WY 2012 – Wet, Dry, or Wild?

Talk Overview

- WY 2011 Review
- Current Climate Signals
- WY 2012 Outlook

Climate States – Oct 2010

- La Nina conditions present in Pacific
- PDO Negative
- Cooler than average summer
- WY 2010 8 station and 5 station indices above average
- Most reservoirs near average storage
- Recent 3-year drought

Niño Region SST Departures (ºC)
Recent Evolution

Early October 2010

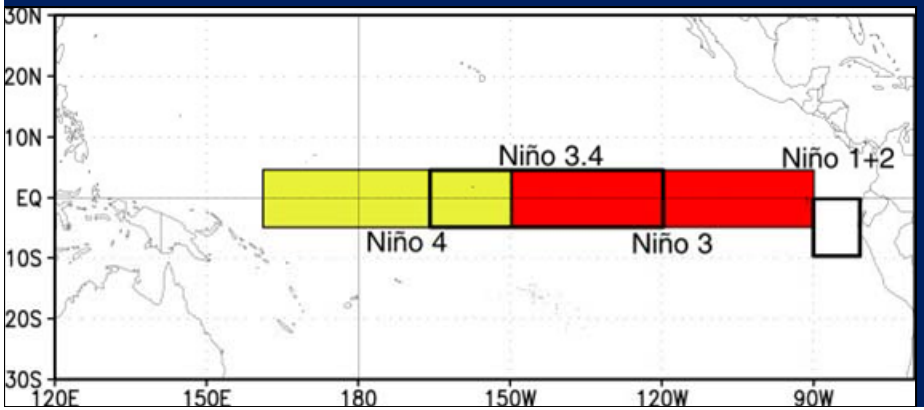
The latest weekly SST departures are:

