

Water Availability Task Force Meeting March 15, 2007

"Timing is Everything"



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HDR

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Significantly
assisted by:
Bill Badini

- **Senior Project Manager and
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HDR Engineering, Inc. – Denver**
- **Certified Consulting Meteorologist since 1980**
- HDR has offices in Denver, Colorado Springs and
Fort Collins plus 140 offices in 42 states + Canada
- 5,500+ employee-owners with ~ \$900M work
- **www.hdrinc.com Full service engineering
and architectural firm**

The logo for HDR, consisting of the letters 'HDR' in a bold, serif font.

Today's thought

“Timing is everything.”

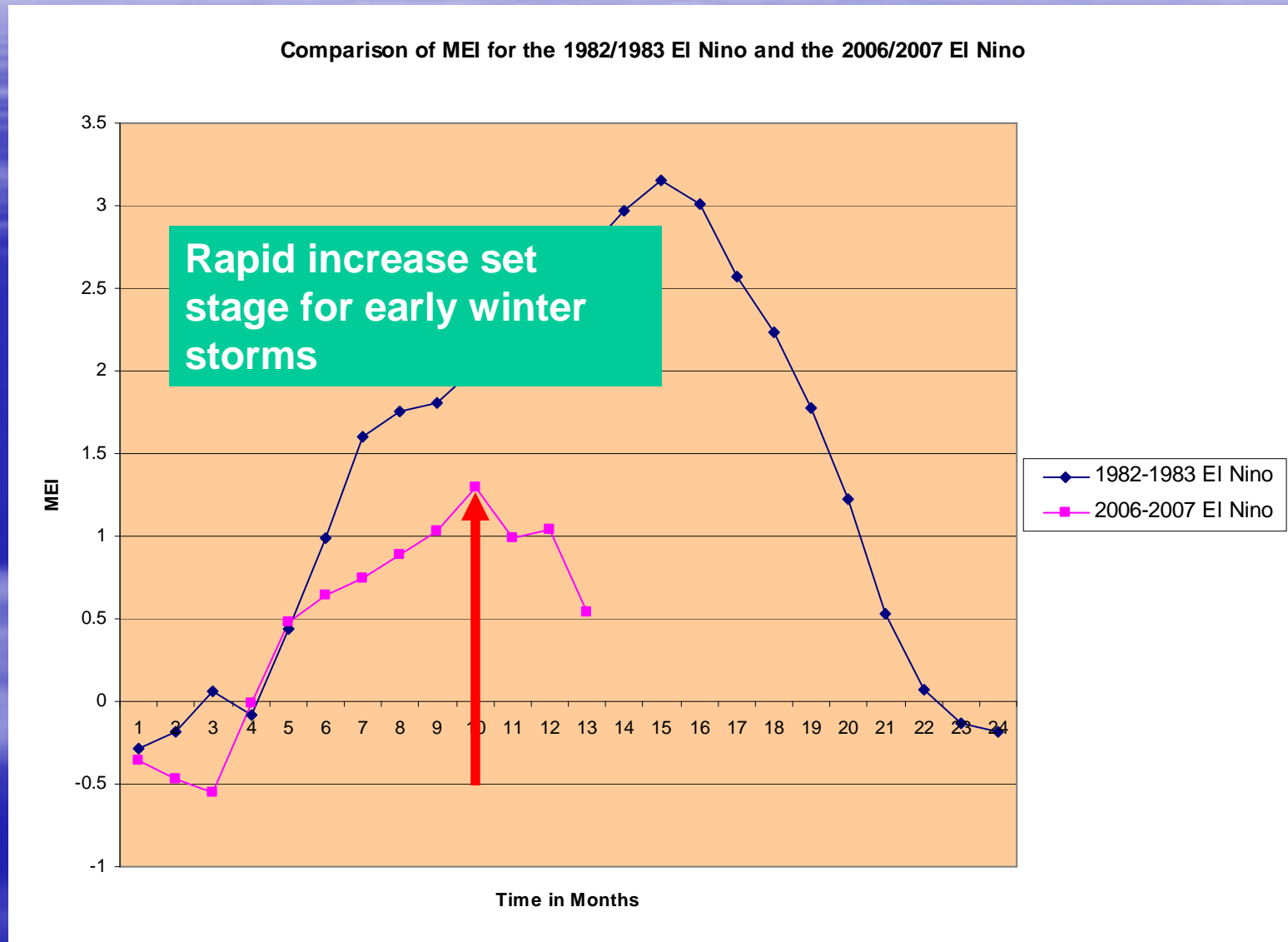
- Asking for a raise
- Telling a joke
- Swinging a golf club
- Operating a reservoir

Today's thought

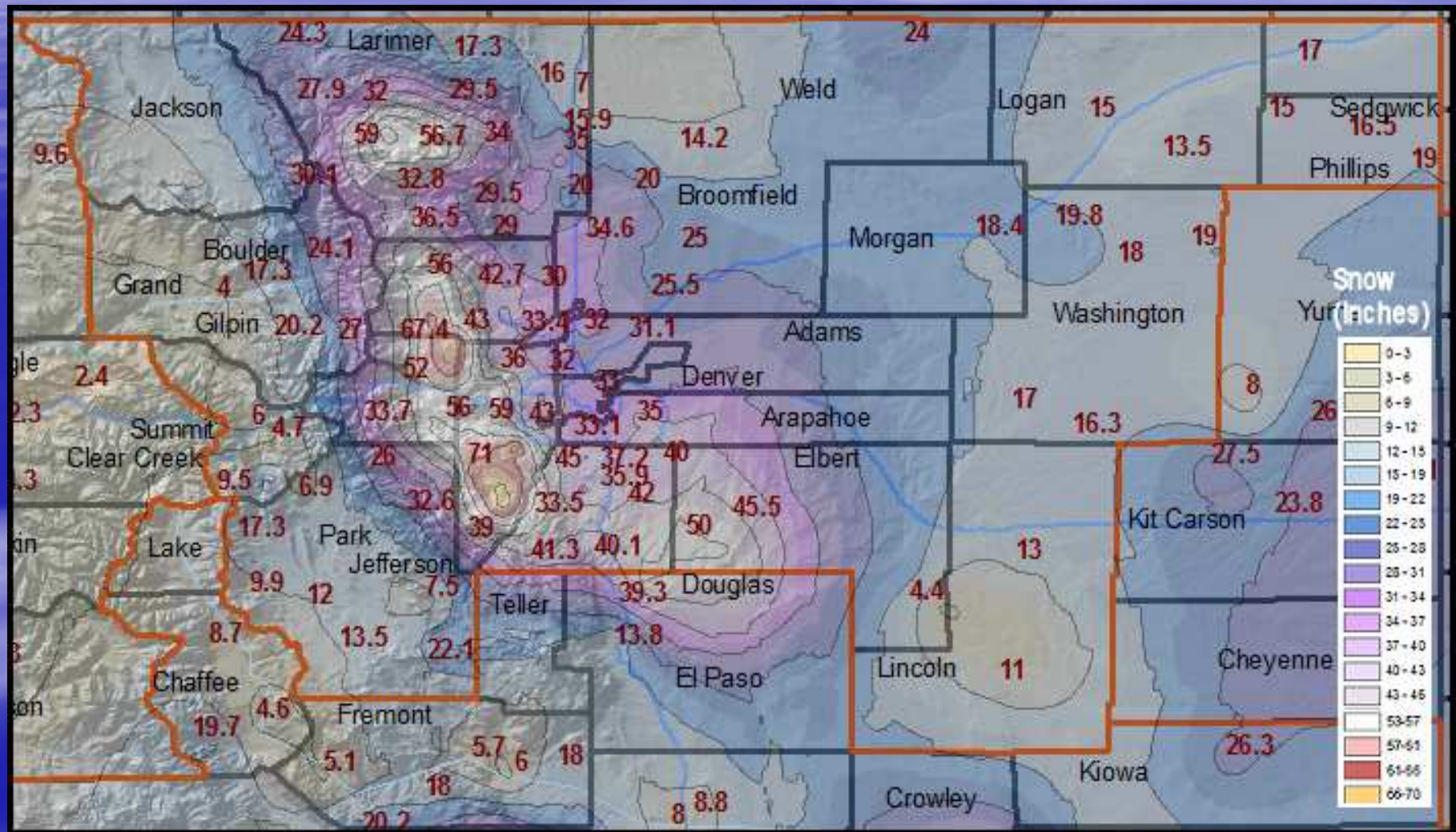
"Timing is everything."

- Advent of an El Nino or a La Nina
- Forecasting of spring runoff
- Difference between a drought, flood and average conditions

Comparison of MEI for 82-83 and 0607 El Nino's (quite different)



Combined snowfall Dec 20/21 and Dec 29/31 storms



Initial snow pack outlook for WY0607 (WATF, Sept 20, 2006) (3-12)

| Basin | October-March Basin Avg. SWE (% of normal) Could be low |
|--------------|---|
| Yampa-White | 80% (88%) |
| Colorado | 95% (95%) |
| South Platte | 110% (112%) |
| Arkansas | 90% (102%) |
| Gunnison | 120% (83%) |
| Rio Grande | 110% (93%) |

