

Drought...I'll Know It When I See It

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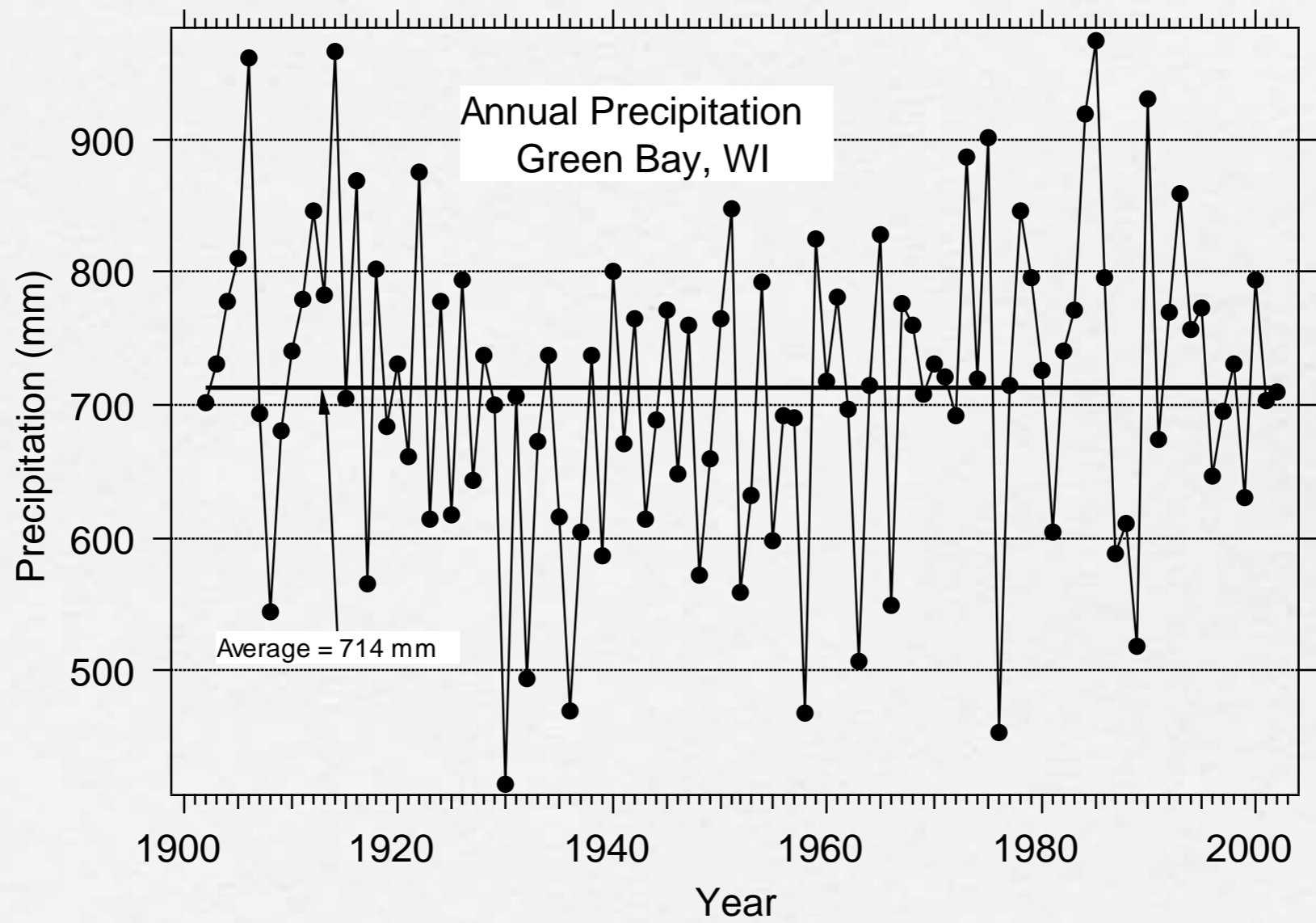
Hydroclimate

- Climate is a description of the long-term nature of weather at a location
- Assume that there is average, battered by annual departures
- Today will discuss ways of expressing precipitation variability and the extreme of drought

Variability

- ❑ No two years quite same
- ❑ Many ways to describe
- ❑ usual assumption is that last 30 years of observations best describe the current climate--the “normals”