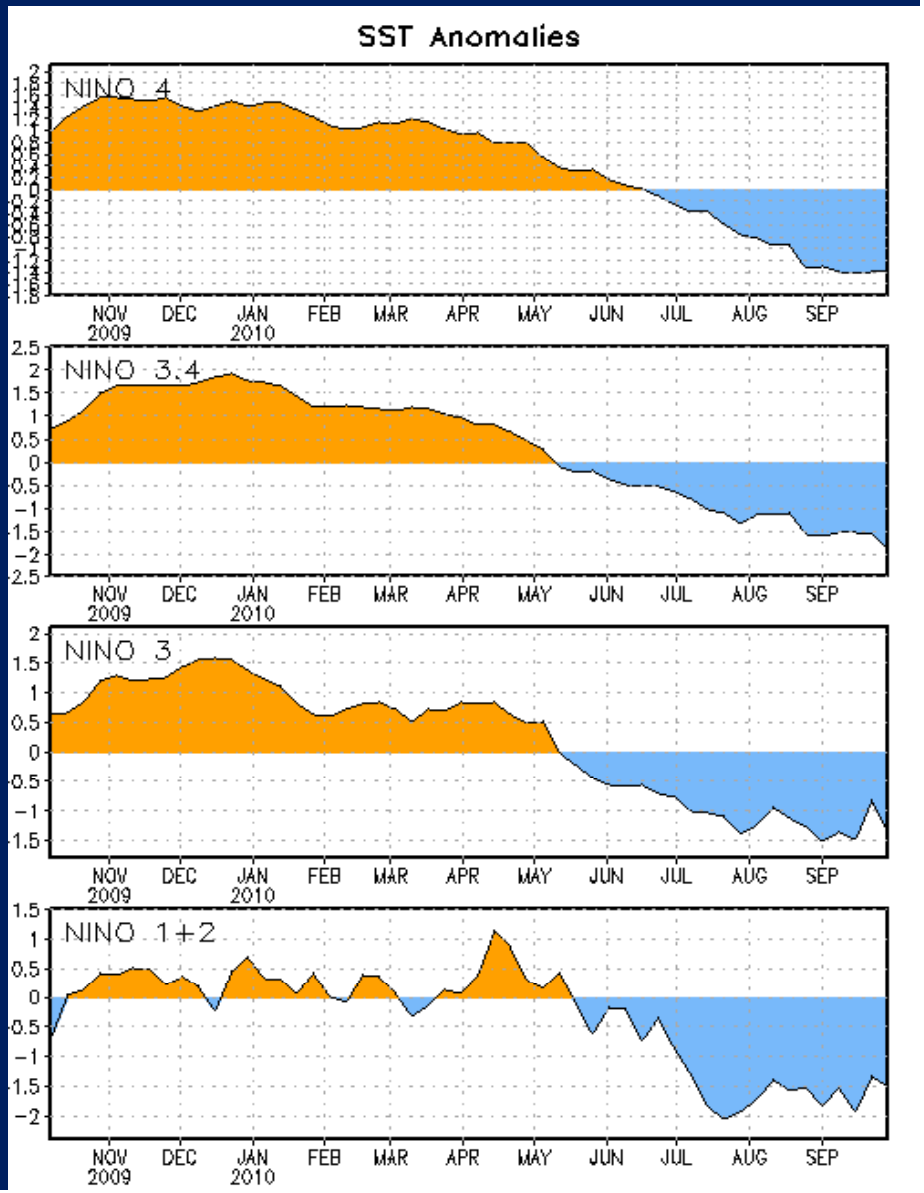
Niño 4 -1.4ºC

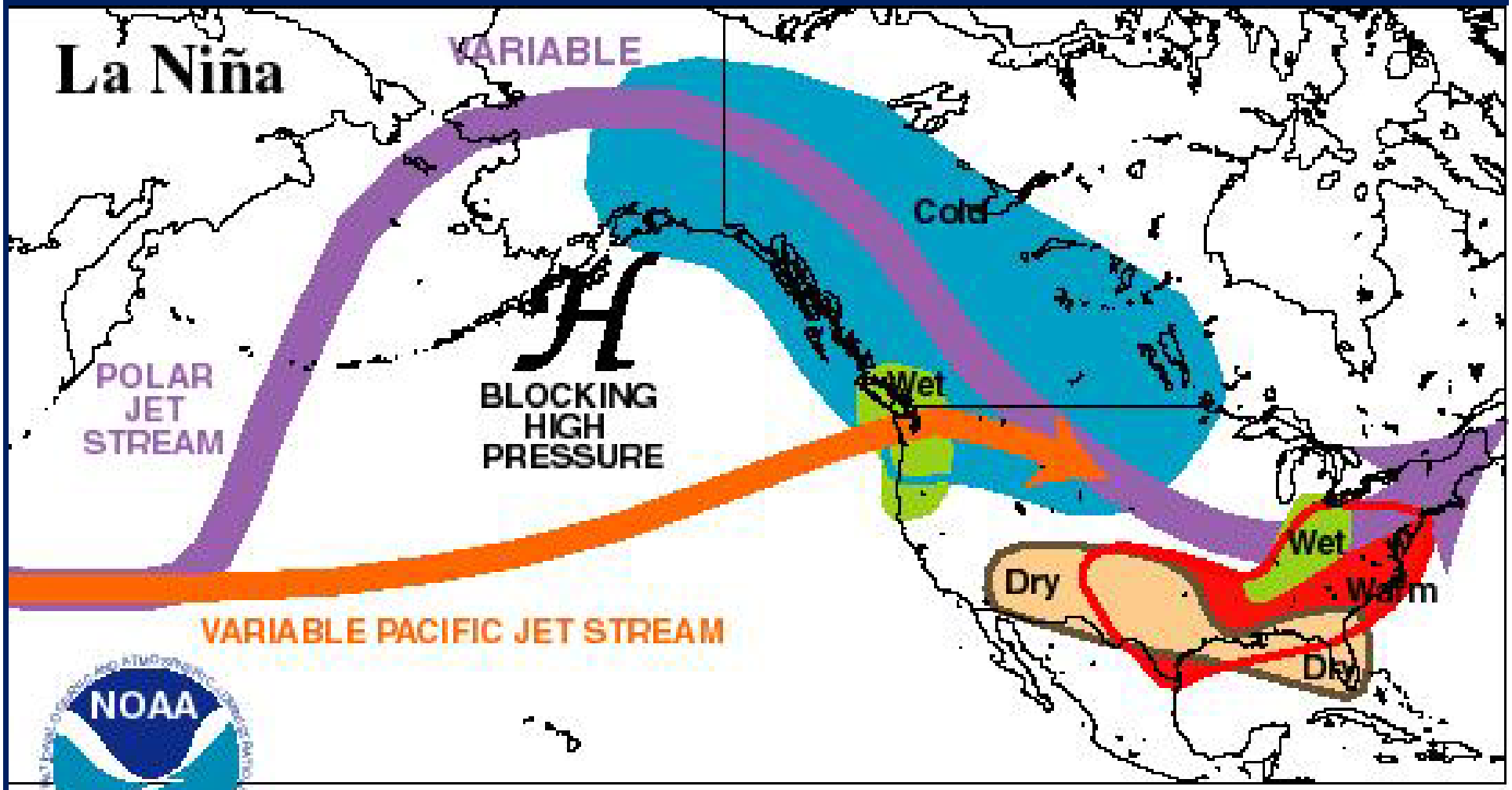
Niño 3.4 -1.8ºC

Niño 3 -1.3ºC

Niño 1+2 -1.5ºC



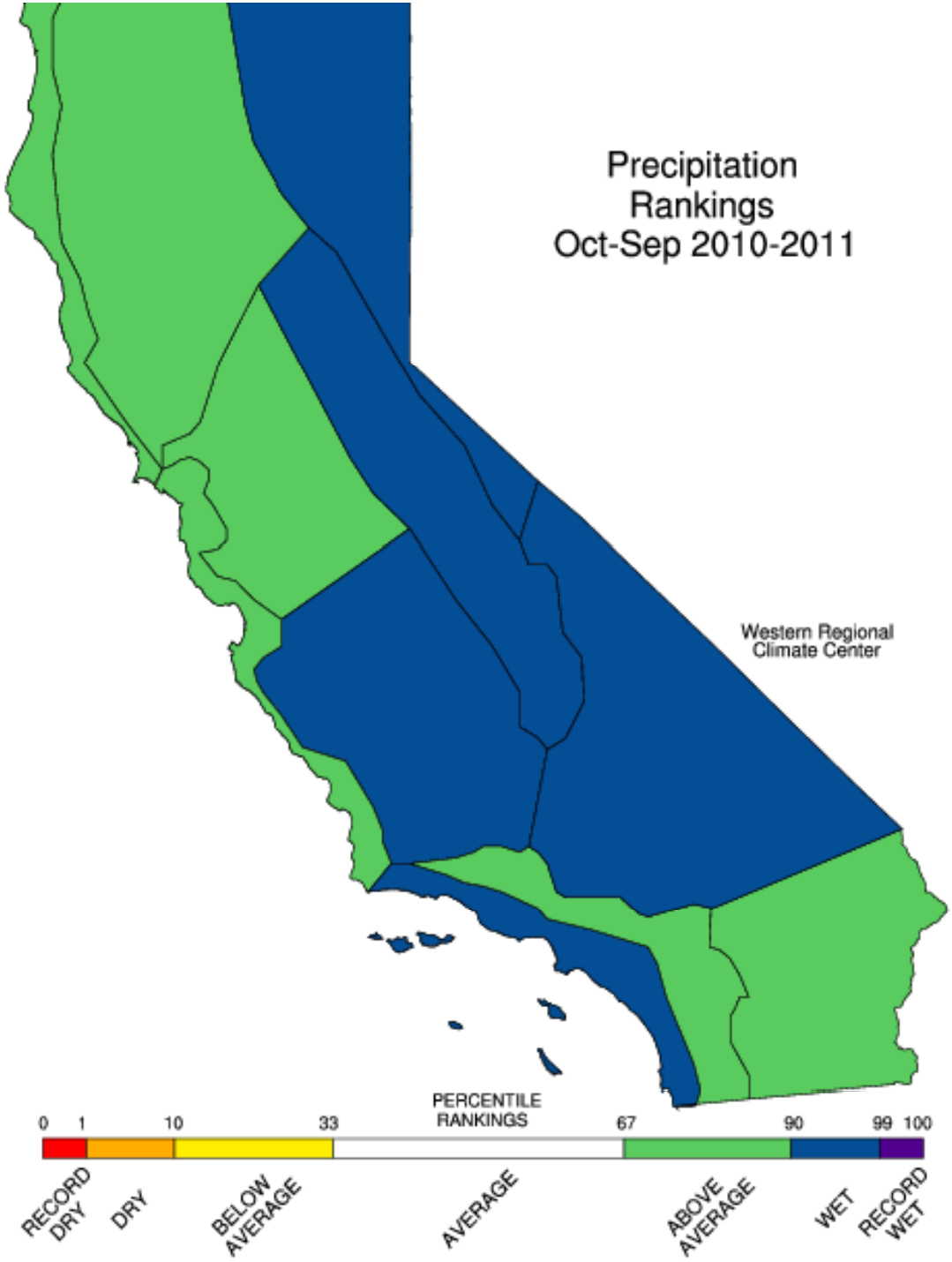




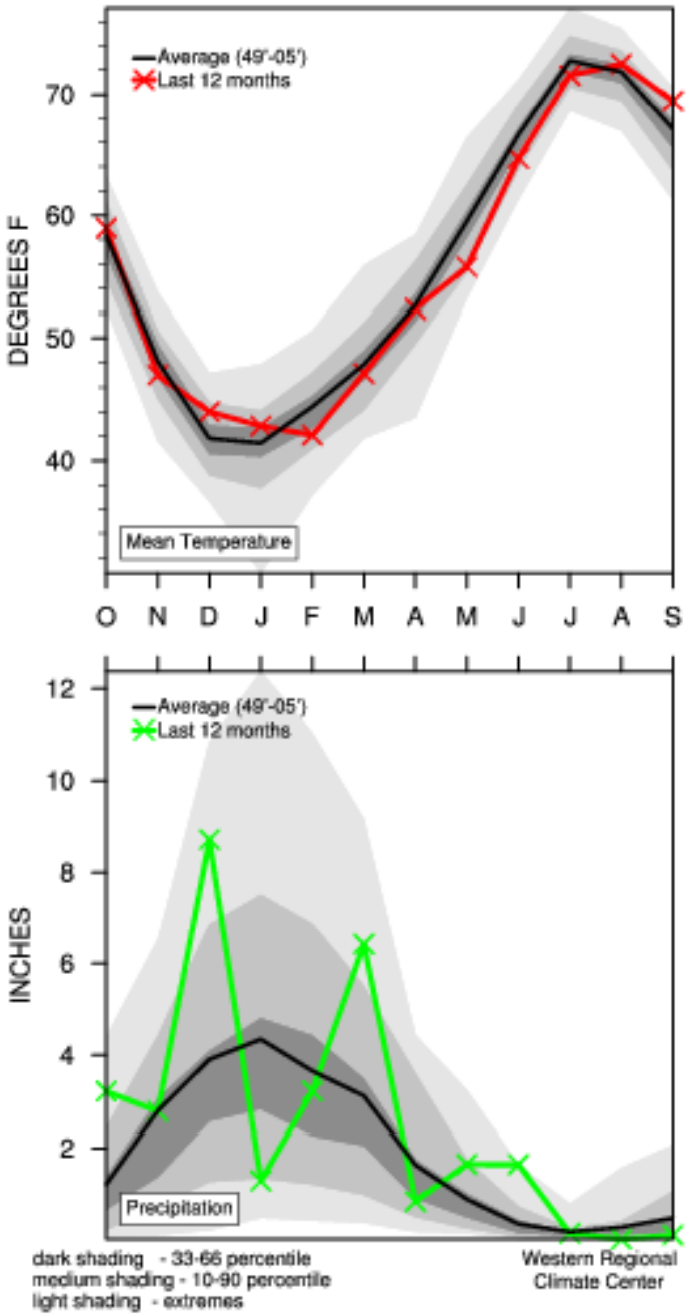
Climate Prediction Center/NCEP/NWS

Expectations – Oct 2010

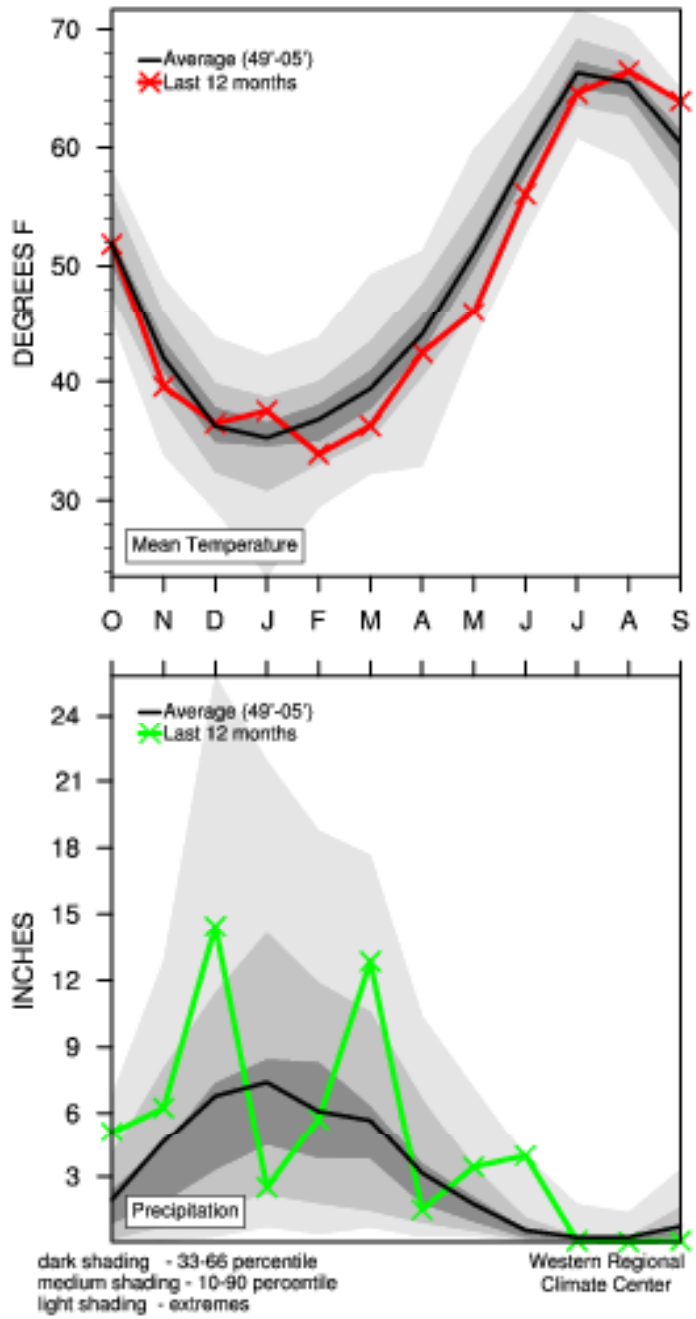
- Cold Outbreaks Possible – frost/freeze warnings
- La Nina does NOT drive flooding in CA in general but conditions can occur (1955 and 1964 floods occurred during La Nina periods with cold Pacific Decadal Oscillation)
- For La Nina subset (years with a La Nina in place) 8 –Station Index seasonal values near total period long-term average with a lot of variability
- Drier to the south transitioning to wet Pacific NW

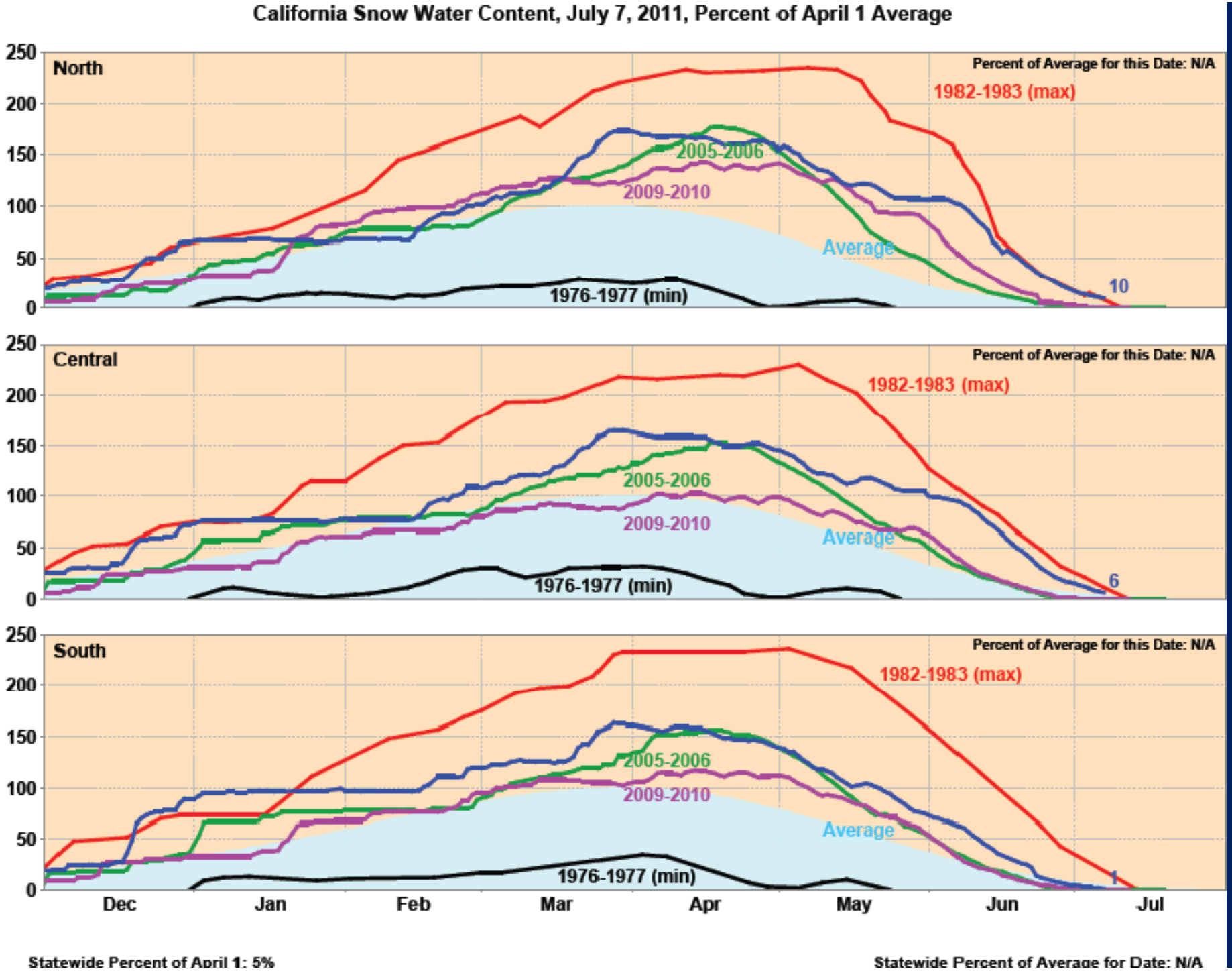

Precipitation
Rankings
Oct-Sep 2010-2011
Western Regional
Climate Center
PERCENTILE
RANKINGS
0
1
10
33
67
90
99
100
RECORD
DRY
DRY
BELOW
AVERAGE
AVERAGE
ABOVE
AVERAGE
WET
RECORD
WET