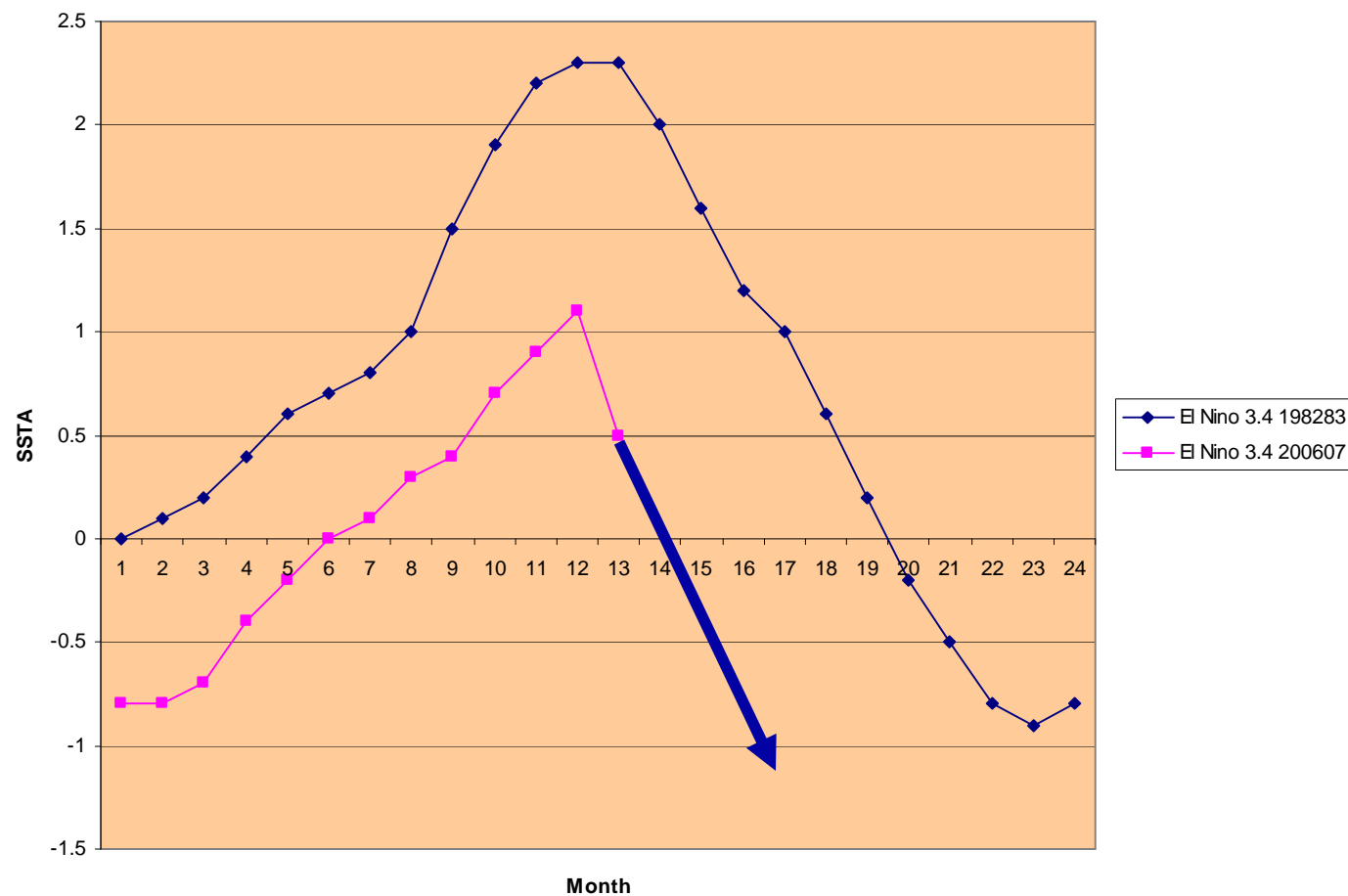
The logo for HDR, consisting of the letters 'HDR' in a stylized, bold, white font.

Now what?

Spring into Fall Outlook

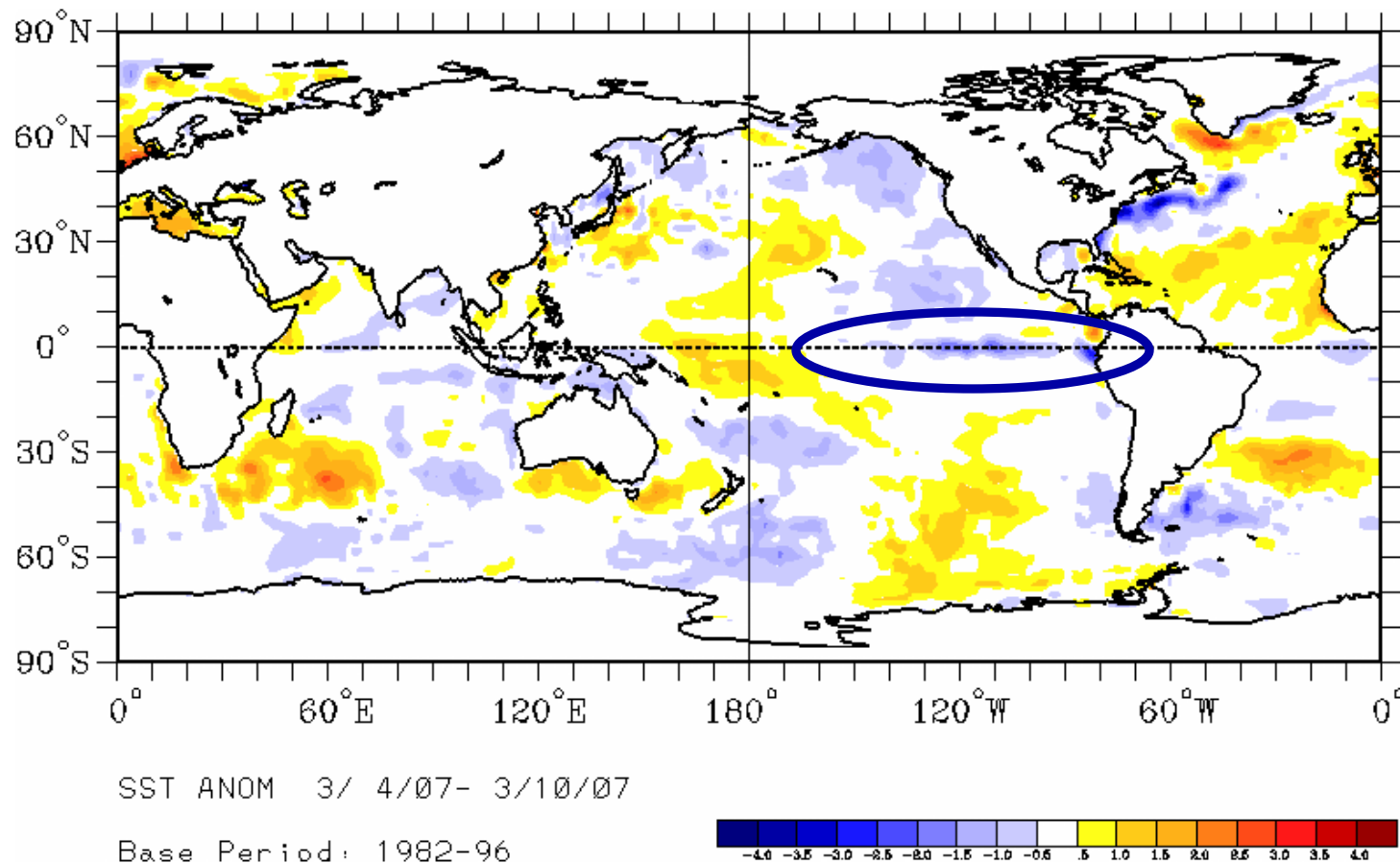
Comparison of Sea Surface Temp. Anomaly in El Nino 3.4 for 82-83 and 0607 El Nino's