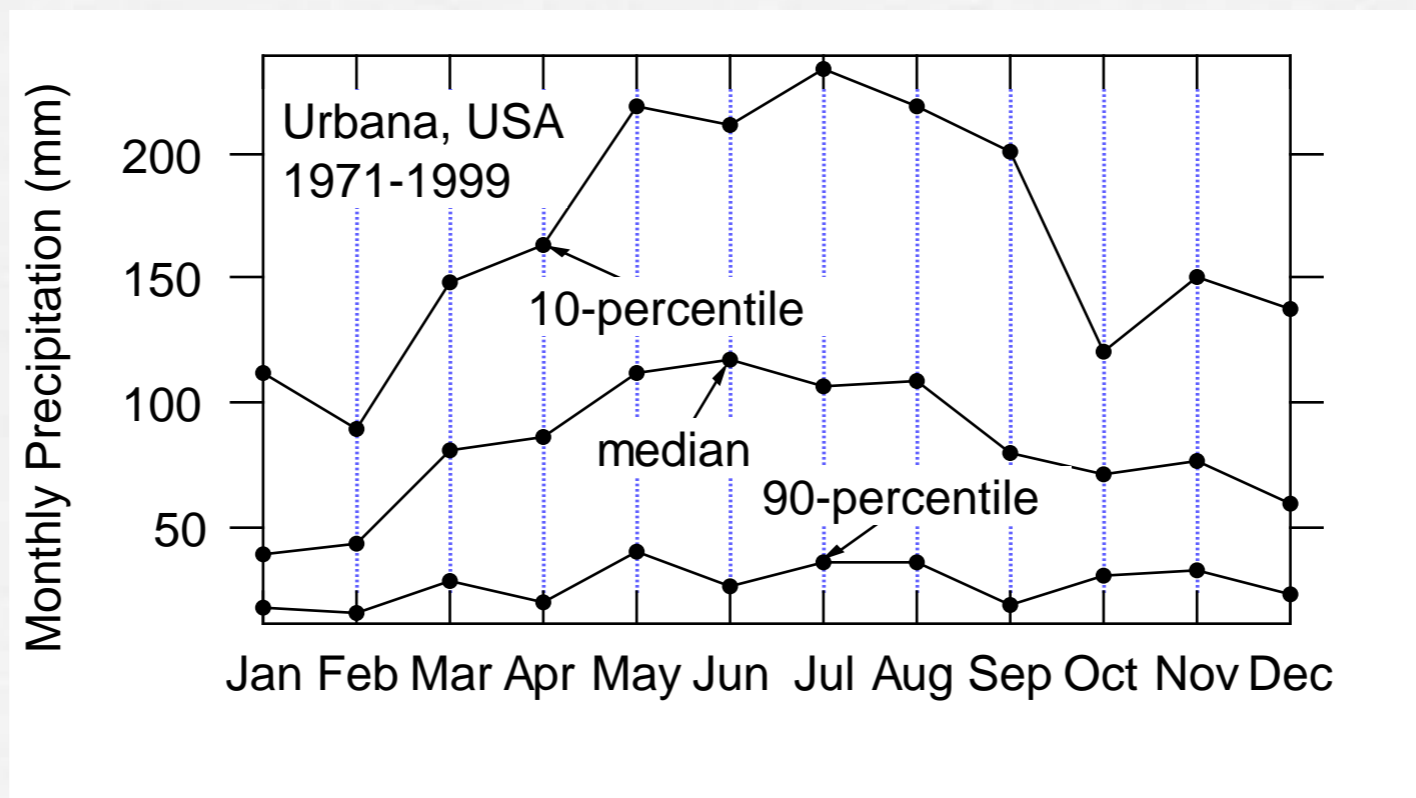
Annual total



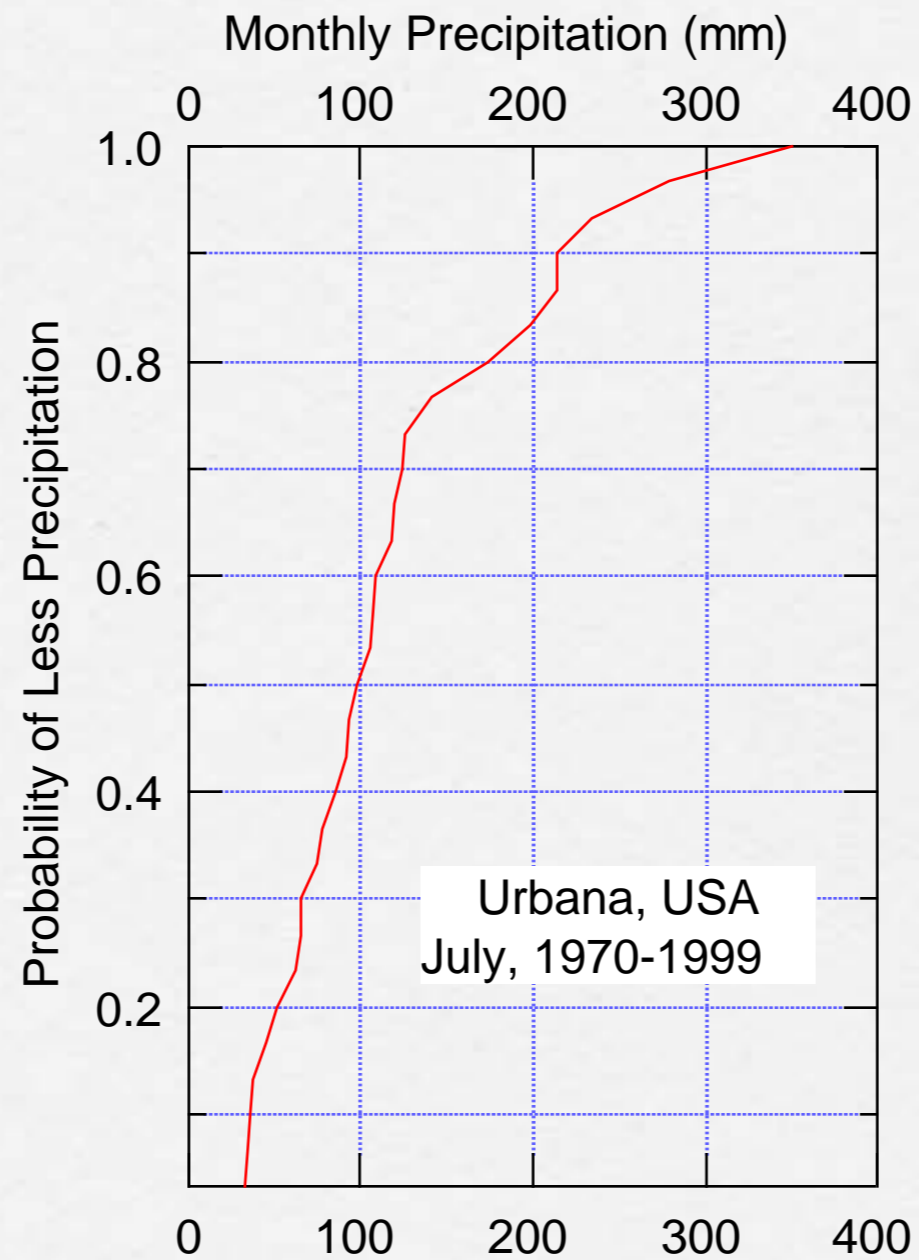
Percentiles

- ❑ Gather all totals together for “period of record”
- ❑ Sort from small to large
- ❑ Find amounts that reveal 10% larger (or smaller), etc.

Urbana deciles



Urbana July probabilities



When to cry “DROUGHT!”?

- A “creeping phenomenon”
- Rain-free →→ Dry spell →→ Drought

Drought Classification

- Meteorological, Agricultural, Hydrological...
- reminds us of variety of effects of drought
- Mostly for something to teach and test on?

