# What can the Upper Colorado basin expect this winter?

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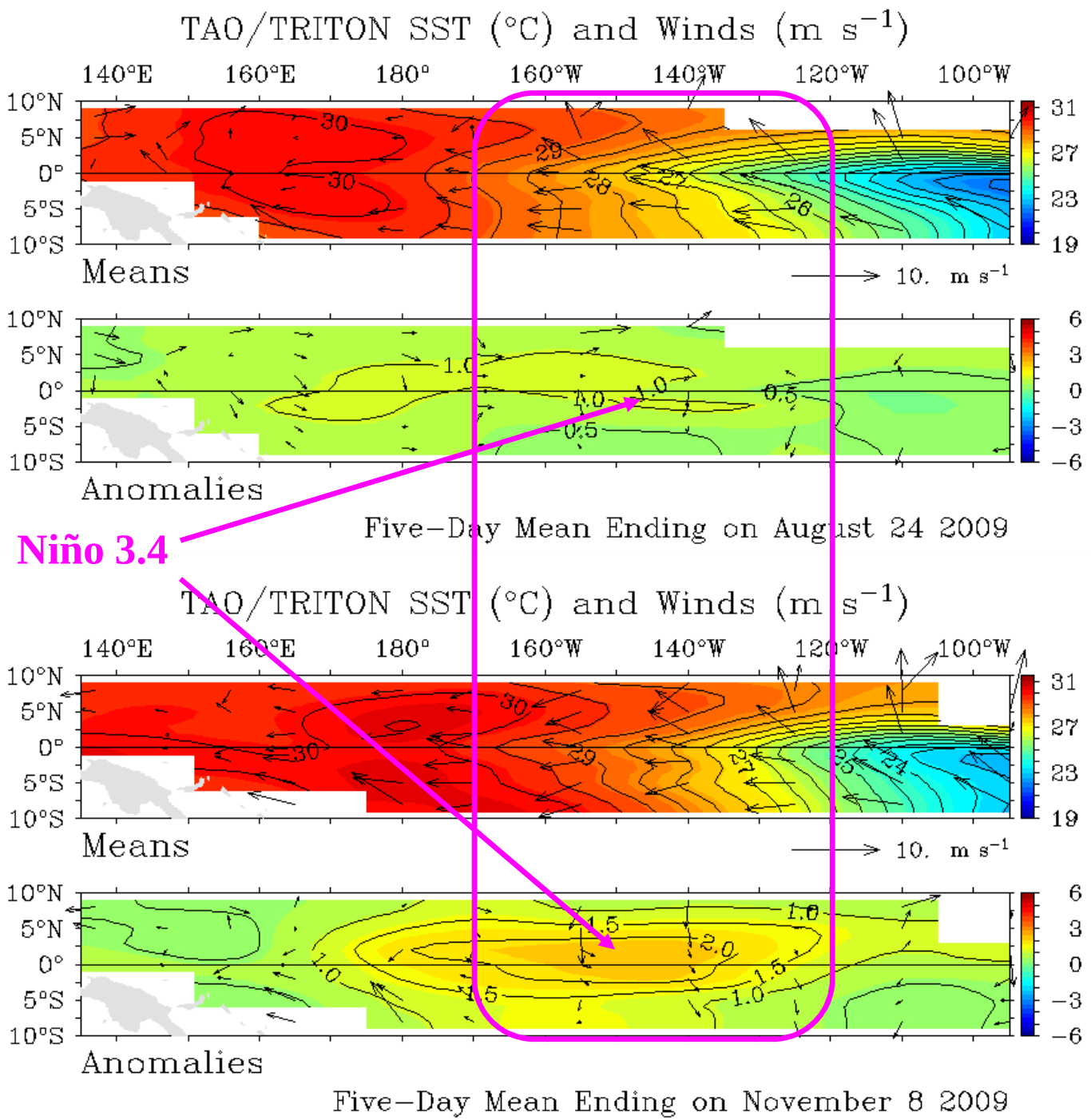
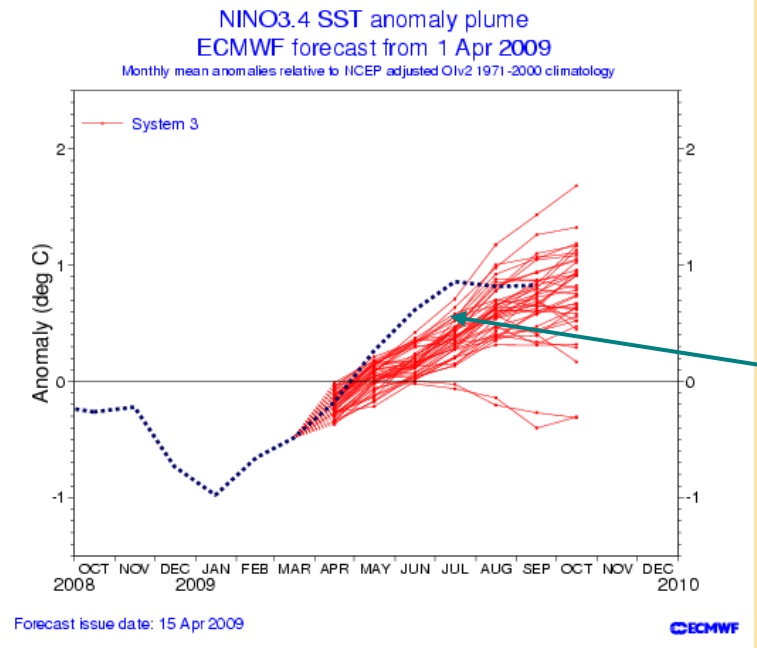
- **ENSO: current situation, typical impacts, and outlook**
- **What about the next two weeks?**
- **SWcasts for fall and winter**
- **A first stab at predicting Lees Ferry flow in 2010**
- **Summary**

**Current state of ENSO (bottom) compared to late-summer (top): after a long stretch of 'life-support' conditions (top), the last six weeks have seen a steady progression towards full-fledged, borderline strong El Niño conditions! This evolution appears to have leveled off, for now.**