Comparison of the 1982/1983 El Nino and 2006/2007 El nino SSTA in Nino 3.4



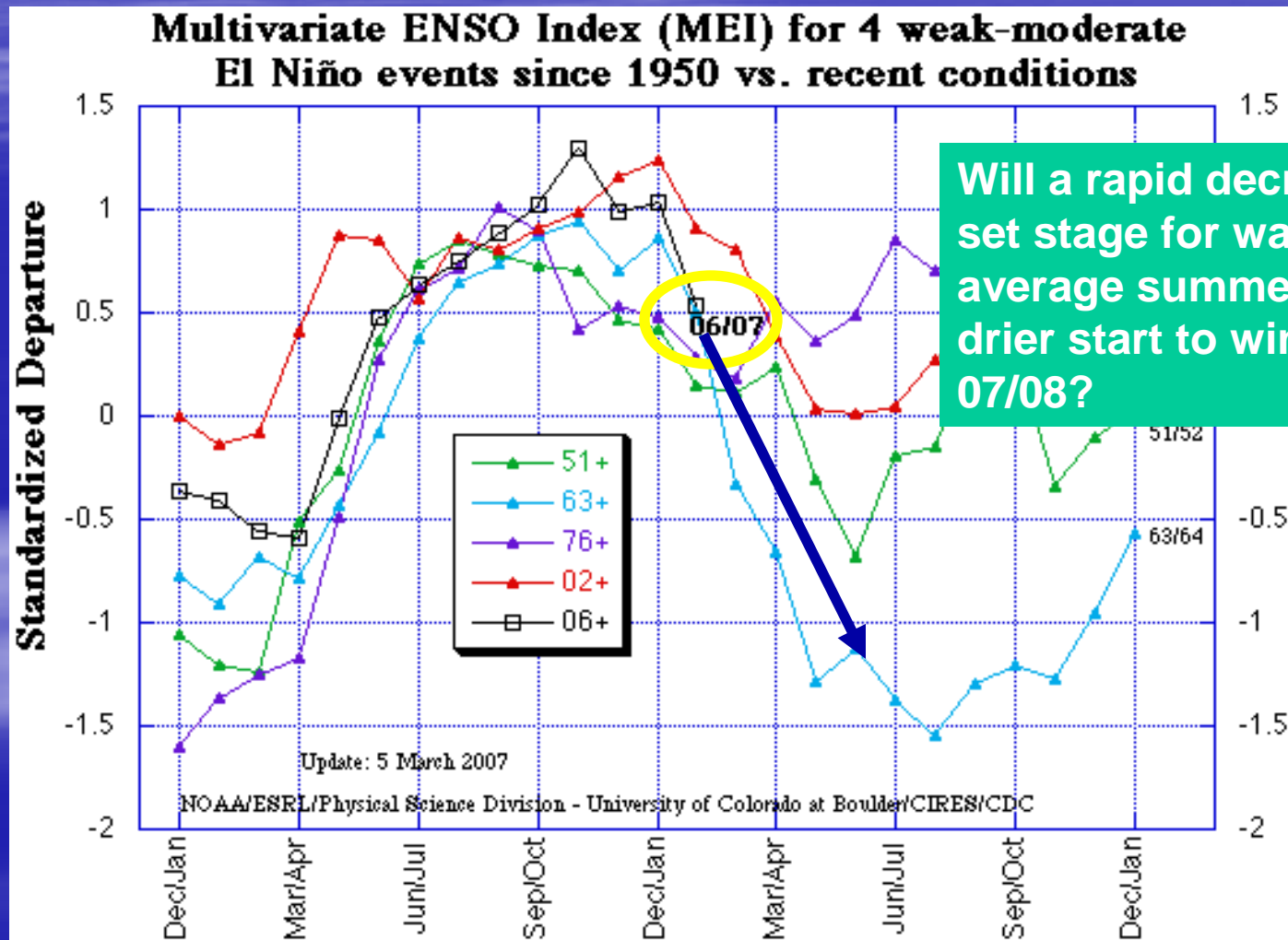
SSTA Change in past month = Cooling

Courtesy: NOAA Climate Prediction Center



MEI Change in past month = La Nina Coming

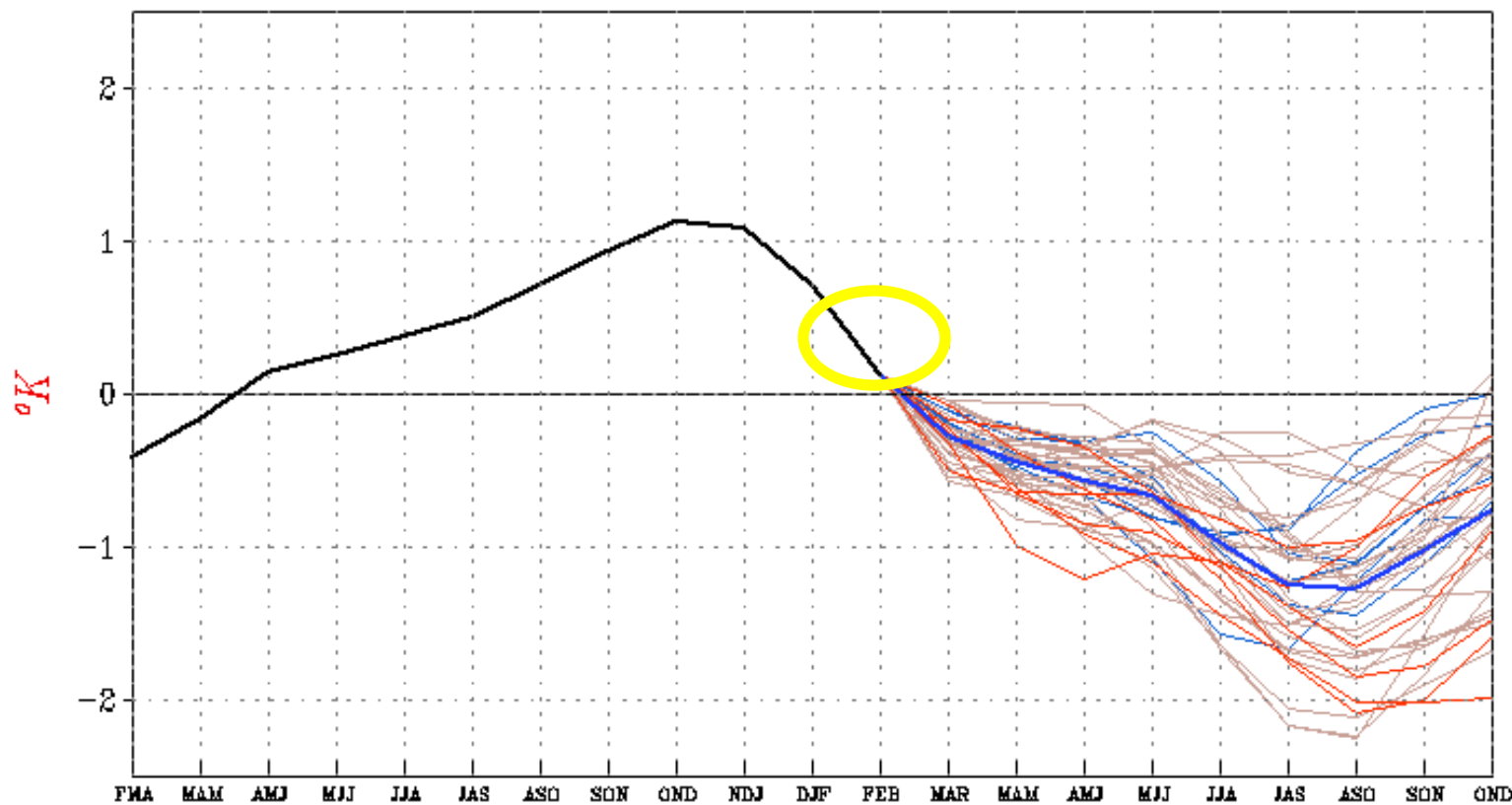
Courtesy: NOAA Climate Prediction Center



MEI Change in past month = La Nina Coming

Courtesy: NOAA Climate Prediction Center

Forecast Nino3.4 SST anomalies from CFS



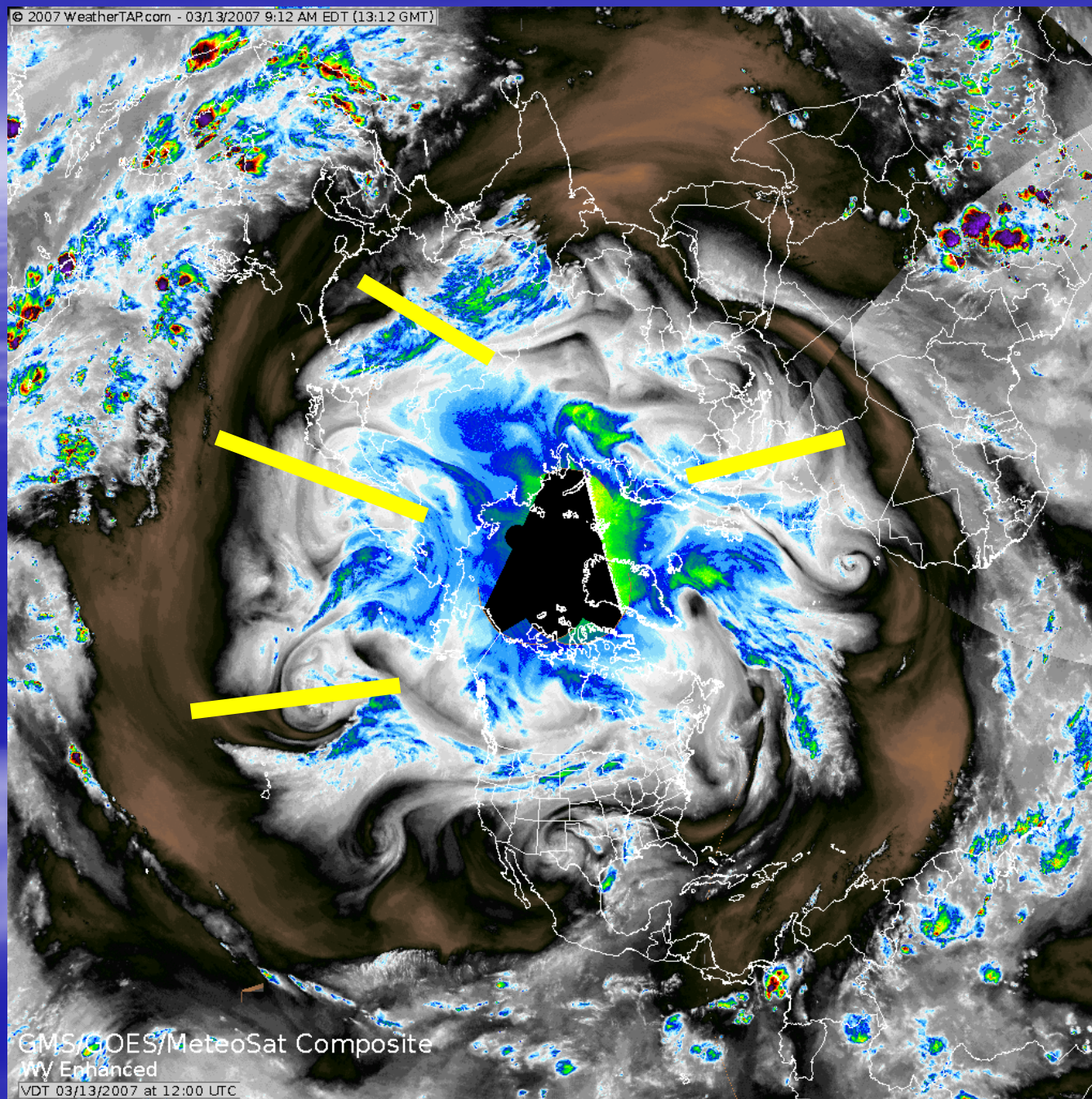
The CFS ensemble mean (heavy blue line) indicates a rapid transition from neutral to La Niña during the next 2-3 months.

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Given a change to la Nina ...

What happens in the
next 6 months?