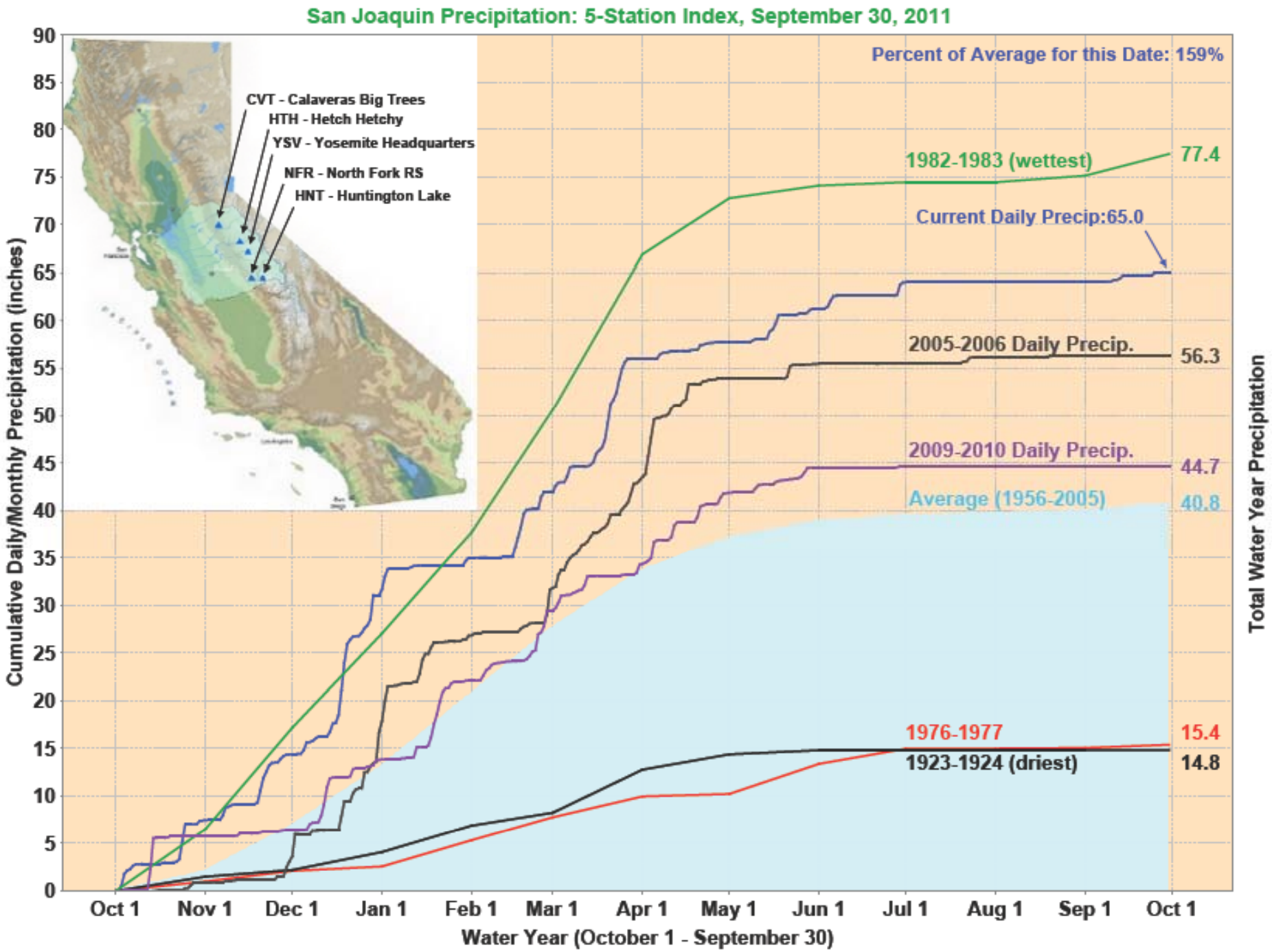
California Statewide Last 12 Months

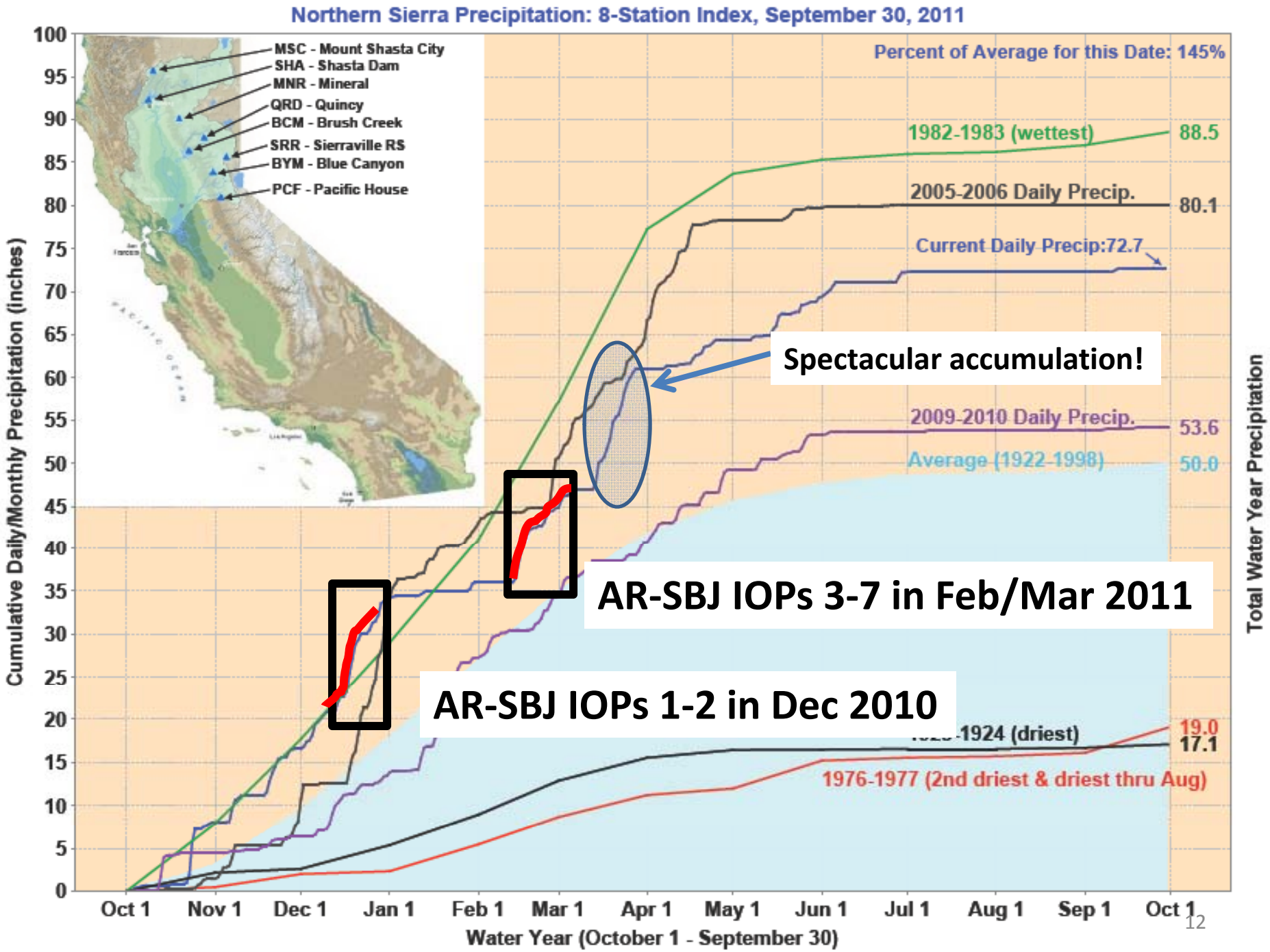


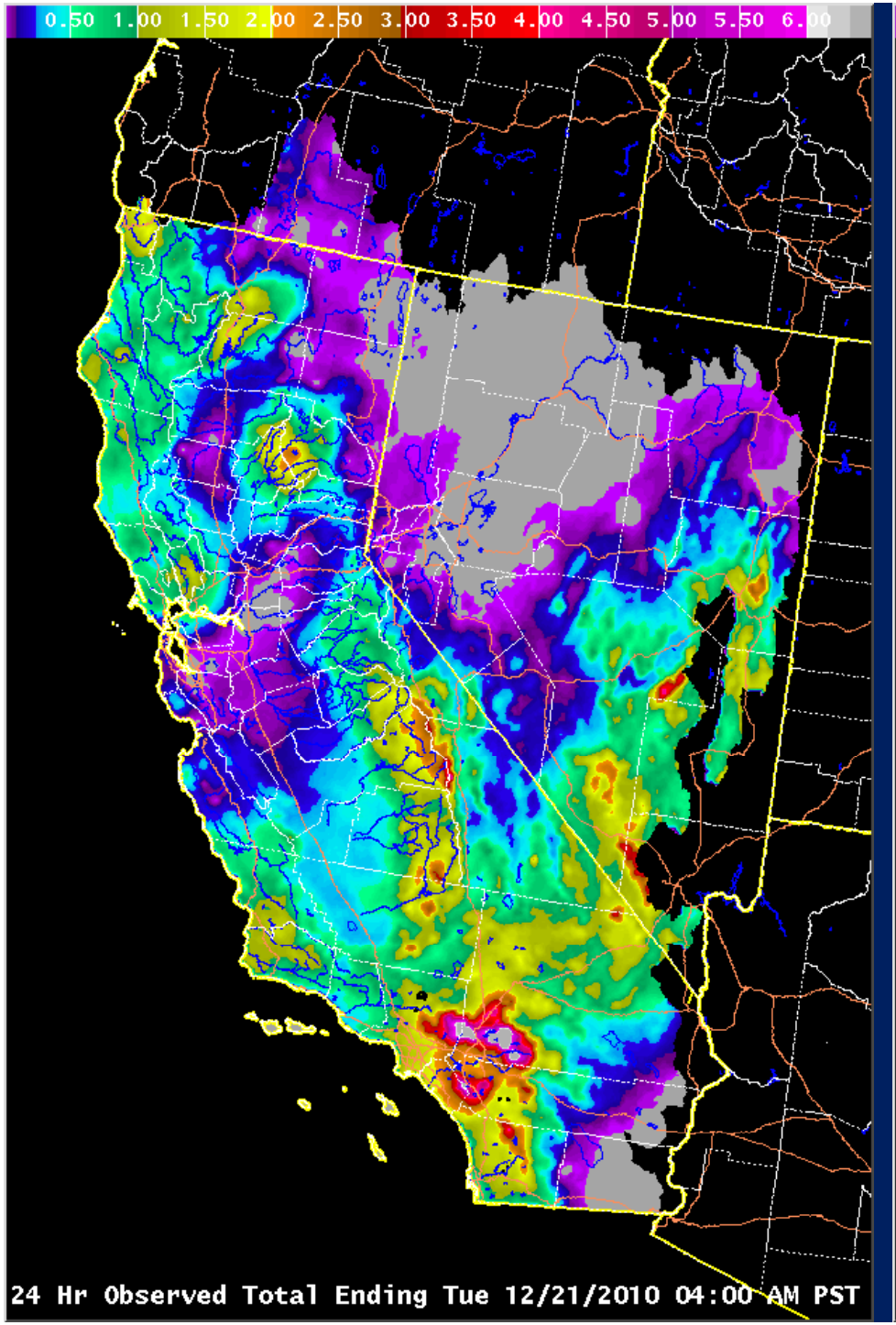
Sierra Region Last 12 Months

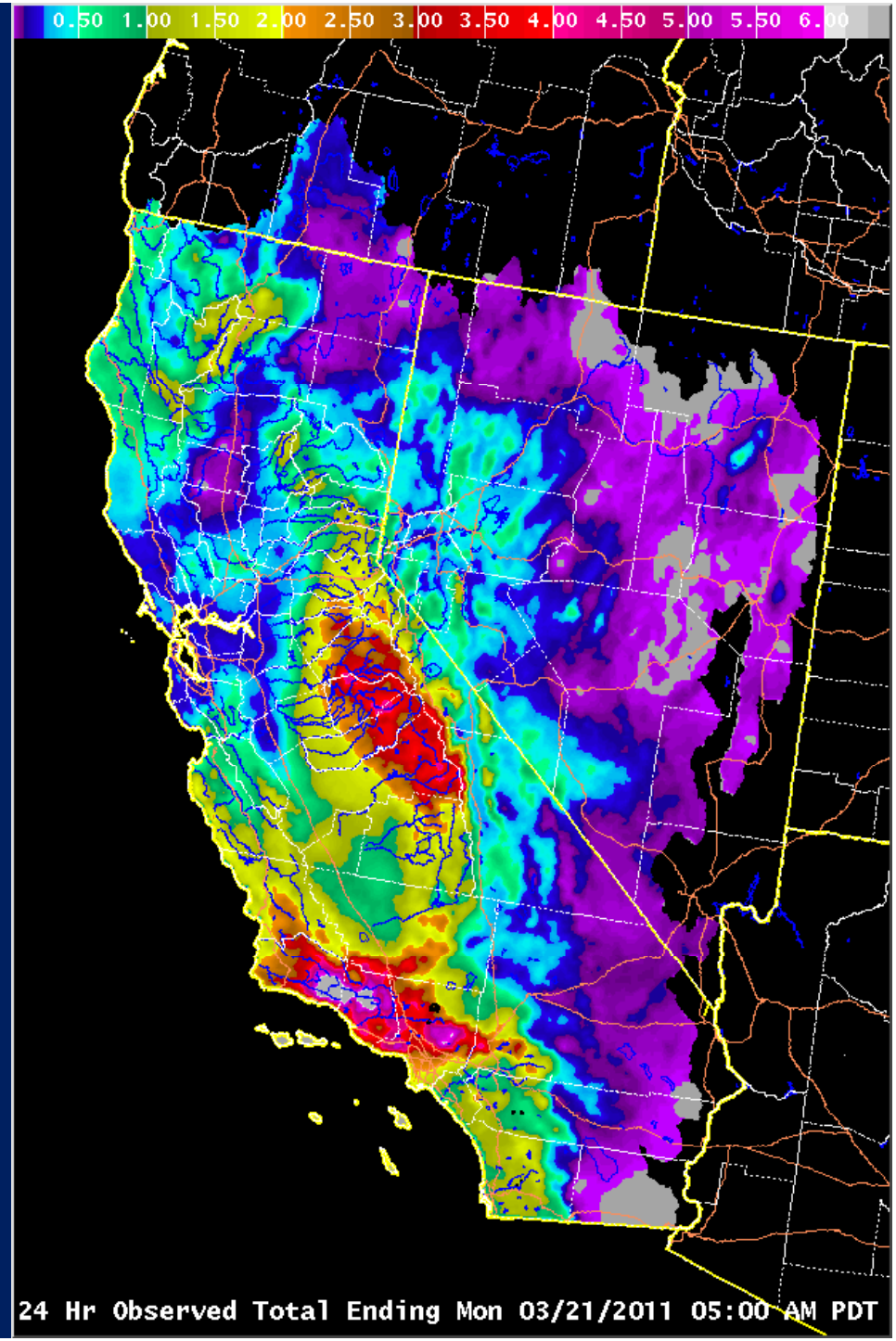



California Snow Water Content, July 7, 2011, Percent of April 1 Average
North
Percent of Average for this Date: N/A
1982-1983 (max)
2005-2006
2009-2010
Average
1976-1977 (min)
10
Central
Percent of Average for this Date: N/A
1982-1983 (max)
2005-2006
2009-2010
Average
1976-1977 (min)
6
South
Percent of Average for this Date: N/A
1982-1983 (max)
2005-2006
2009-2010
Average
1976-1977 (min)
1
250
200
150
100
50
0
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Statewide Percent of April 1: 5%
Statewide Percent of Average for Date: N/A


San Joaquin Precipitation: 5-Station Index, September 30, 2011
Percent of Average for this Date: 159%
CVT - Calaveras Big Trees
HTH - Hetch Hetchy
YSV - Yosemite Headquarters
NFR - North Fork RS
HNT - Huntington Lake
1982-1983 (wettest)
77.4
Current Daily Precip:65.0
2005-2006 Daily Precip.
56.3
2009-2010 Daily Precip.
44.7
Average (1956-2005)
40.8
1976-1977
15.4
1923-1924 (driest)
14.8
Cumulative Daily/Monthly Precipitation (inches)
Total Water Year Precipitation
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Oct 1
Water Year (October 1 - September 30)