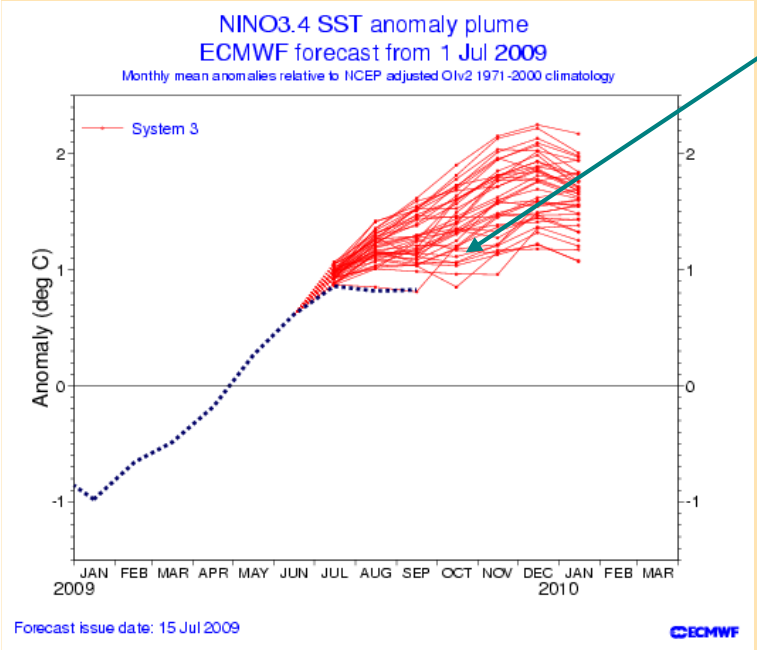


# What's going on with ENSO?

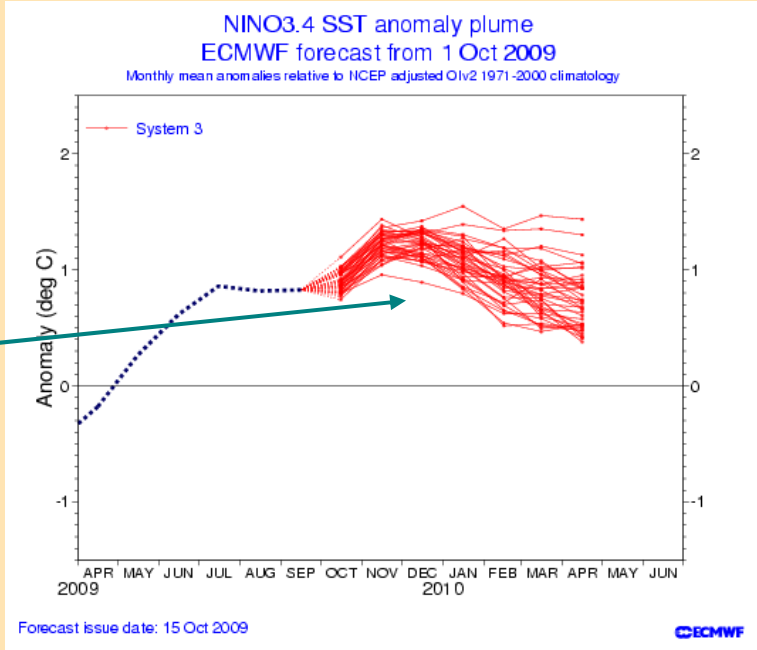



**The best performing coupled forecast model for 3-6 months out (Barnston, 2009): ECMWF April '09 forecast (left) anticipated El Niño conditions by July, not bad, but a bit too conservative;**

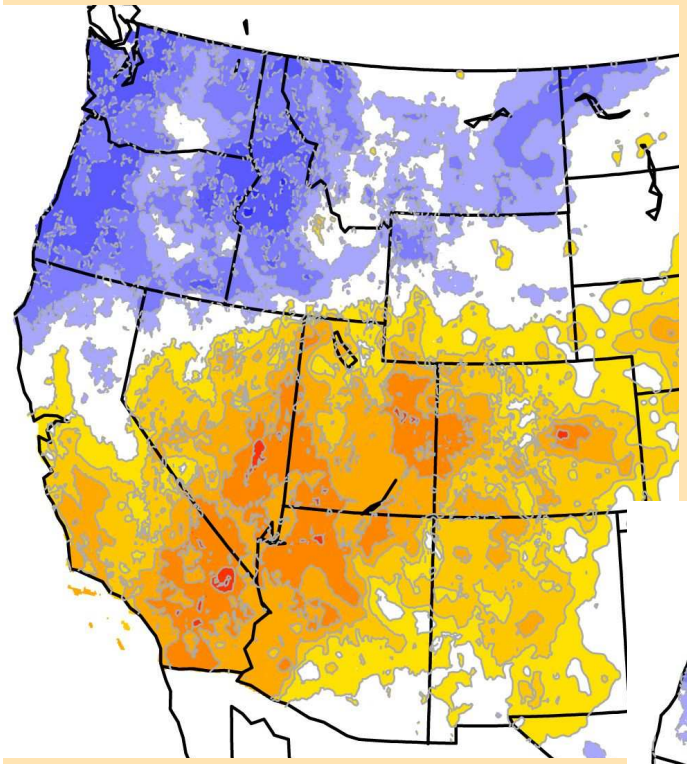
**Three months later, most models were too optimistic about the growth potential for Niño 3.4, including 49 out of 50 ensemble members of the ECMWF…**



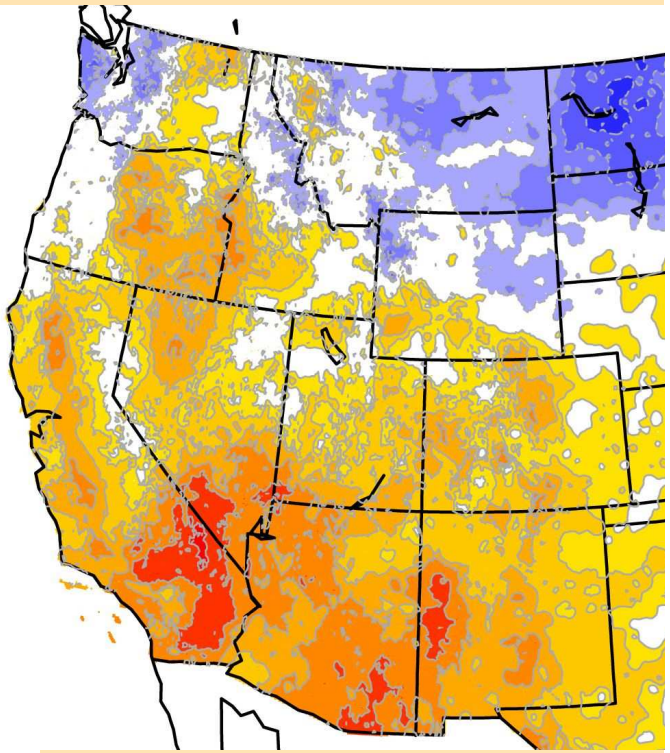

**'Chastened' by recently stalled warming, the latest forecast maintains a moderate event into next year.**



# What are typical impacts in Western U.S.?

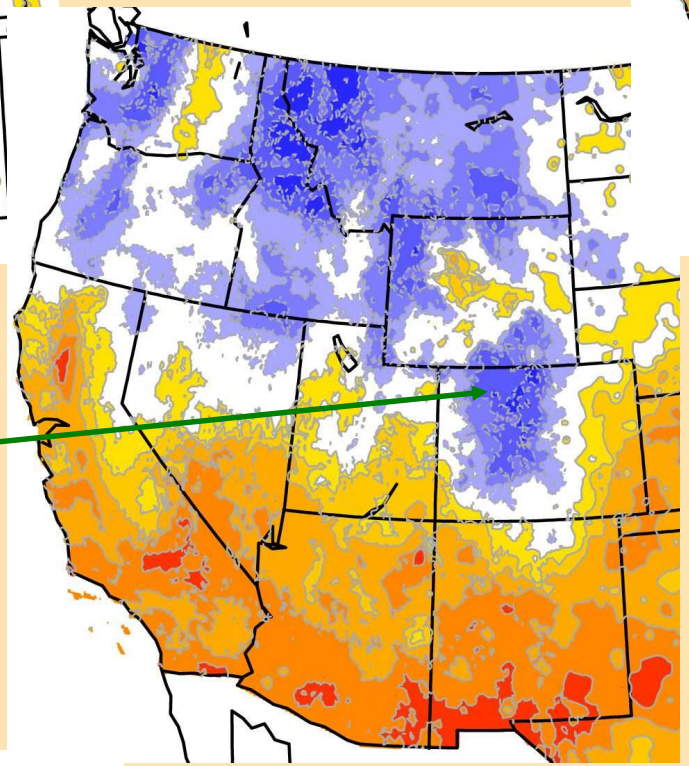


**MEI vs. precipitation:** El Niño tends to be **wet** in **fall** and **spring** in UT and CO, but **dry** during mid-**winter**, especially at higher elevations!