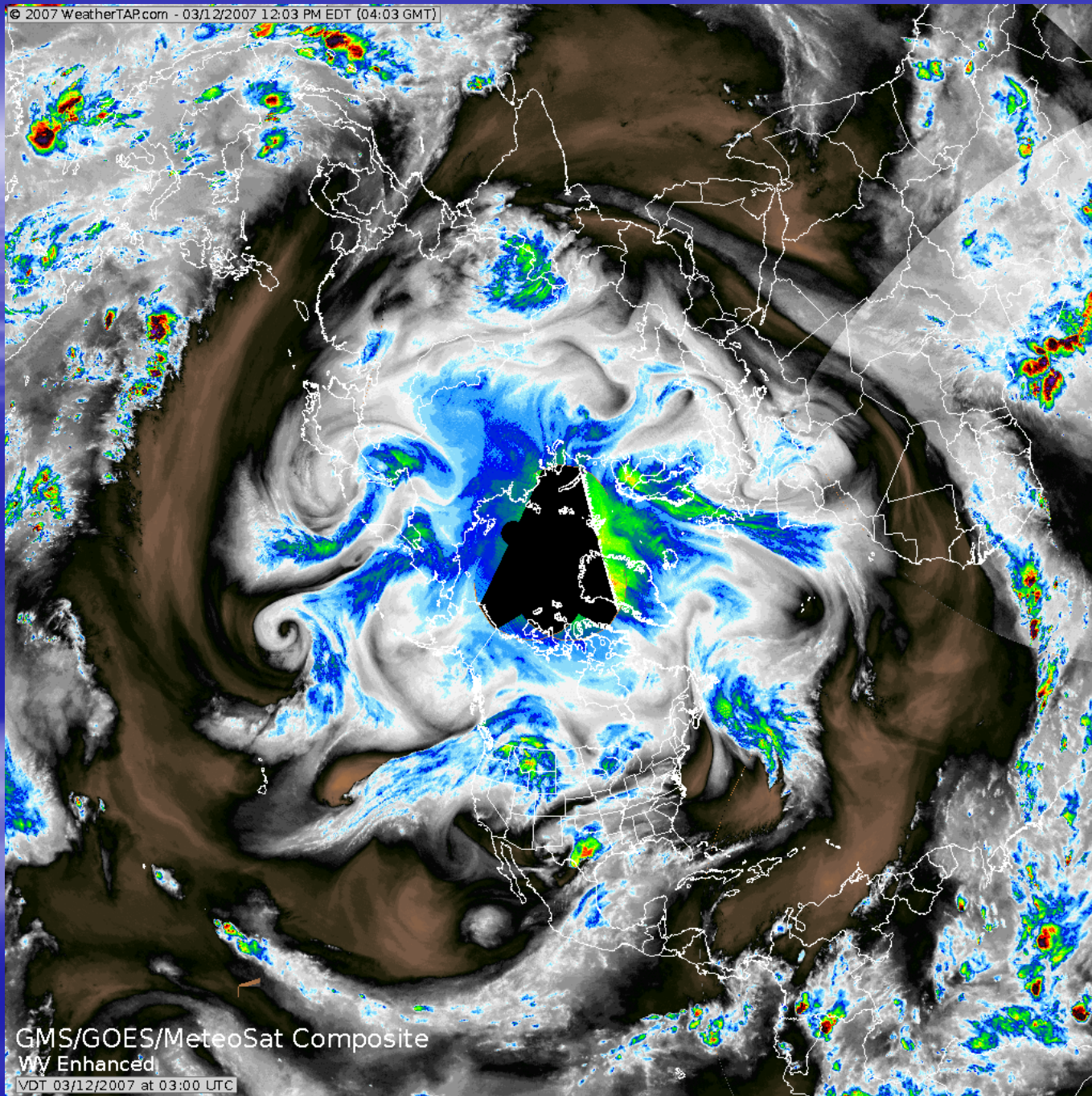
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GMS/GOES/MeteoSat Composite
WV Enhanced
VDT 03/13/2007 at 12:00 UTC

NH
Storm
Track
4
storms
to
west

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GMS/GOES/MeteoSat Composite
WV Enhanced
VDT 03/12/2007 at 03:00 UTC

NH Storm Track

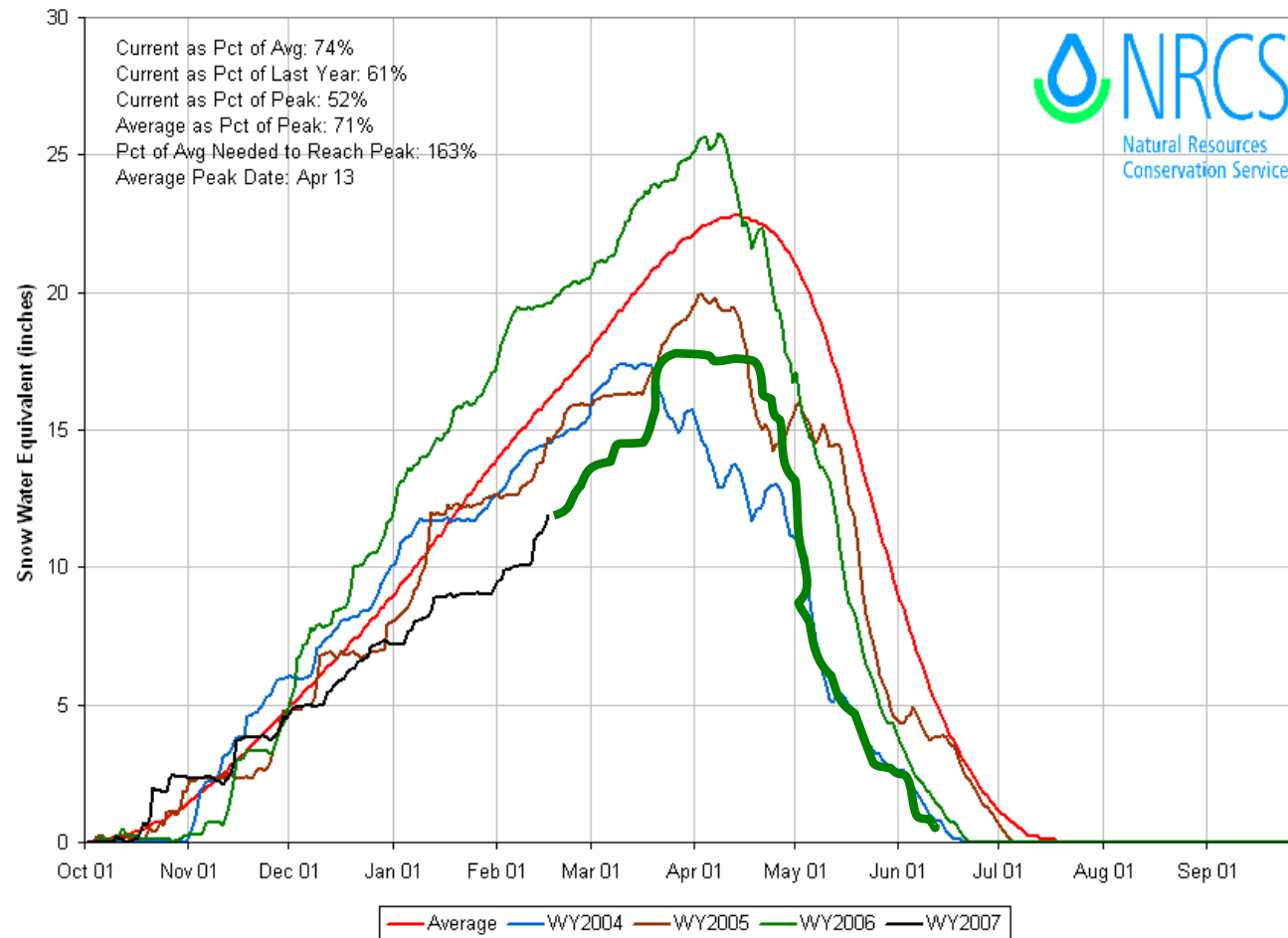
HDR SWE Forecasts

- Pacific storm track to shift from Northwesternly to Westerly position.
- One or three key spring storms may hit SW mountains: Mar 20-23, 27-30, Apr 2-5, 8-11.
- South Platte/Arkansas basins may be hit by 2-4 wet, spring storms into mid-May.
- Timing of Spring runoff will be slightly early to average. Statewide: near-normal.

