# The Current California Drought
# From the Southwest to the Santa Ana


**October 2014**

**Glen M. MacDonald**
**UCLA**

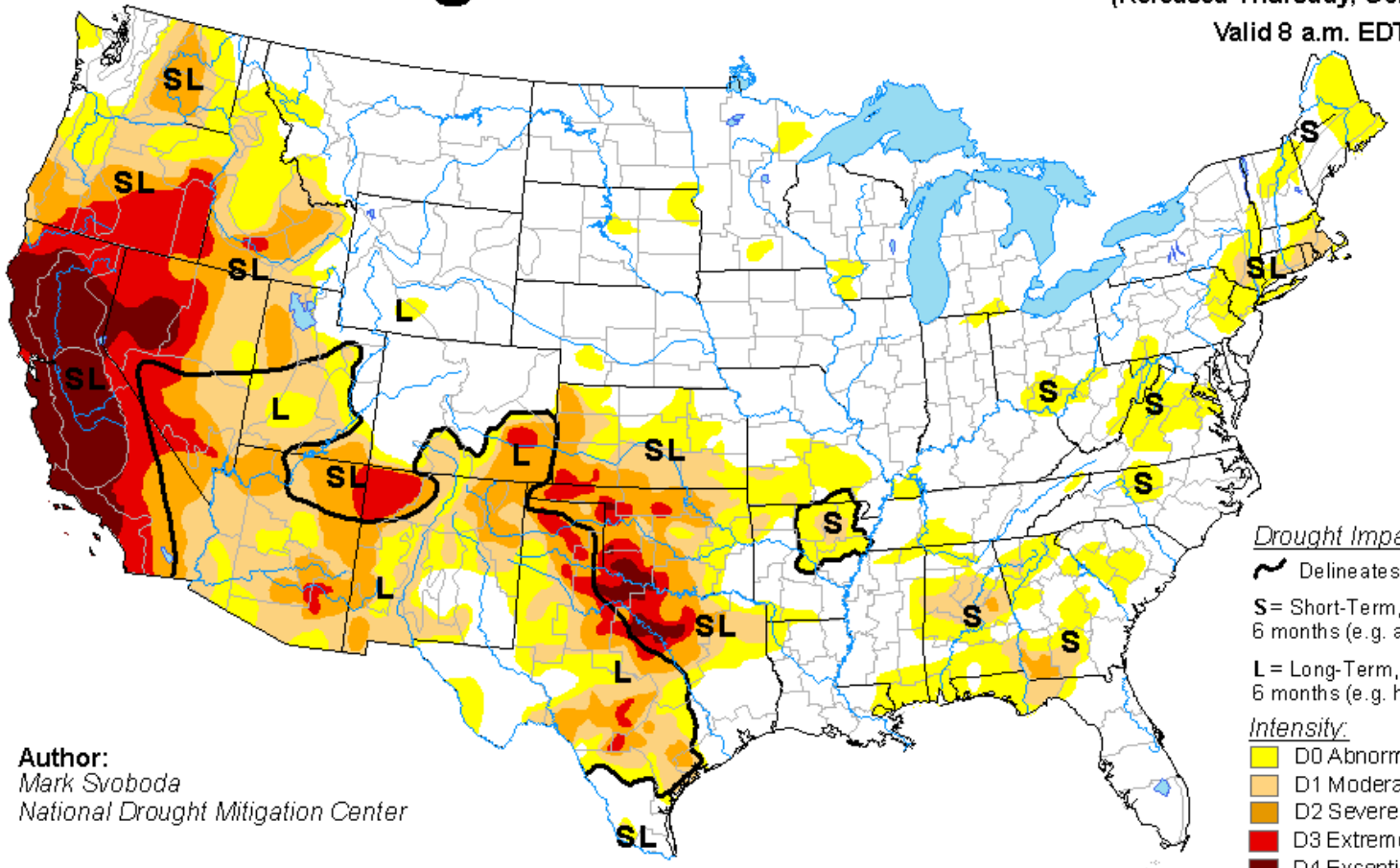
Southwest Climate Science Center

# U.S. Drought Monitor

**October 7, 2014**

*(Released Thursday, Oct. 9, 2014)*

Valid 8 a.m. EDT




**Author:**
*Mark Svoboda*
*National Drought Mitigation Center*

*Drought Impact Types:*

Delineates dominant impacts

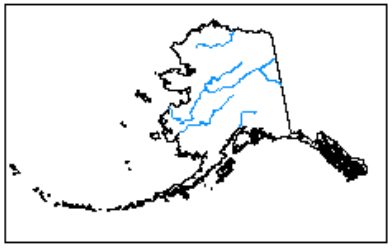
**S** = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)

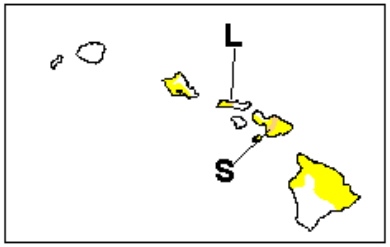
**L** = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