**SEP-NOV**

**Upper Colorado basin prefers La Niña during winter!**



**MAR-MAY**

**DEC-FEB**

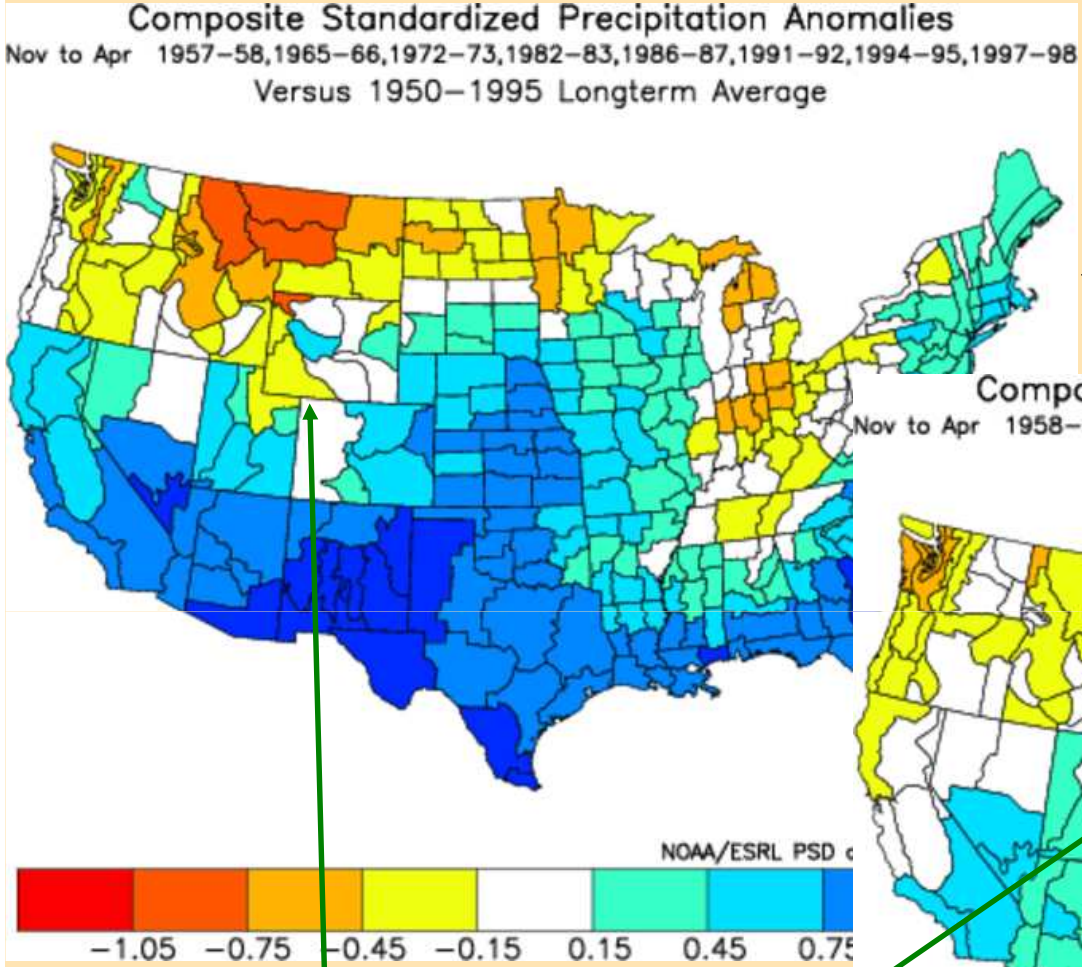
# Summary statistics on last decade of ENSO winters

**El Niños** since 1999: ***mixed*** success with composites, 2004-05 matched ENSO expectations of 'any flavor', while both 2002-03 and **2006-07 did poorly** vs 'weak' event classification, somewhat better vs 'strong'.

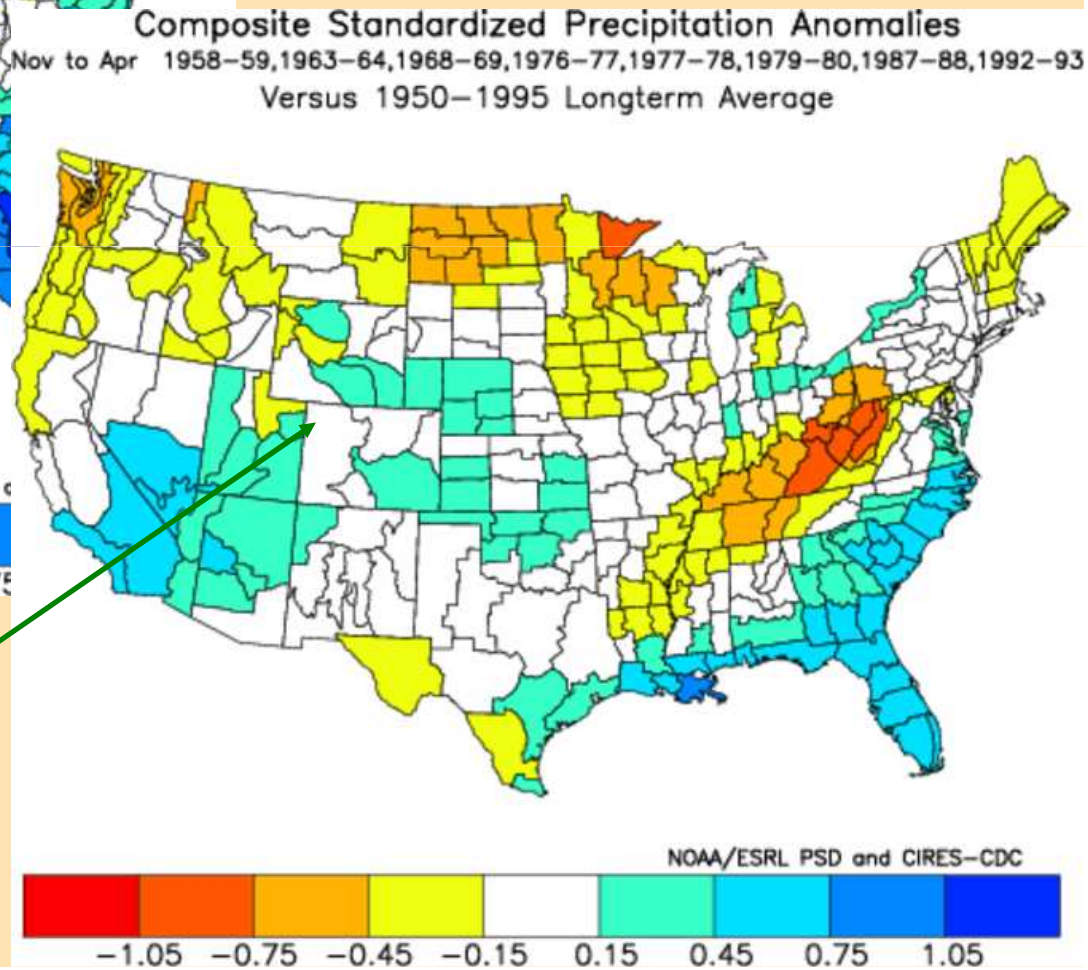
**La Niñas** since 1999: much better **success** in three out of four cases (2007-08 was an outlier on the WET side); *proper identification as 'strong' or 'weak' improved skill of composite-based forecast in every single case*.