HDR Yampa/White SWE Forecast

Yampa and White River Basins Time Series Snowpack Summary

Based on Provisional SNOTEL data as of Feb 16, 2007

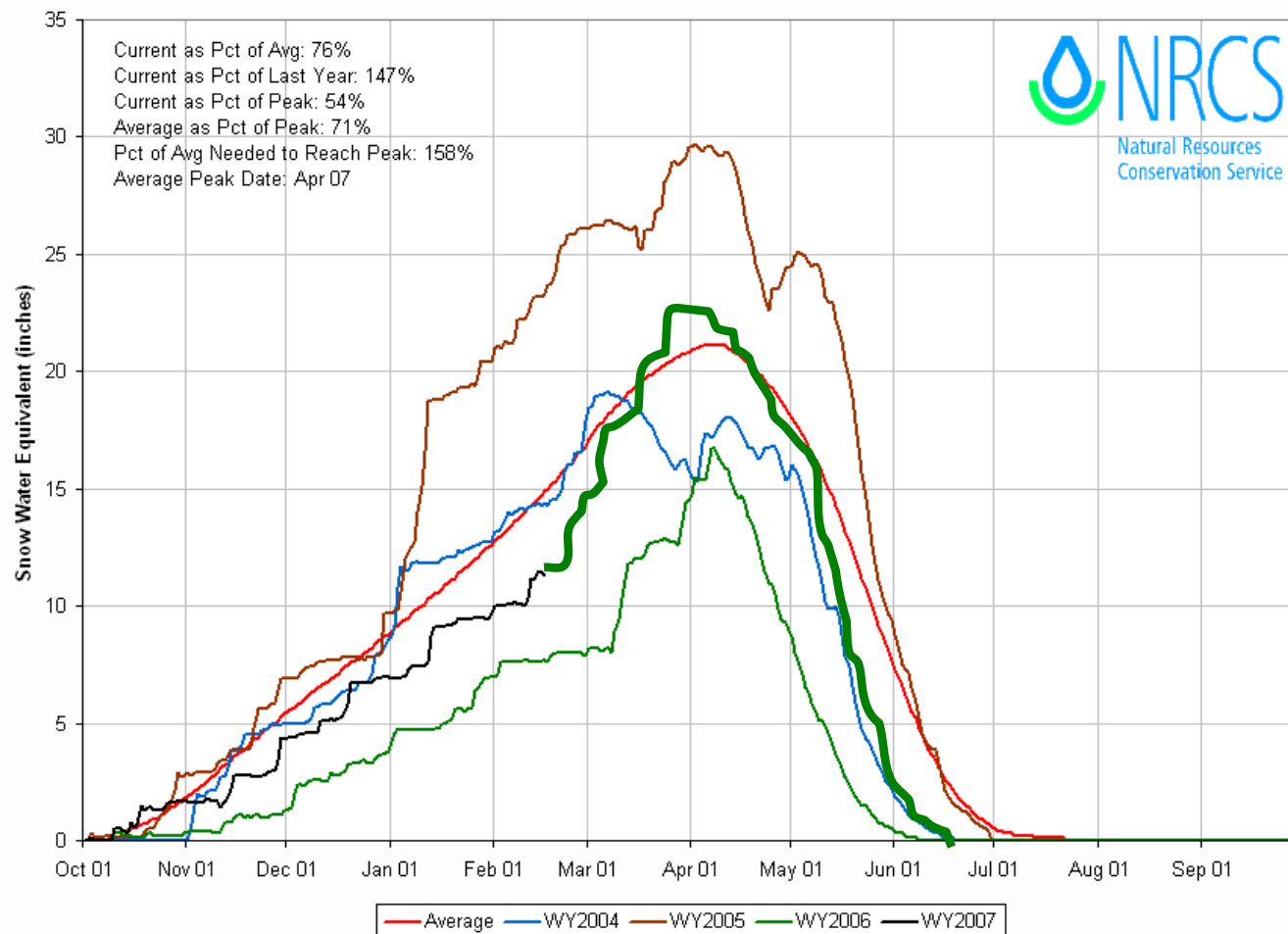


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HDR SMDASJ SWE Forecast

San Miguel, Dolores, Animas & San Juan River Basins Time Series Snowpack Summary

Based on Provisional SNOTEL data as of Feb 16, 2007

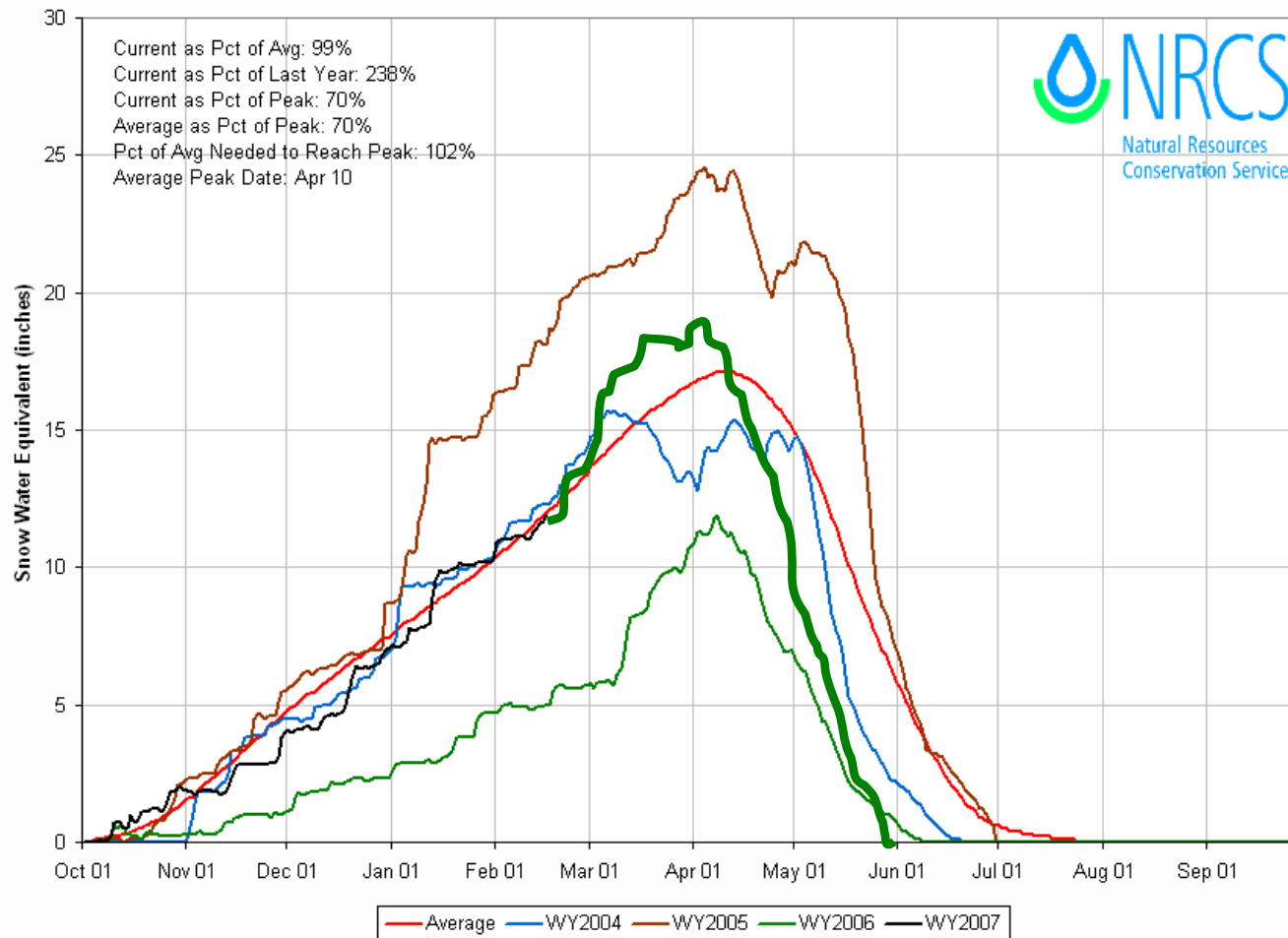


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HDR Rio Grande SWE Forecast

Upper Rio Grande Basin Time Series Snowpack Summary

Based on Provisional SNOTEL data as of Feb 16, 2007

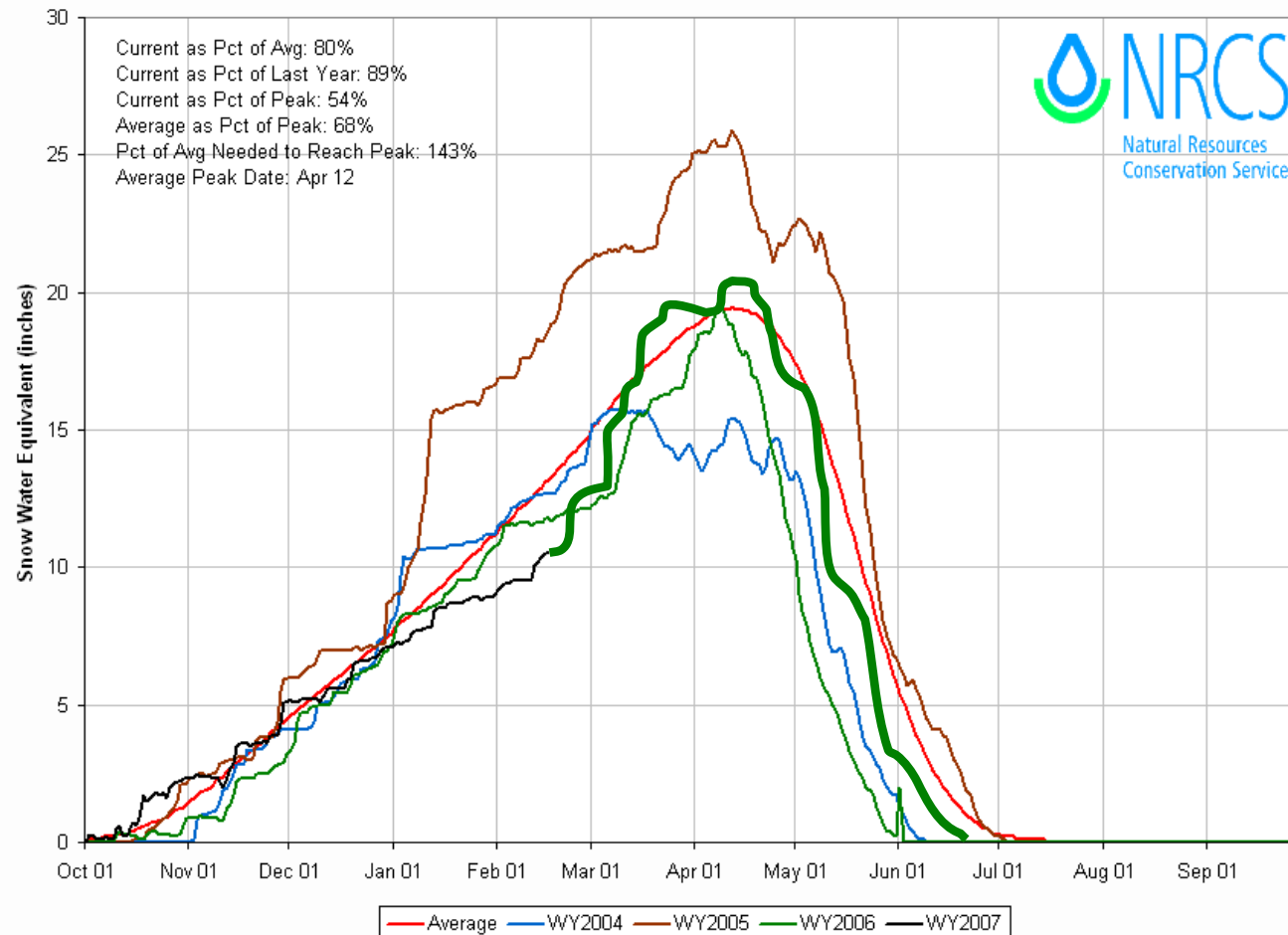


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HDR Gunnison SWE Forecast

Gunnison River Basin Time Series Snowpack Summary

Based on Provisional SNOTEL data as of Feb 16, 2007

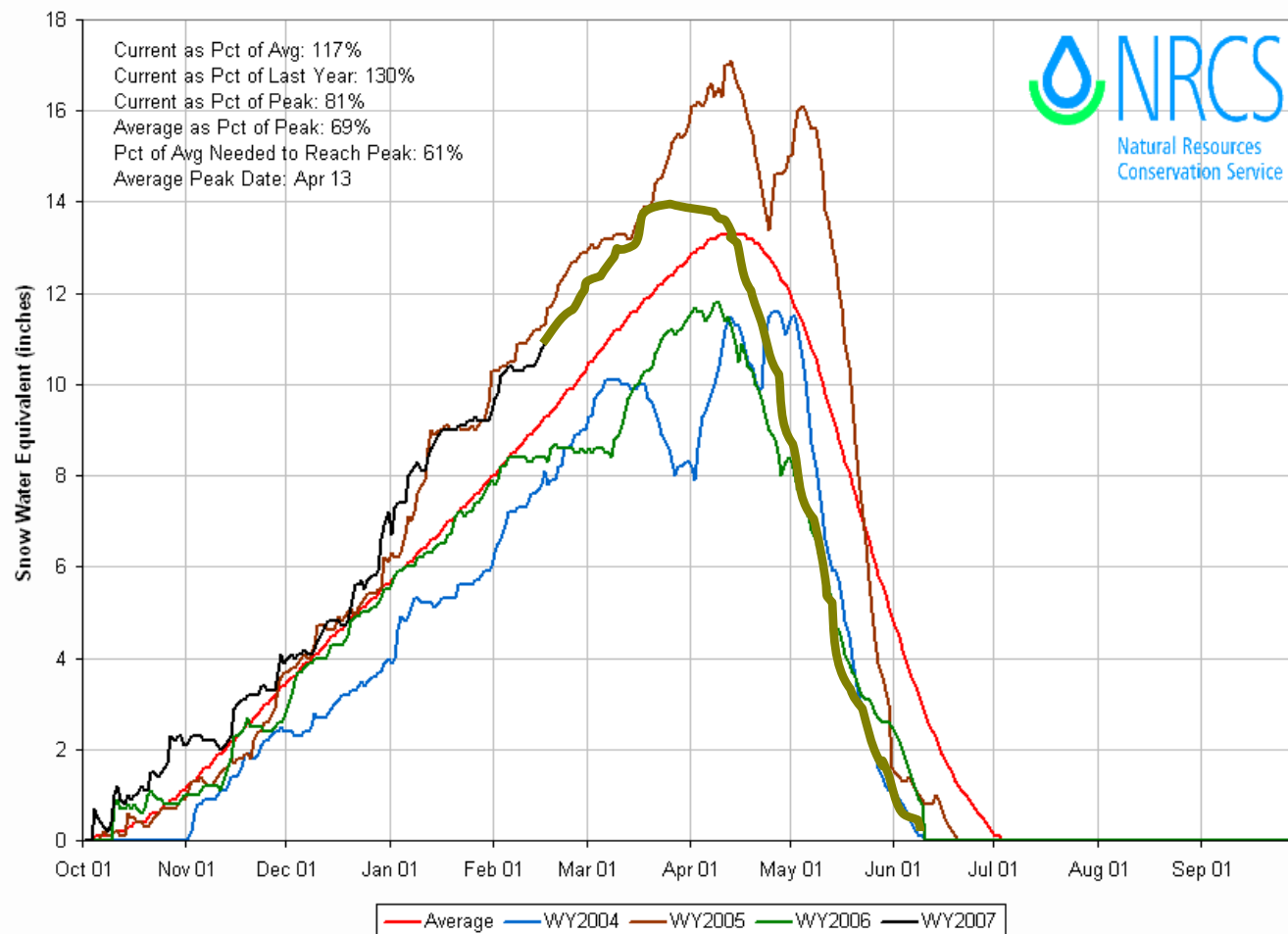


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HDR Arkansas SWE Forecast