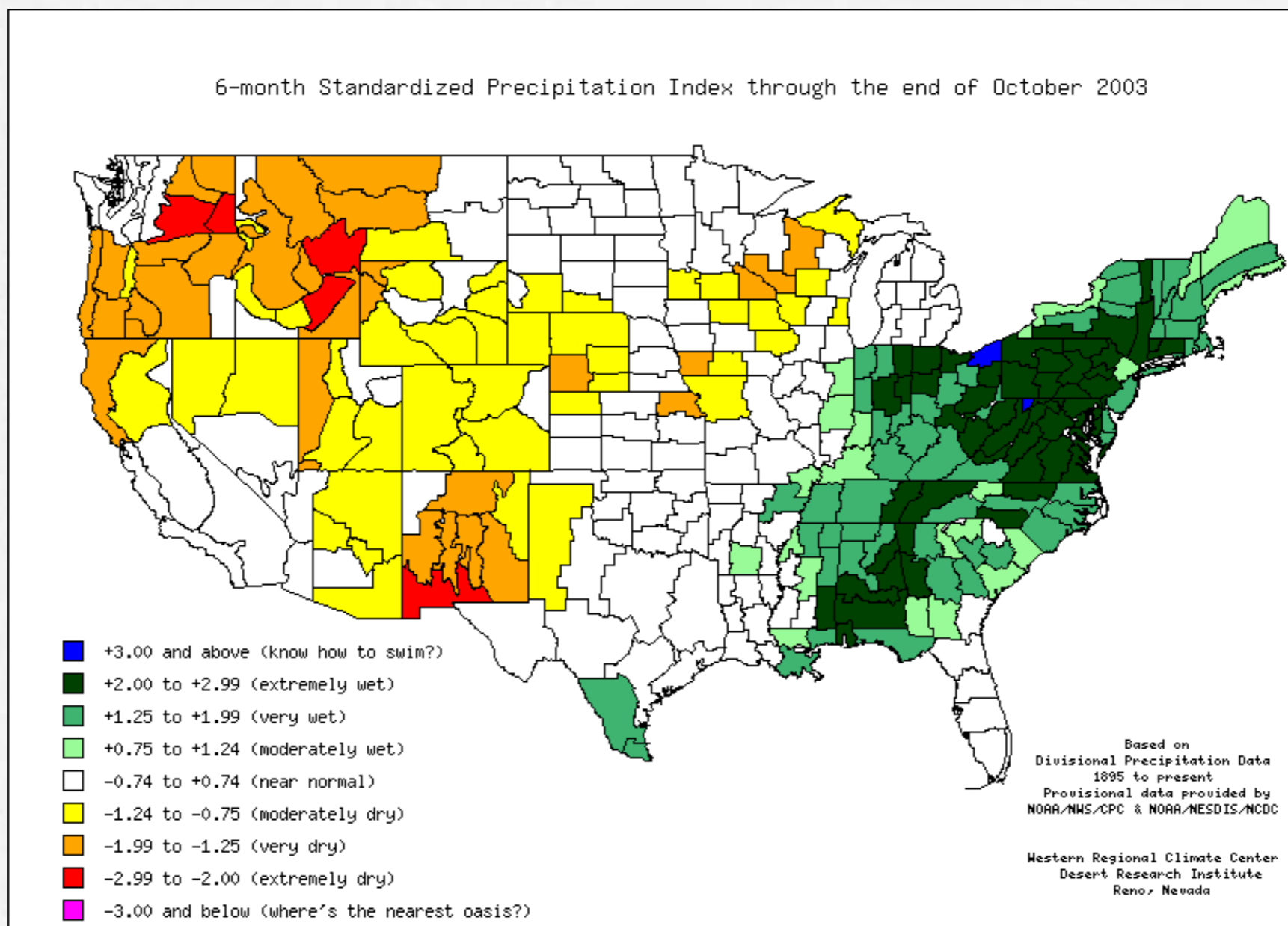
Drought Indexes

- Ways to summarize precipitation records into simple #
- Standardized Precipitation Index
- Palmer Drought Severity Index
- Crop Moisture Index