Northern Sierra Precipitation: 8-Station Index, September 30, 2011
MSC - Mount Shasta City
SHA - Shasta Dam
MNR - Mineral
QRD - Quincy
BCM - Brush Creek
SRR - Sierraville RS
BYM - Blue Canyon
PCF - Pacific House
Percent of Average for this Date: 145%
1982-1983 (wettest)
88.5
2005-2006 Daily Precip.
80.1
Current Daily Precip:72.7
Spectacular accumulation!
2009-2010 Daily Precip.
53.6
Average (1922-1998)
50.0
AR-SBJ IOPs 3-7 in Feb/Mar 2011
AR-SBJ IOPs 1-2 in Dec 2010
1924 (driest)
19.0
17.1
1976-1977 (2nd driest & driest thru Aug)
Cumulative Daily/Monthly Precipitation (inches)
Total Water Year Precipitation
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Oct 1
Water Year (October 1 - September 30)

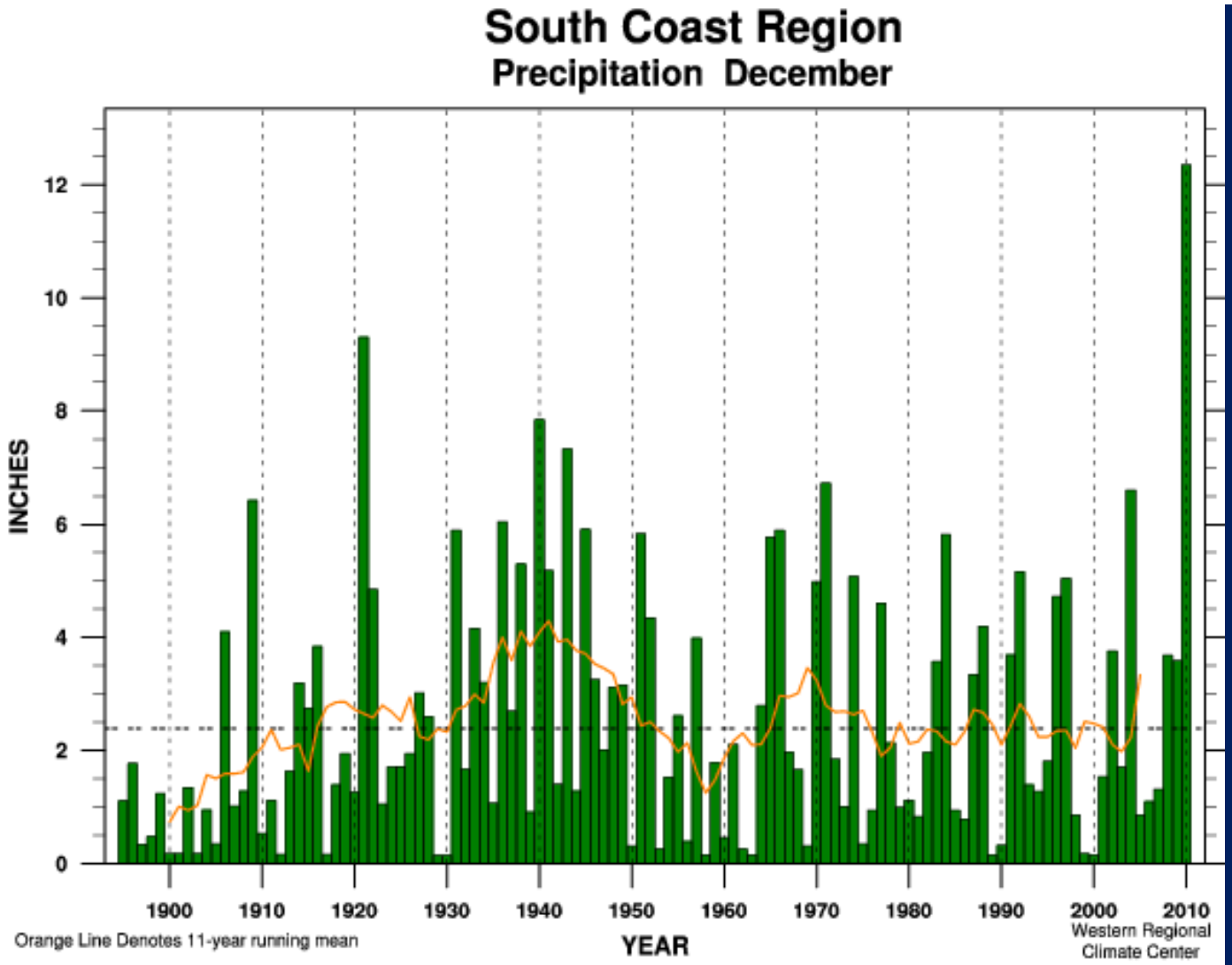

0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 6.00
24 Hr Observed Total Ending Tue 12/21/2010 04:00 AM PST


0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 6.00
24 Hr Observed Total Ending Mon 03/21/2011 05:00 AM PDT

Records

- 570 Temperature Records and 120 Precipitation Records so far this water year (October through April)
- Records set on 133 out of 212 days (63%)
- By December 23rd:

LOCATION	DEC 2010	DEC/YEAR
LOS ANGELES AIRPORT	7.68	6.49/2004
LONG BEACH AIRPORT	8.91	5.29/1971
CAMARILLO AIRPORT	6.01	5.32/1964
SANTA BARBARA AIRPORT	8.59	6.78/1945
SANTA MARIA AIRPORT	8.24	7.50/1941