Arkansas River Basin Time Series Snowpack Summary

Based on Provisional SNOTEL data as of Feb 16, 2007

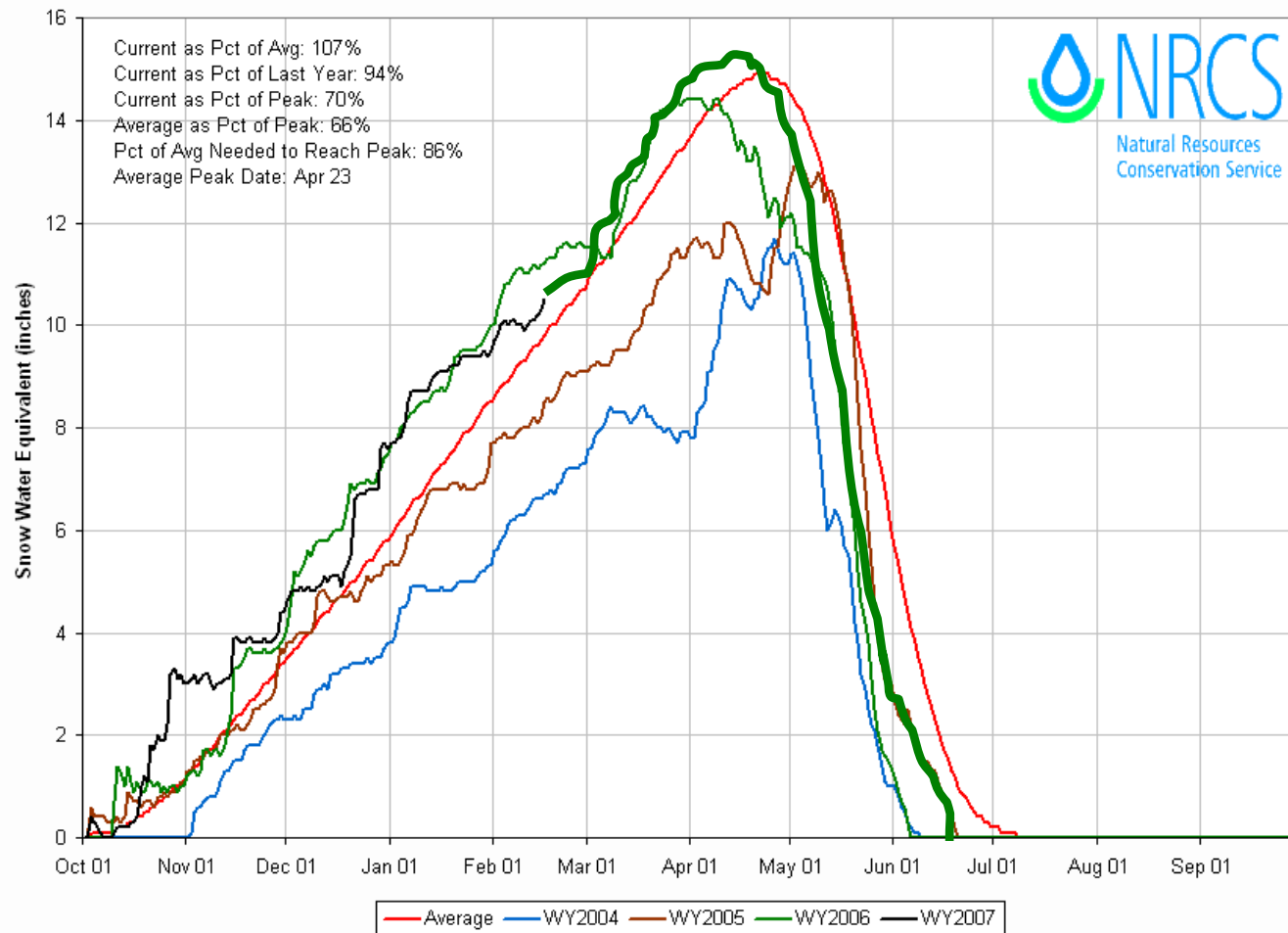


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HDR South Platte SWE Forecast

South Platte River Basin Time Series Snowpack Summary

Based on Provisional SNOTEL data as of Feb 16, 2007



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Heading towards a La Nina

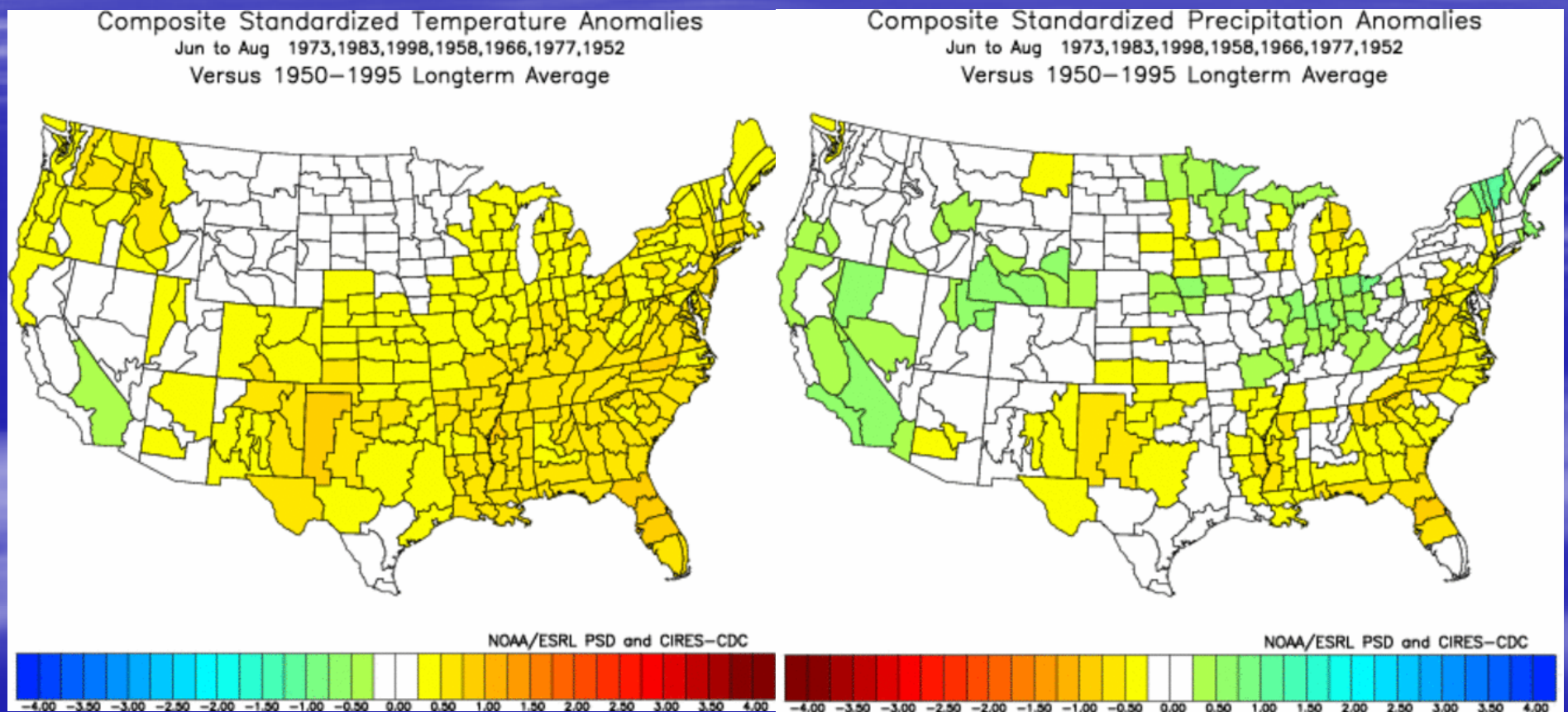
- Lingering storminess into Spring (mid-May).
- Storm track to aid SW Mountain basins with wet spring snow.
- Upslope rains could impact eastern plains into mid-May.
- Summer precipitation looks “average” as we transition from El Nino into La Nina pattern during spring-summer.

Spring Flood threats

- Purgatoire River below Trinidad
- Arkansas River below La Junta
- Rest of state average to below average risk
- A word of caution: Spring storms could still impact SE plains into mid-May; we need to be vigilant.
- How about summer?

