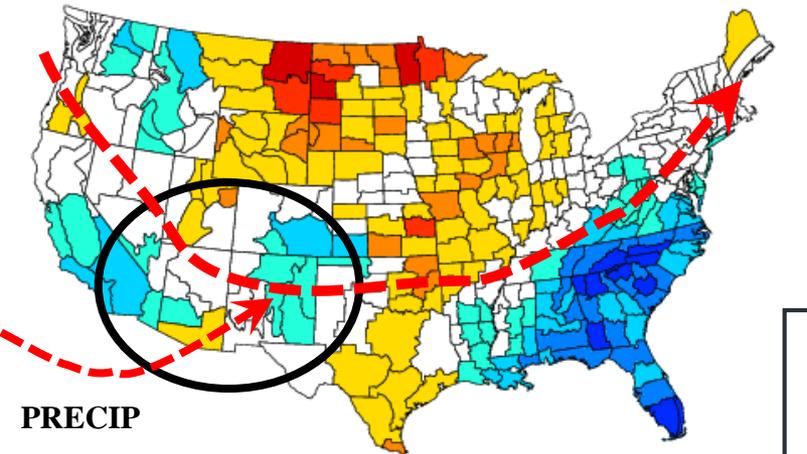
NOAA/NCDC Climate Division Composite Standardized Temperature Anomalies  
Apr to May 2003,1994,1984,1958,1959,1980  
Versus 1981-2010 Longterm Average



TEMP



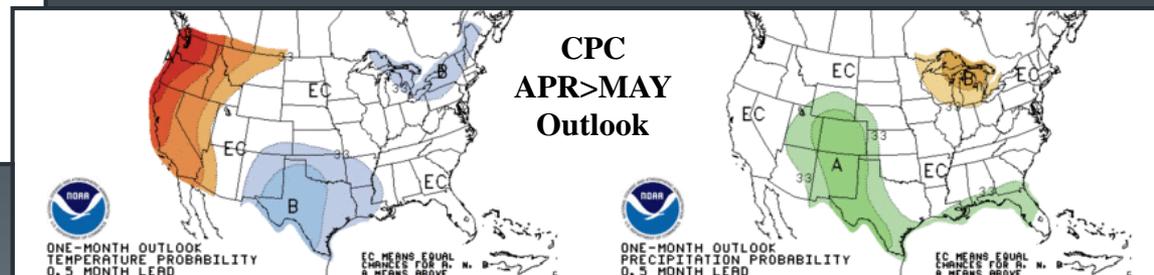
NOAA/NCDC Climate Division Composite Standardized Precipitation Anomalies  
Apr to May 2003,1994,1984,1958,1959,1980  
Versus 1981-2010 Longterm Average



PRECIP

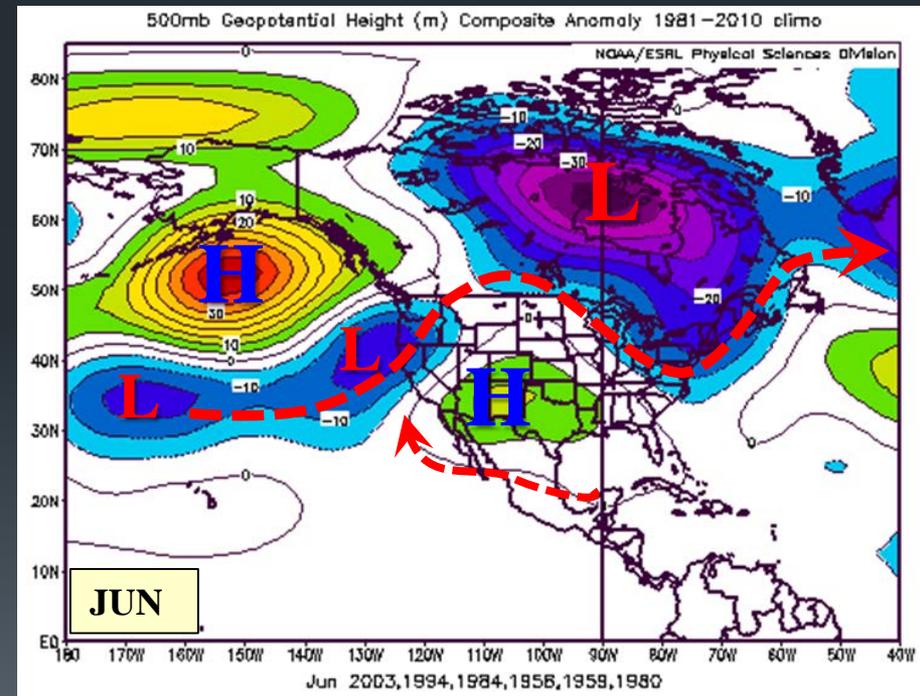
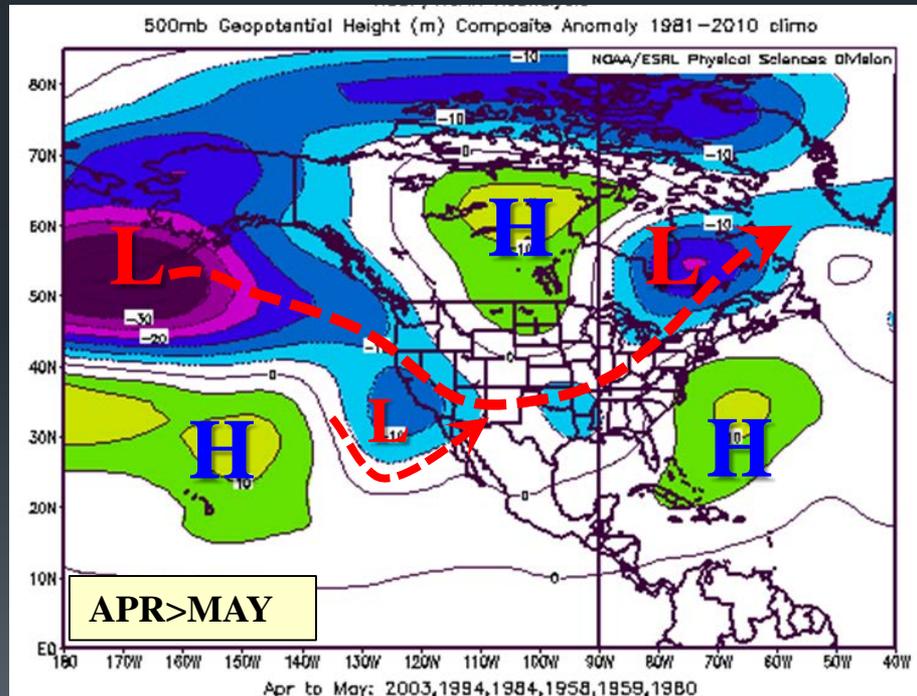
→ = General Storm Track

- Active jet stream continuing to bring systems into & across the Southwest. *Persistence of this pattern, how frequent storms will be, and how long the pattern will last will be critical!*
- Likely **cool trend overall** with periodic moisture impacts aiding areas of **above normal precipitation** (focused east).
- A few slow moving storms may try to approach from the Baja vicinity, and these could be major precipitation producers. (fine fuels re-green potential)