***Given the (more or less) negative phase of the PDO in the last decade, this is actually consistent with the role of the PDO (negative PDO interfering with El Niño!)***

# What are typical El Niño impacts in Western U.S.?

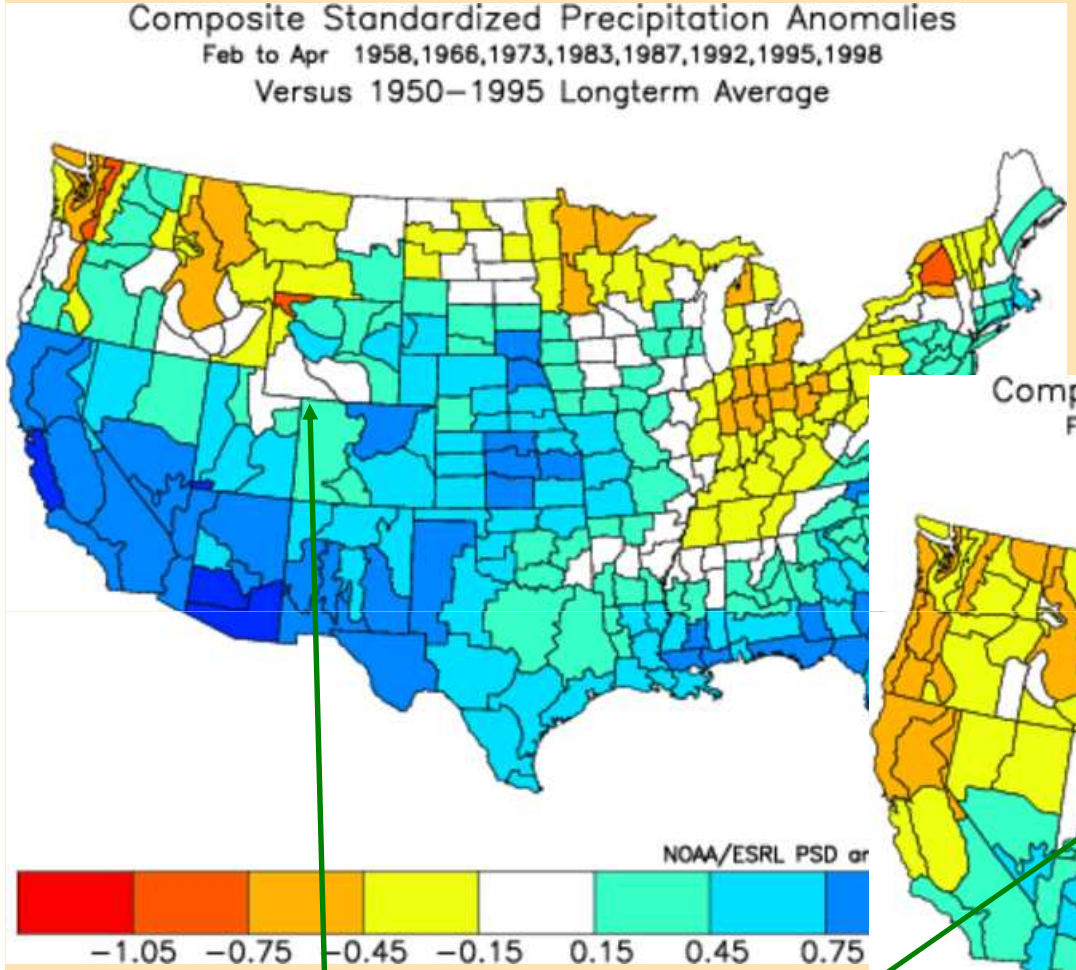



**Nov-Apr Precipitation:** Eight strong El Niño (**left**) vs. eight weaker El Niño cases (**bottom**) show better odds for moisture in most of the Southwest with stronger El Niños.