Jun – Jul - Aug
Temperature
Above average

Precipitation
Near average



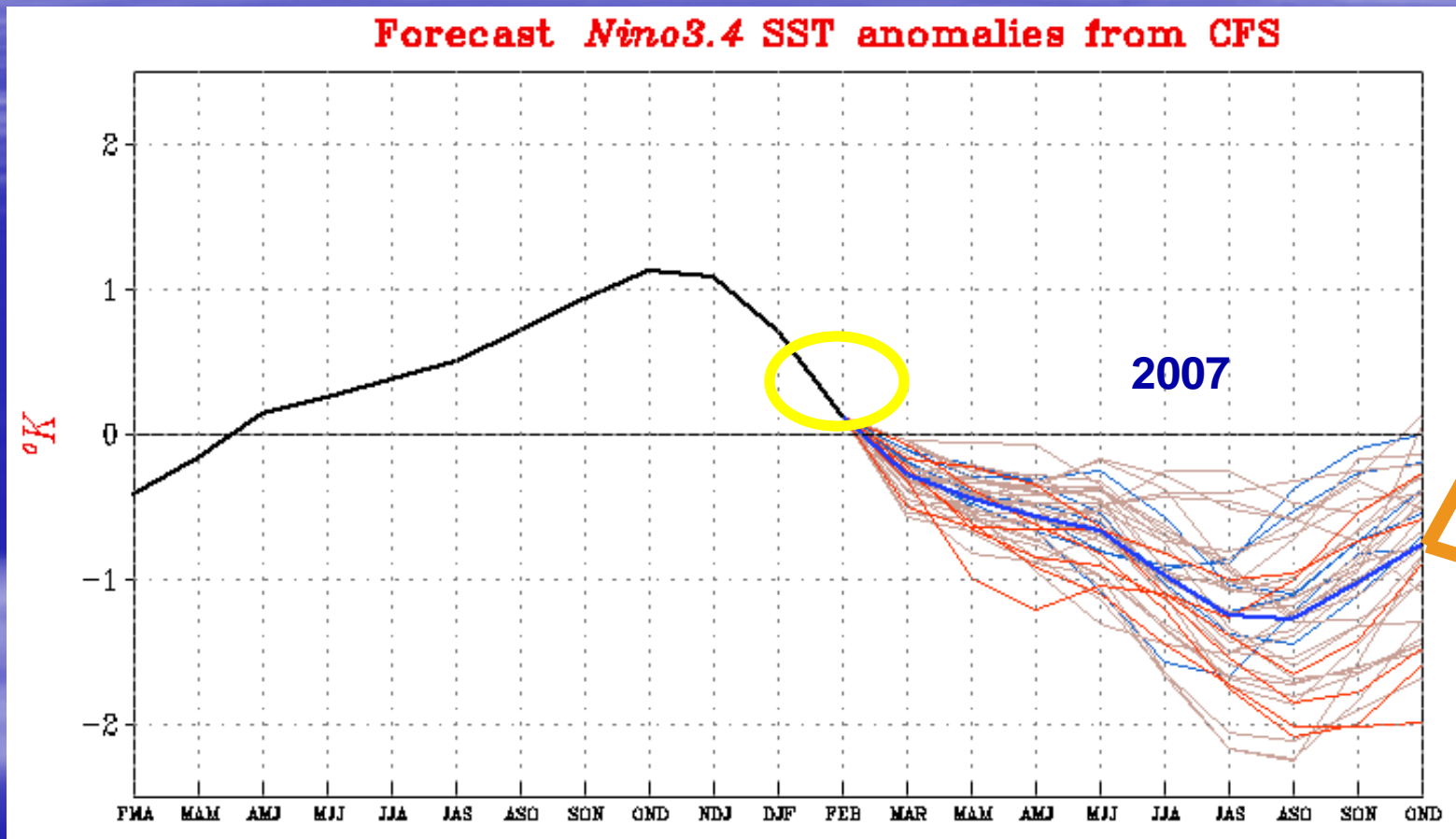
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Summer flood threat

- Lower than last year from monsoon
- Monsoon to be average with a “mon-latter” starting July 4-10 and ending by mid-August to before Labor Day.
- However, severe thunderstorms with hail may return and produce urban flooding threats late May to mid-June, mid-July and early September.

What could happen in 2008?

Courtesy: NOAA Climate Prediction Center



The CFS ensemble mean (heavy blue line) indicates a rapid transition from neutral to La Niña during the next 2-3 months.

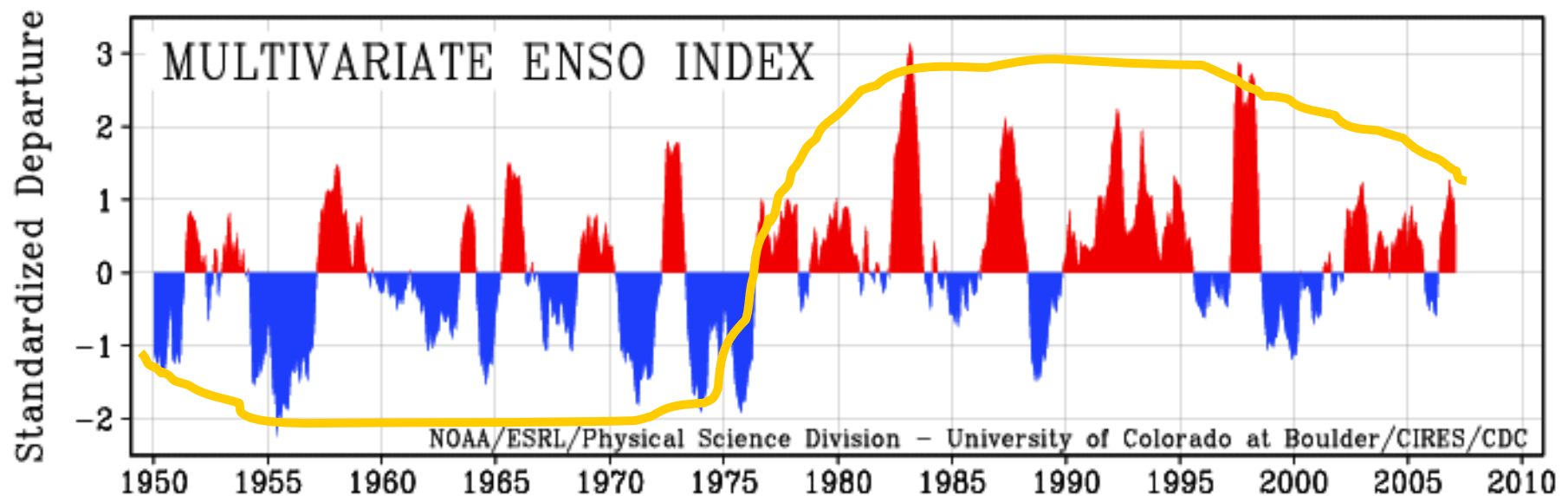
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Looking way ahead: WY 07/08

- La Nina dominated storm tracks into Dec/Jan
- Favors average to above average winter snows in northern and central mountains and Rio Grande/Sangre de Cristo's
- Below average snow in SW mountains.
- Less snow in South Platte Front Range basins and fewer big storms on eastern plains next winter ...
note: I did not say we won't get a big one or two.
- Poses some very significant questions.

MEI Change in past month = La Nina Coming. Is this a big change?

Courtesy: NOAA Climate Prediction Center



Will La Nina die early and give way to a '08 Mar-Dec El Nino or Not?

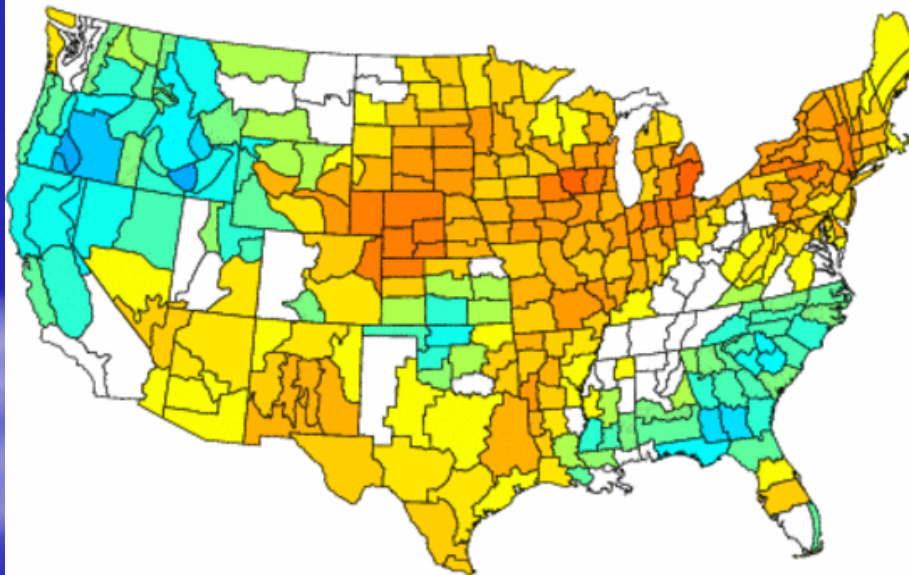
- If La Nina persists we could experience 1-3 dry years again in a row.
- If true then dry conditions with above normal temperatures likely statewide for 2008.
- Snow packs could be average to below if we have two dry years in a row.
- If El Nino returns after a brief La Nina then a very different scenario plays out.
- If El Nino comes back in 2008 we could face a very wet May-July with a nasty monsoon followed by a couple of wet winters.
- Snow packs would be on the higher side of average except northern mountains.