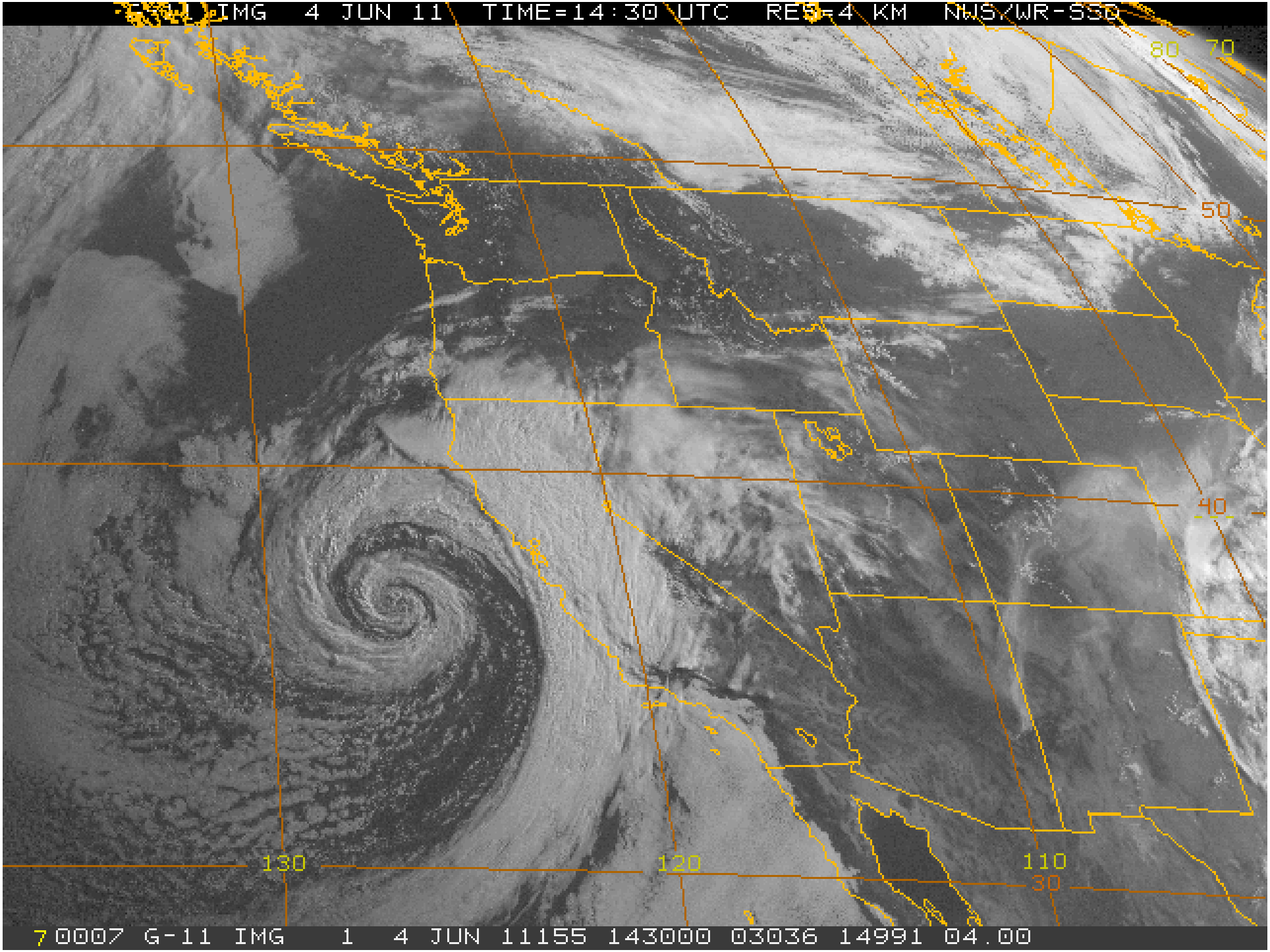


Linear Trend 1895-present	+ 0.99 ± 1.23 in.	(+ 41 ± 51%) per 100 yr	
Linear Trend 1949-present	+ 1.78 ± 3.27 in.	(+ 74 ± 136%) per 100 yr	
Linear Trend 1975-present	+ 6.40 ± 7.81 in.	(+ 267 ± 326%) per 100 yr	
Wettest Year	12.35 in. (516%) in 2010	MEAN	2.39 in.
Driest Year	0.14 in. (5%) in 1929	STDEV	2.00 in.
December 2010	12.35 in. (516%)	RANK	116 of 116

North Coast Average Dec Precipitation 11.97 inches

San Diego Average Annual Precip 10.18 inches

Los Angeles Civic Center Average Annual Precip 14.85 inches

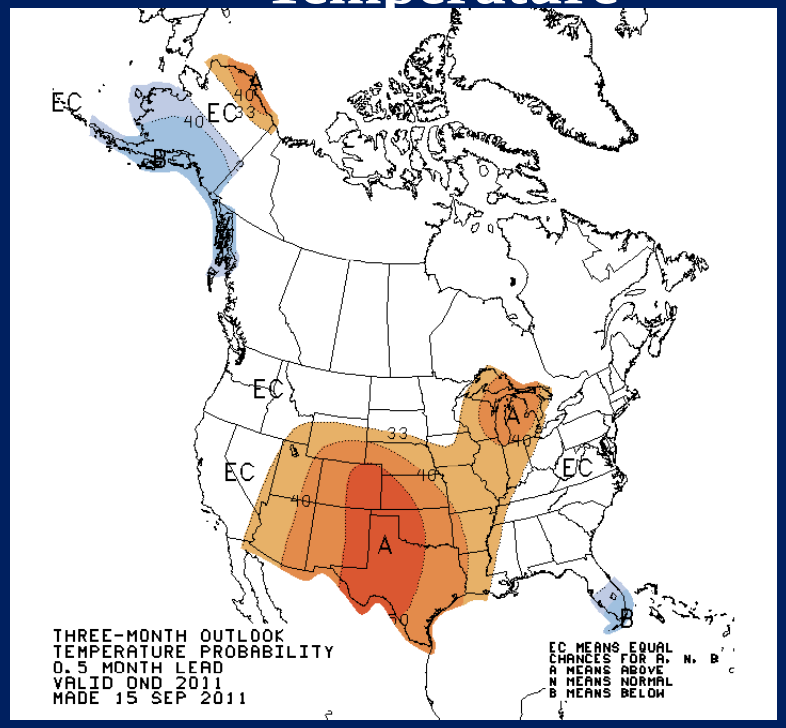

G-11 IMG 4 JUN 11 TIME=14:30 UTC RES=4 KM NWS/WR-SSD
80
70
50
40
130
120
110
30
7 0007 G-11 IMG 1 4 JUN 11155 143000 03036 14991 04.00

Climate States – Oct 2011

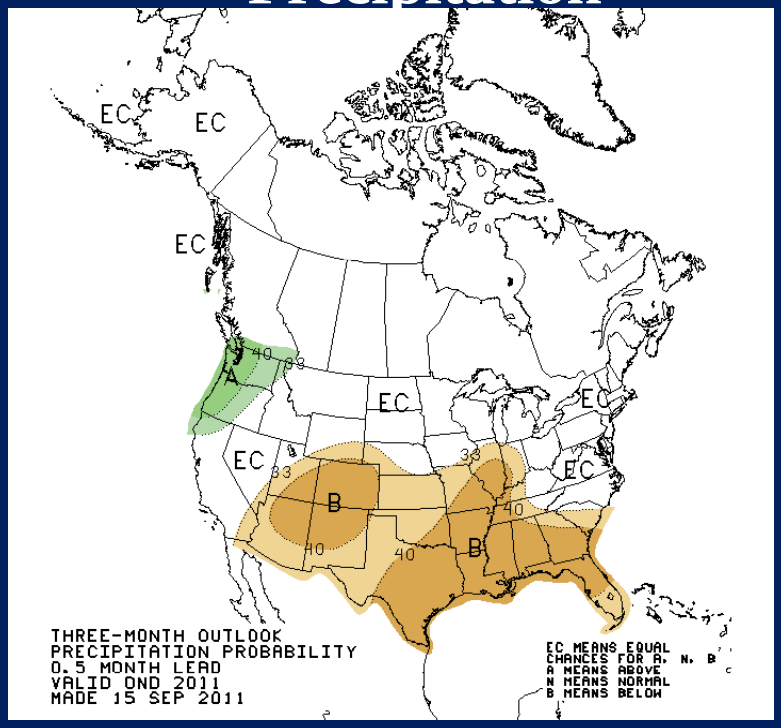
- La Nina conditions present in Pacific
- PDO Negative
- Cooler than average summer
- WY 2011 8 SI and 5 SI above average
- Reservoirs have above average storage
- Epic Snowpack provides for wetter than average antecedent conditions

U. S. Seasonal Outlooks
October – December 2011

Temperature



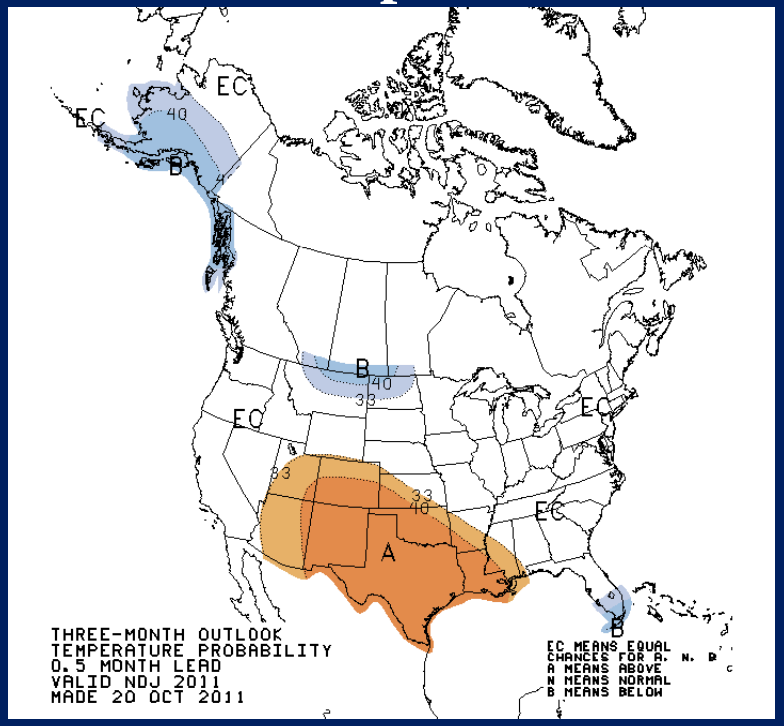
Precipitation



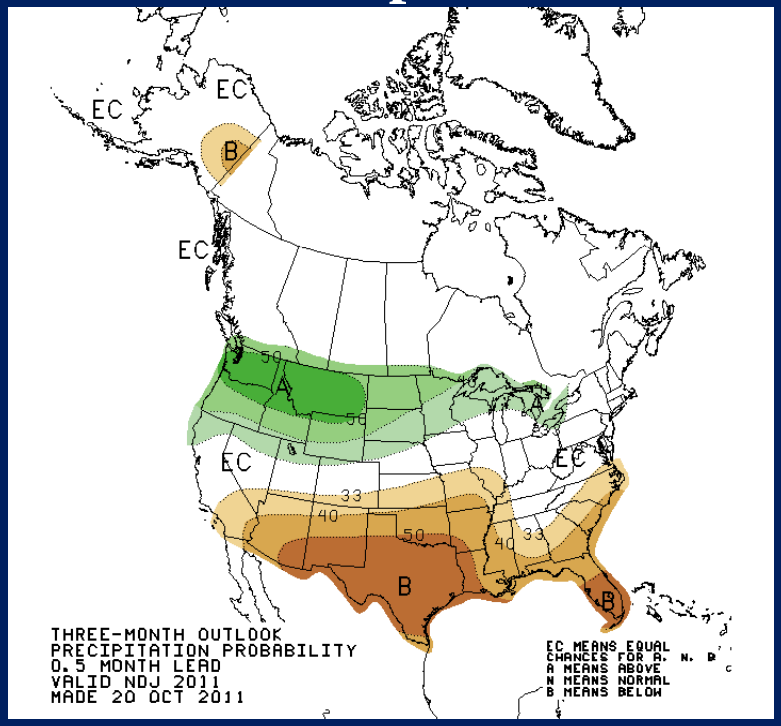
The seasonal outlooks combine the effects of long-term trends, soil moisture, and, when appropriate, ENSO.

U. S. Seasonal Outlooks
November – January 2012

Temperature



Precipitation



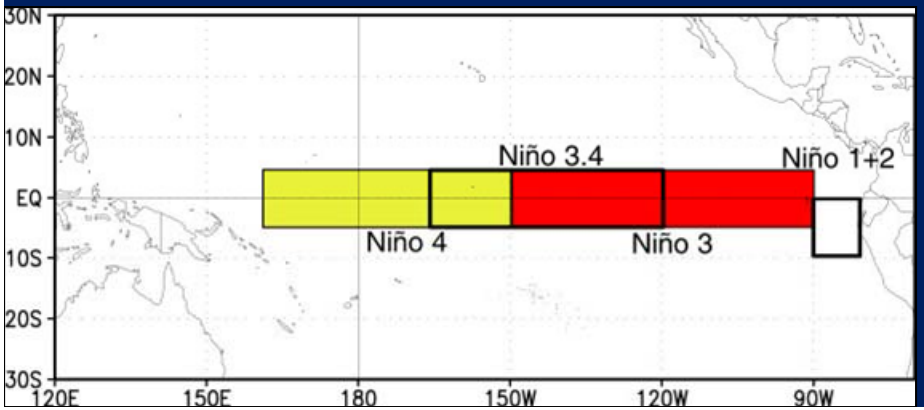
The seasonal outlooks combine the effects of long-term trends, soil moisture, and, when appropriate, ENSO.