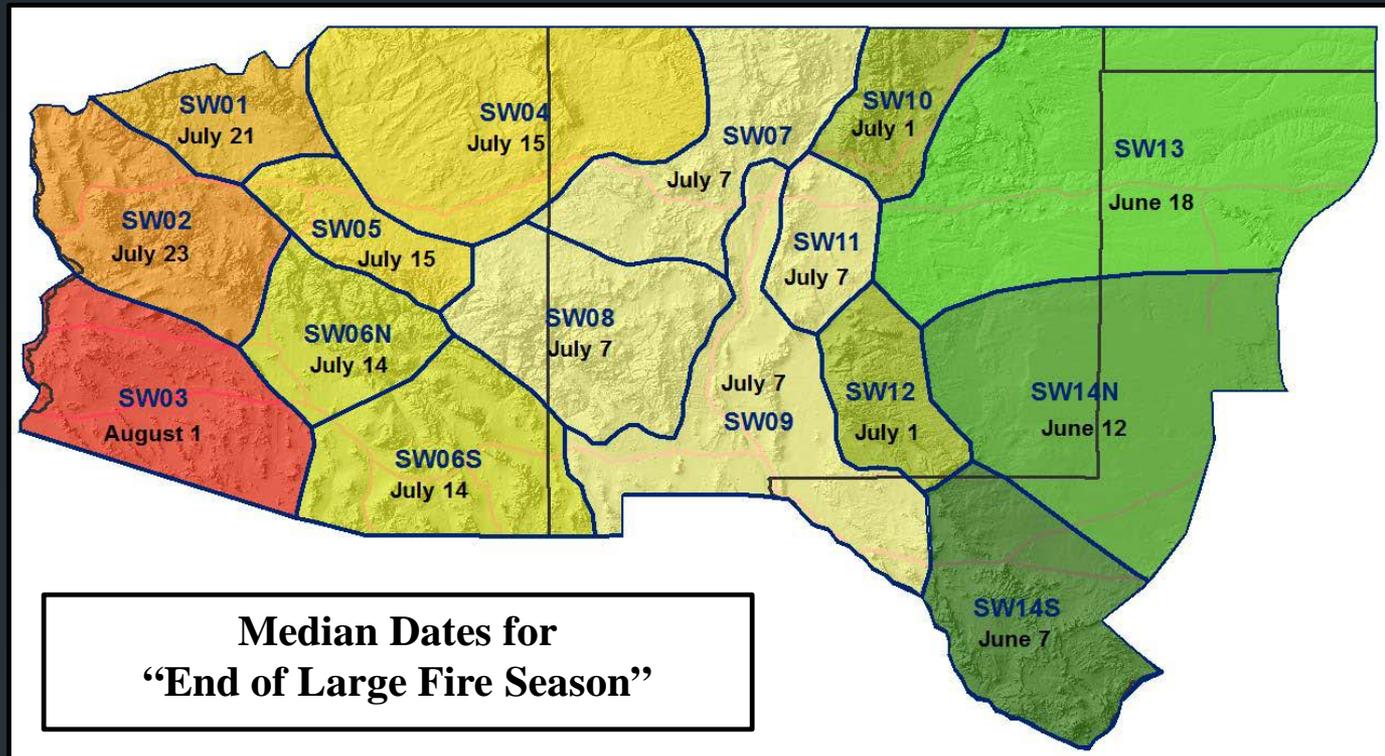


# Fire Season 2015: Spring & Early Summer Weather Pattern – Jet Stream/Storm Track

- Active APR>MAY southern stream jet weakening and shifting north & west in JUN.
- With this pattern: Cooler with periods of moisture and limited potential for critically windy & dry conditions through MAY. Hotter/drier with potential for multiple lightning outbreaks in JUN.



# Fire Season 2015: Monsoon

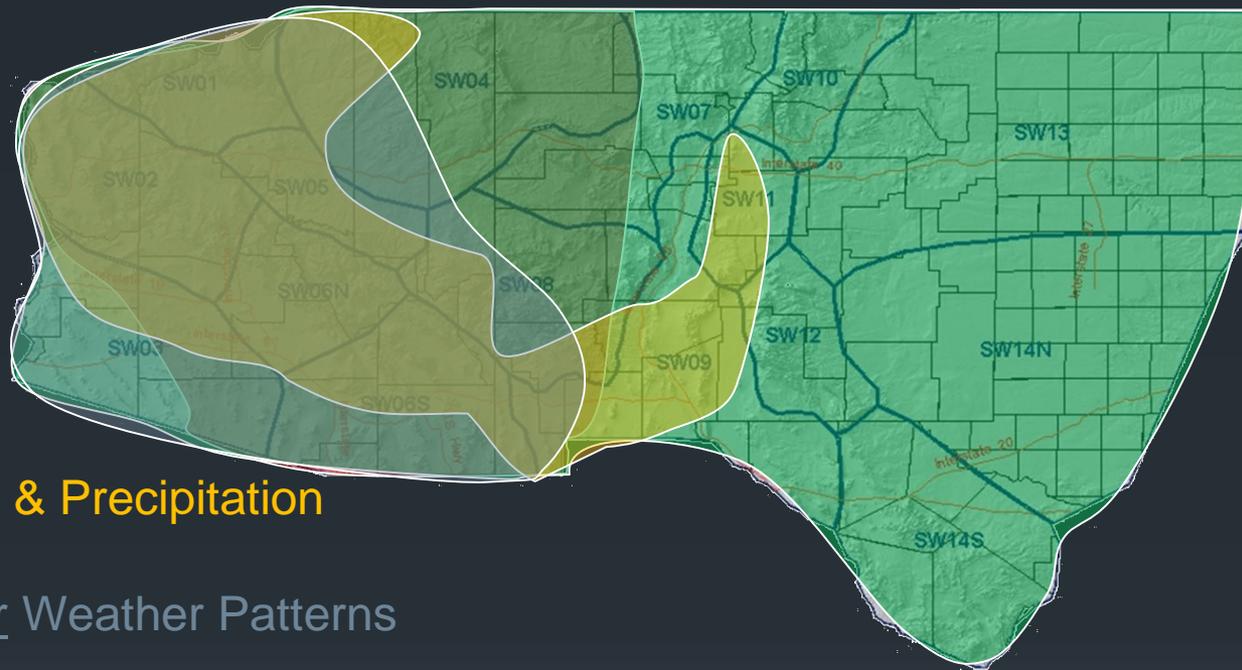


- Onset: No strong reason at this time to expect other than a near normal monsoon onset and wind-down of fire season
- Overall Summer: Conflicting signals, with some indications of **wetness** area-wide and others of **wetter west** & **drier east**. This needs to be watched given amount of available fine fuels!