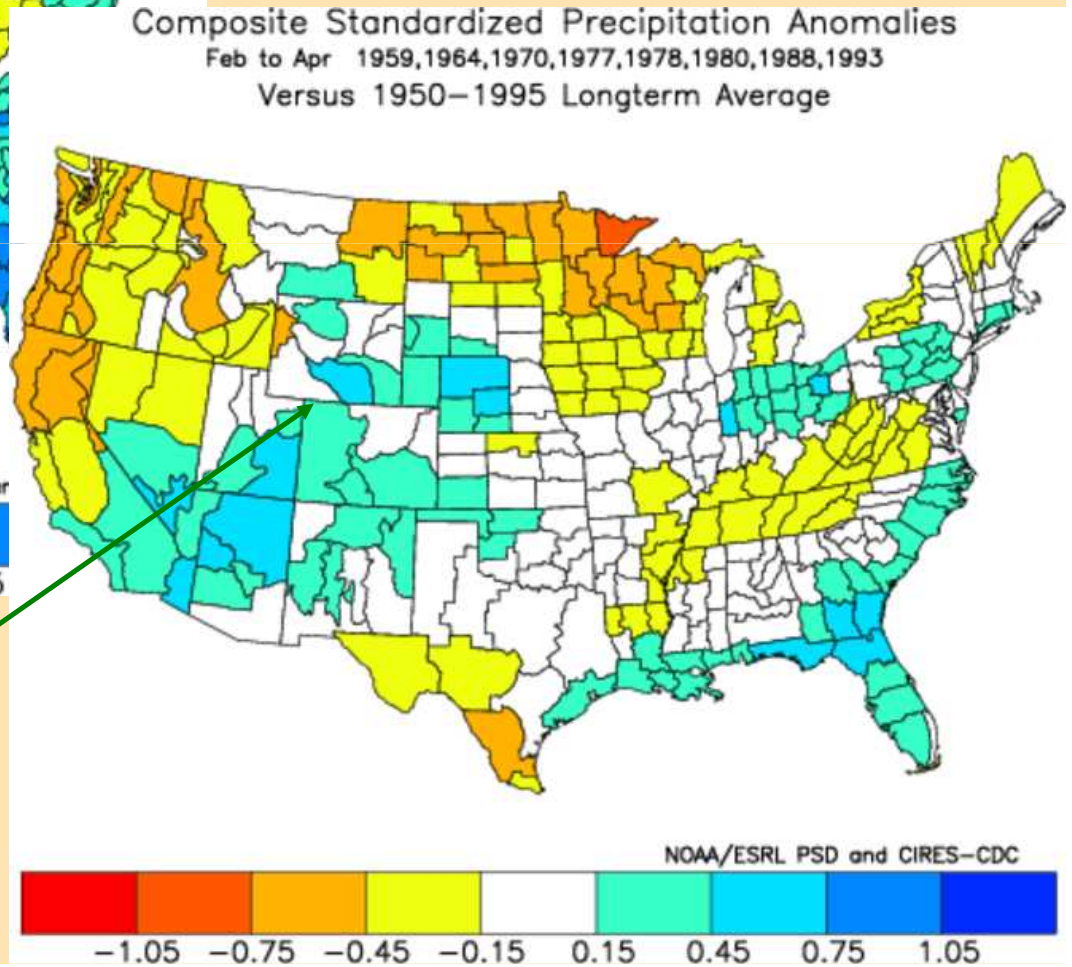



**Upper Colorado basin appears marginal at best!**

# What are typical impacts in Western U.S.?

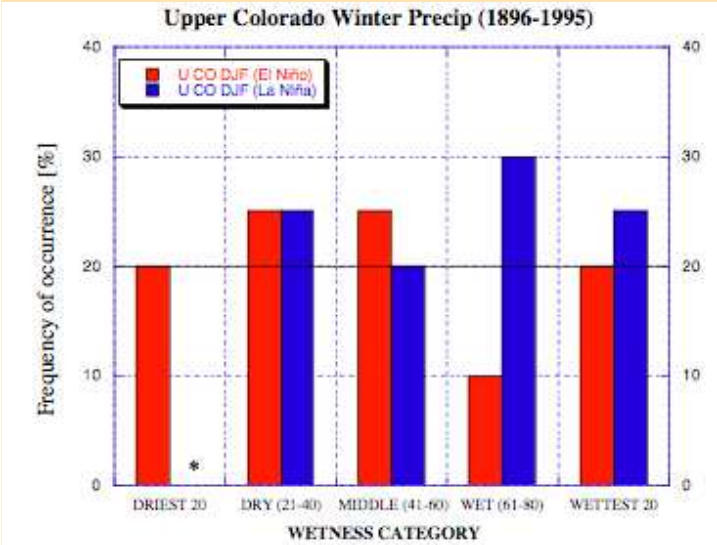


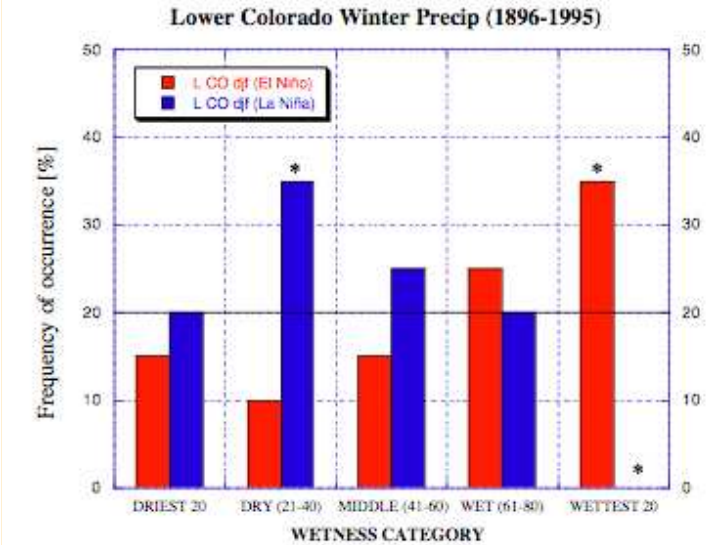

**Feb-Apr Precipitation:** Eight strong El Niño (**left**) vs. eight weaker El Niño cases (**bottom**) continue this preferential response to strong events into late winter/early spring.