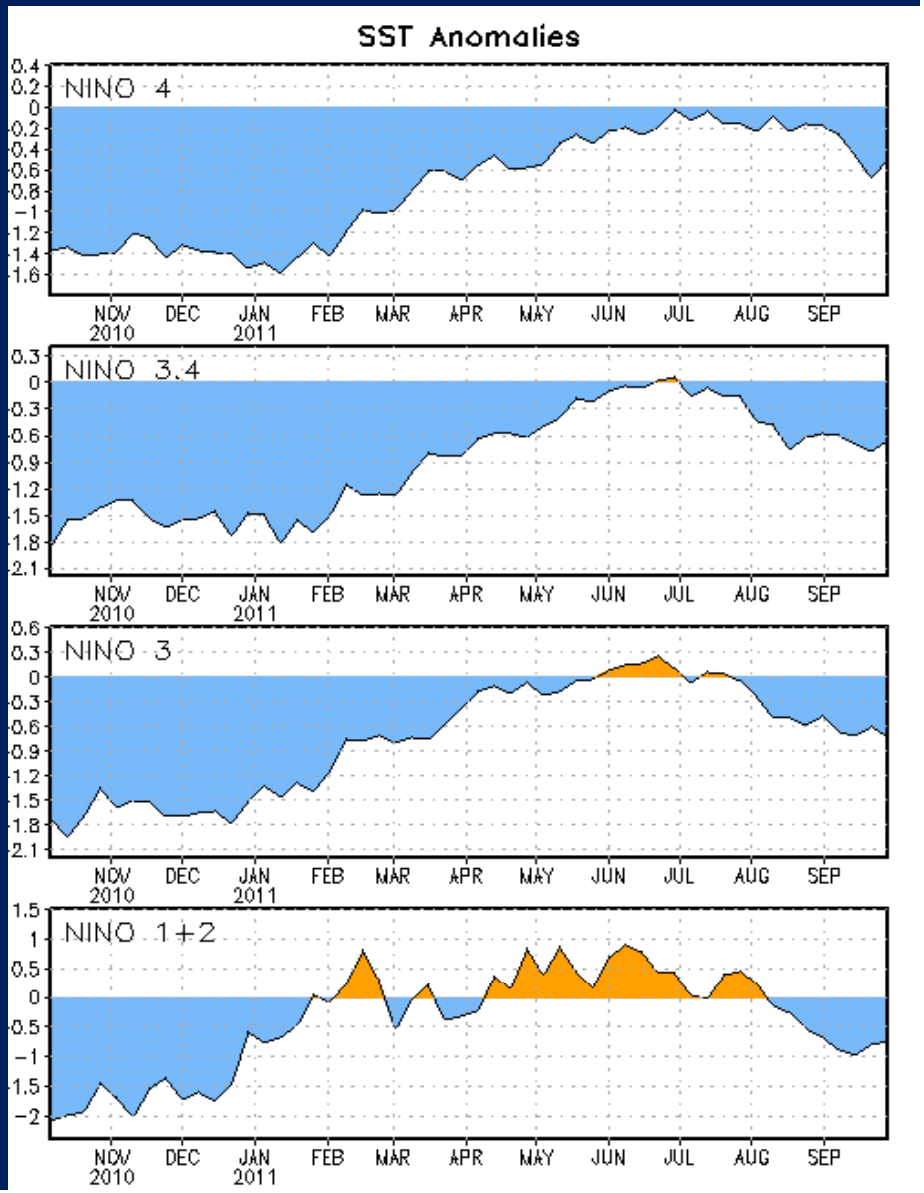
Niño Region SST Departures (ºC)
Recent Evolution

End of September

The latest weekly SST departures are:

Niño 4	**-0.5ºC**
Niño 3.4	**-0.7ºC**
Niño 3	**-0.7ºC**
Niño 1+2	**-0.7ºC**





Niño Region SST Departures (ºC)
Recent Evolution

End of October

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Niño 3.4	**-1.1ºC**
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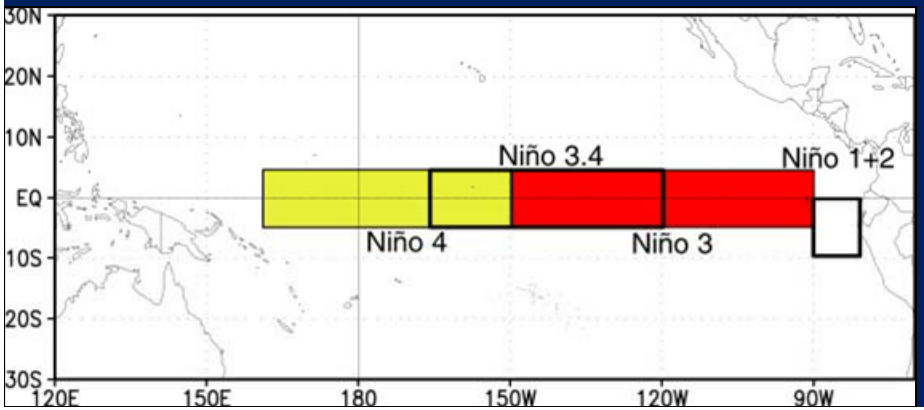
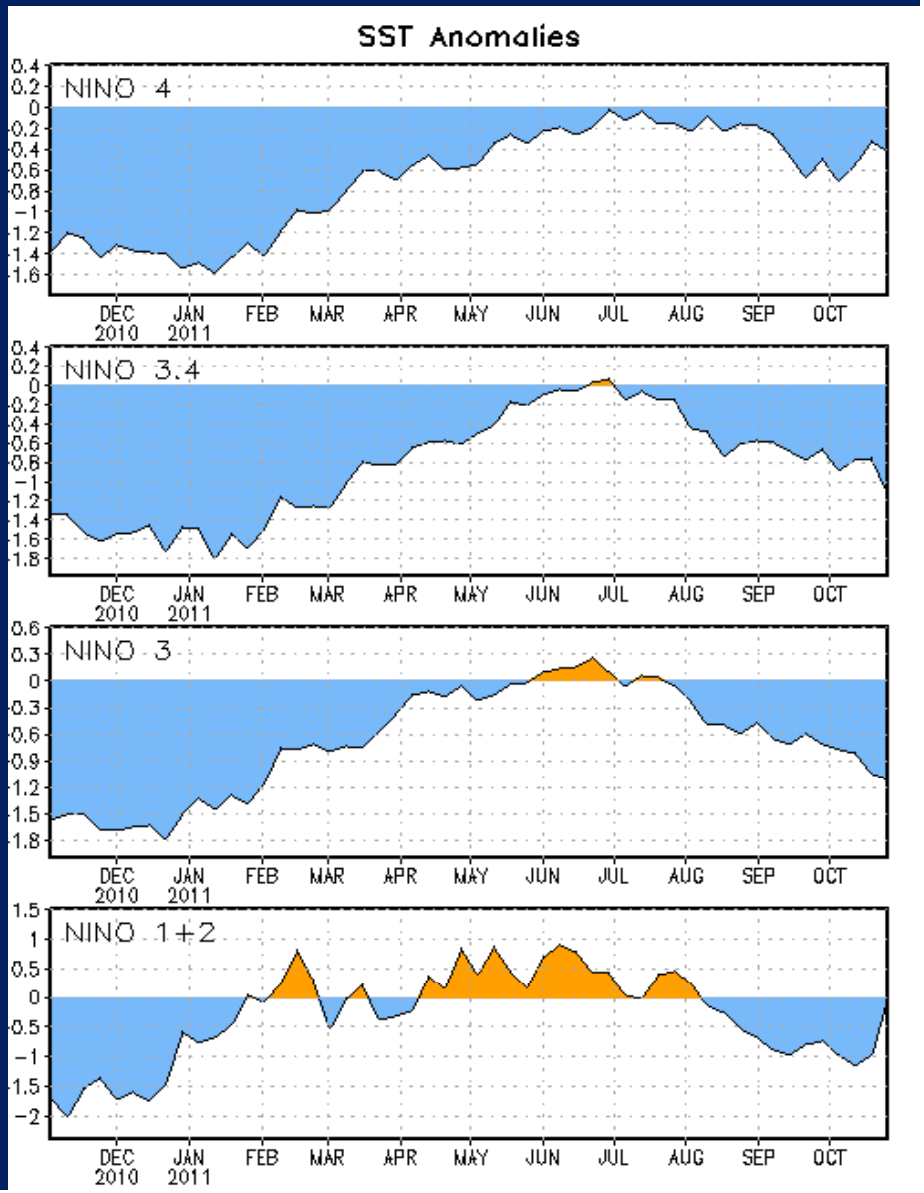
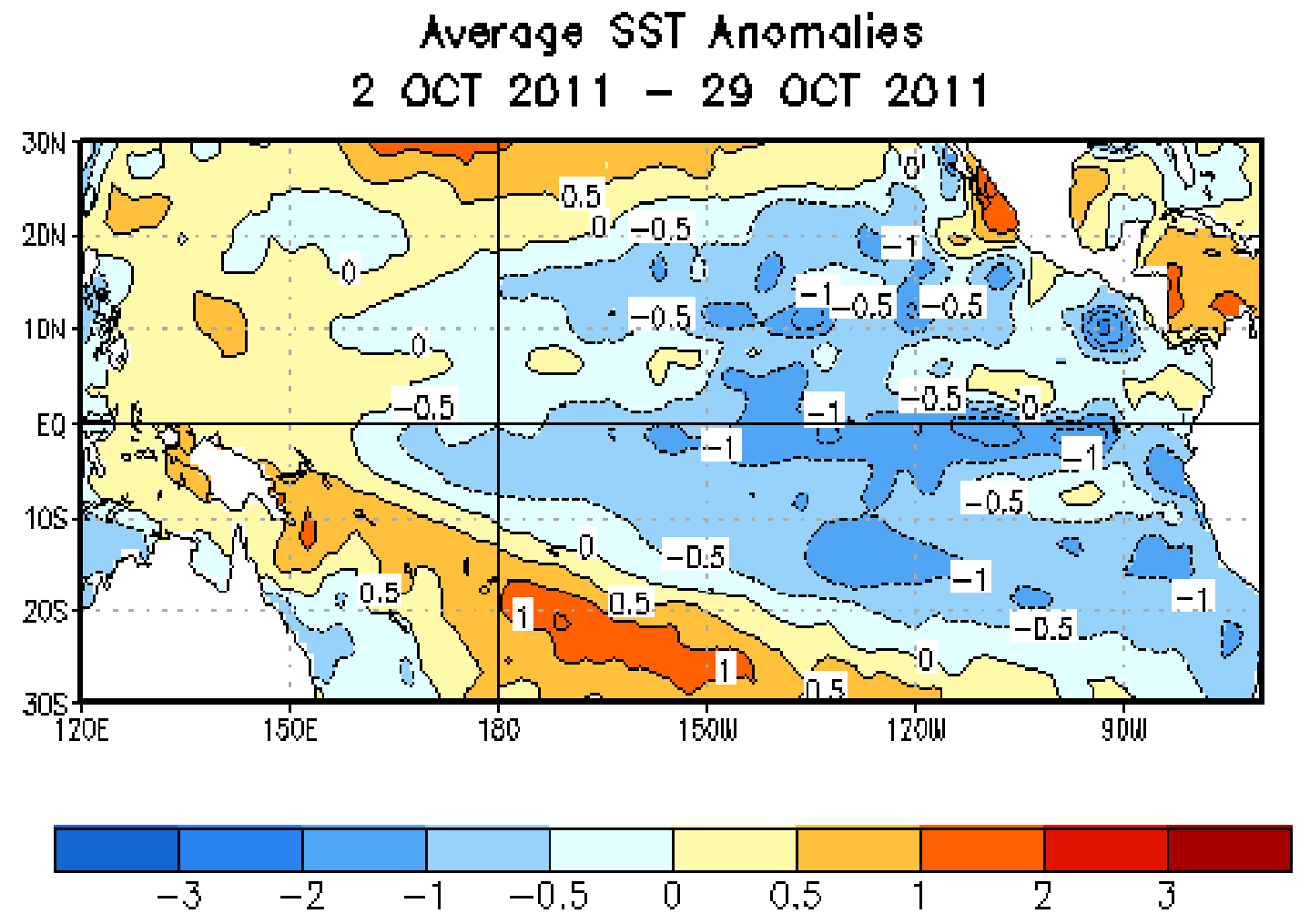
Niño 1+2	**0.0ºC**