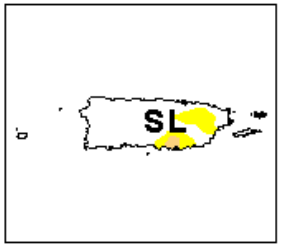
*Intensity:*

- 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.*





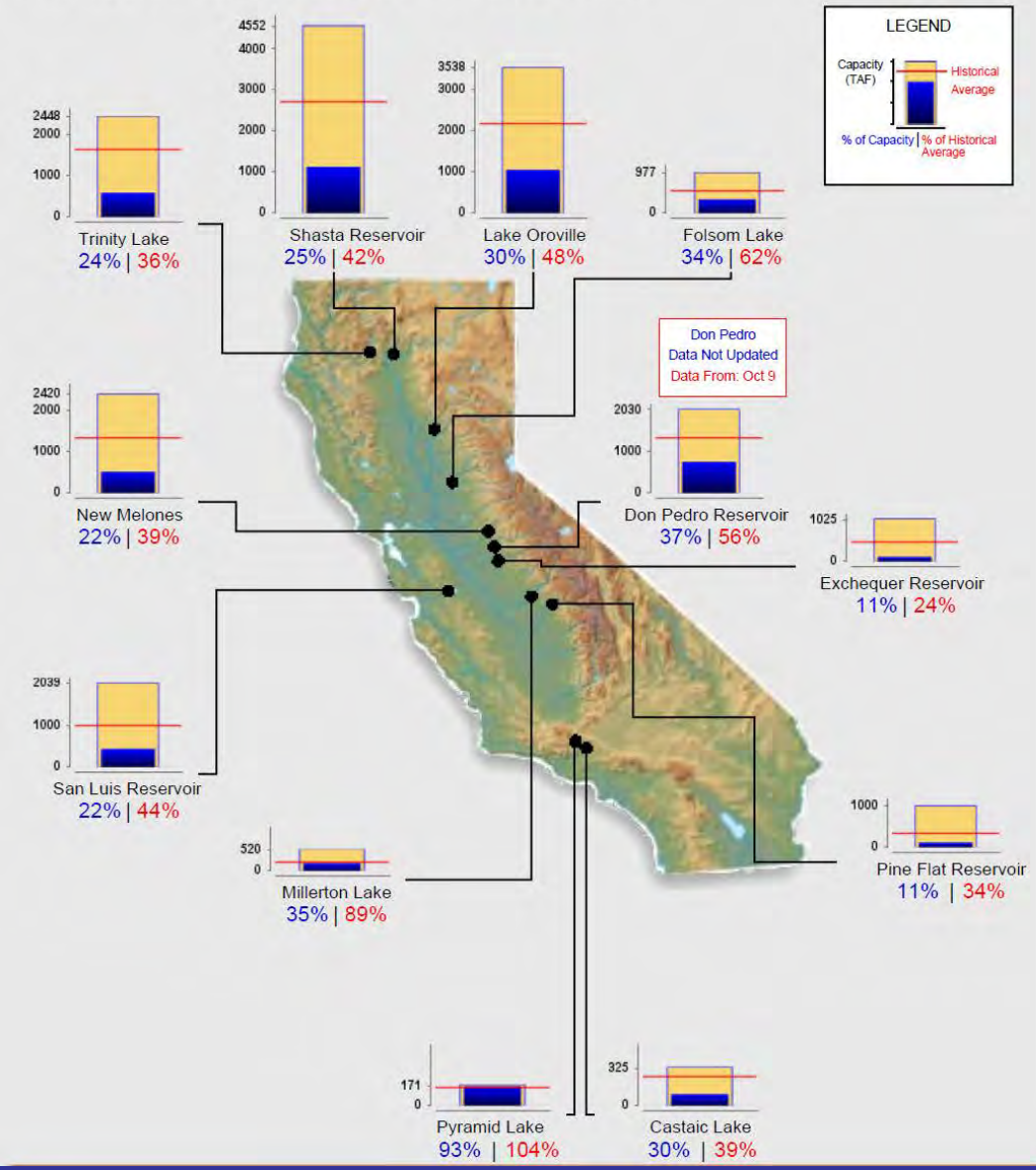

USDA National Drought Mitigation Center

http://droughtmonitor.unl.edu/

# Reservoir Conditions

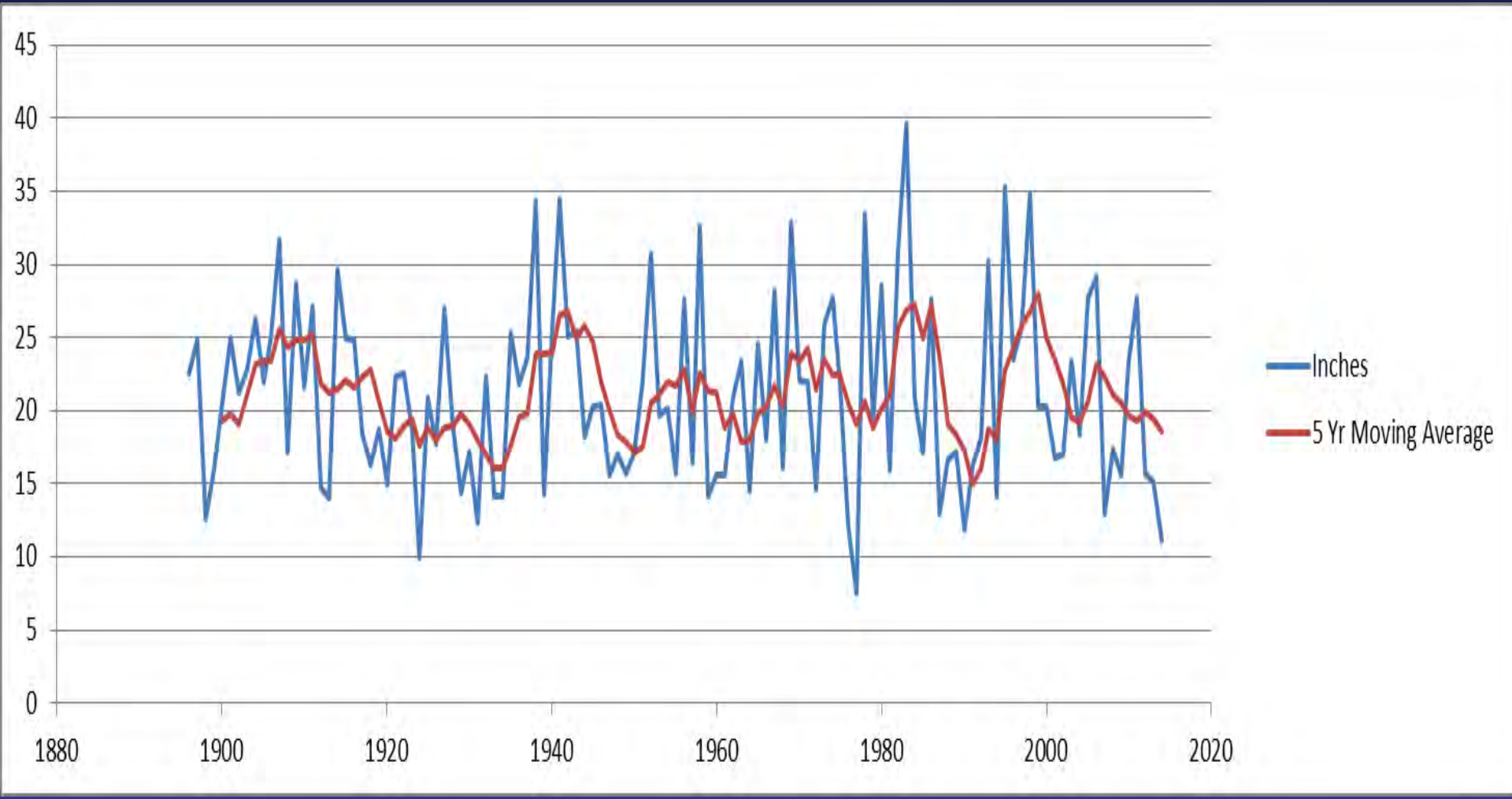
Ending At Midnight - October 11, 2014

## CURRENT RESERVOIR CONDITIONS

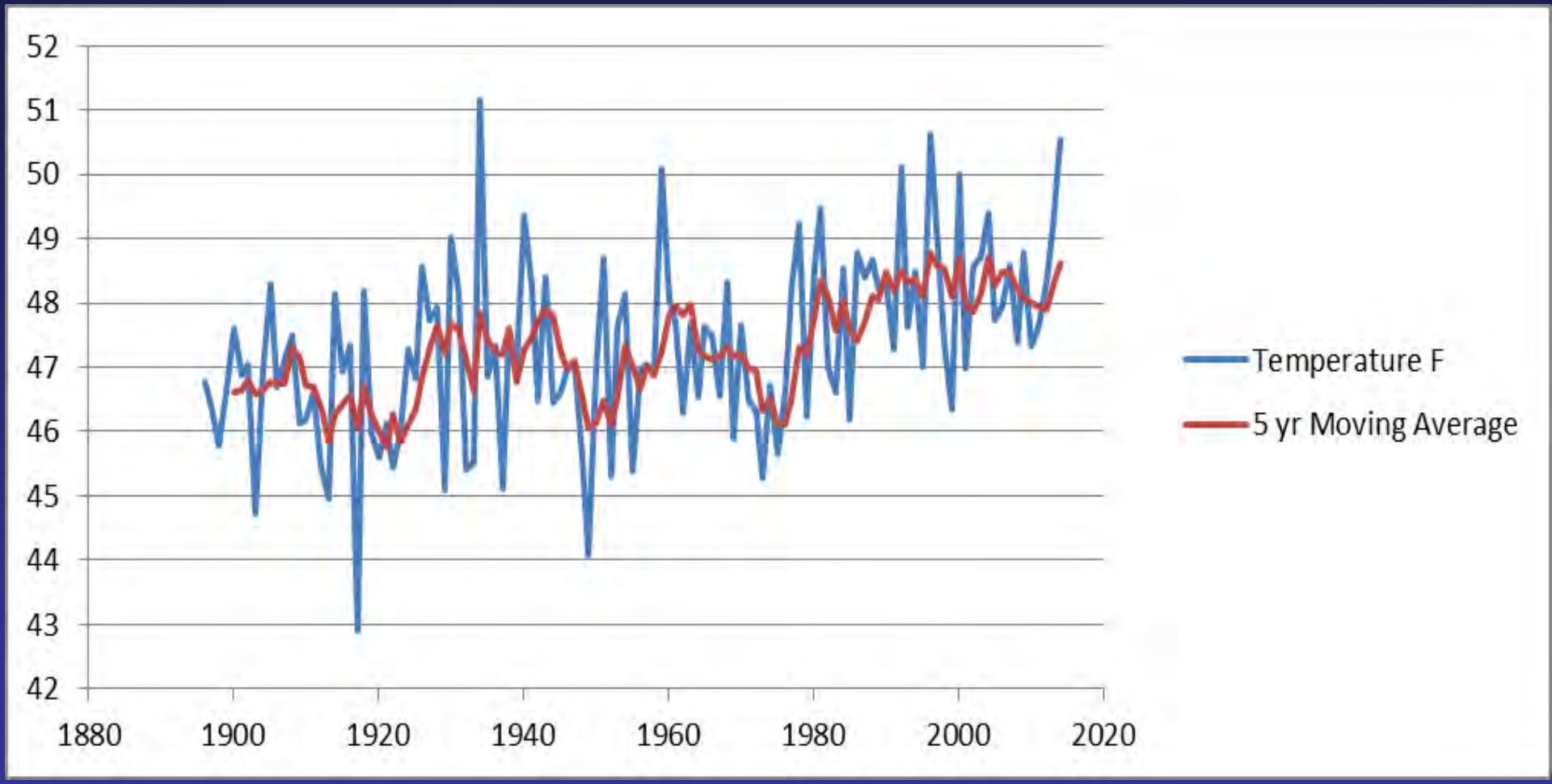



USGS Image

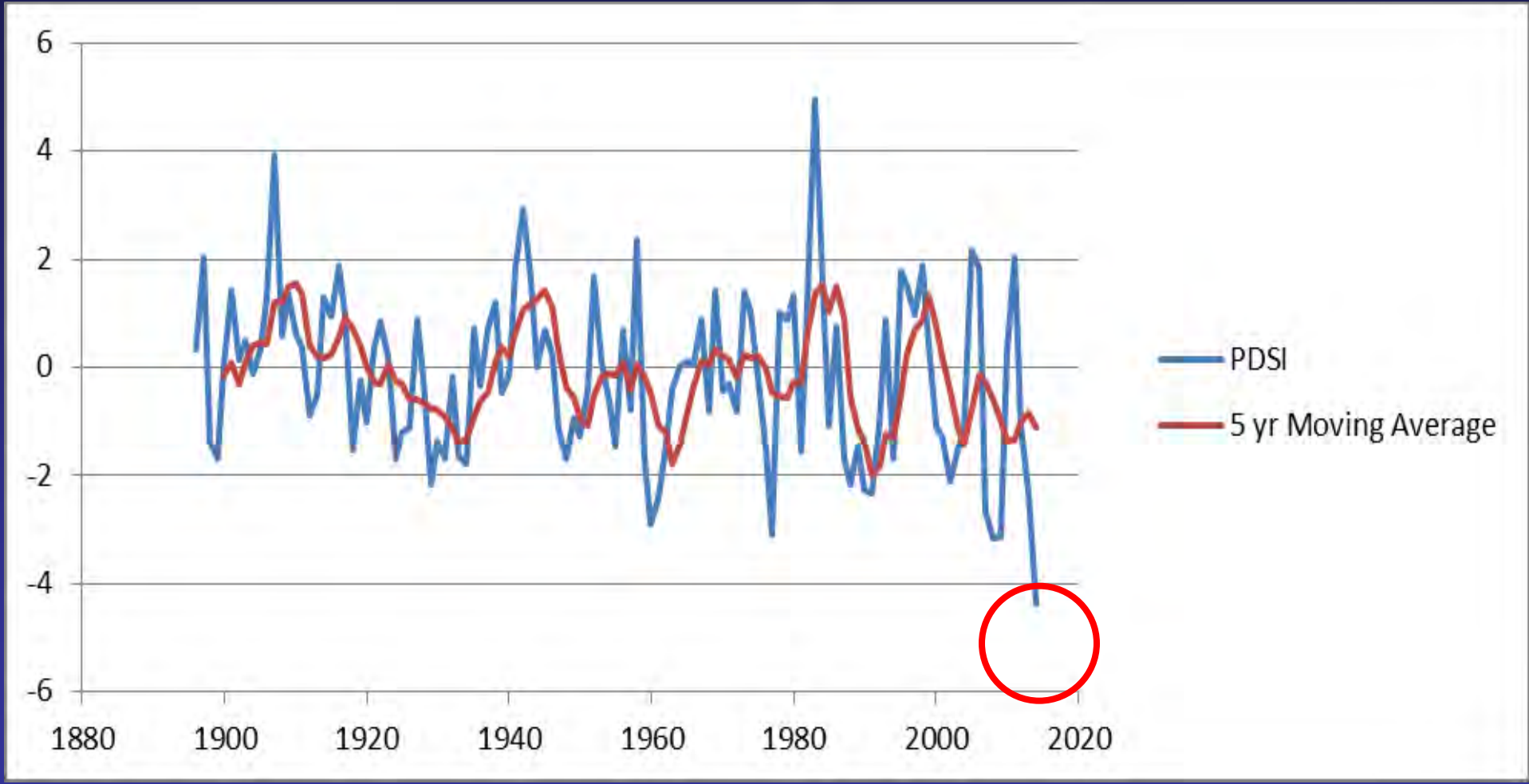
# California Precipitation Oct-Apr 2013-14



# California Temperature Oct-Apr 2013-14

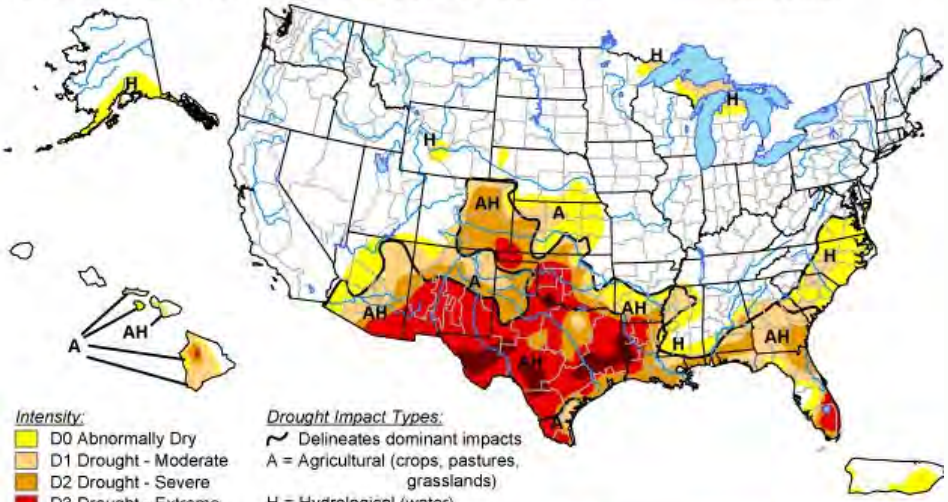


# California Palmer Drought Severity (PDSI) Oct-Apr 2013-14



# U.S. Drought Monitor

**April 26, 2011**
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
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

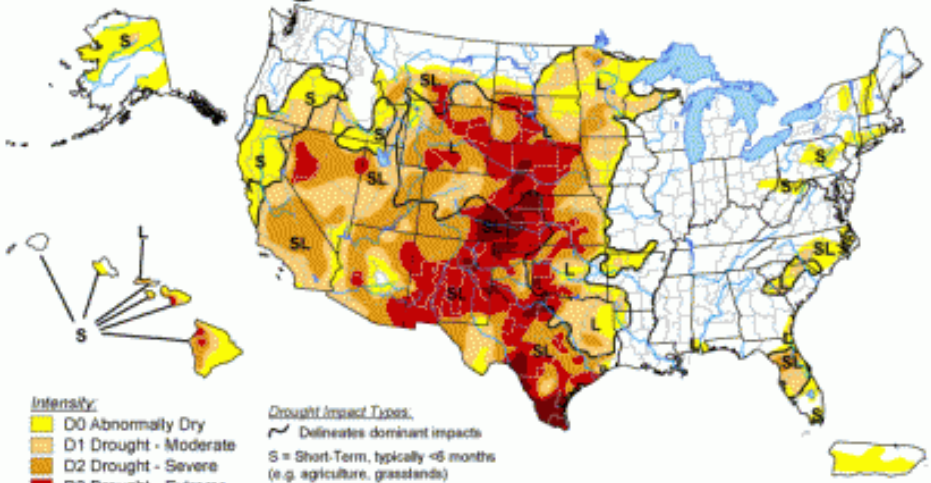
*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

**http://drought.unl.edu/dm**

***Released Thursday, April 28, 2011***
***Author: Michael Brewer/L. Love-Brotak, NOAA/NESDIS/NCDC***

# U.S. Drought Monitor

**April 23, 2013**
Valid 7 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)

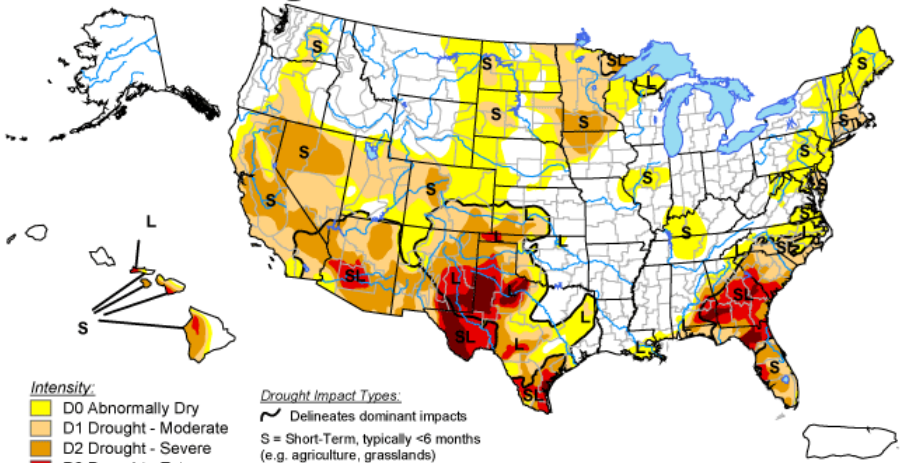
*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

**http://droughtmonitor.unl.edu/**

***Released Thursday, April 25, 2013***
***Author: Eric Luebehusen, U.S. Department of Agriculture***

# U.S. Drought Monitor

**April 3, 2012**
Valid 7 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)

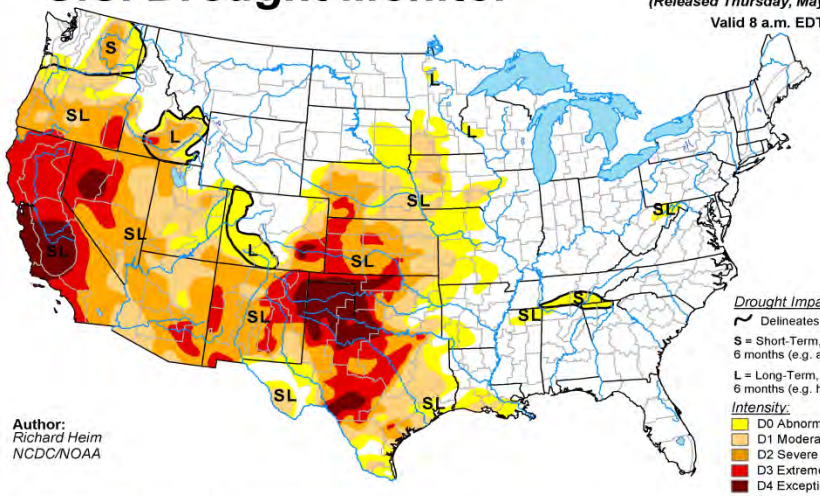
*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