# Fire Season 2015: Combined Fire Potential Factors

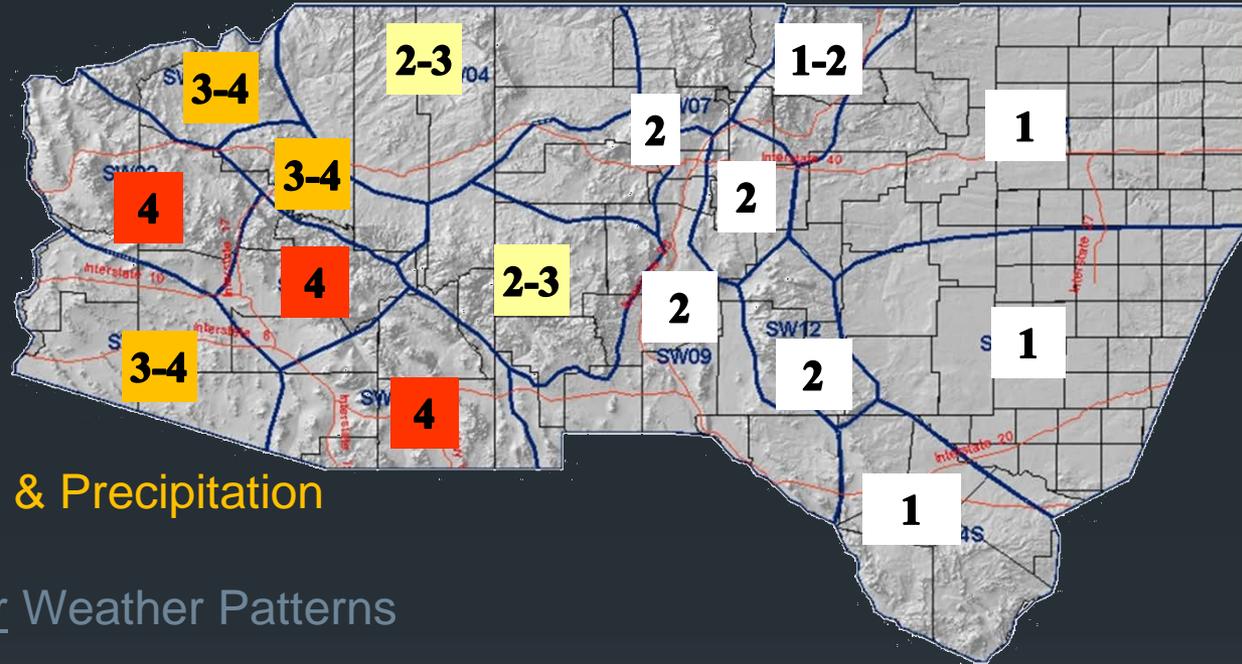
1. Drought
2. Fine Fuels Condition
3. Seasonal Temperature & Precipitation
4. Spring & early Summer Weather Patterns
5. Monsoon (not included)

- Only factors which would support above normal fire potential are highlighted.
- Alignment clearly focused across the western half of the area.



# Fire Season 2015: Number of Factors Aligning to Support Above Normal Seasonal Fire Potential

1. Drought
2. Fine Fuels Condition
3. Seasonal Temperature & Precipitation
4. Spring & early Summer Weather Patterns
5. Monsoon



- **Monsoon** factor excluded, so these numbers represent total out of first 4 factors.
- Maximum alignment of conditions across the western half of the area expected during the JUN>mid JUL time frame.

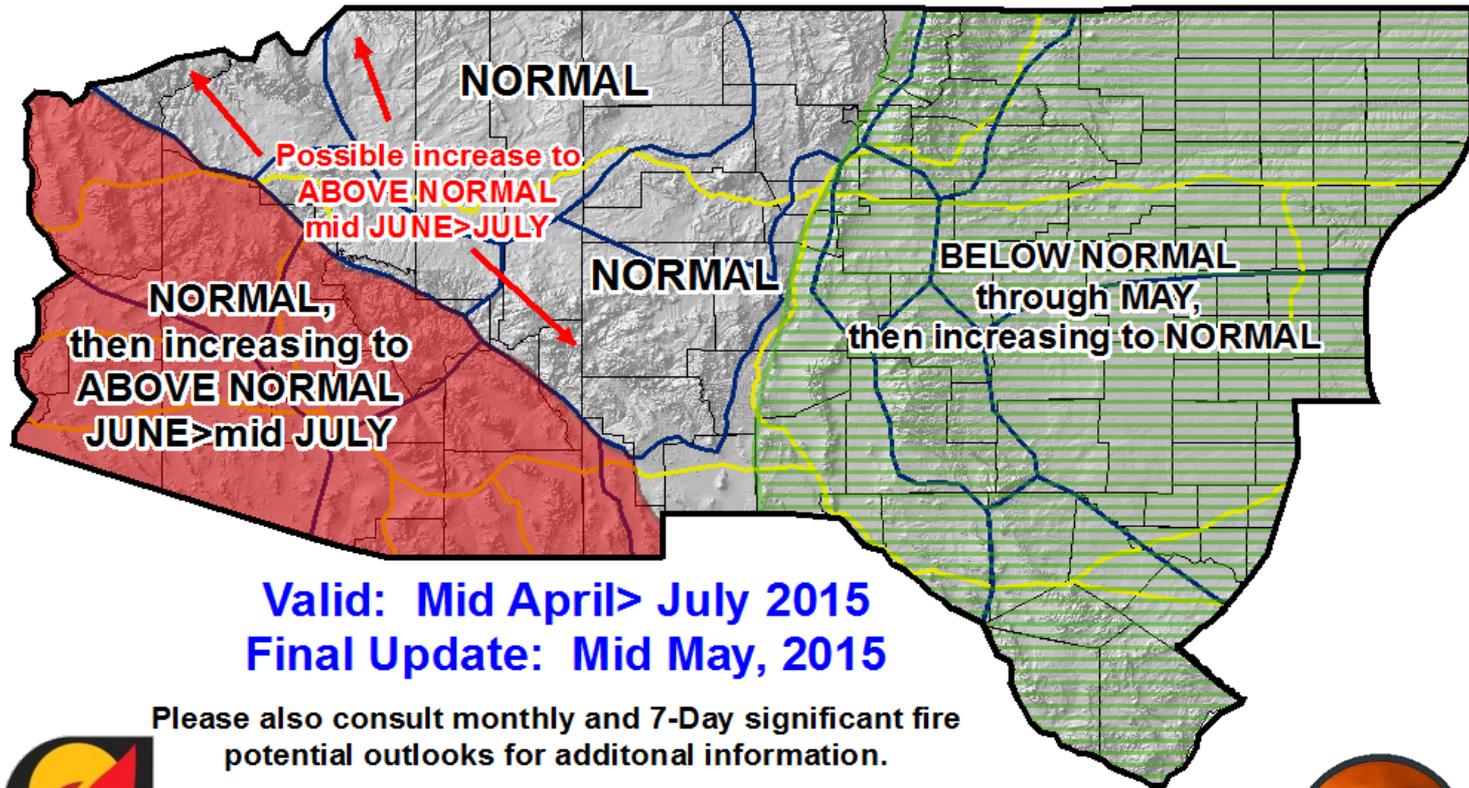
# 2015 Fire Season Potential Summary

- Most all of the factors point to a delayed fire season onset area-wide, with **Normal to Below Normal** fire potential east and **Above Normal** fire potential emerging across parts of the west during June.
  - Area of **Above Normal** fire potential to develop across mid and lower elevations of Arizona during June and possibly spread to include the higher elevations before the monsoon onset. (thinking along the lines of the 2005 season – June>mid July?).
  - Dynamic live fuels conditions & weather pattern impacts the likely primary drivers of the season. Excessively windy & dry conditions should not be a factor, but that opens the door for increased lightning potential as the season progresses.
  - Will have to carefully monitor drought impacts, as some areas may remain in Severe+ and fuels & fire potential will respond accordingly.
  - Fine fuels availability + drought impacts + lightning alignment = 2015?