**Upper Colorado basin slightly improved!**

# Colorado River El Niño Basin winters&springs



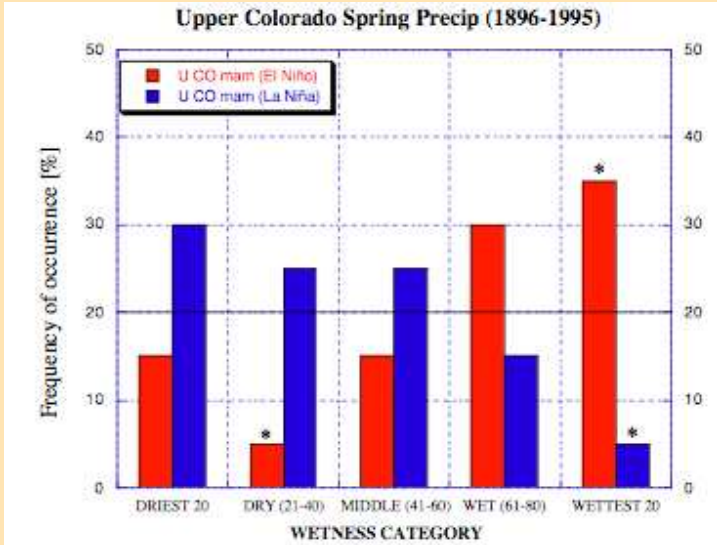

**Upper Basin**

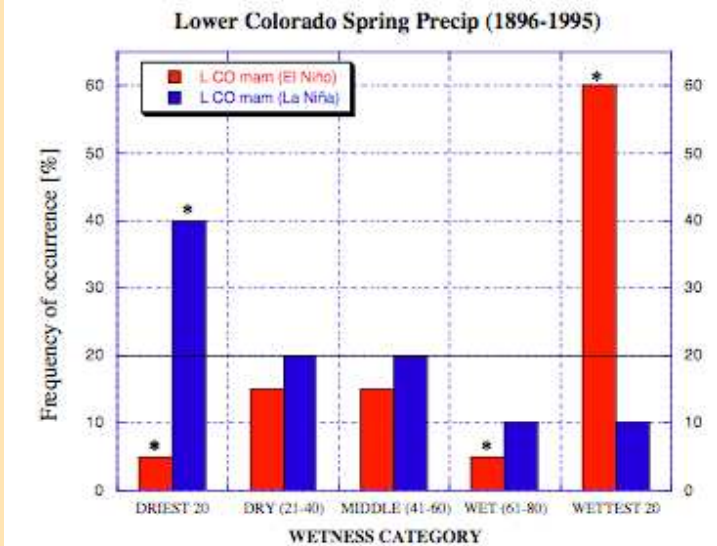
**Winter (left)**

**vs.**

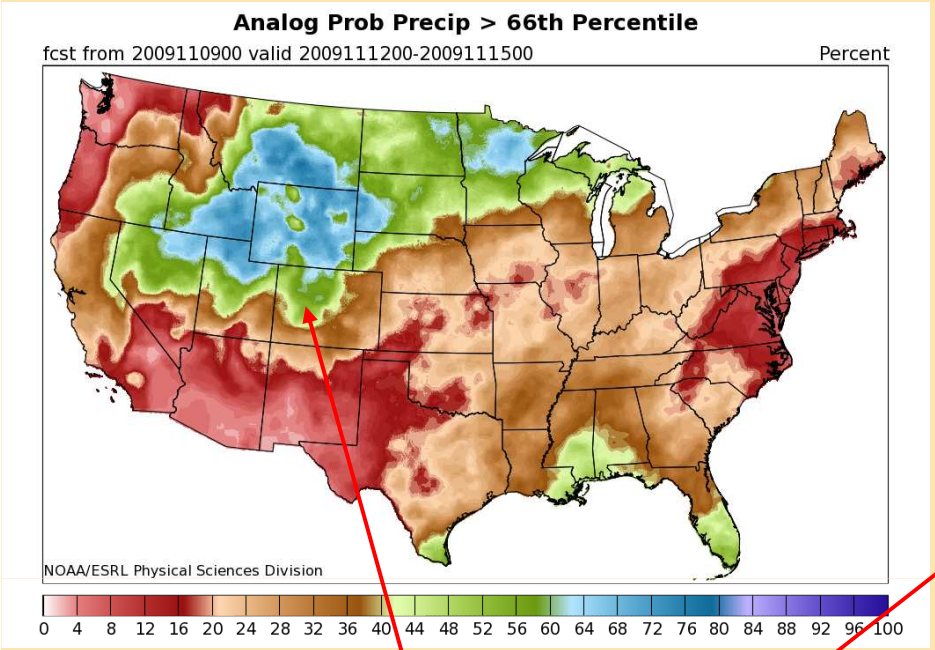
**Spring (right)**

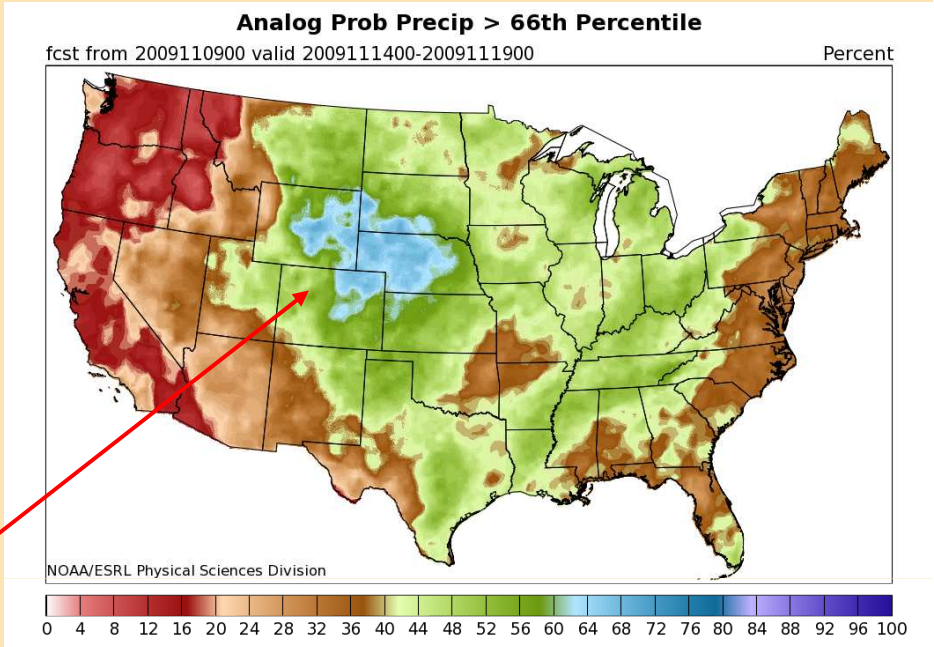
**Lower Basin**

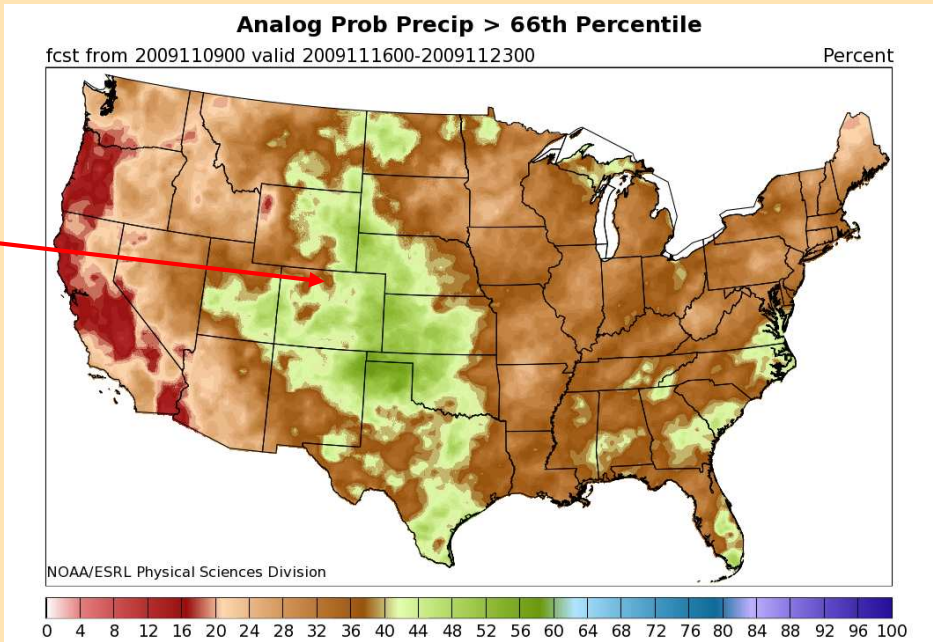


# What can we expect in the next two weeks?

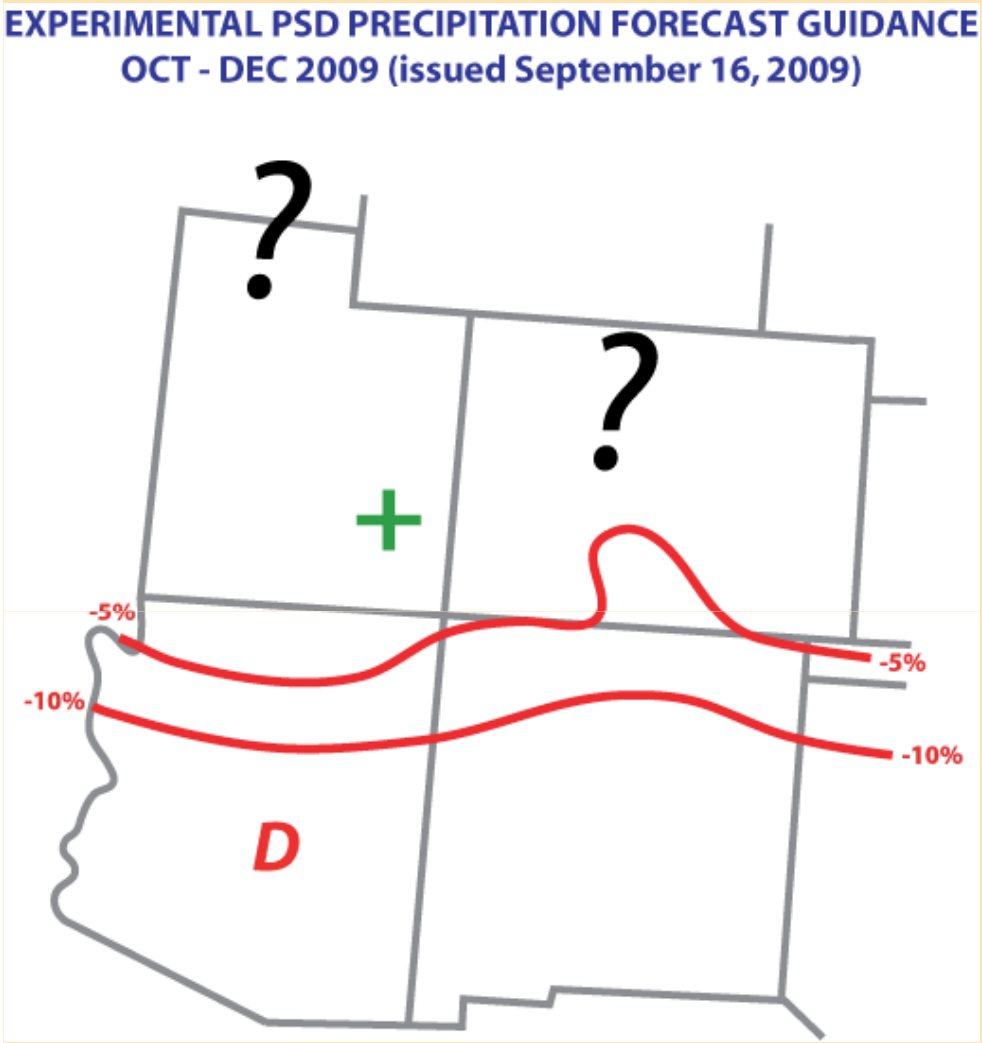