**http://droughtmonitor.unl.edu/**

***Released Thursday, April 5, 2012***
***Author: Brian Fuchs, National Drought Mitigation Center***

# U.S. Drought Monitor

**April 29, 2014**
***(Released Thursday, May. 1, 2014)***
Valid 8 a.m. EDT

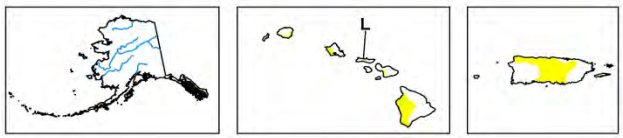



**Author:**
*Richard Heim*
*NCDC/NOAA*

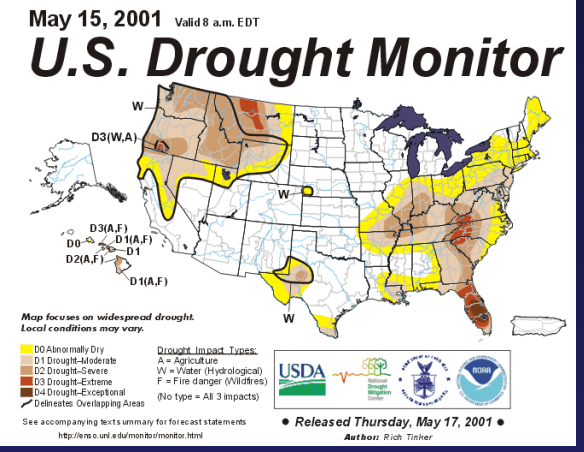
*Drought Impact Types:*
- Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

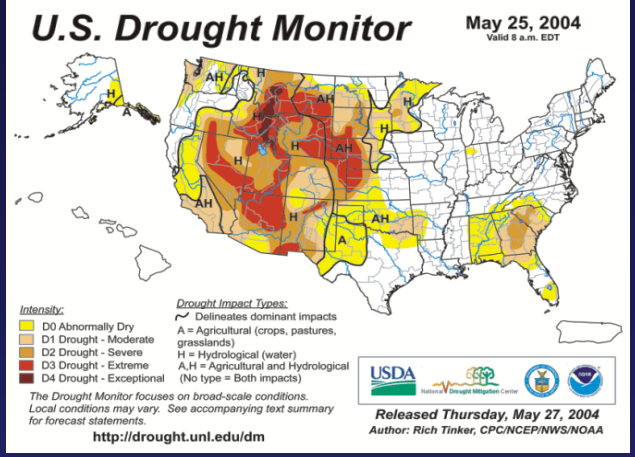
*Intensity:*
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

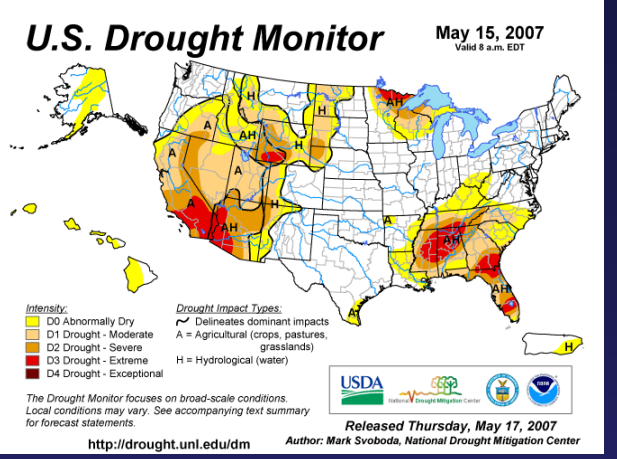
*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

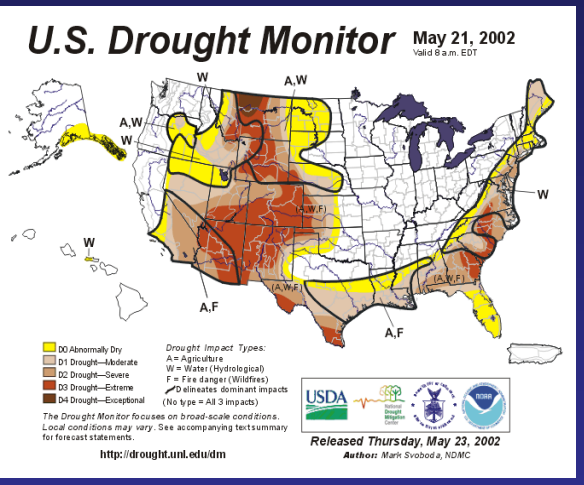


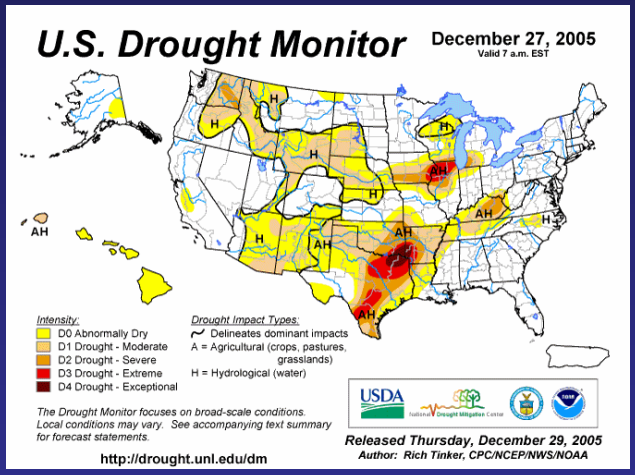

**http://droughtmonitor.unl.edu/**

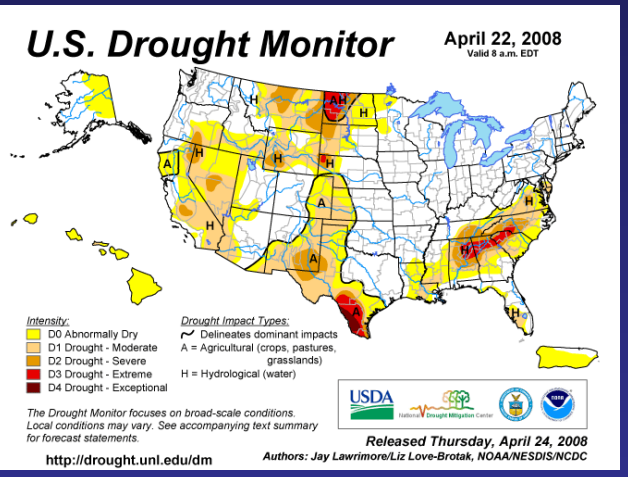

May 15, 2001 Valid 8 a.m. EDT
U.S. Drought Monitor
Map focuses on widespread drought.
Local conditions may vary.
Drought Impact Types:
A = Agriculture
W = Water (Hydrological)
F = Fire danger (Wildfires)
(No type = All 3 impacts)
Released Thursday, May 17, 2001
Author: Rich Tinker

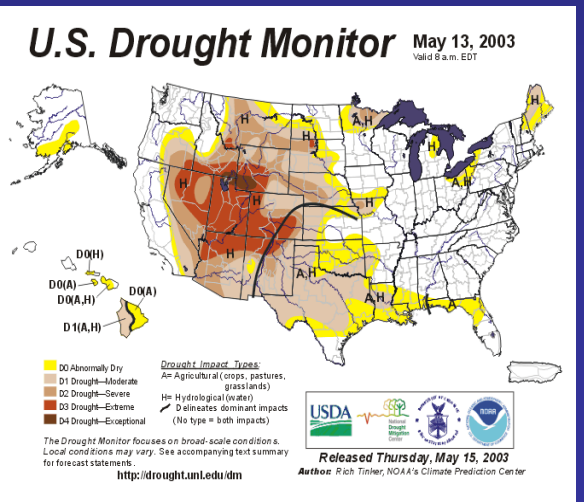

U.S. Drought Monitor
May 25, 2004
Valid 8 a.m. EDT
Intensity:
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptional
Drought Impact Types:
Delineates dominant impacts
A = Agricultural (crops, pastures, grasslands)
H = Hydrological (water)
A,H = Agricultural and Hydrological
(No type = Both impacts)
The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary for forecast statements.
http://drought.unl.edu/dm
Released Thursday, May 27, 2004
Author: Rich Tinker, CPC/NCEP/NWS/NOAA

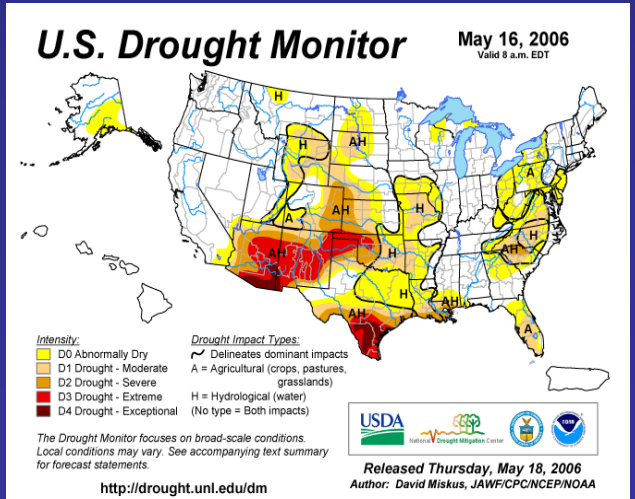

U.S. Drought Monitor
May 15, 2007
Valid 8 a.m. EDT
Intensity:
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptional
Drought Impact Types:
Delineates dominant impacts
A = Agricultural (crops, pastures, grasslands)
H = Hydrological (water)
The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary for forecast statements.
http://drought.unl.edu/dm
Released Thursday, May 17, 2007
Author: Mark Svoboda, National Drought Mitigation Center

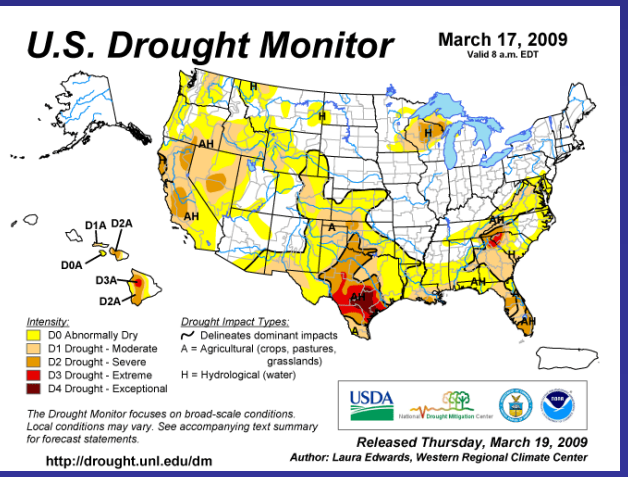

U.S. Drought Monitor
May 21, 2002
Valid 8 a.m. EDT
D0 Abnormally Dry
D1 Drought—Moderate
D2 Drought—Severe
D3 Drought—Extreme
D4 Drought—Exceptional
Drought Impact Types:
A = Agriculture
W = Water (Hydrological)
F = Fire danger (Wildfires)
Delineates dominant impacts
(No type = All 3 impacts)
The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary for forecast statements.
http://drought.unl.edu/dm
Released Thursday, May 23, 2002
Author: Mark Svoboda, NDMC

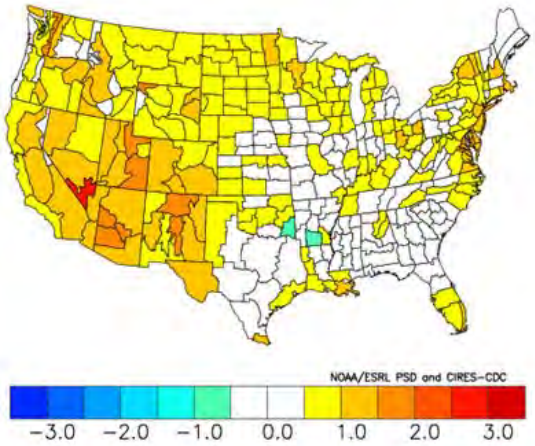

U.S. Drought Monitor
December 27, 2005
Valid 7 a.m. EST
Intensity:
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptional
Drought Impact Types:
Delineates dominant impacts
A = Agricultural (crops, pastures, grasslands)
H = Hydrological (water)
The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary for forecast statements.
http://drought.unl.edu/dm
Released Thursday, December 29, 2005
Author: Rich Tinker, CPC/NCEP/NWS/NOAA


U.S. Drought Monitor
April 22, 2008
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
A = Agricultural (crops, pastures, grasslands)
H = Hydrological (water)
The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary for forecast statements.
http://drought.unl.edu/dm
Released Thursday, April 24, 2008
Authors: Jay Lawrimore/Liz Love-Brotak, NOAA/NESDIS/NCDC