# Significant Fire Potential Outlook - Fire Season 2015

Updated: April 17, 2015



- This depiction likely to shift. Stay tuned for updates!

# 2015 Fire Activity

## 2015 FIRE OCCURENCE - ARIZONA -

### Legend

Arizona Fire Reports  
January 1, 2015 to April 24, 2015

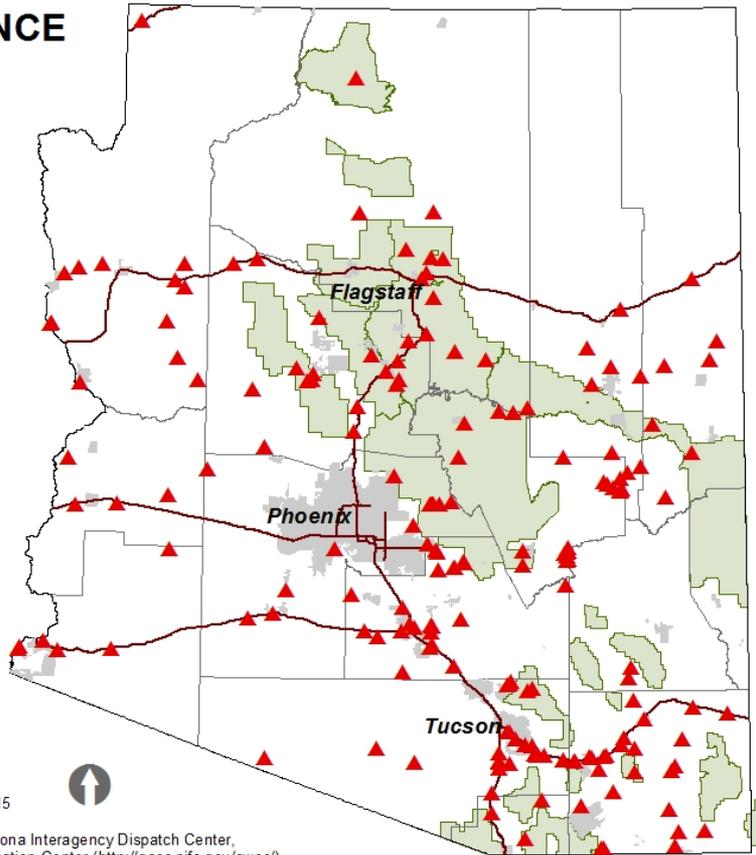
- ▲ Fire Reports
- National Forests of Arizona
- Incorporated Municipalities



Projection/Datum:  
UTM / North American Datum 1983

Map Created by Arizona State Forestry - April 27, 2015

Fire points based on best available data from the Arizona Interagency Dispatch Center,  
National Interagency Fire Center / Southwest Coordination Center (<http://gacc.nifc.gov/swcc/>).



**2015**  
**Fires to Date : 289**  
**Acres to Date: 969.10**

Executive Summary Report,  
Monday, April 27, 2015

# Flagstaff District

## Mohave County

63



■ Andy Devine Rd, Kingman



**Pine Lake area Hualapai Mountains**

# Flagstaff District Coconino County

64



Mid elevation brush and pine stands east of Flagstaff.

Higher than normal grass crop from 3 years of later than normal monsoon rains north of Flagstaff



# Flagstaff District

## Apache and Navajo Counties

65



Hwy 180 approx. 2 miles south of St. Johns 5000 ft. elevation



Wallow Fire burn area 7500 ft. elevation

# Phoenix District

- Area of concern is the brush belt between 3000 and 5000 ft.
- Some grass production in the desert areas
- Riparian areas a concern (ex. Salt and Gila River corridors)
- Continuous fine fuel production in the foothills

03/2015

New River Road

03/2014



# Tucson District

- Concern in the Mesquite and Oak woodlands
- Fine Fuel growth in the 3000 to 6500 ft elevation band
- Desert Fuels are less sparse than previous years
- Heavier fuels and Live Fuels are Drought Stressed

Hwy 79 between Oracle Junction  
and Florence



Facing North, Lyle Canyon, Santa  
Cruz County



# Integrated Interagency Approach

- 32 Core Division Fire staff and 20 Seasonal Fire employees
- (12) 20-person Forestry Division/DOC wildfire crews
- 3 Single Engine Air Tankers (SEATS) as fire conditions warrant
- Ready access to:
  - 1,150 local fire engines
  - 450 local water tenders
  - 2,600 local firefighters
  - Substantial national resources
- Support for Regional Interagency Incident Management Teams
- Support for local Type 3 Incident Management Teams





Questions?



# California Drought Update

May 5, 2015

Christopher Harris, Deputy Director  
Colorado River Board of California



# Overview

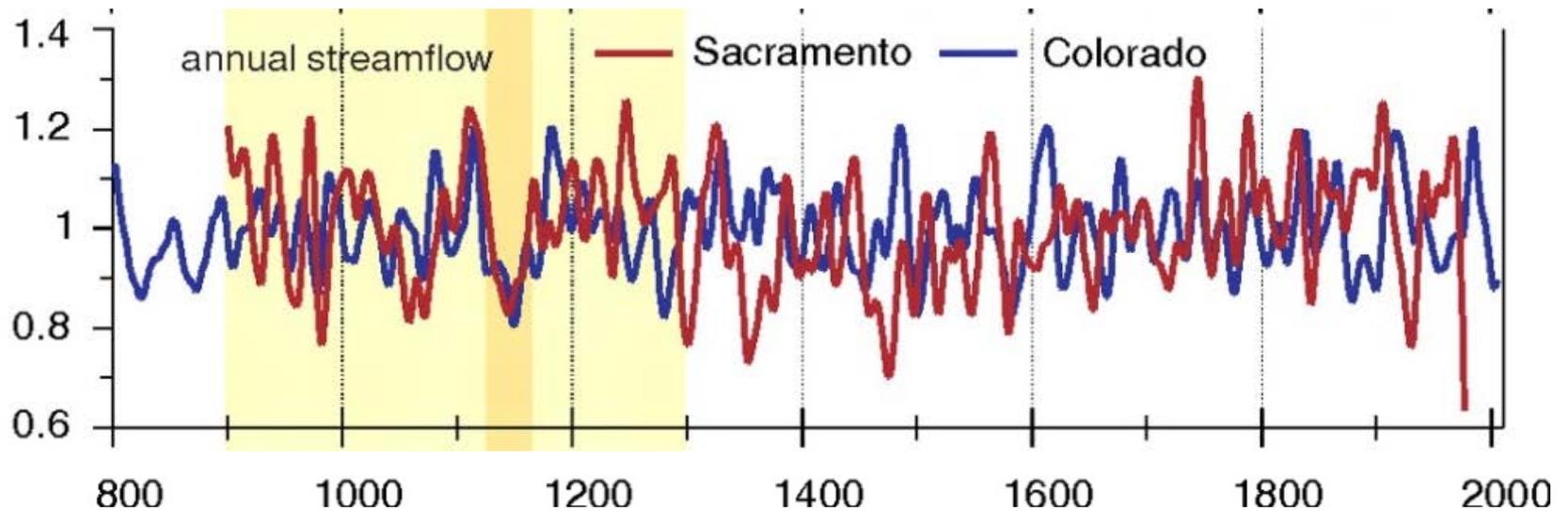
- California water system
- Current water supply conditions
- Drought responses—
  - State
  - Interagency Drought Task Force
  - Local
- Summary/Conclusions
- Drought resources