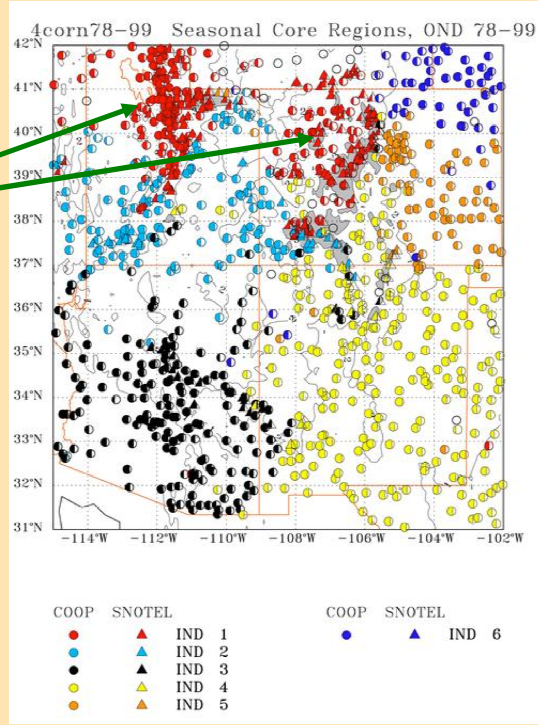



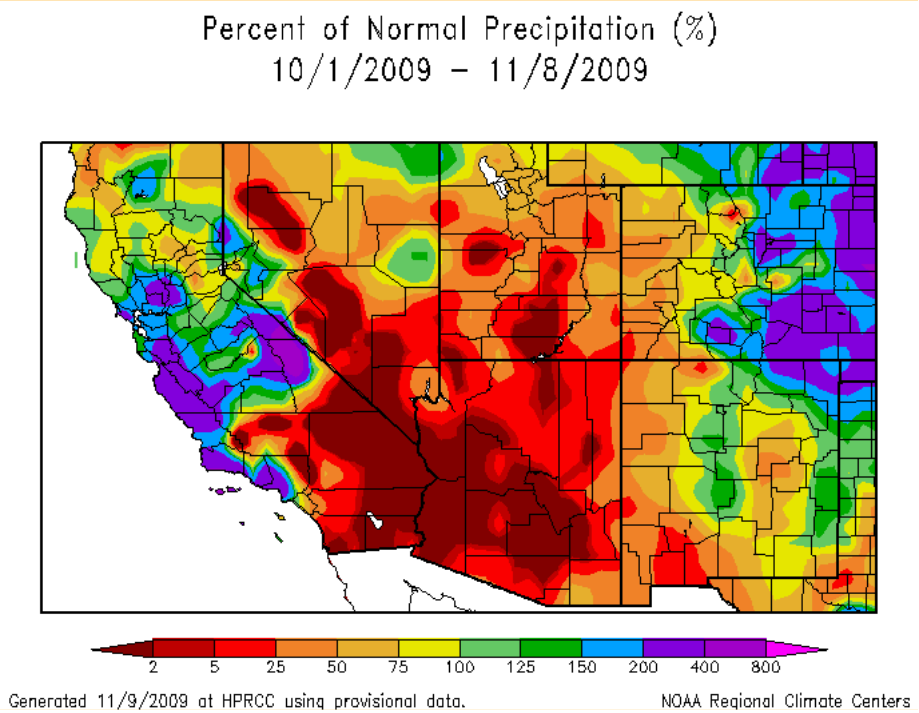

**Rainfall chances for 4-6, 6-10, and 8-14 days from yesterday show a good chance for moisture later this week for the Upper Colorado basin, followed by a drying trend later next week. We should also return to near-normal temperatures for mid-November.**

# SWcasts



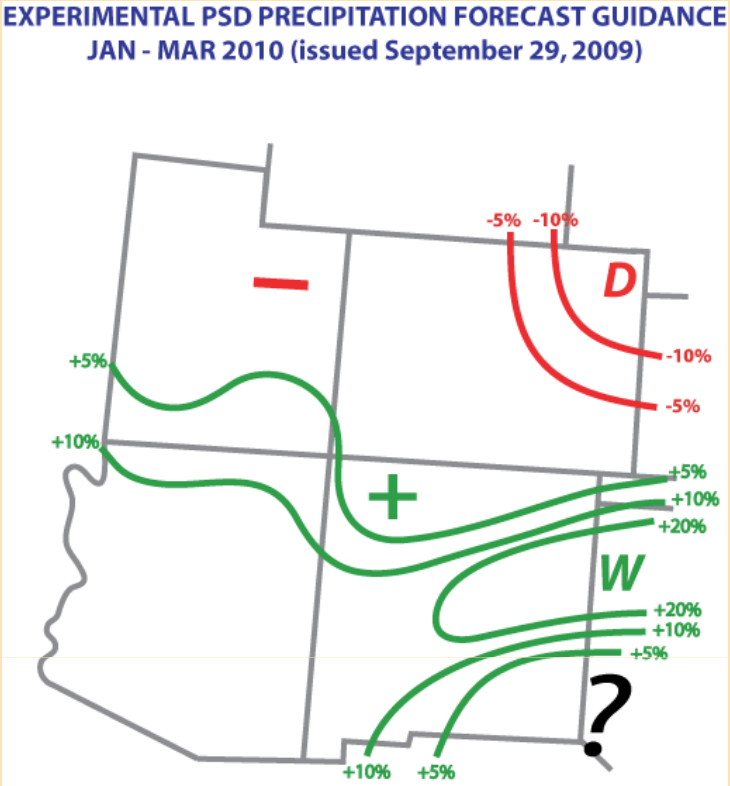

*This region and season correlates at +0.7 with subsequent runoff at Lees Ferry!*