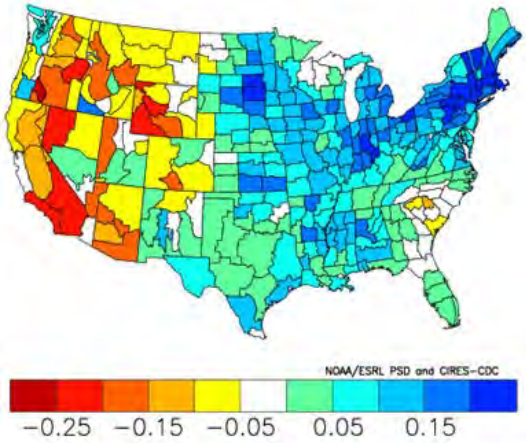

U.S. Drought Monitor
May 13, 2003
Valid 8 a.m. EDT
D0 Abnormally Dry
D1 Drought—Moderate
D2 Drought—Severe
D3 Drought—Extreme
D4 Drought—Exceptional
Drought Impact Types:
A= Agricultural (crops, pastures, grasslands)
H= Hydrological (water)
Delineates dominant impacts
(No type = both impacts)
The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary for forecast statements.
http://drought.unl.edu/dm
Released Thursday, May 15, 2003
Author: Rich Tinker, NOAA's Climate Prediction Center


U.S. Drought Monitor
May 16, 2006
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
A = Agricultural (crops, pastures, grasslands)
H = Hydrological (water)
(No type = Both impacts)
The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary for forecast statements.
http://drought.unl.edu/dm
Released Thursday, May 18, 2006
Author: David Miskus, JAWF/CPC/NCEP/NOAA

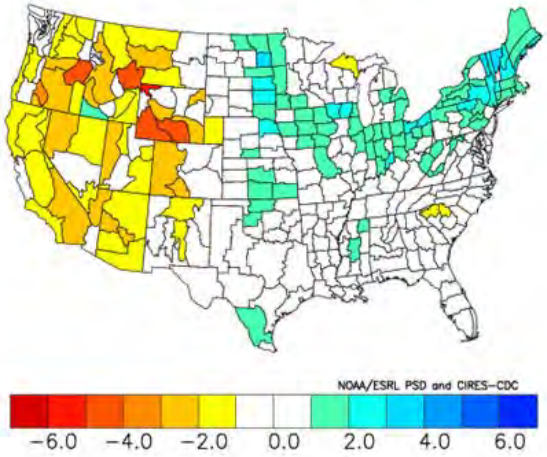

U.S. Drought Monitor
March 17, 2009
Valid 8 a.m. EDT
Intensity:
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptional
Drought Impact Types:
Delineates dominant impacts
A = Agricultural (crops, pastures, grasslands)
H = Hydrological (water)
The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary for forecast statements.
http://drought.unl.edu/dm
Released Thursday, March 19, 2009
Author: Laura Edwards, Western Regional Climate Center