Such a change occurred from
1964 into 1965

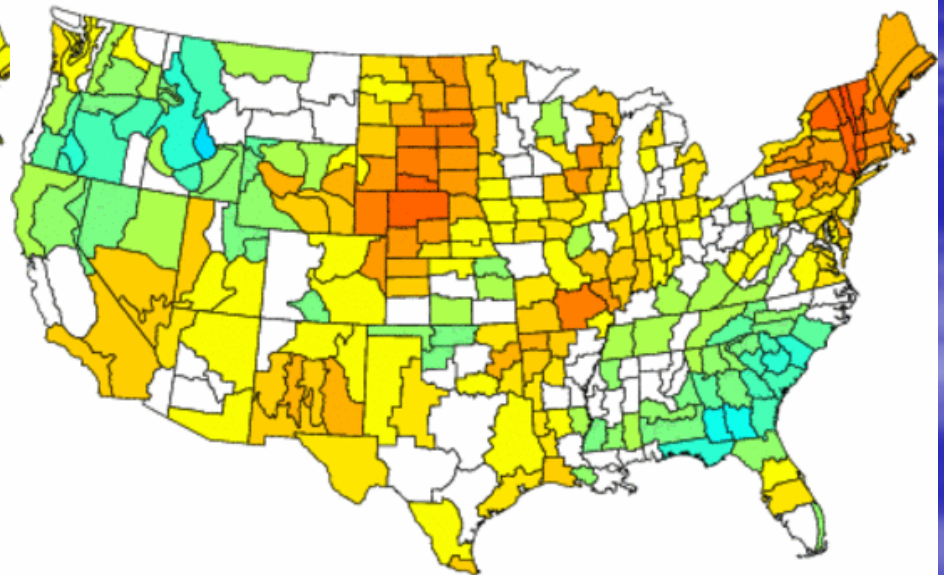
History never repeats itself but is
worth remembering.

Oct 1964 to Mar 1965 precipitation

Standardized Precipitation Anomalies
Oct to Dec 1964
Versus 1950–1995 Longterm Average

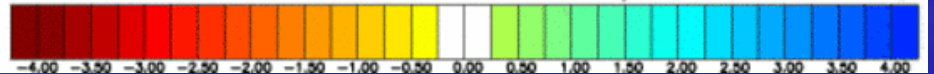
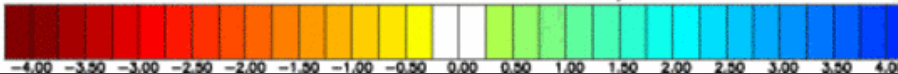


Standardized Precipitation Anomalies
Oct to Mar 1964–65
Versus 1950–1995 Longterm Average



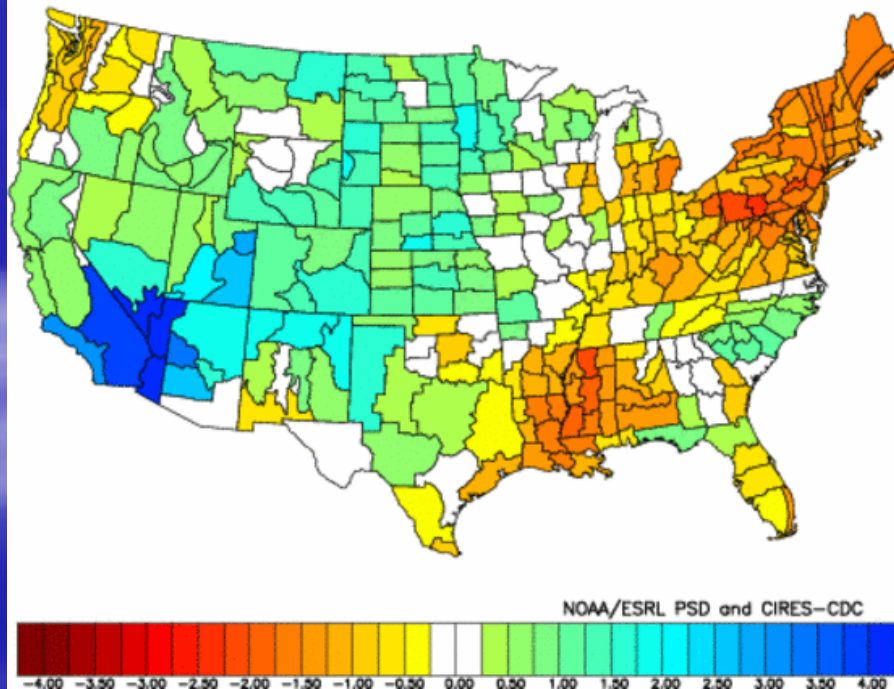
NOAA/ESRL PSD and CIRES–CDC

NOAA/ESRL PSD and CIRES–CDC

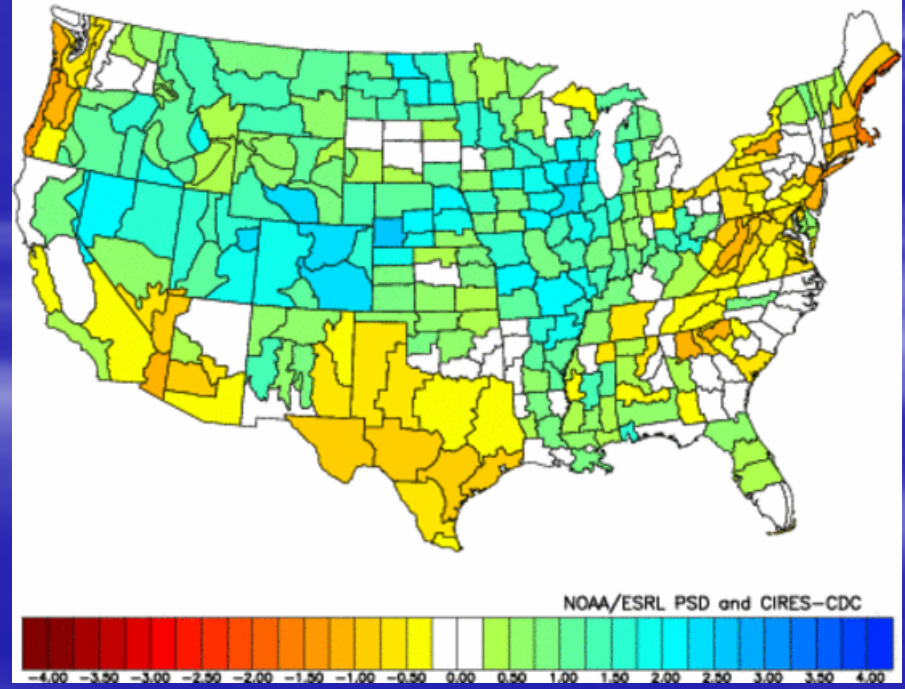


April to Sep 1965 precipitation

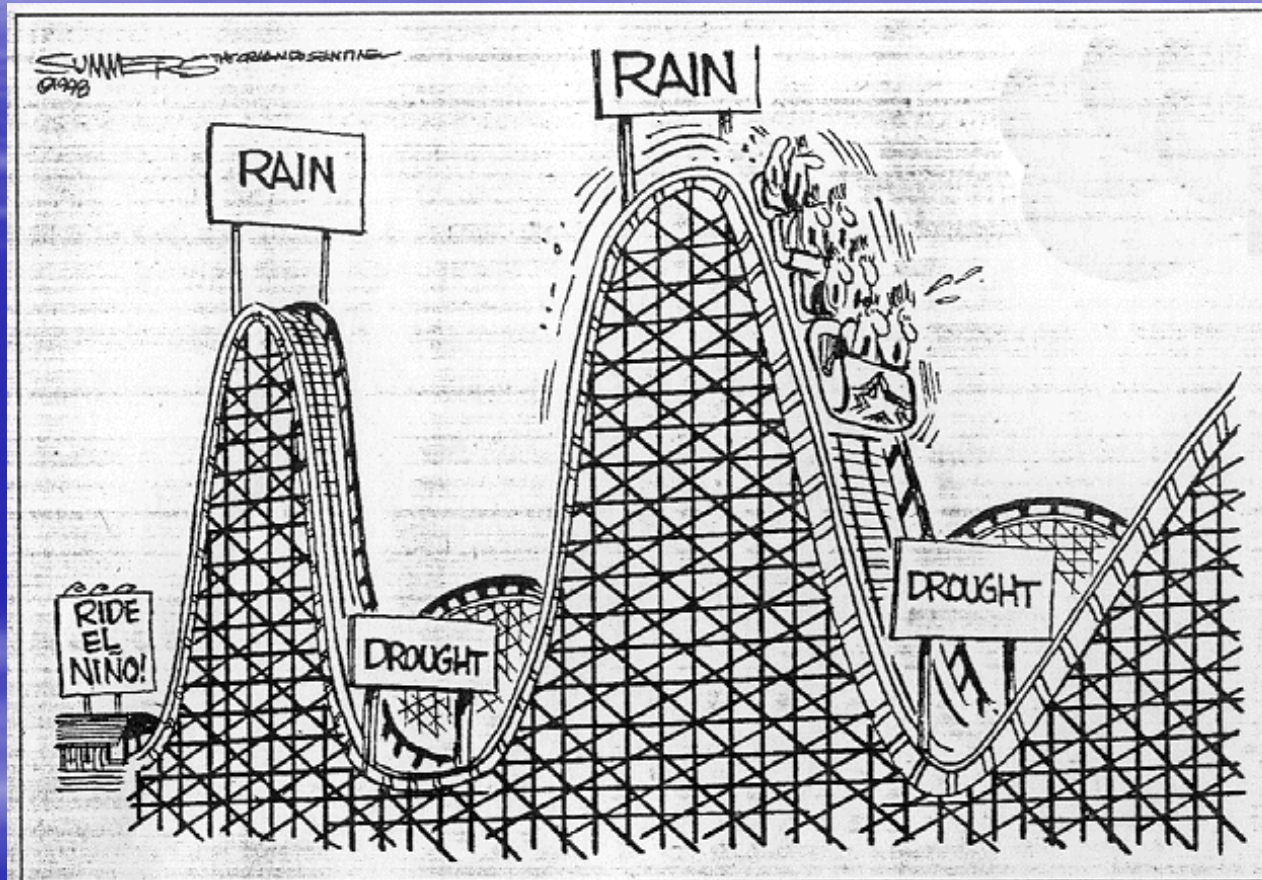
Standardized Precipitation Anomalies
Apr to Jun 1965
Versus 1950–1995 Longterm Average



Standardized Precipitation Anomalies
Jul to Sep 1965
Versus 1950–1995 Longterm Average



Let's do more than hang on!



By Dana Summers, The Orlando (Fla.) Sentinel, Tribune Media Services



Today's second thought

**"Logic will get you from A to B.
Imagination will take you
everywhere."**

Albert Einstein

HDR

*"Climate is what you expect;
weather is what you get"*

- Robert A. Heinlein

Questions?

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