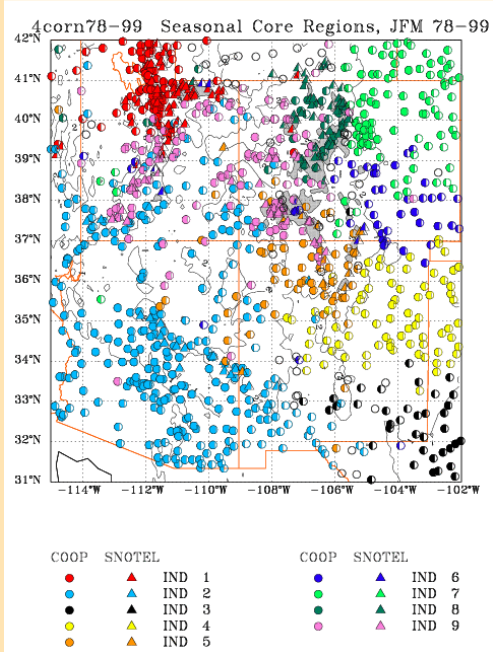


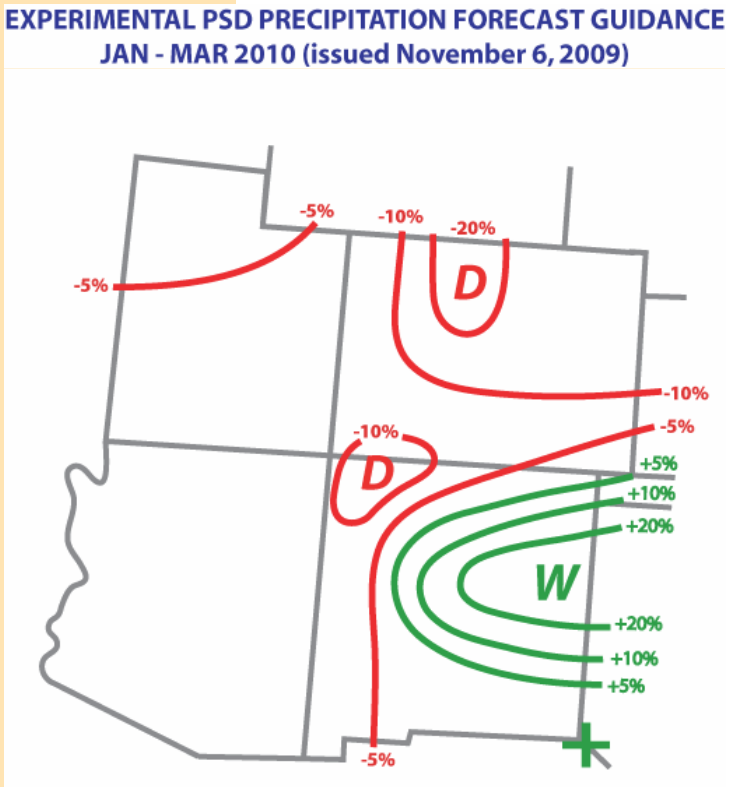




**A surprisingly dry forecast for AZ/NM has been verifying so far…**

# SWcasts

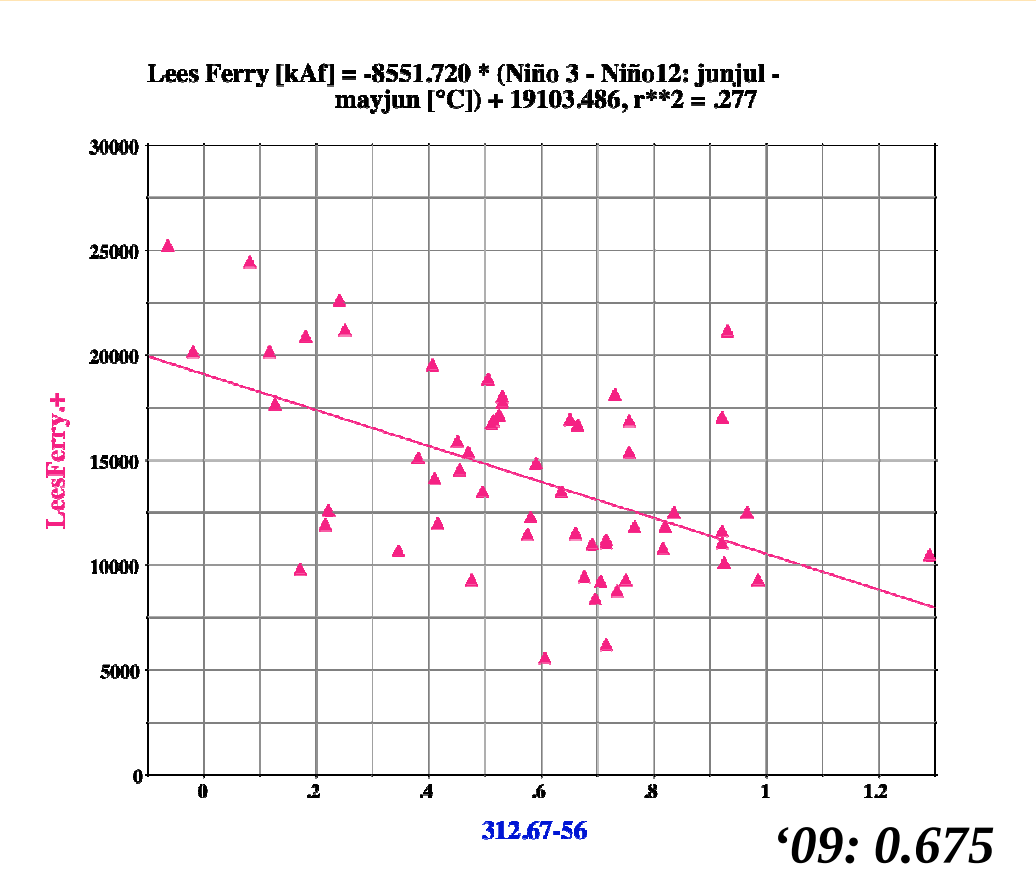



**My September forecast (top) for late winter (Jan-Mar ’10) was fairly consistent with El Niño expectations, while the more recent updates (right) have been much less optimistic for Arizona and Colorado’s mountains in particular.** ***Historical skill during the last decade has been better for earlier forecasts!***

# A first attempt at predicting Lees Ferry runoff in 2010




**Best predictor at this lead-time is tendency of east Pacific Niño SST gradient over the early summer – anticipates a slight deficit (about -7%) for next year's flow.**

# Executive Summary

- **Next two weeks don't look particularly active for the southwestern U.S., with one mid-sized storm system crossing our region later this week, but not much behind that until possibly later next week.**

- **Current classification of growing El Niño / neutral PDO gives most of Utah and Colorado better than average precipitation chances through November, but decreased chances for moisture in the core winter months, followed by improved chances for late season precipitation in spring. If this El Niño were to strengthen further, this would increase precipitation chances in spring, but would not necessarily help during the winter season.**

- **Given this sequence of typical El Niño impacts, it will be of interest to monitor both ENSO status and snowpack as we get into the winter – the lower the snowpack gets in the winter (as percent of normal), the harder it will be to recover from this deficit, ditto for ENSO (weak winter El Niño has lower chances for spring-time pay-off).**

- **A first attempt at predicting Lees Ferry runoff based on information through October yields a below-average 'forecast' (around 13.5 M Af).**

# Unusual October Cold in NE Colorado -> ?