# California's Water System

**State Water Project  
Central Valley Project  
Colorado River Aqueduct  
LA Aqueduct  
Etc.**

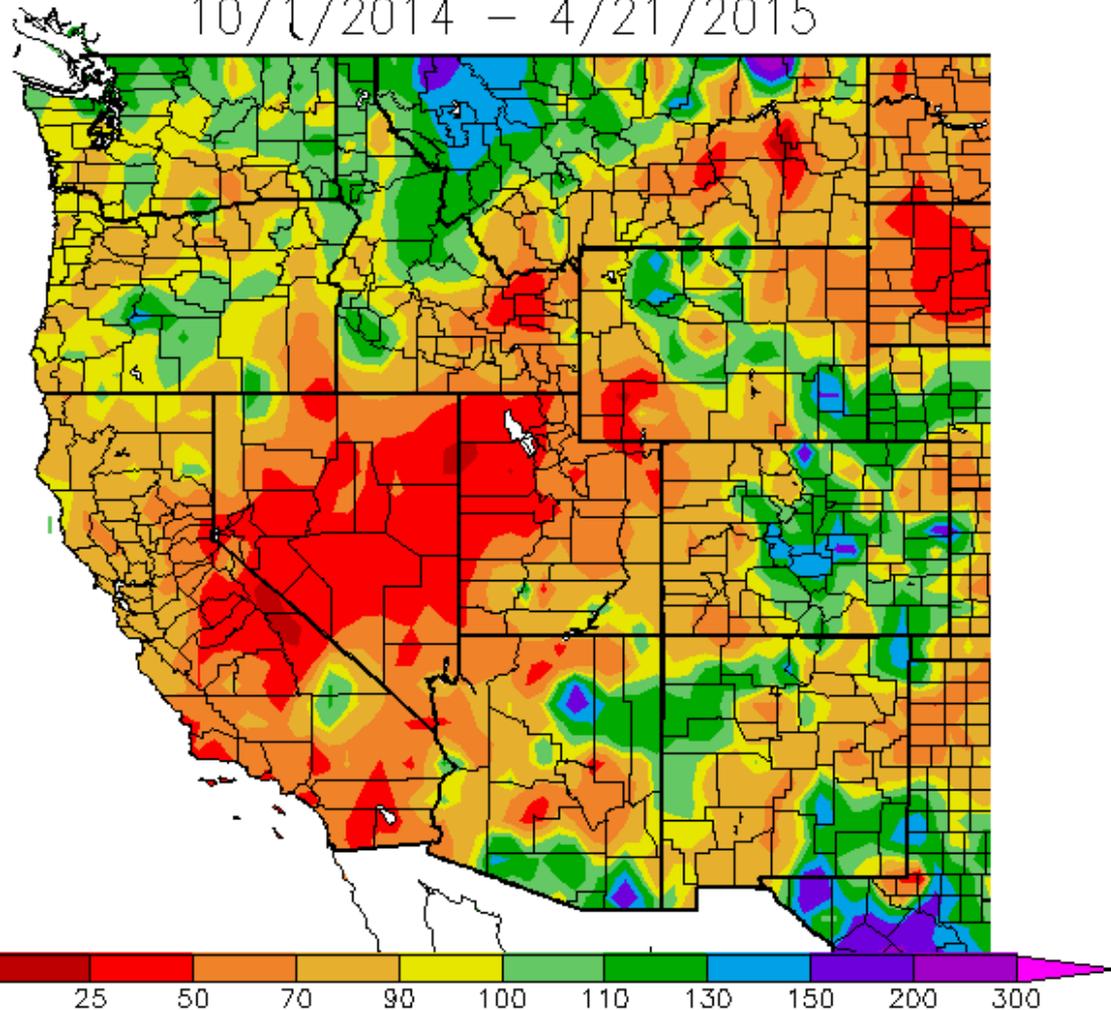


# Paleo-reconstruction of Colorado River and Sacramento River index



# Water Year 2015 to Date

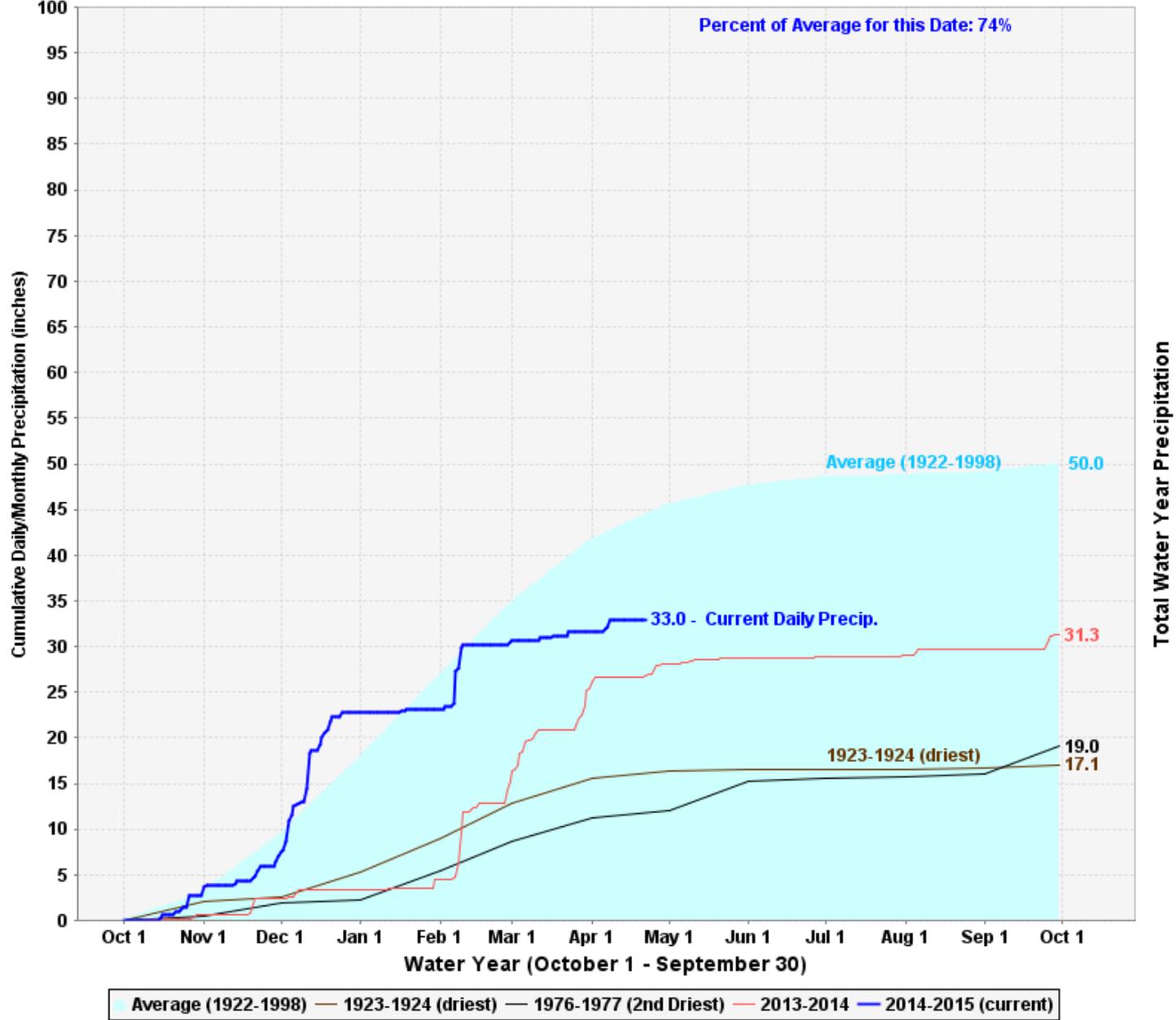
Percent of Average Precipitation (%)  
10/1/2014 – 4/21/2015