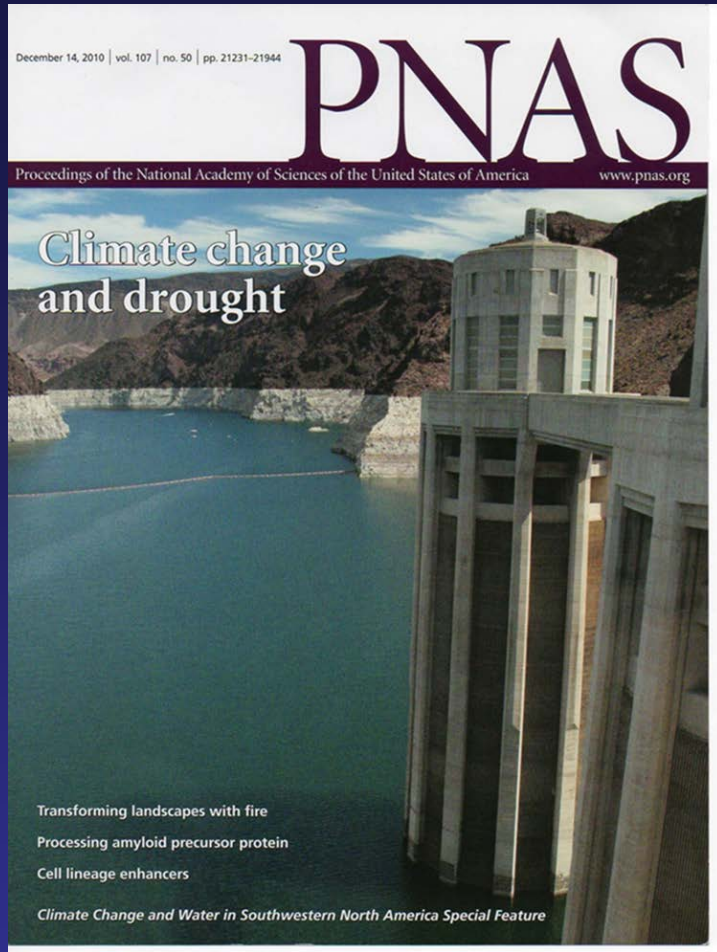

Temperature



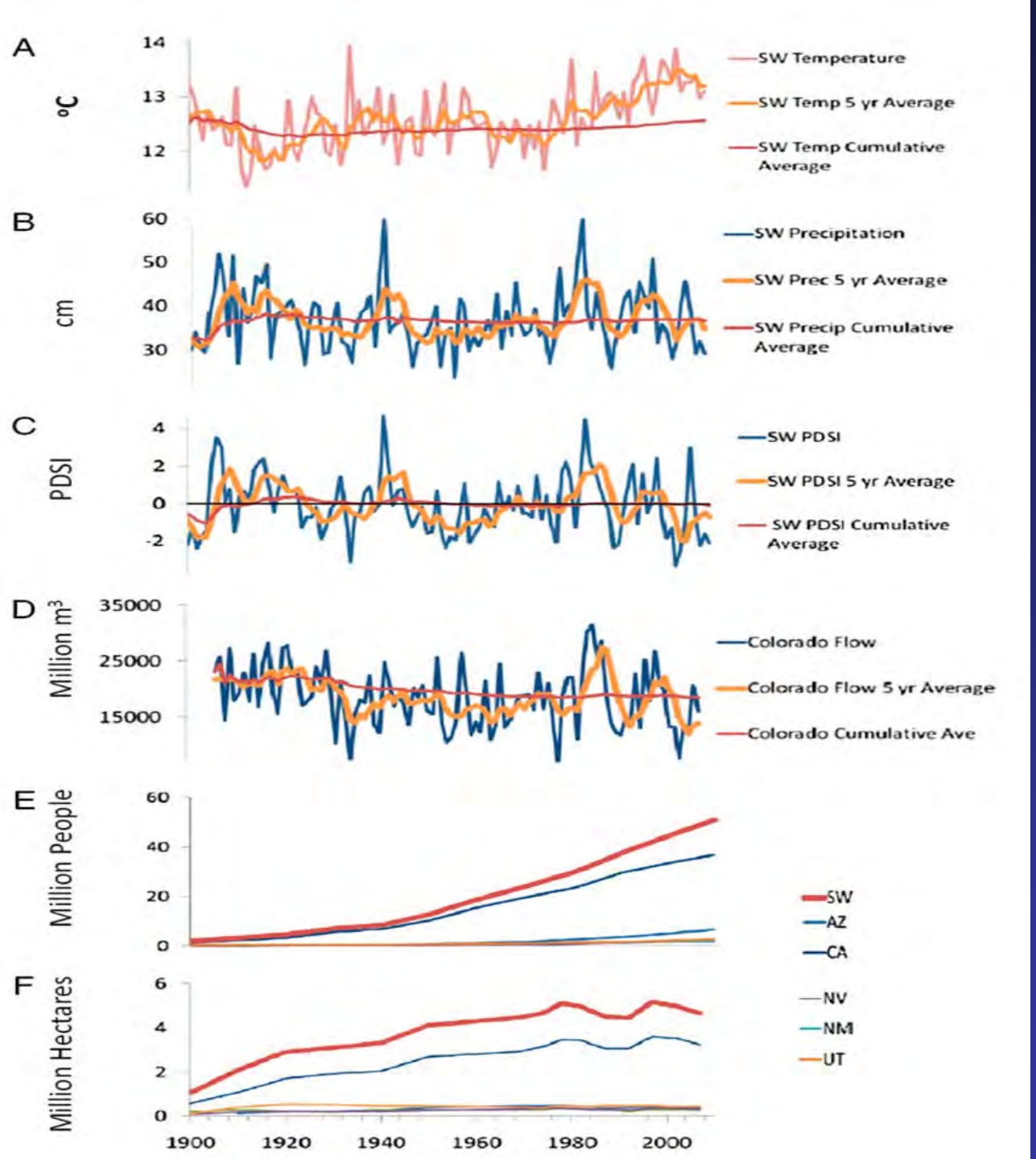

Precipitation




PDSI

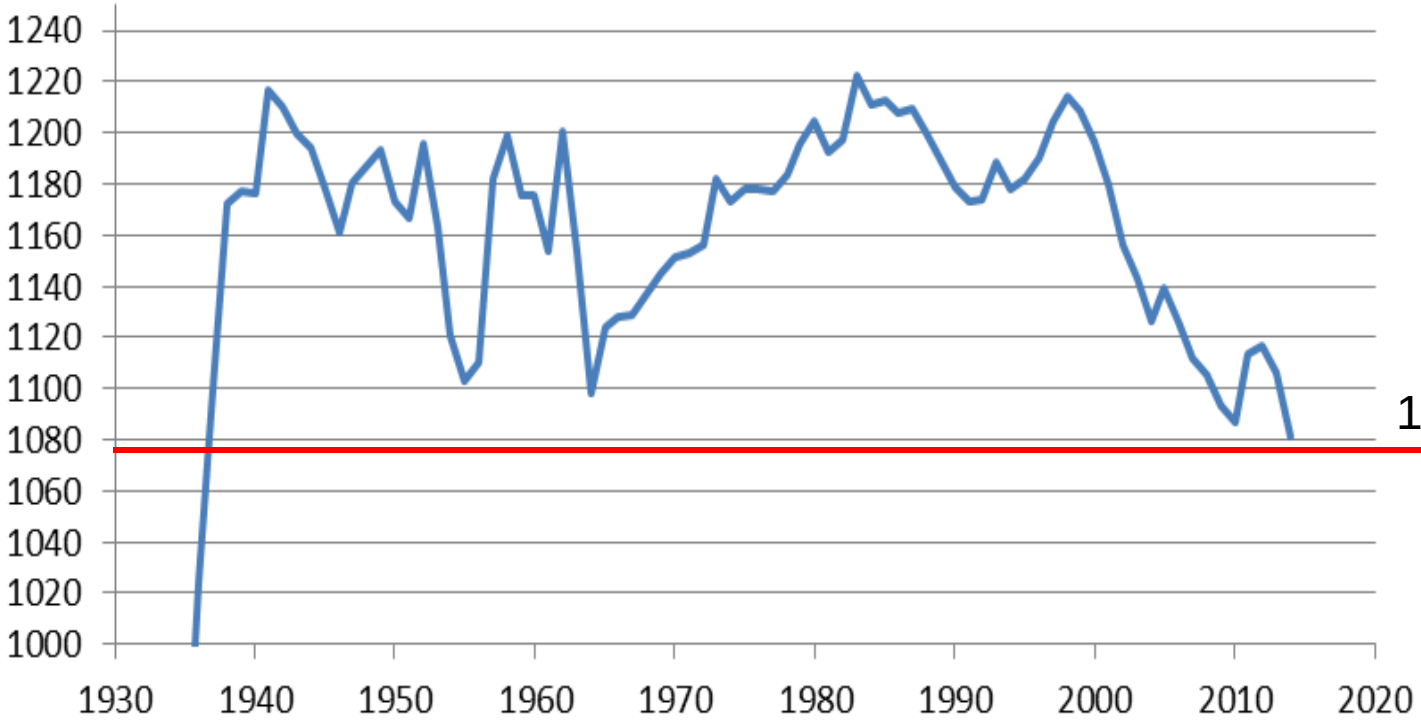



MacDonald 2010 PNAS



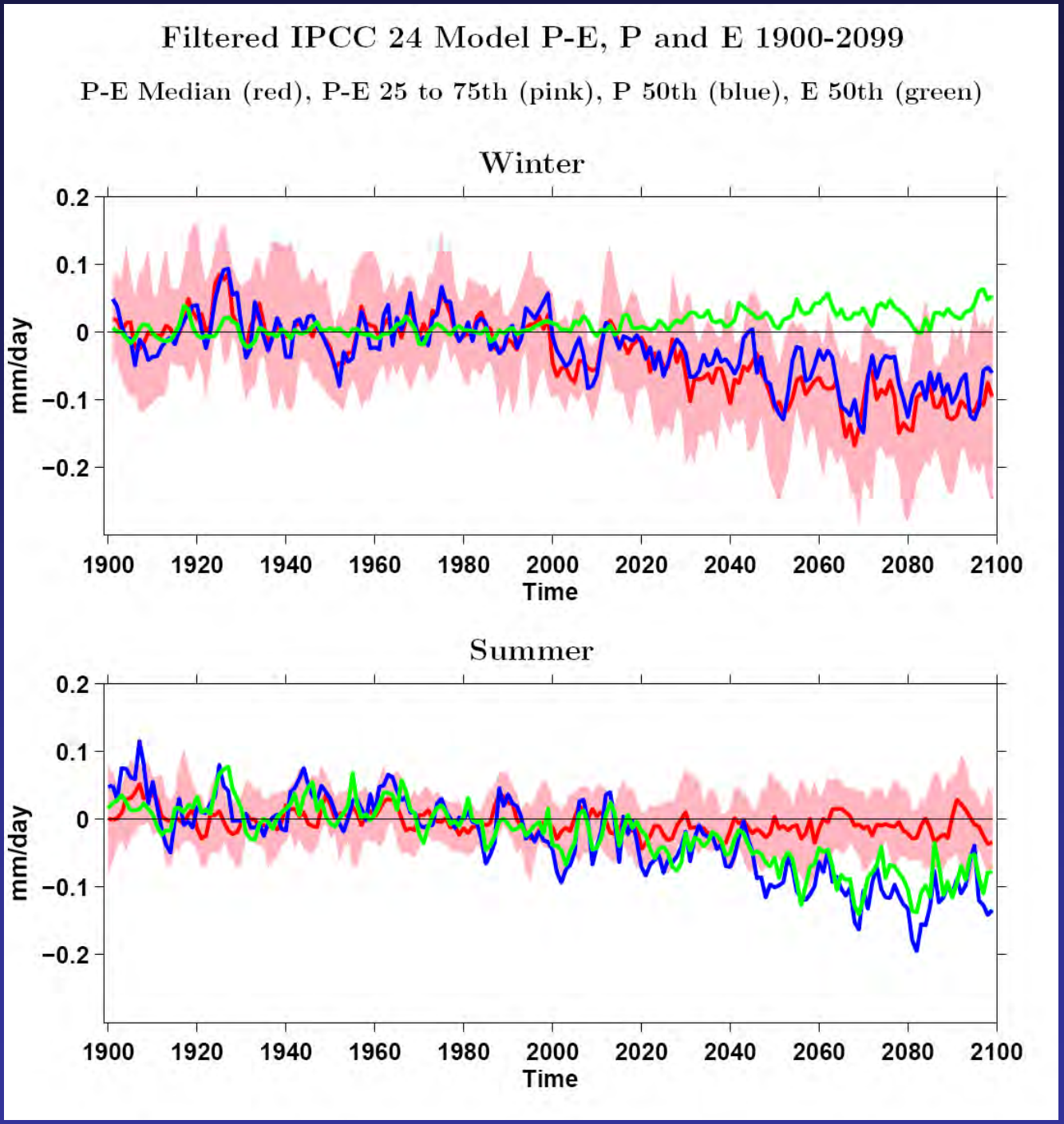

MacDonald 2010 PNAS

# Lake Mead Elevation Ft



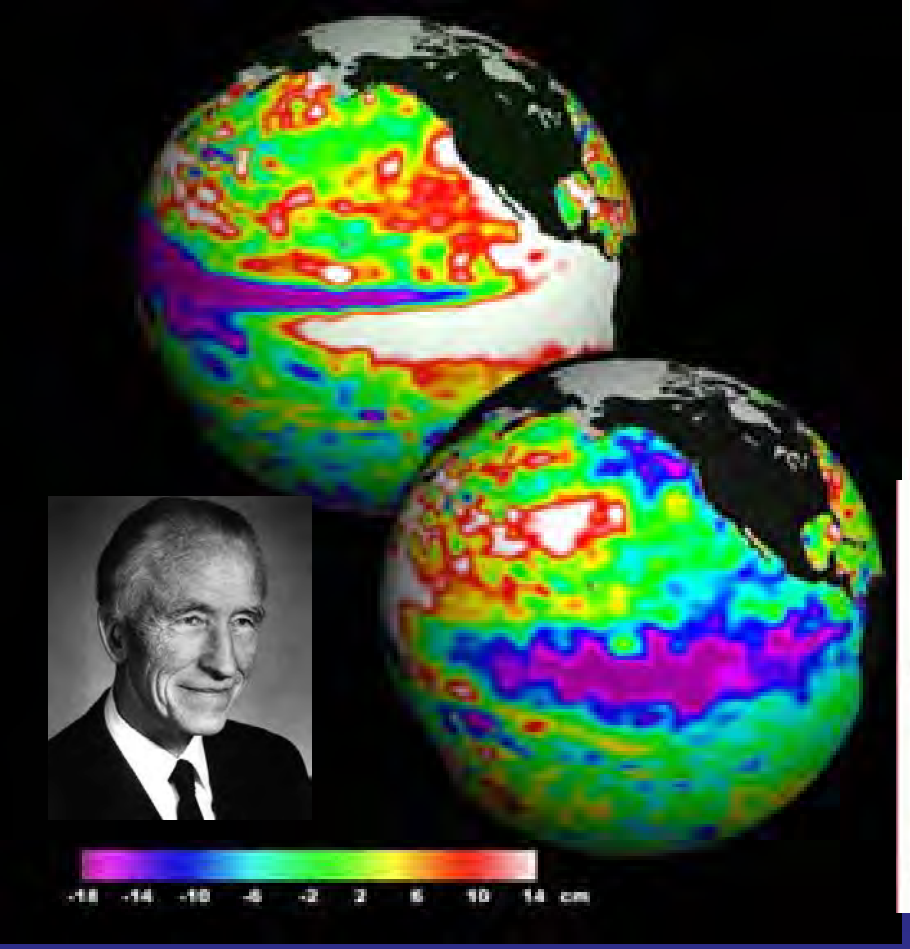

**1,075 ft elev. Federal Water Shortage Declaration**

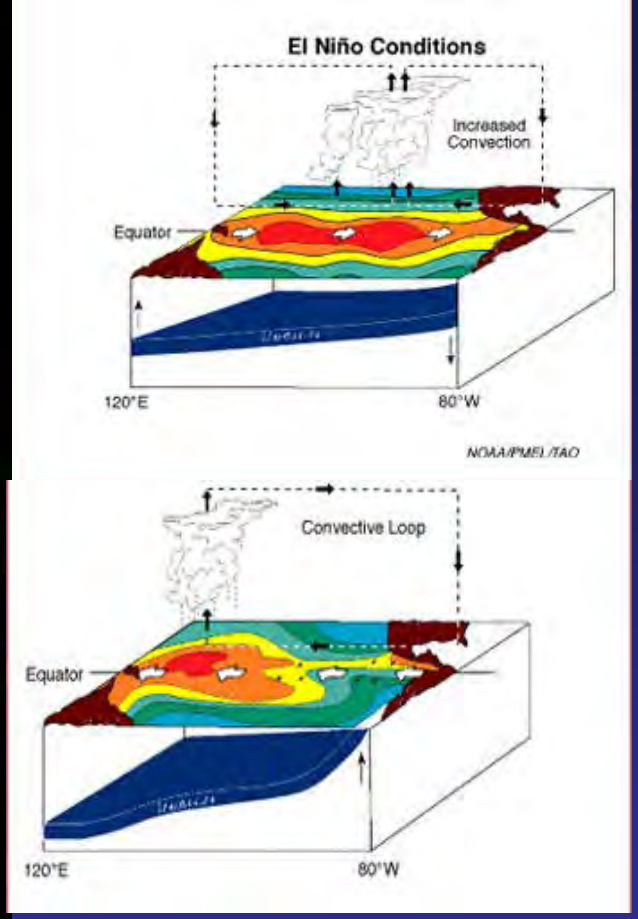
- Water cut by 4.4 percent in the three Lower Basin states:
- Arizona would take an 11 percent cut
- Nevada 4 percent cut
- Mexico 3.3 percent cut
- California – No Cut

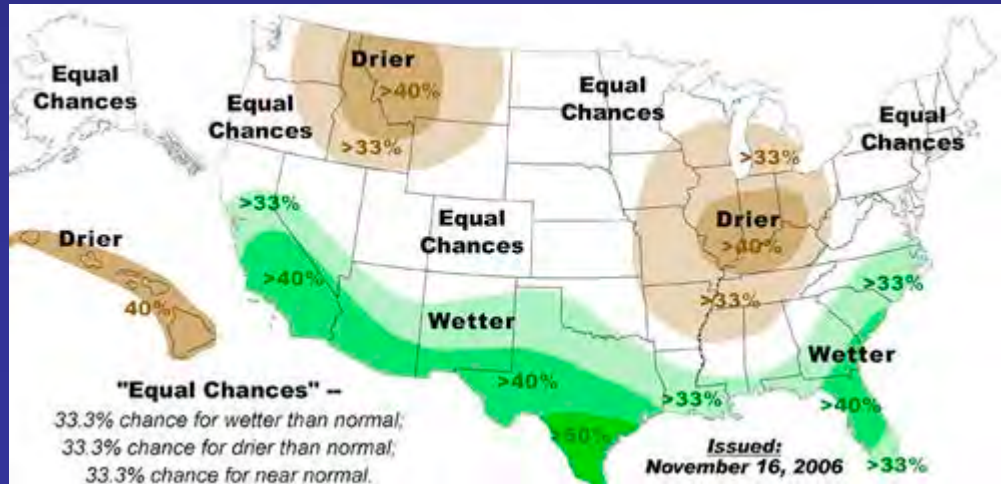


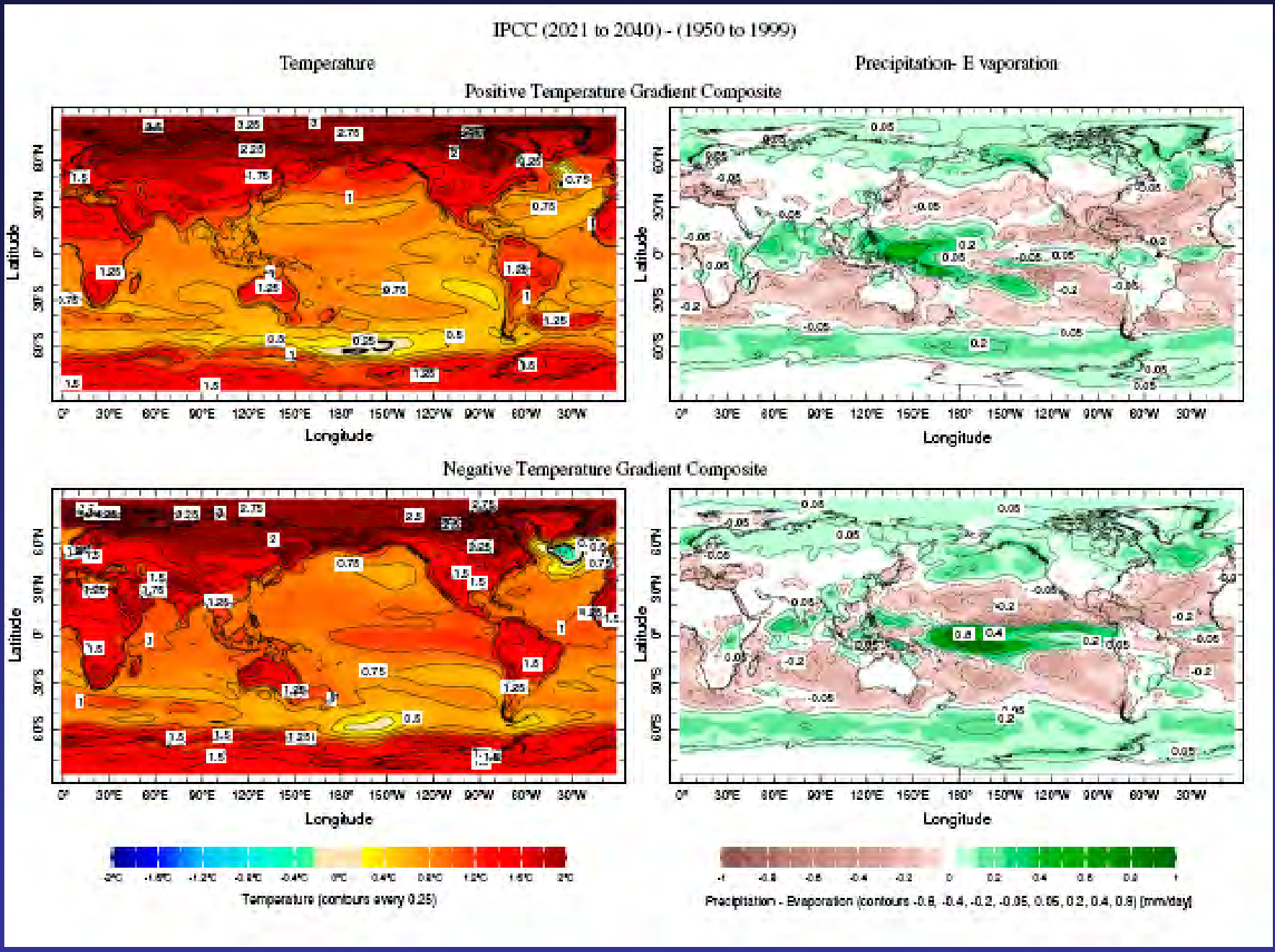

**“Due to the presence of large amplitude decadal variations of presumed natural origin, observations to date cannot confirm that this transition to a drier climate is already underway,**
**but it is anticipated that the anthropogenic drying will reach the amplitude of natural decadal variability by midcentury.”**