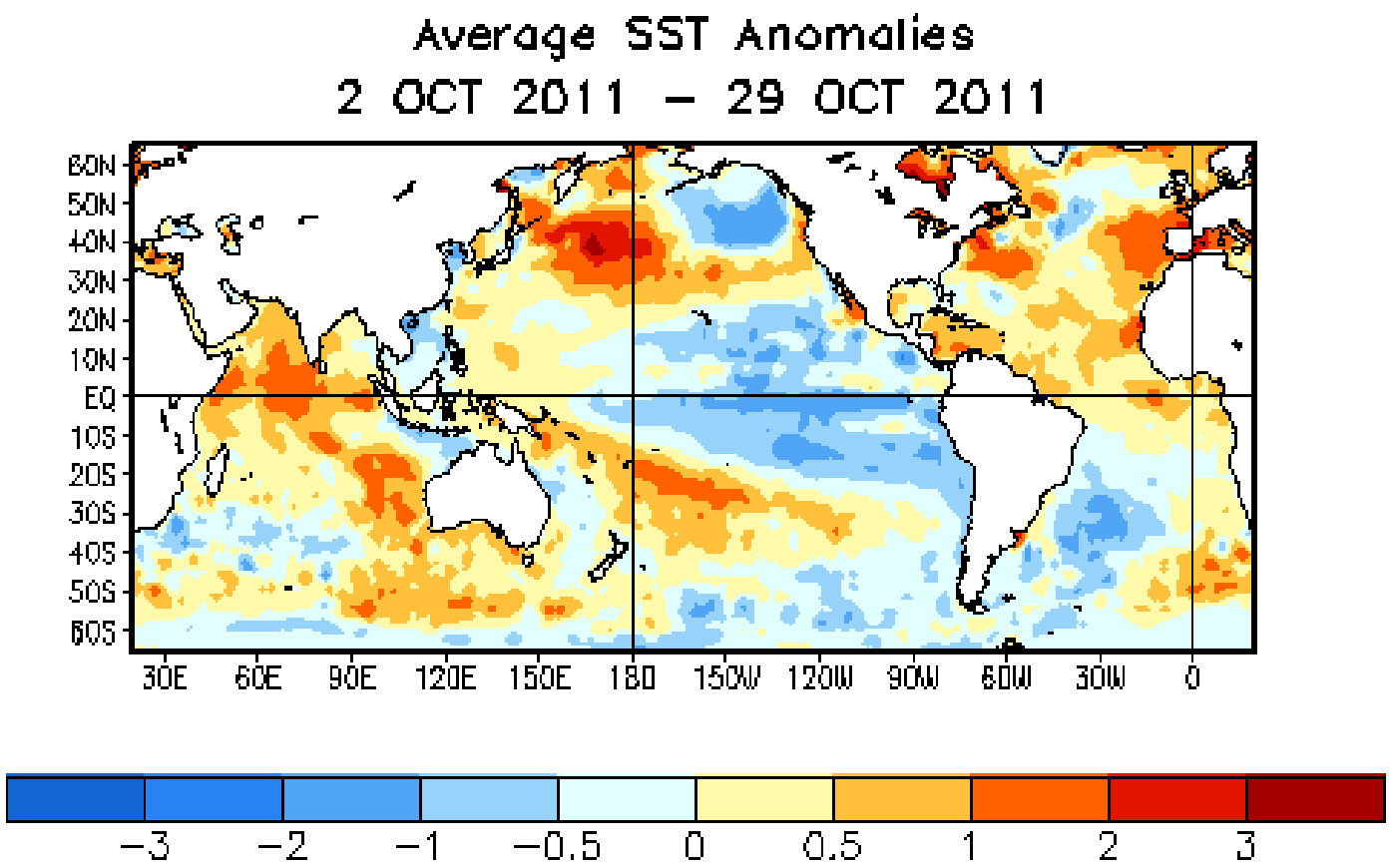


SST Departures (°C) in the Tropical Pacific During the Last 4 Weeks

During the last 4-weeks, equatorial SSTs were more than 0.5°C below average east of 170°E and more than 1°C below average east of 155°W.

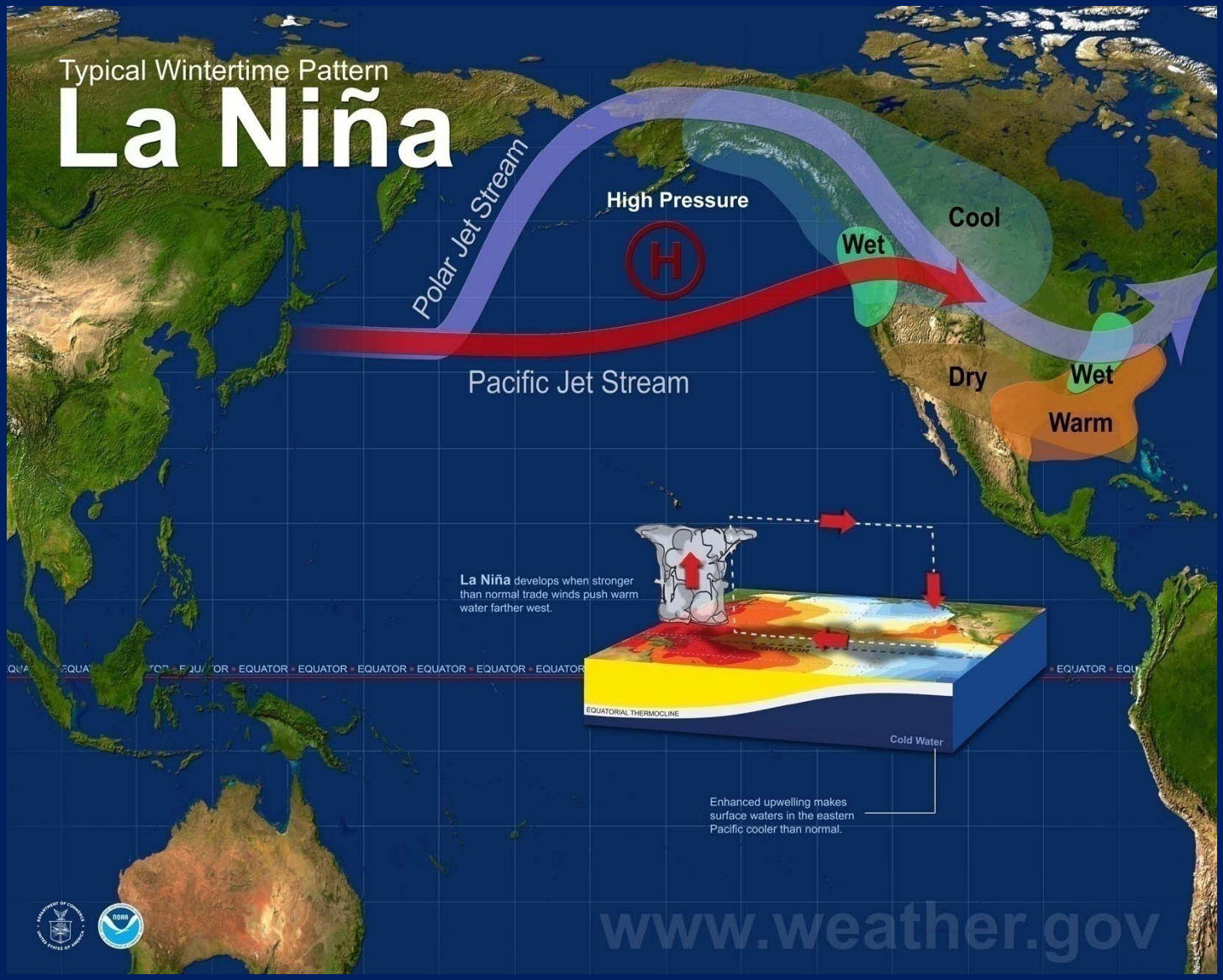


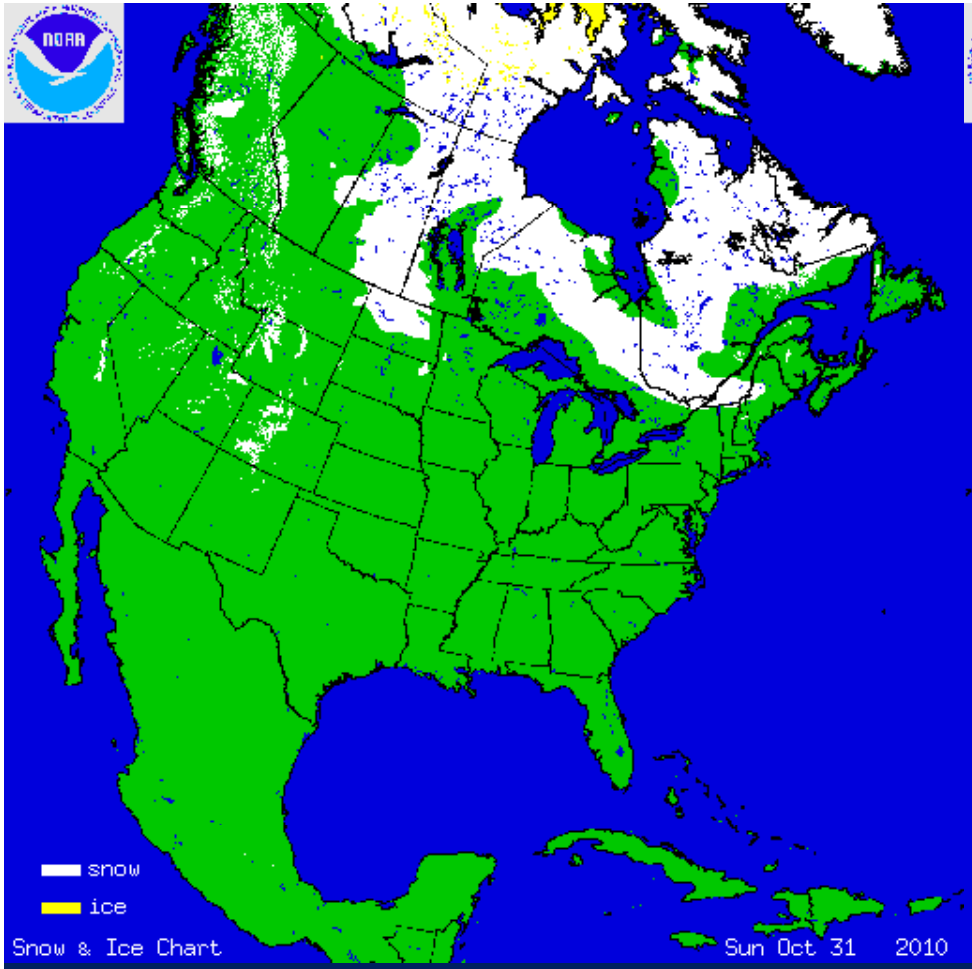
Global SST Departures (°C)