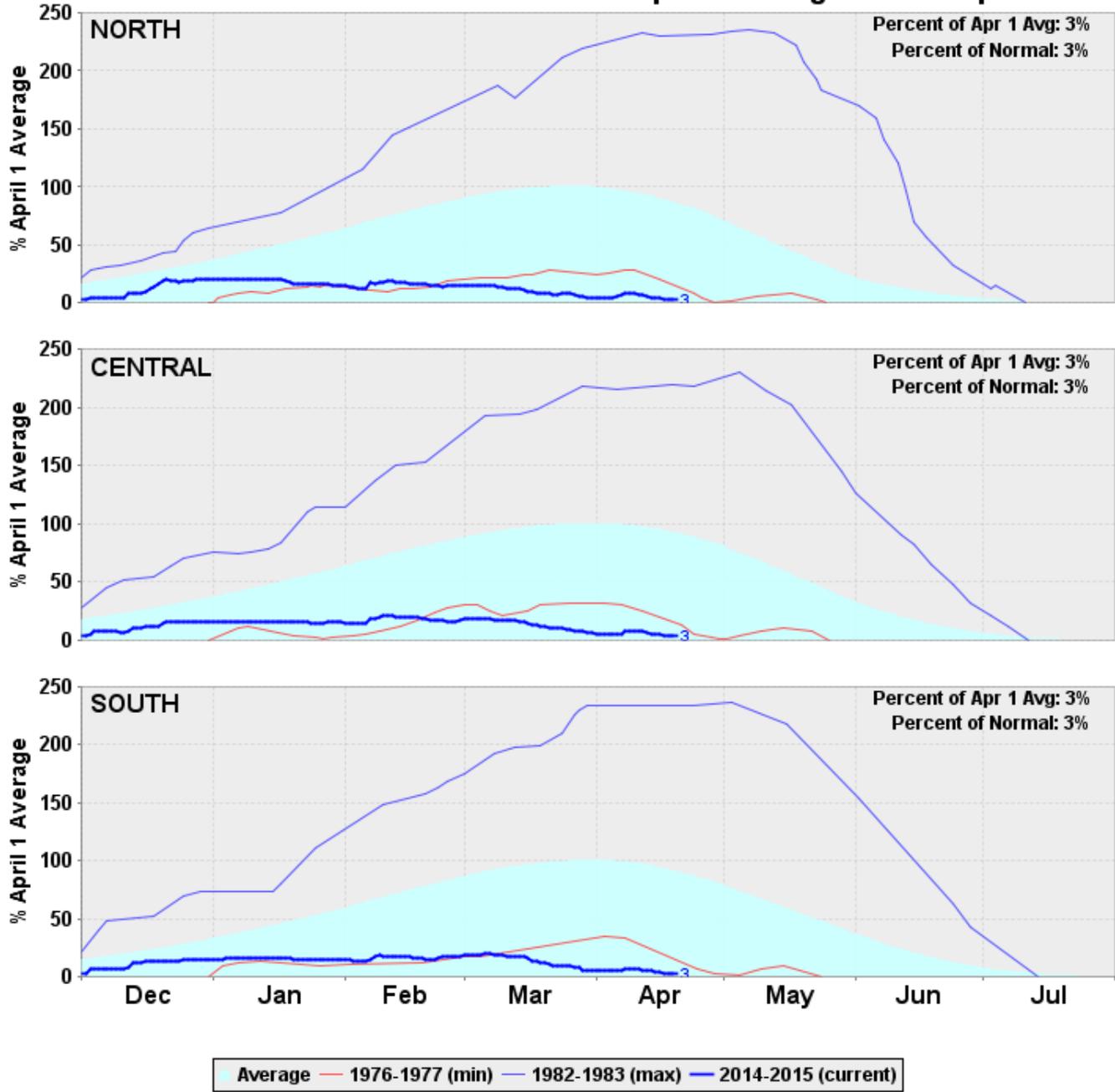
Generated 4/22/2015 at WRCC using provisional data.