**Seager and Vecchi, PNAS 2010**

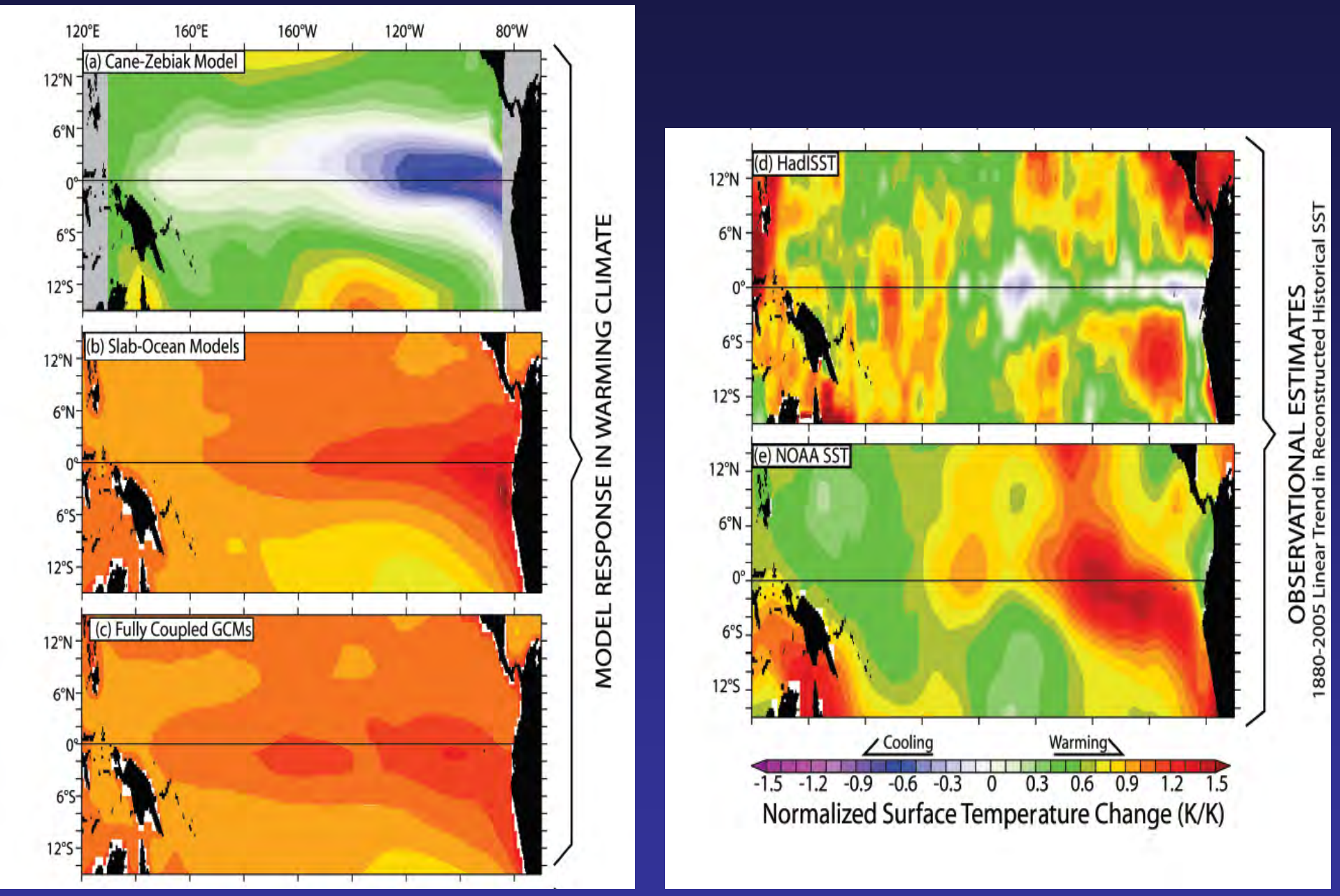

-18 -14 -10 -6 -2 2 6 10 14 cm


El Niño Conditions
Increased Convection
Equator
120°E
80°W
NOAA/PMEL/TAO
Convective Loop
Equator
120°E
80°W

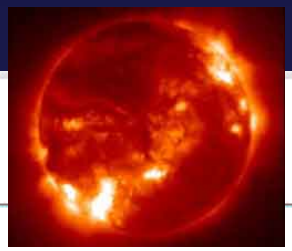

Equal Chances
Drier
>40%
Equal Chances
>33%
Equal Chances
>33%
Equal Chances
>33%
Drier
Equal Chances
Drier
>40%
>40%
>33%
40%
Wetter
Wetter
>40%
>33%
>40%
"Equal Chances" --
33.3% chance for wetter than normal;
33.3% chance for drier than normal;
33.3% chance for near normal.
Issued:
November 16, 2006
>33%