SPI-Standardized Precipitation Index

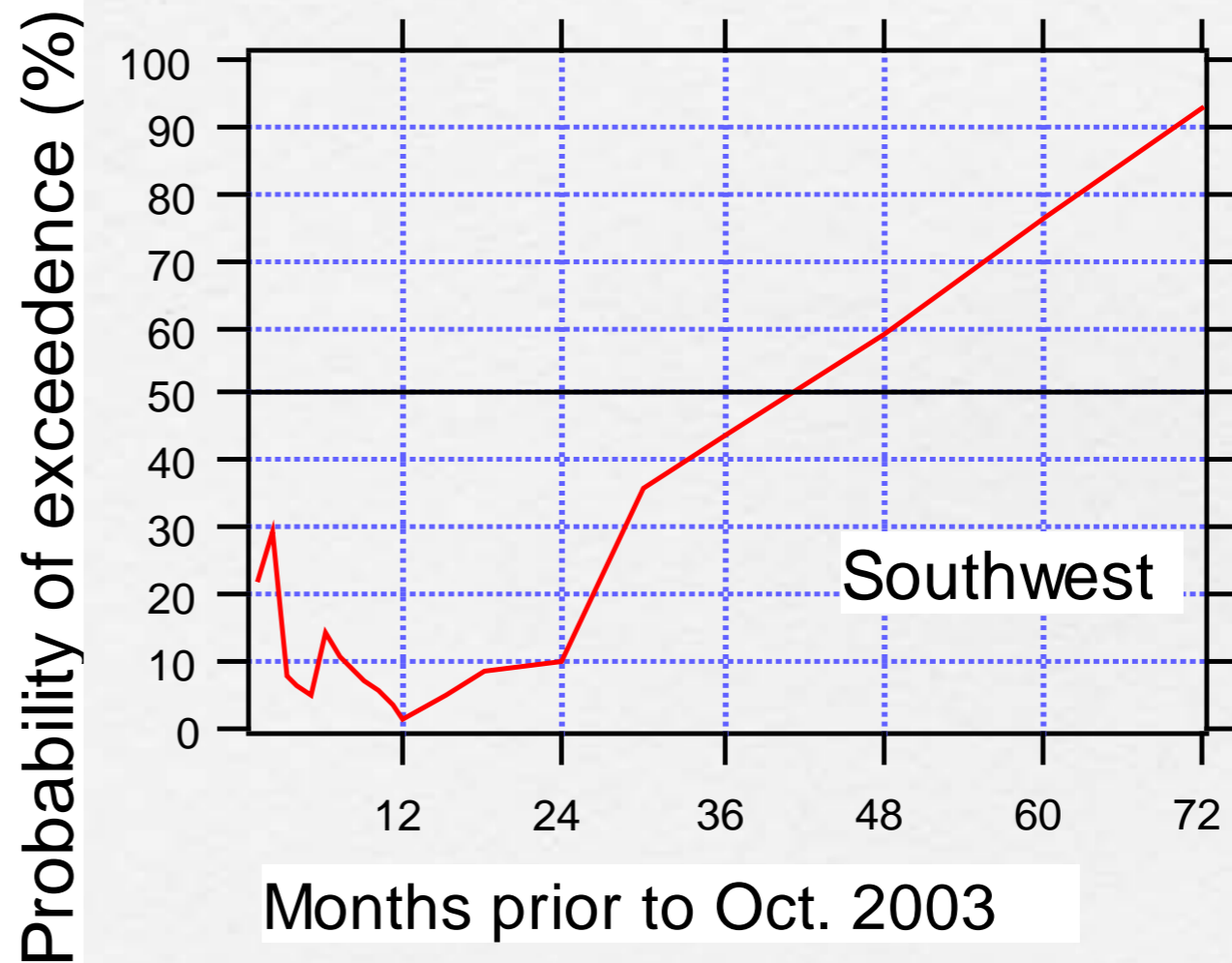
- ❑ www.wrcc.dri.edu/spi/spi.html
- ❑ summary of precipitation history at a location
- ❑ express as % exceedence or -3 to +3 index
- ❑ Fig 6 of “Hydroclimatology” handout
 - ❑ note durations, prior to 10/2003

SPI map-Fig. 6



SPI-see Fig 5 of Hydroclimatology

- location
- duration
- time



SPI-pause to think...

- Study graph of a region for 1 minute
 - How does it jibe with your memory??
- Compare with neighbor...

PDSI-Palmer Drought Severity Index

- ❑ www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif
- ❑ Scale of -4(dry) to +4(wet)
- ❑ Widely used for relief decisions