NOAA Regional Climate Centers

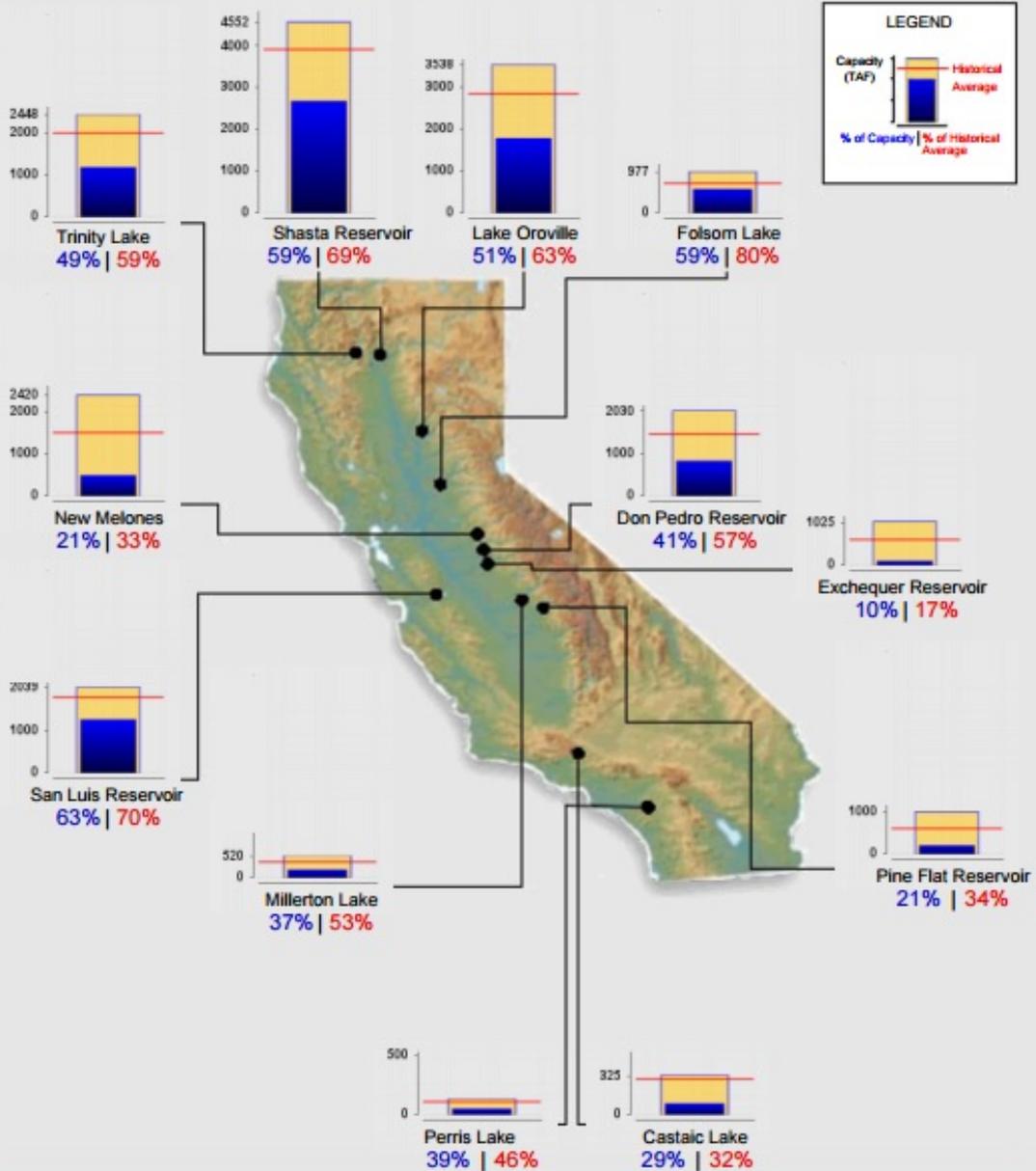
# Northern Sierra Precipitation: 8-Station Index, April 22, 2015



### California Snow Water Content - Percent of April 1 Average For: 20-Apr-2015



# CURRENT RESERVOIR CONDITIONS



**Total system storage is approximately 12 MAF, or about 60% of historic average**

**Loss of generation capability at hydropower facilities**

# Comparison of Water Project Allocations in Dry Years

	1991	2009	2014
<b>SWP</b>	30% / 0%	40%	5%
<b>SWP water rights</b>	50%	100%	100%
<b>CVP N of Delta Ag</b>	25%	40%	0
<b>CVP S of Delta Ag</b>	25%	10%	0
<b>Friant</b>	100%	100%	0
<b>CVP Sac water rts</b>	75%	100%	75%
<b>CVP SJ water rts</b>	75%	100%	65%

# State Board Curtails Water Rights in Sacramento River & Delta April 30, 2015

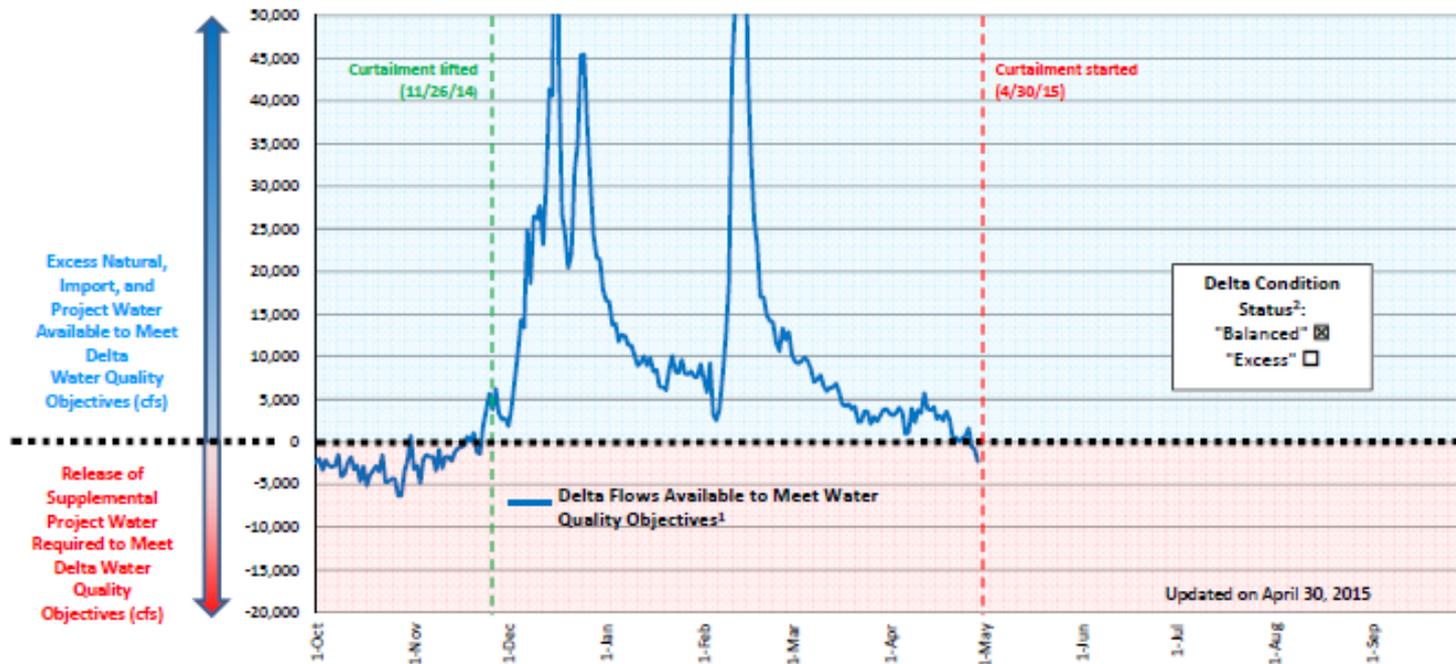


## TERM 91 CURTAILMENT

WATER YEAR 2015 (October 1, 2014 through September 30, 2015)

Term 91 Curtailment:  
In Effect   
Not in Effect

For permits and licenses with Term 91, water is generally available to divert when the plotted line is in the blue area.  
No water is available - and diversion may be curtailed - when the plotted line is in the red area.



**EXPLANATION:** Permit and license holders having Term 91 as a condition of their water right, must cease diversions under the permit or license when notified by the State Water Board. A Term 91 Curtailment Notice is triggered when; (i) Supplemental Project Water is needed to meet water quality objectives, and (ii) the Delta is in "Balanced Condition." Supplemental Project Water describes the net storage releases from Shasta, Folsom and Oroville reservoirs, plus water imported from the Trinity River CVP facilities, when they collectively exceed total Delta exports plus Carriage Water calculated from the Delta Export Index. The Delta is referred to as in Balanced Condition when the Projects are required to release previously stored water to meet water quality objectives in the Delta. The graph plots a daily calculation of Supplemental Project Water and depicts Delta conditions. When the "Balanced" box is checked, and the graph indicates that regular flows through the Delta are insufficient so that Supplemental Project Water must be released, a notice of curtailment may be issued.