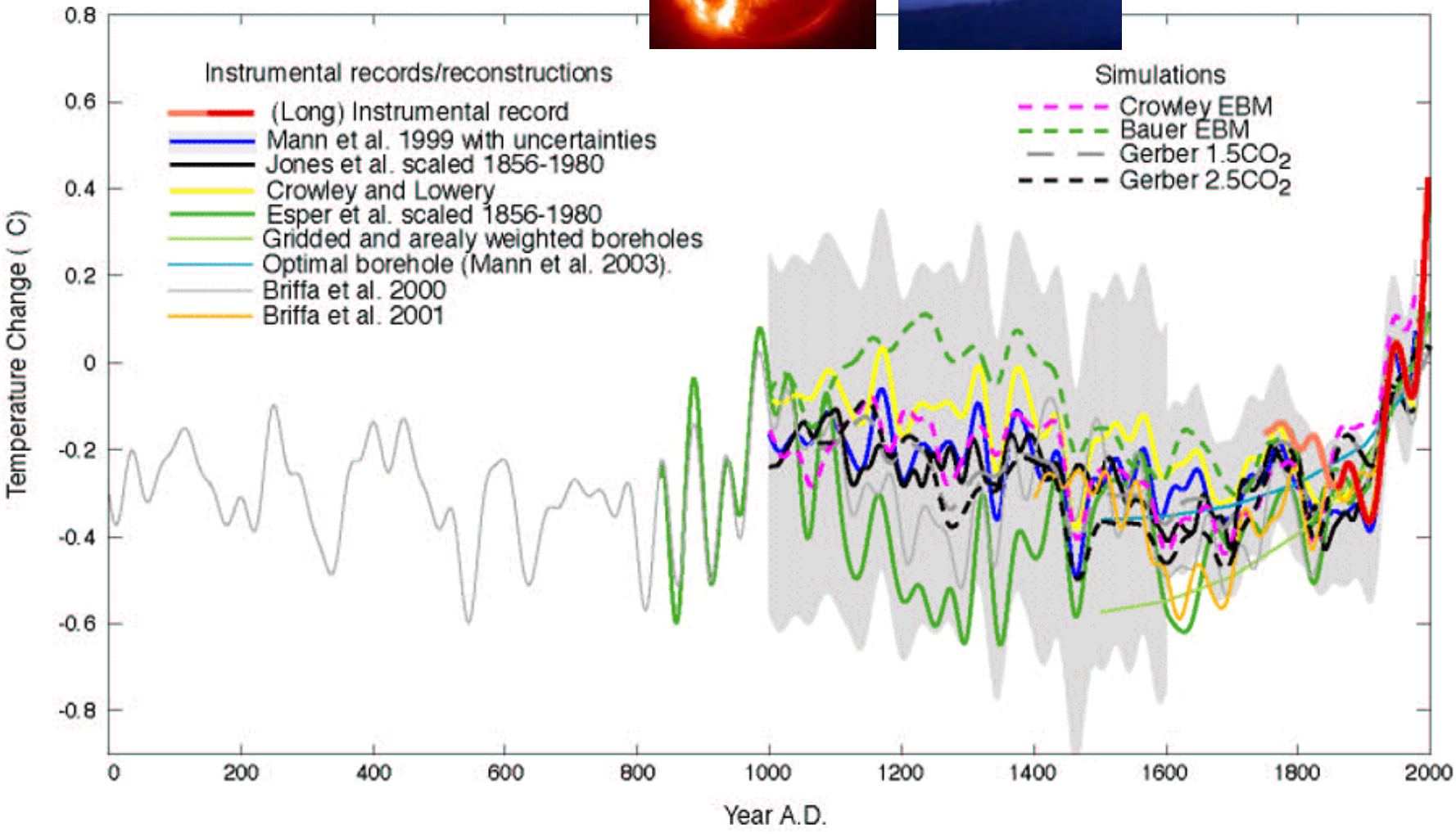



Seager and Vecchi 2010 PNAS

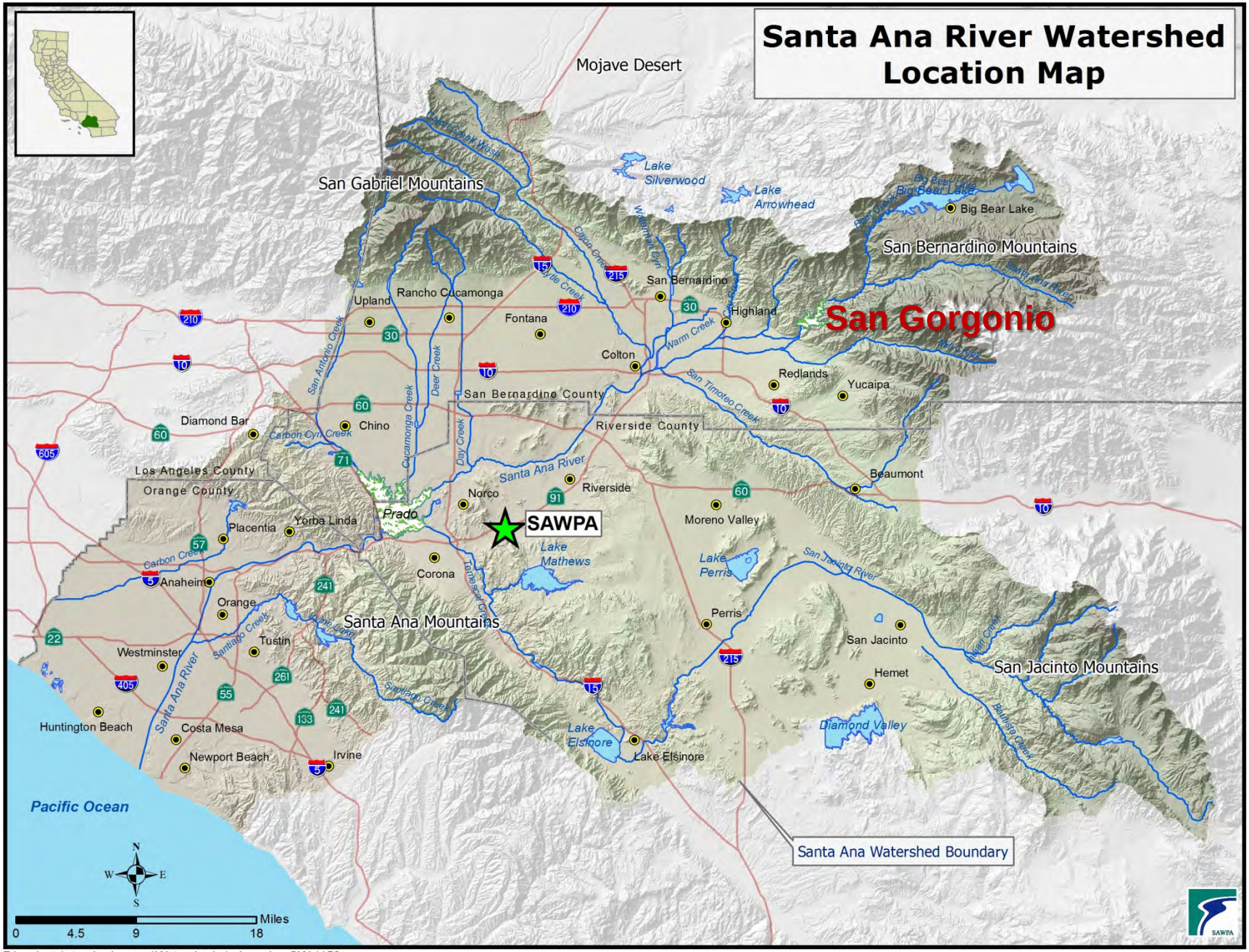



Vecchi et al. EOS 2008

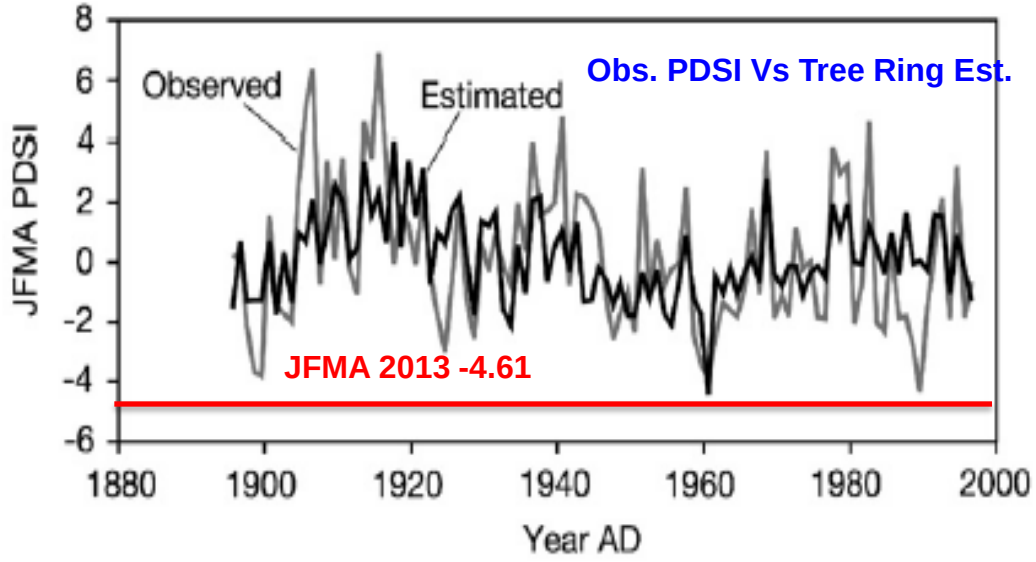


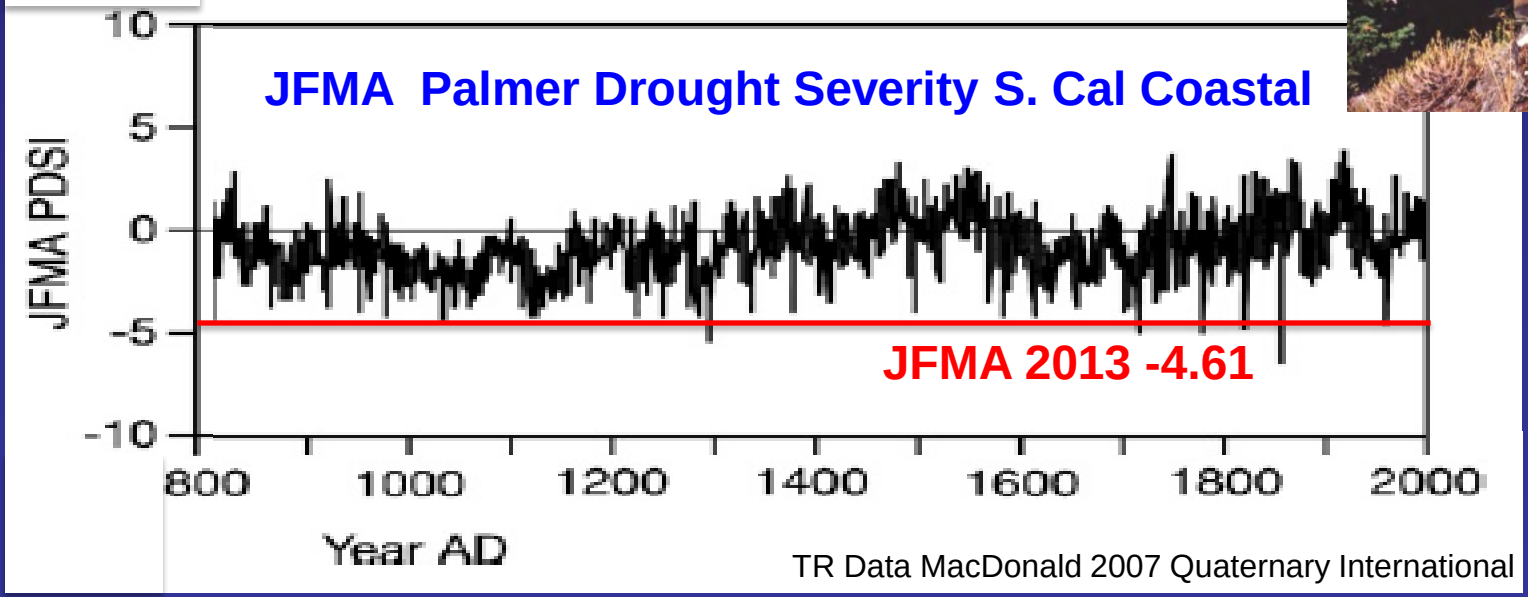



**Mann et al. 2003**

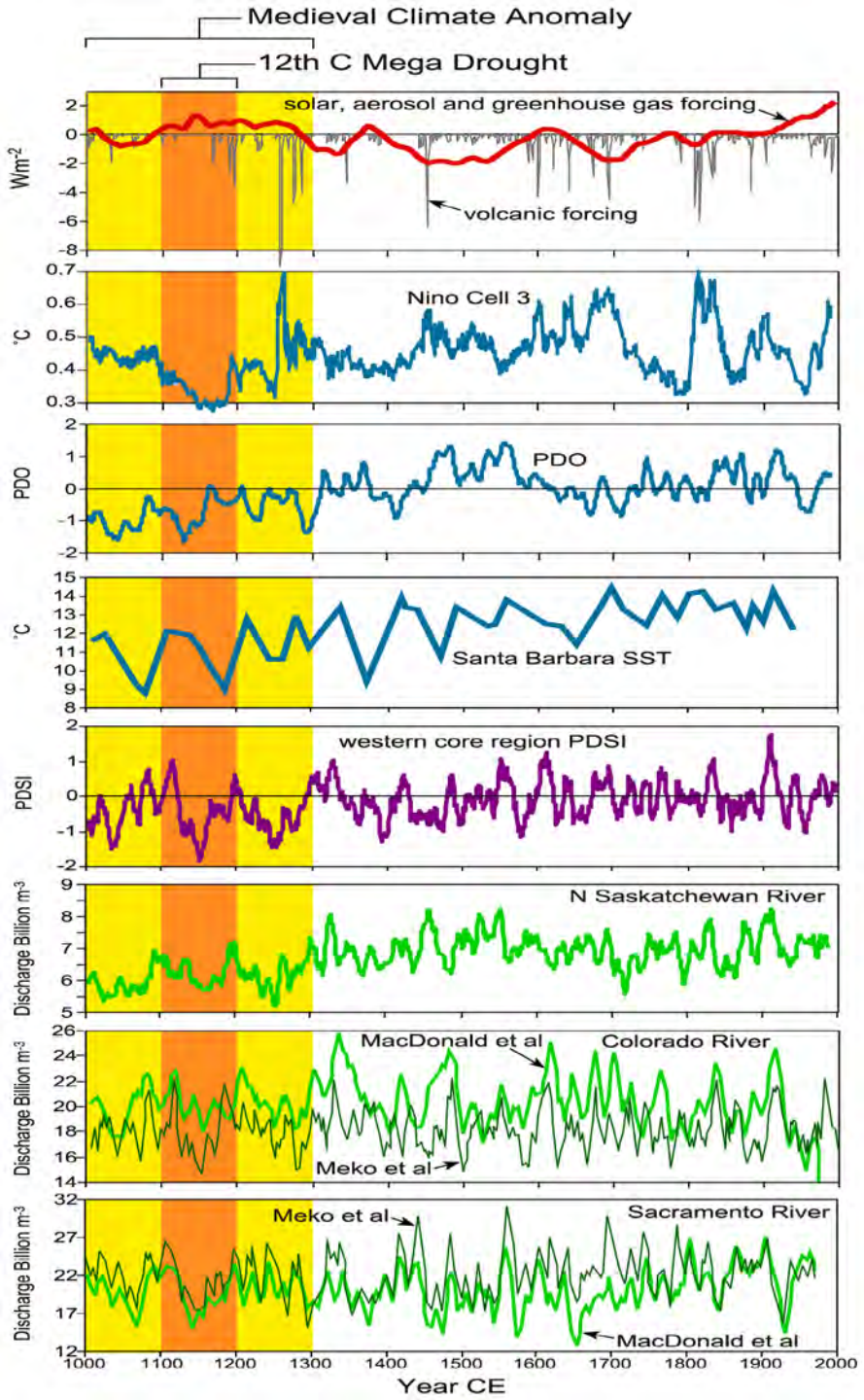


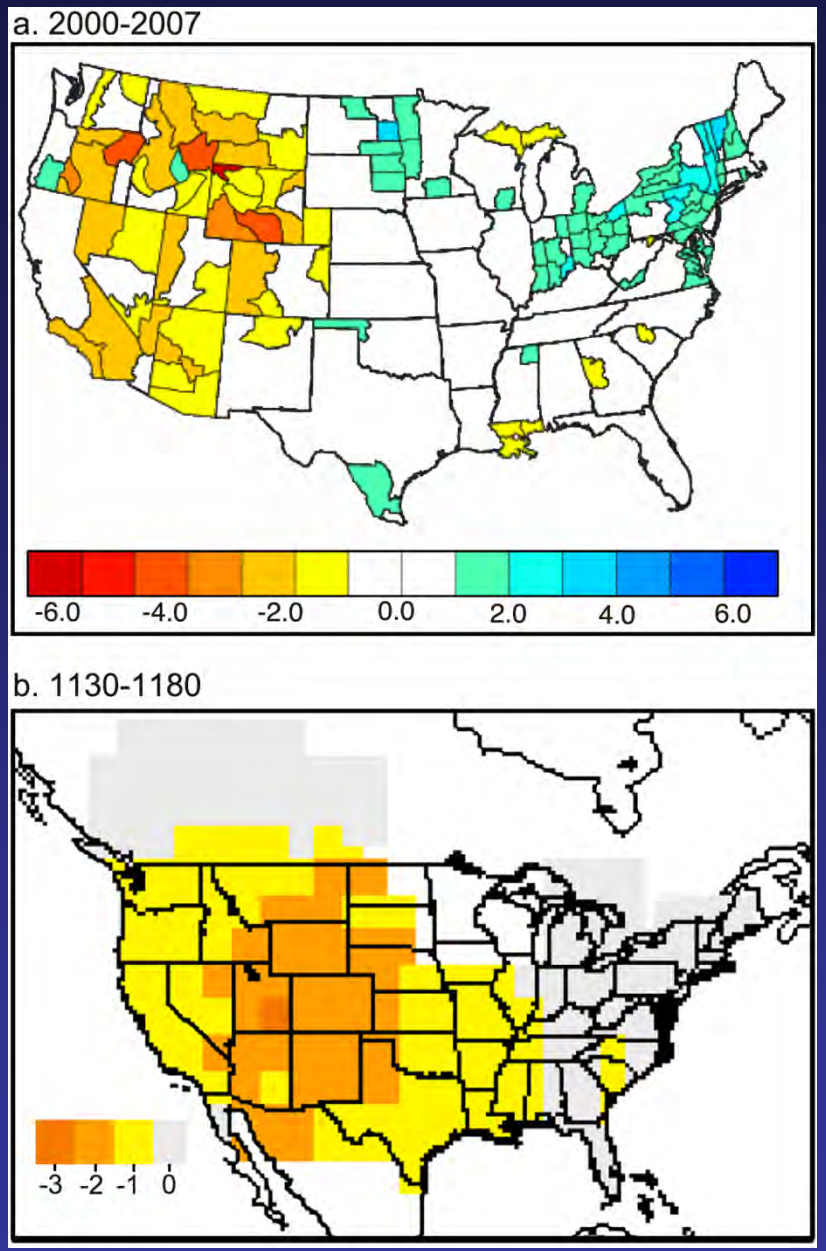

P:\projects\standard_maps\Watershed_1_A.mxd SW-1150



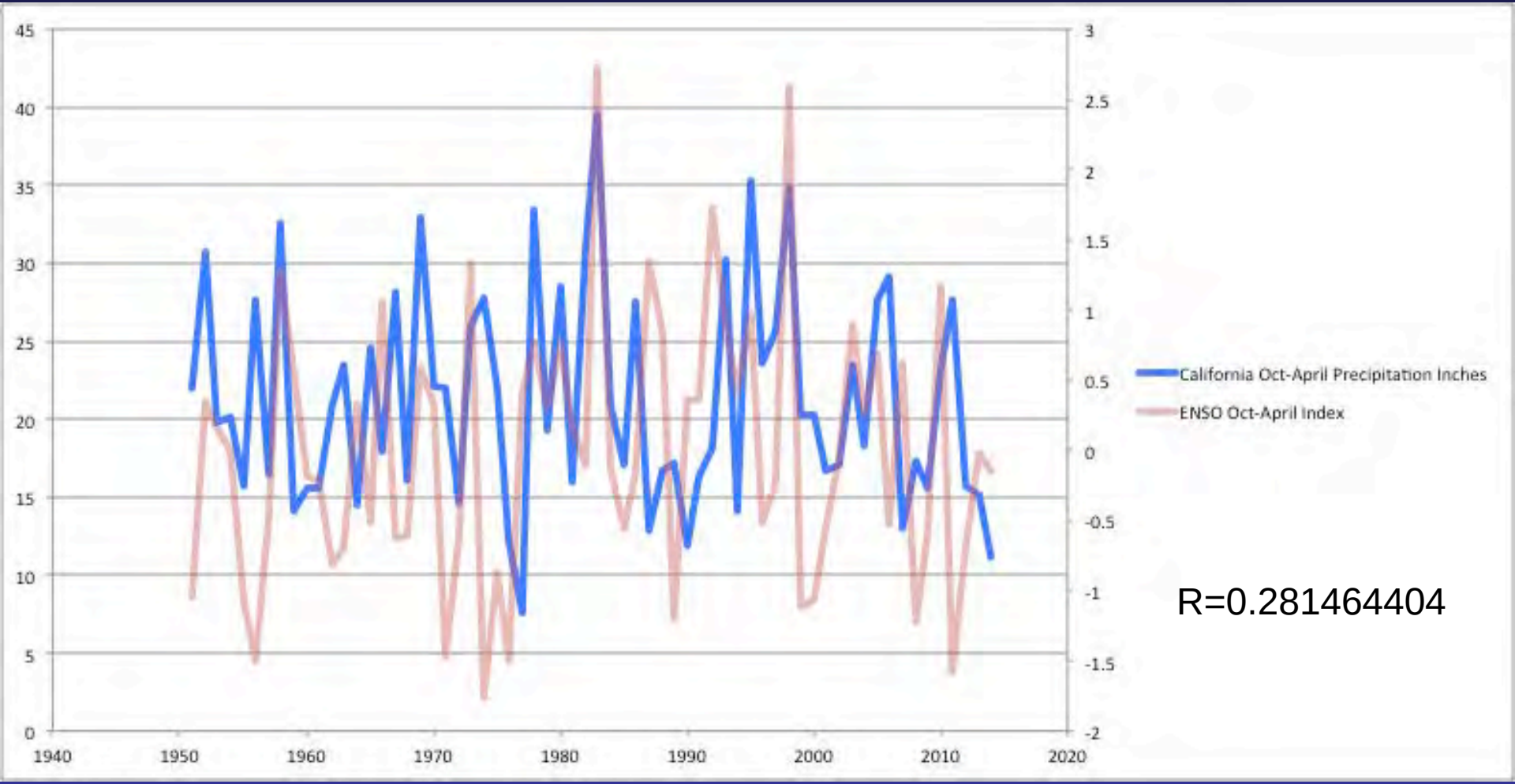

TR Data MacDonald 2007 Quaternary International




MacDonald et al 2008 EOS

# ENSO to the rescue in Winter 2014-15?

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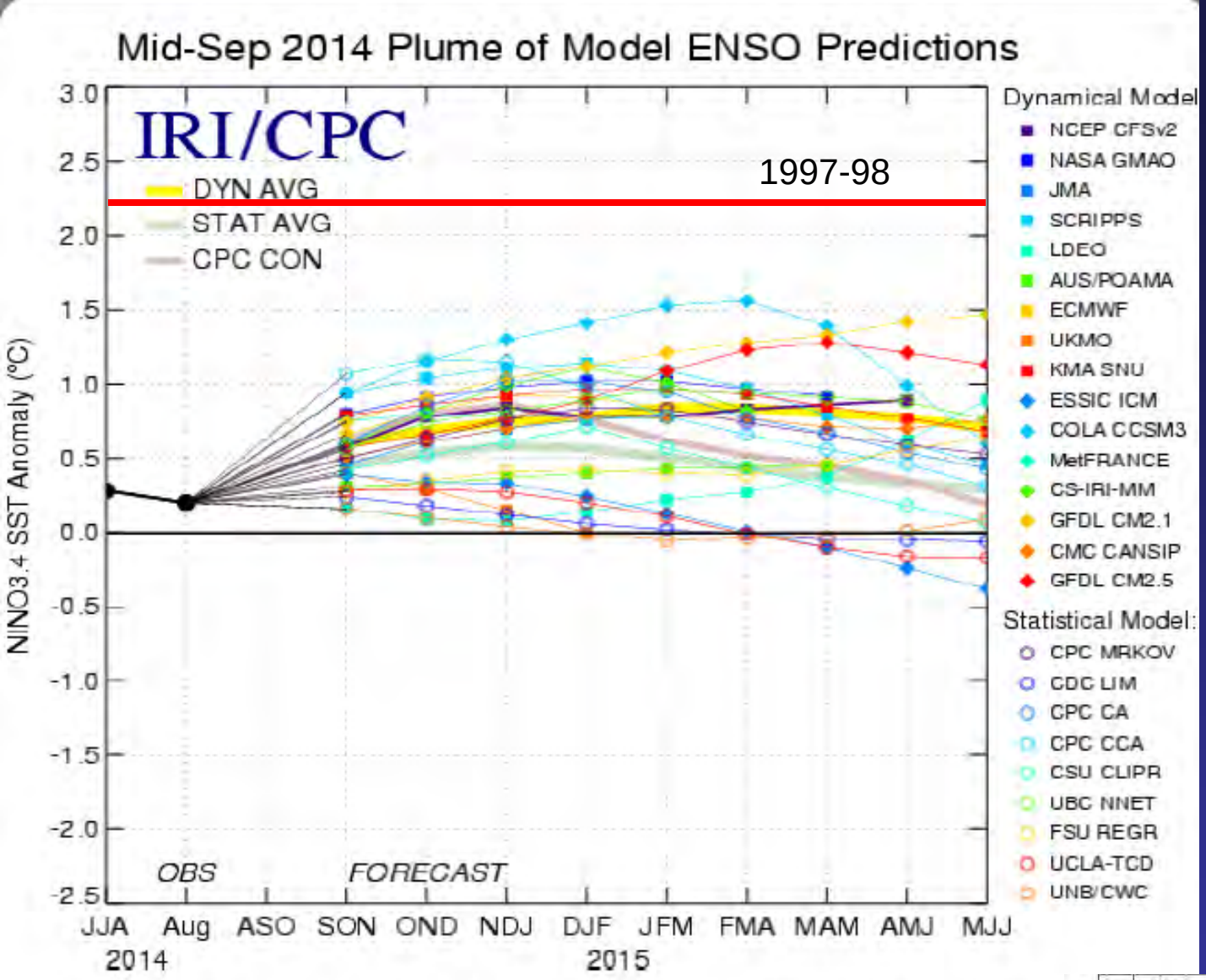
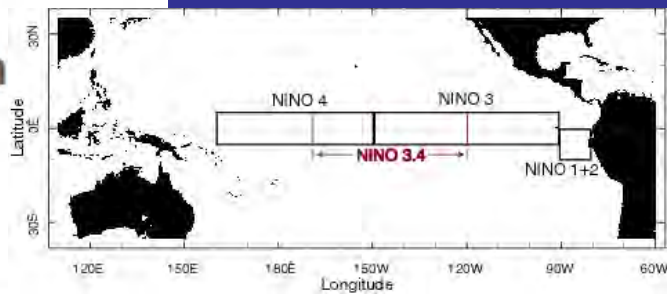



Figure provided by the International Research Institute (IRI) for Climate and Society (updated 16 September 2014).