PDSI

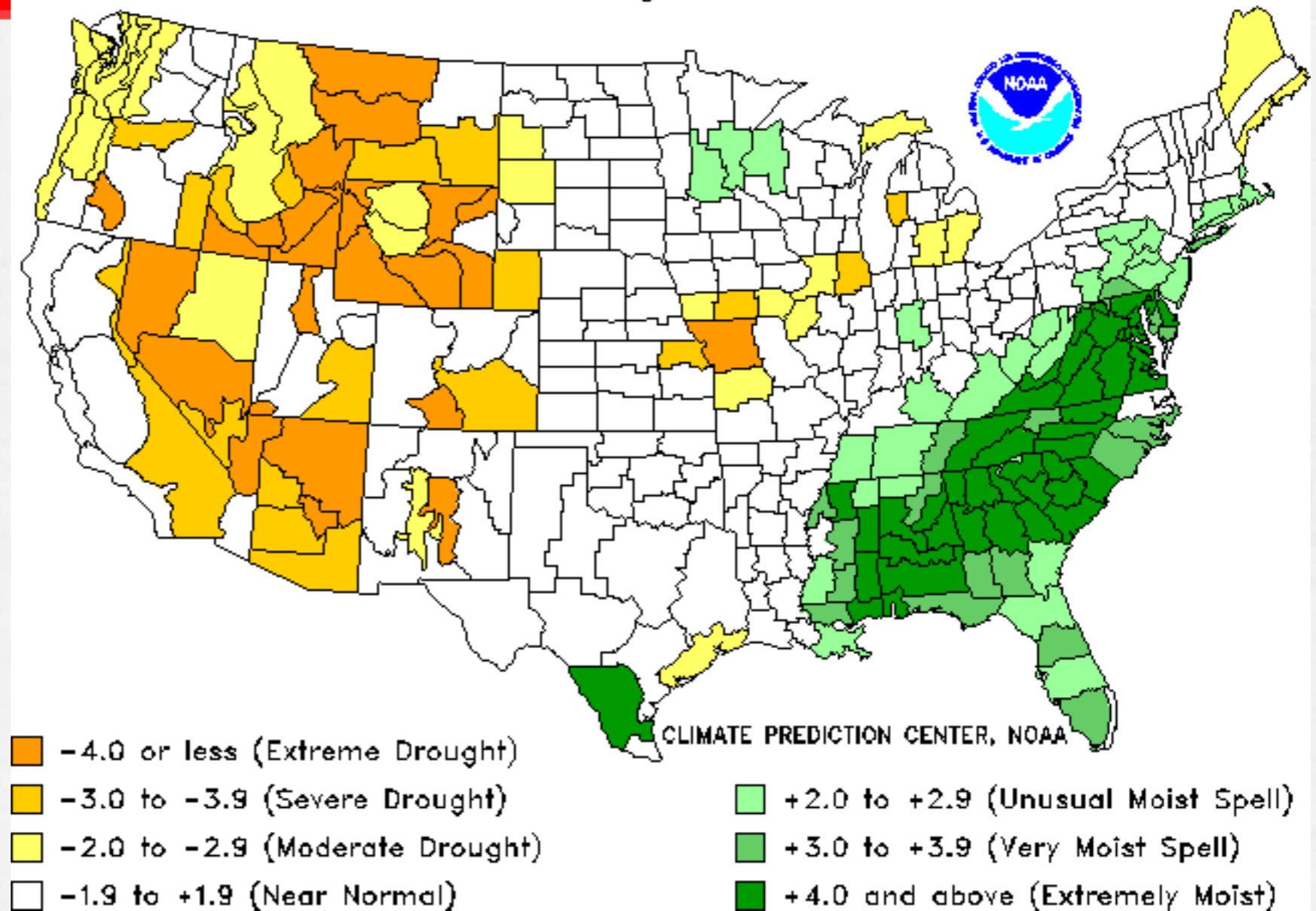
- ❑ estimates soil water holding capacity and evaporation (yeah, right!)
- ❑ duration is not clearly defined
- ❑ losing ground to newer indexes