<sup>1</sup> Source: <http://www.usbr.gov/mp/cvo/vungvar/term91.pdf> <sup>2</sup> Source: <http://www.usbr.gov/mp/cvo/vungvar/coanew.pdf>

# Drought Impacts



# State Drought Response Timeline of Major Actions

May  
2013

Executive Order to streamline voluntary water transfers to assist agricultural industry



Dec.  
2013

Governor Brown convenes a Drought Task Force after California experiences the driest conditions on record



Jan.  
2014

Governor Brown declares Drought State of Emergency. DWR sets State Water Project Allocation to Zero



# State Drought Response Timeline of Major Actions

Mar.  
2014

Governor Brown signs Drought Legislation  
Governor's Office of Emergency Services, DWR and the Save Our Water campaign team up to create Public Service campaign



July  
2014

In response to severe drought, mandatory water conservation regulation goes into effect – targeting outdoor urban use



# State Drought Response Timeline of Major Actions

Sept.  
2014

Groundwater Legislation provides relief for families with drinking water shortages



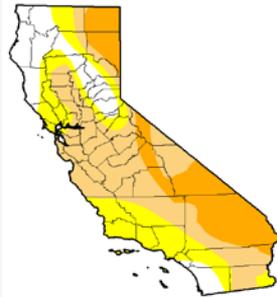
Mar.  
2015

DWR increases 2015 State Water Project allocation to 20%  
Governor Brown signs \$1 Billion Emergency Drought Package



# State Drought Response Timeline of Major Actions

Apr. 2015  
Governor Brown directs first ever statewide mandatory water reductions of 25%



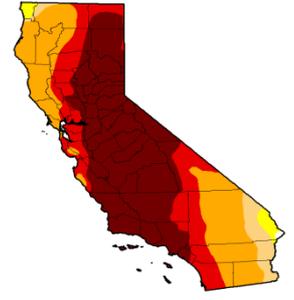
April 2012



April 2013



April 2014



April 2015

## Four Actions:

- Save water (e.g., replace 50 million sq. ft. of turf)
- Increase enforcement
- Streamline government response
- Invest in new technologies

# State Drought Response Interagency Drought Task Force

- Meets regularly to coordinate drought response
- Publishes bi-weekly drought updates
- Coordinates with federal and local agencies
- California Water Action Plan 2014-2018
  - California GW Legislation signed on September 16, 2014
- CVP/SWP Drought Contingency Plan 2015



**Cal OES**  
GOVERNOR'S OFFICE  
OF EMERGENCY SERVICES



CALIFORNIA DEPARTMENT OF  
FOOD & AGRICULTURE



CALIFORNIA  
**Water Boards**  
STATE WATER RESOURCES CONTROL BOARD  
REGIONAL WATER QUALITY CONTROL BOARDS



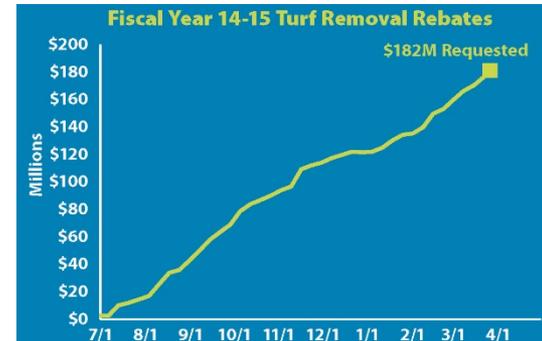
# Local Drought Response

- 54 local emergency proclamations to date from city, county, tribal governments, and special districts
- 29 county drought task forces to coordinate local drought response



# Local Drought Response Metropolitan Water District

- Because of the drought, MWD's current supply imbalance is 570 kaf (4 MAF/yr total demand)
- Level 3 cutbacks starting in July, with a 15% reduction in wholesale water use
- \$100 Million budgeted for rebates and other water-saving incentives (5X normal budget)
  - \$60 Million for turf-removal
  - Regional investments/incentives
    - Conservation
    - Recycling
    - Groundwater recovery
    - Infrastructure improvements
- MWD per capita use has declined 24% since 1980s with population increase of 5 million



# Local Drought Response Metropolitan Water District

- Weekly evaluation of conservation response, local supplies, and reservoir storage levels and adaptively manage
- Promote and enhance local water supplies
- Outreach and funding initiatives to support drought response activities
- Accelerate recycling, groundwater cleanup, stormwater capture and desalination with member agencies



# Local Drought Response

## Los Angeles DWP

- Water Conservation Response Unit
  - 8-minute watering cycle 3 times a week
  - No irrigation between 9 a.m. and 4 p.m.
  - Odd/even water schedule based on street address
  - Community patrols and conservation education
- Rebates for water conservation devices
  - HE washers and toilets
  - faucet aerators, showerheads, and weather-based irrigation controllers



Los Angeles  Department of Water & Power



# Local Drought Response Los Angeles DWP

- California Friendly Landscape Incentive Program
  - Turf replacement rebate program and landscape improvements within the right-of-way
  - Residential/Commercial—Tiered replacement rates for both, with no caps



# Summary

## STATEWIDE

- Governor's Executive Orders direct state agencies to take specific actions;
- Drought response is escalating—Mandatory reductions; curtailment of water rights and deliveries;
- Impacts are highly site-specific, and vary depending on the ability of water users to invest in reliability; and
- Consumer response through conservation programs is higher than ever.

## SOUTHERN CALIFORNIA REGION

- Southern California region is experiencing an historic 8-year drought
- Investments have allowed the region to avoid shortage cutbacks in recent years
- Larger urban waters agencies can typically manage 3-4 years of drought with limited impacts to their customers—but those reserves have declined significantly

**What if 2016 is Dry?**

[www.drought.ca.gov](http://www.drought.ca.gov)



# Governor's Drought Interagency Coordinating Group

Tuesday, May 5, 2015 - 10:00 - 12:00 p.m.

## Meeting Agenda

### **I. Welcome & Introductions**

*Tom Buschatzke (Co-chair), Arizona Department of Water Resources*

*Wendy Smith-Reeve (Co-chair), Arizona Division of Emergency Management*

### **II. Drought Status Update and Activities of the Monitoring Technical Committee**

*Nancy Selover, Arizona State University,*

### **III. Summer 2014 Outlook and Winter 15-16 Preview**

*Mark O'Malley, National Weather Service*

### **IV. Colorado River - Water Supply Update**

*Tom Buschatzke, Arizona Department of Water Resources*

### **V. Salt & Verde Watersheds- Water Supply Update**

*James Walter, Salt River Project*

### **VI. Wildfire Outlook**

*Jeff Whitney, Arizona State Forestry*

### **VII. Update on California Drought**

*Chris Harris, California Colorado River Board*

### **VIII. Drought Declaration Recommendation**

Action Item – Discussion and Recommendation to the Governor

*Tom Buschatzke (Co-chair), Arizona Department of Water Resources*

*Wendy Smith-Reeve (Co-chair), Arizona Division of Emergency Management*

### **IX. Call to the Public and Closing Remarks**

*Tom Buschatzke (Co-chair), Arizona Department of Water Resources*

*Wendy Smith-Reeve (Co-chair), Arizona Division of Emergency Management*