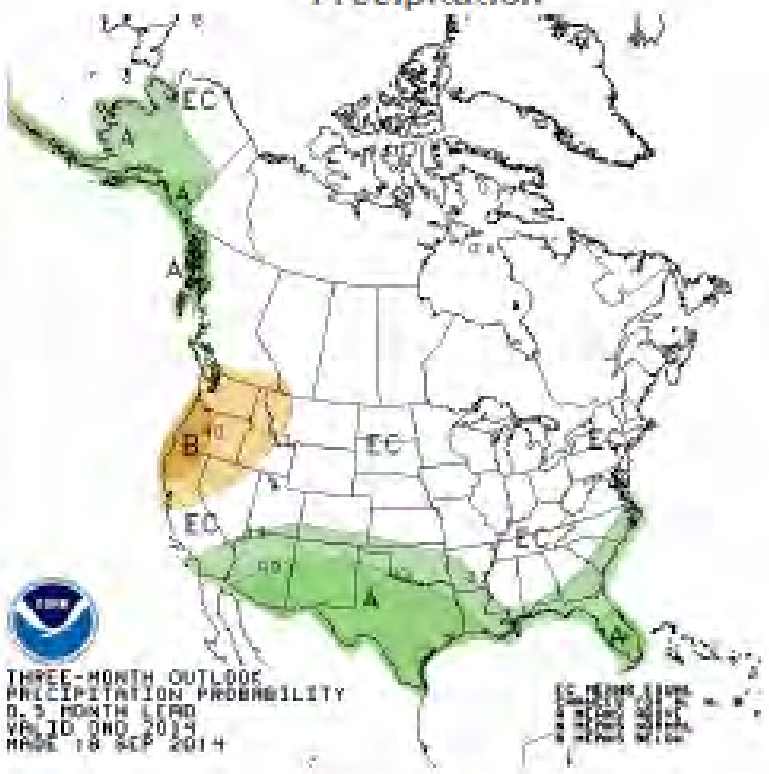


# U. S. Seasonal Outlooks

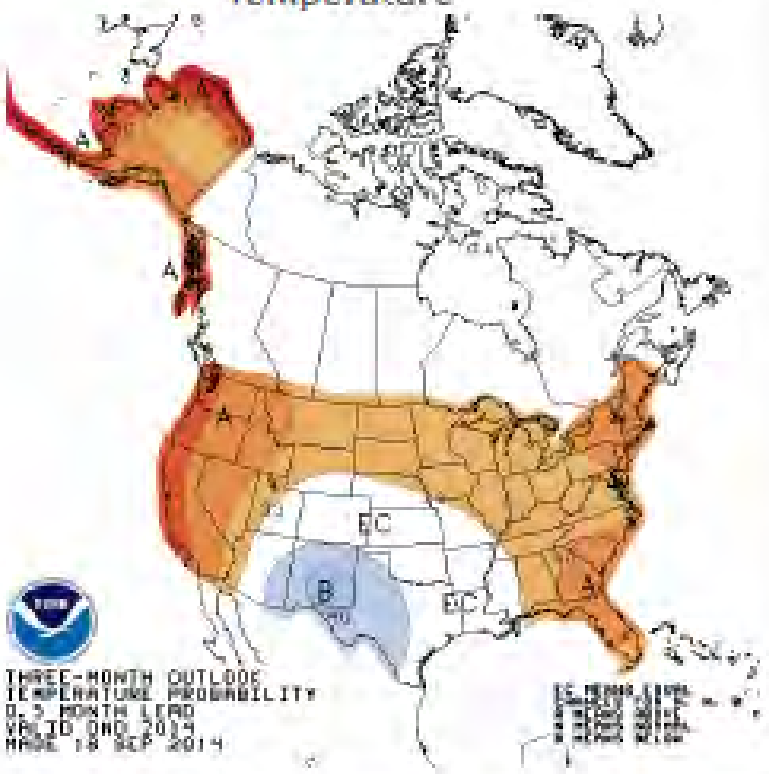
## October - December 2014

The seasonal outlooks combine the effects of long-term trends, soil moisture, and, when appropriate, ENSO.

Precipitation




Temperature



Los Angeles Times

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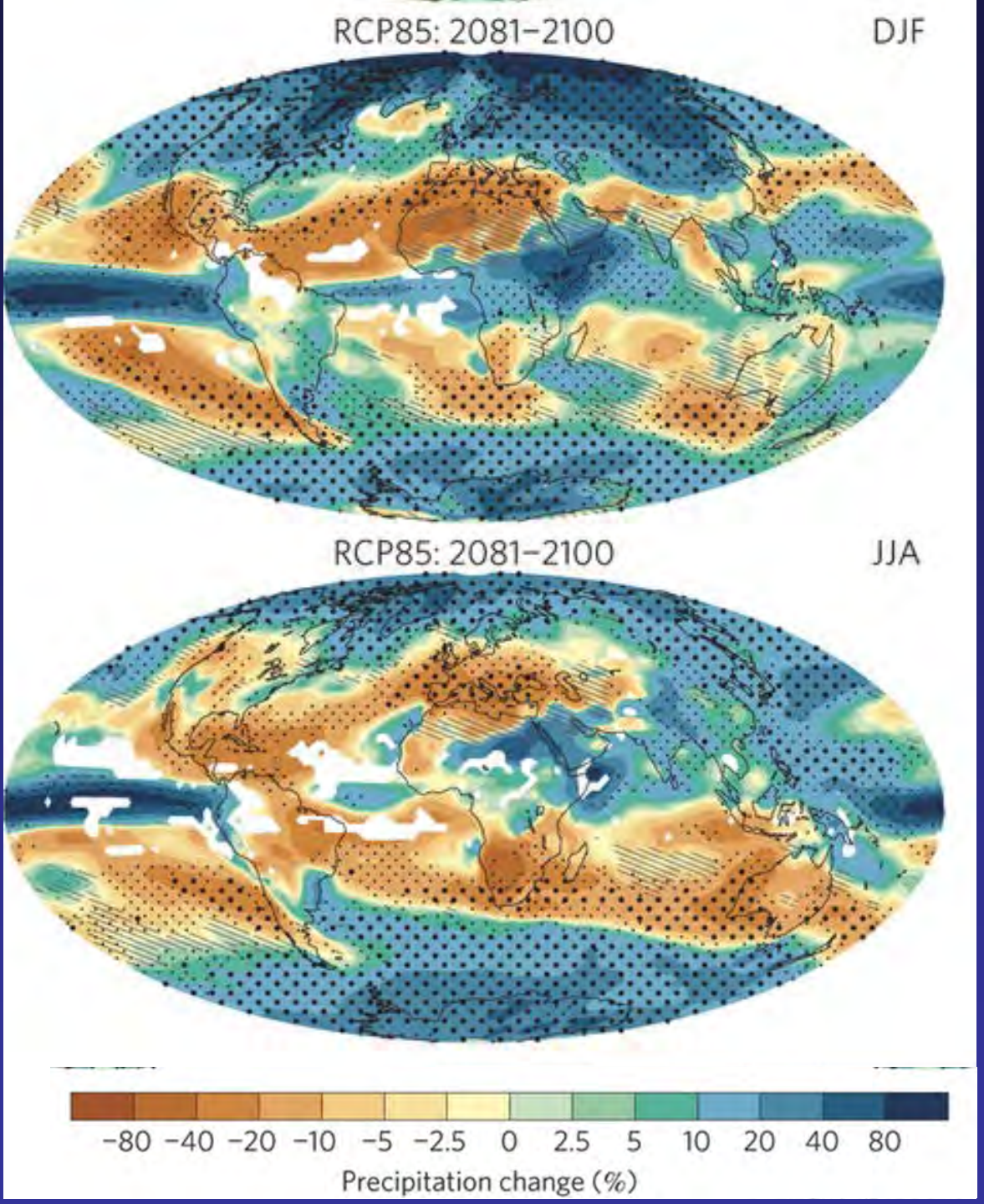
# Mammoth Mountain owner buys Bear Mountain and Snow Summit

Marine Corps Lance Cpl. Jonathan Wescott, 23, takes a run at Bear Mountain in the San Bernardino Mountains in 2012. Bear Mountain and



Thank You!


RCP85: 2081–2100
DJF
RCP85: 2081–2100
JJA
−80 −40 −20 −10 −5 −2.5 0 2.5 5 10 20 40 80
Precipitation change (%)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