PDSI-

Drought Severity Index by Division

Weekly Value for Period Ending 5 JUL 2003

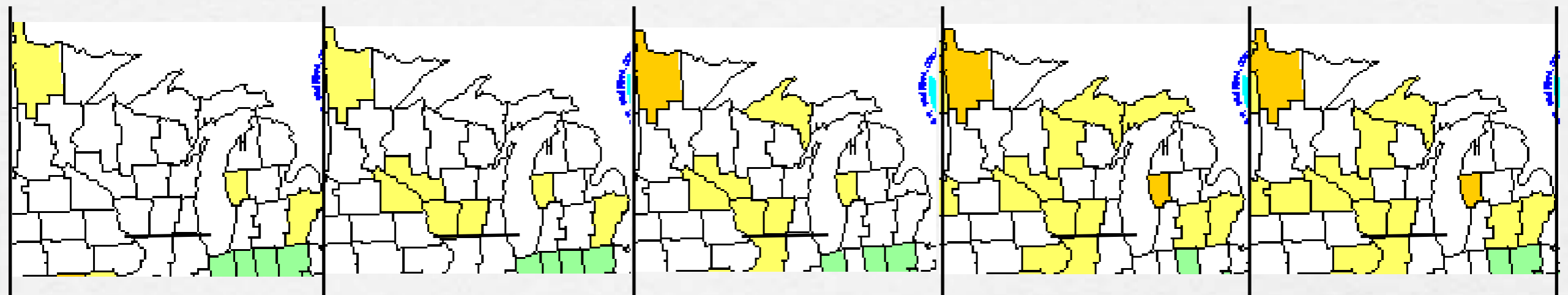
Long Term Palmer



PDSI in WI last seasons

- Figure 7 in Hydroclimatology
- Snipped out WI from map in 1st week of month
- See drought evolve, as recognized by PDSI

PDSI August 2003



8/2

8/9

8/16

8/23

8/30

The future?

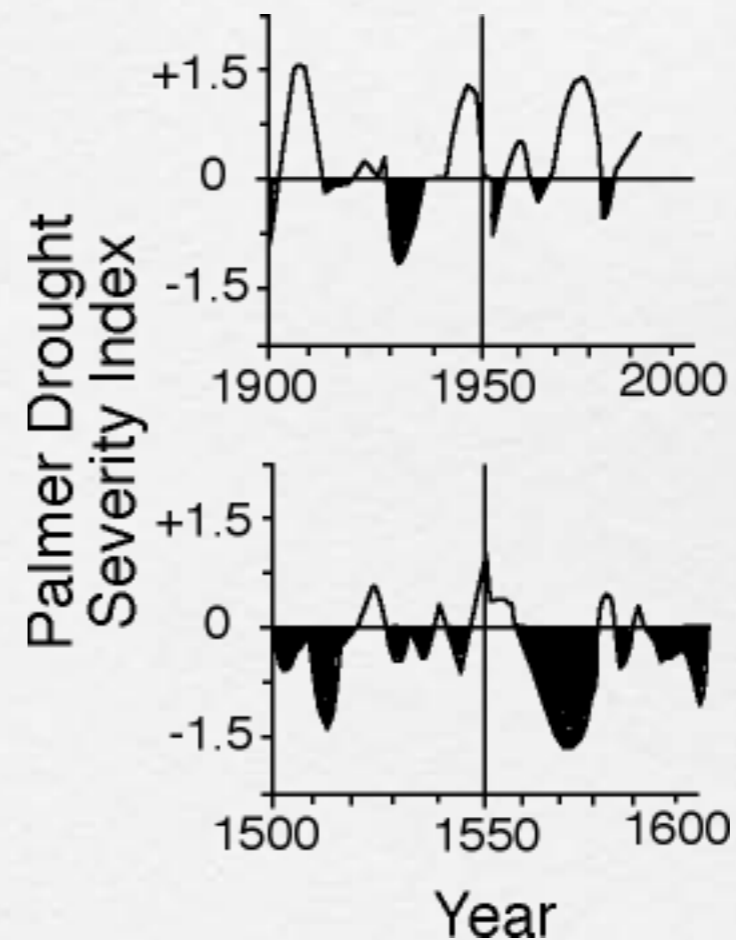
- ❑ Federal government folks experimenting with “blends” of indices and additional data to create drought maps
- ❑ drought.unl.edu/dm/current.html
- ❑ predictions? not possible in Mid-West
 - ❑ climatology as good as it gets

Will there be big droughts?

- ❑ drought indexes are created with relatively recent hydroclimate in mind
- ❑ what does 100s and 1000s of years ago suggest about drought?
- ❑ “paleoclimatology” makes use of “proxies”
 - ❑ lake sediments, tree rings

PDSI from tree-rings

- for Missouri
- drought of 30s exceeded in 16th century



Summary

- precipitation variation can be described by various statistics
- drought is difficult to define
 - start, severity, end
- various “Index” calculations in use, with newer “blends,” all on the WWW

Summary-2

- ❑ Study of past hydroclimate by proxies reveals megadroughts
- ❑ no reason to assume we are not at risk...