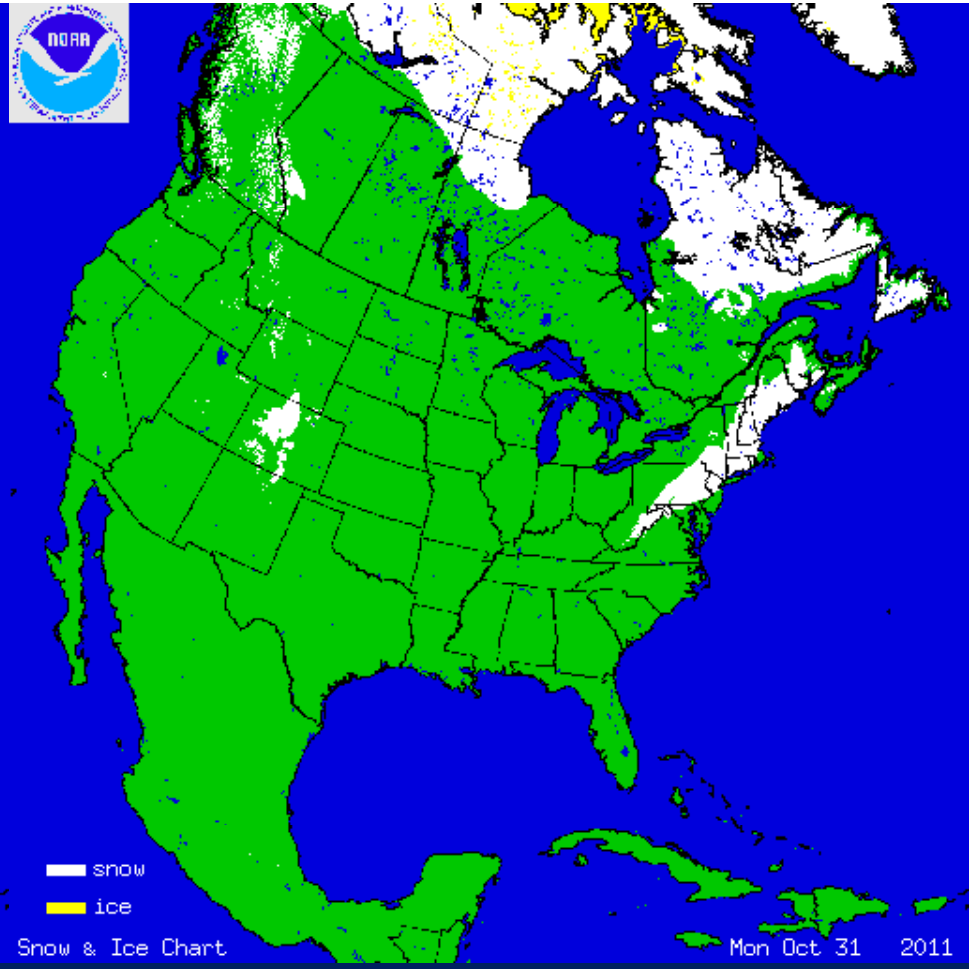


During the last four weeks, equatorial SSTs were below average across much of the Pacific Ocean and above average across much of the Indian and Atlantic Oceans. A horseshoe pattern of above-average SSTs extended from the Maritime Continent into the middle latitudes of the Pacific Ocean.

Typical US Temperature, Precipitation and Jet Stream Patterns during La Niña Winters

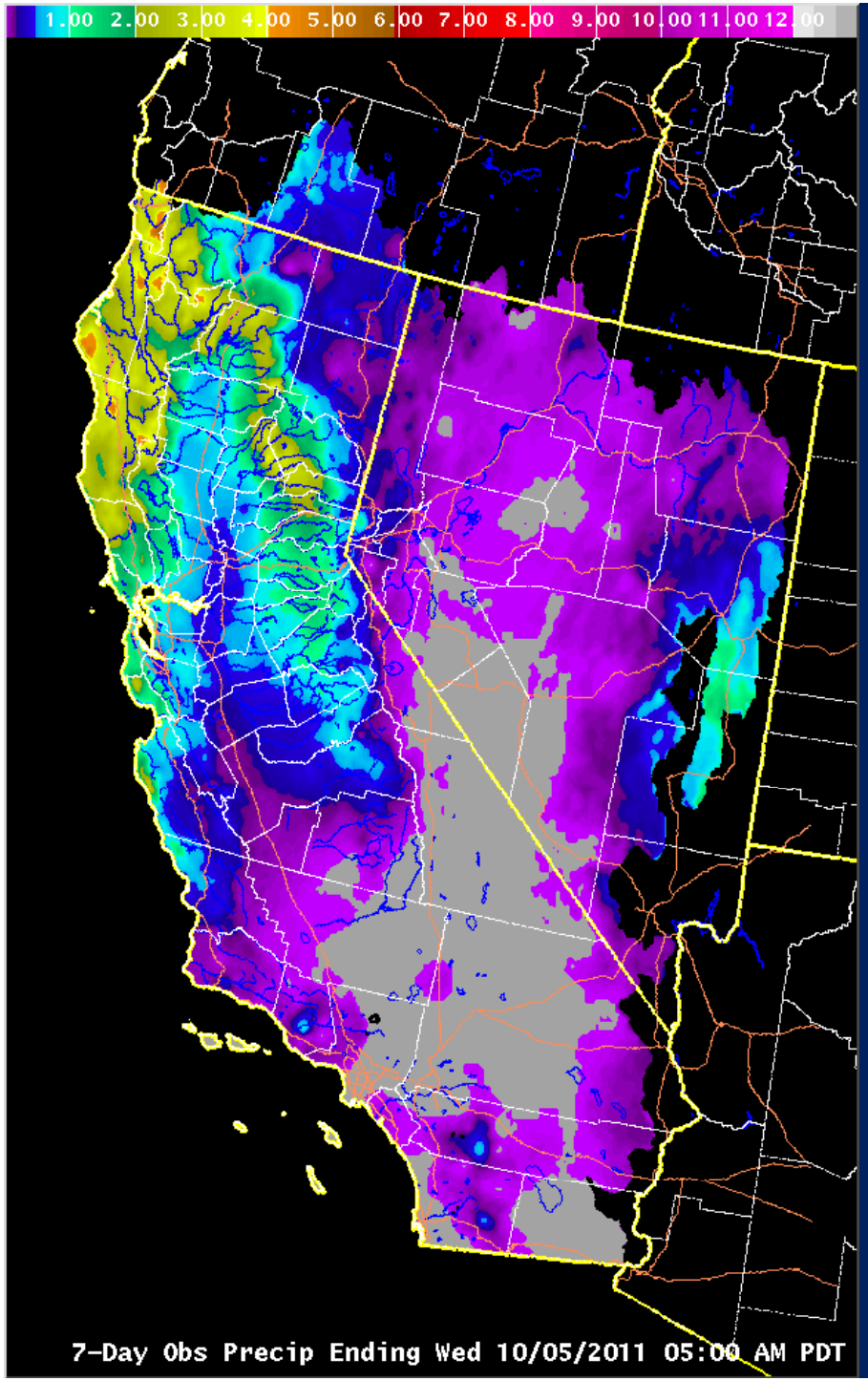






October 2010

October 2011

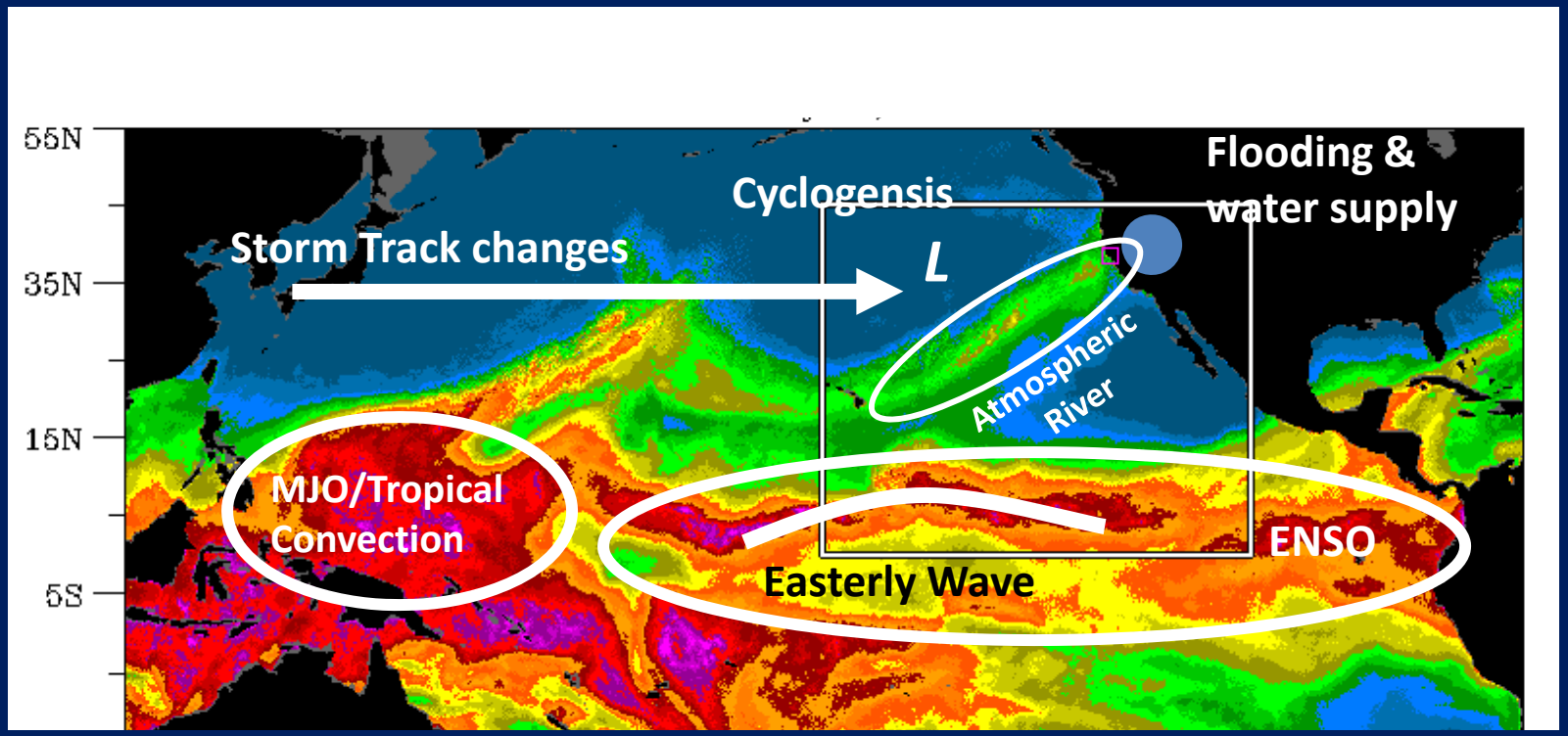


Reservoir Storage 131% of average

October 5 Values

Shasta	3.315	MAF
Oroville	2.989	MAF
Folsom	0.715	MAF

Key Phenomena Affecting California Water Supply/Flooding:



The most extreme CA storm would result from a rare alignment of these key processes

Slide from Marty Ralph NOAA ESRL

Expectations – Oct 2011

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- La Nina does NOT drive flooding in CA in general but conditions can occur (1955 and 1964 floods occurred during La Nina periods with cold Pacific Decadal Oscillation)
- For La Nina subset (years with a La Nina in place) 8 –Station Index seasonal values near total period long-term average with a lot of variability

California FRET Project

- All WFOs for CA producing product
- 7 daily and weekly total values available
- Departure from Normal, Climatology, and Information tabs also available
- http://www.wrh.noaa.gov/forecast/evap/FRET/FRET.php?wfo=sto

Other Projects of Note

- Central Valley Hydrology Study (CVHS)
- Central Valley Climate Sensitivity Study (CVSS)
- Central Valley Flood Protection Plan (CVFPP) and Thresholds Approach for Climate Change
- NOAA Atlas 14 and DWR Bulletin 195
- Flood Emergency Response Information System (FERIS)
- Western Region Climate Center Partnership

Questions?

Email: manderso@water.ca.gov