

# *Tree-Ring Based Reconstructions of Precipitation Variability in SW Wyoming over the Past 750 Years*

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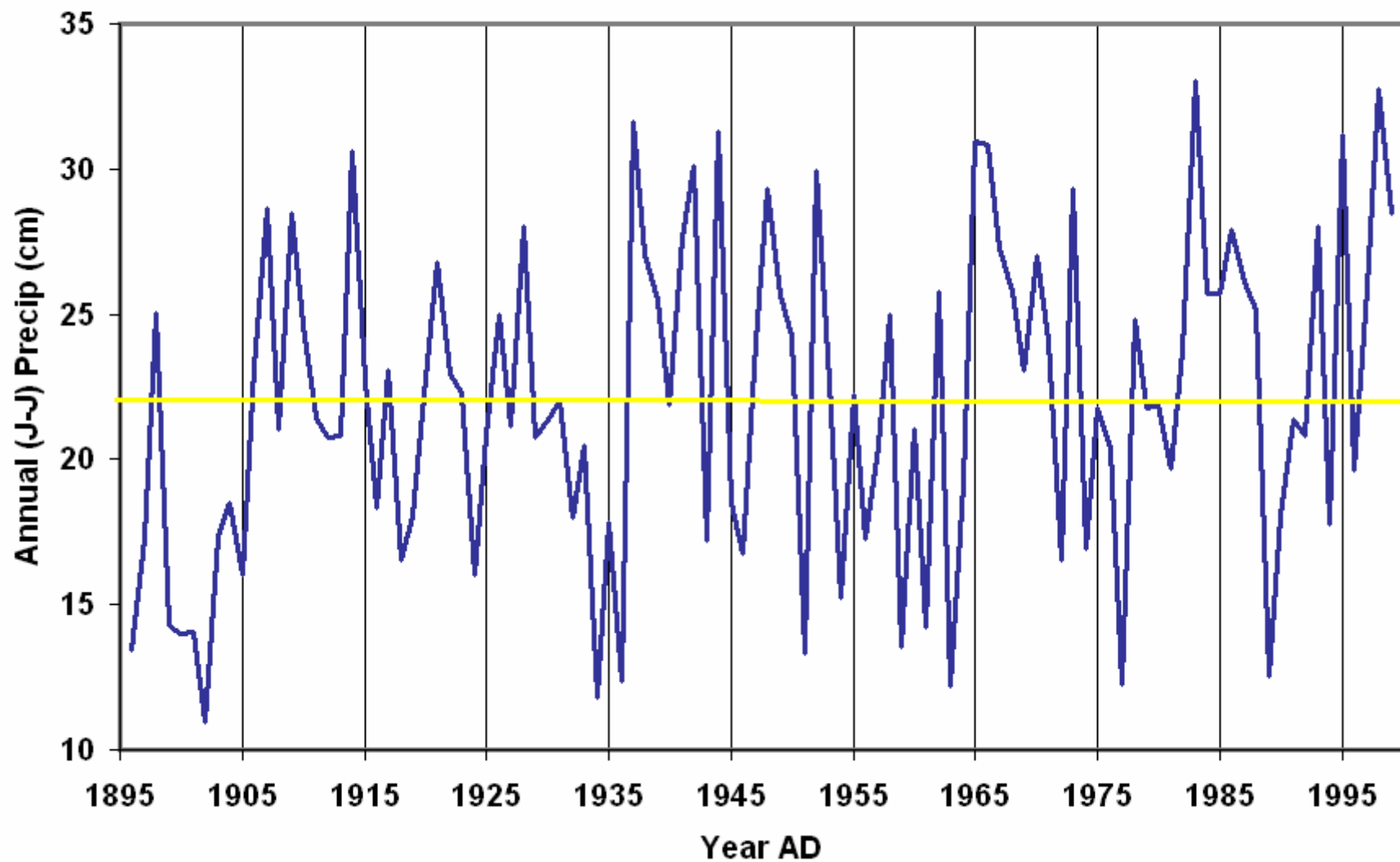
# Outline

- **Limitations of the instrumental weather record**
- **Reconstructing precipitation from tree-rings**
- **Precipitation variability in SW Wyoming/NE Utah from 1250-2001**
- **Preliminary Recommendations**

# 20th Century Climate

- **Almost all water-resources planning is based on the climate of the past ~100 years**
- *Problem: The instrumental record provides a limited sample of extreme wet/dry events*
- *Problem: Long-term trends and cycles may not be apparent in the instrumental record*

## Green River Basin Instrumental Precipitation

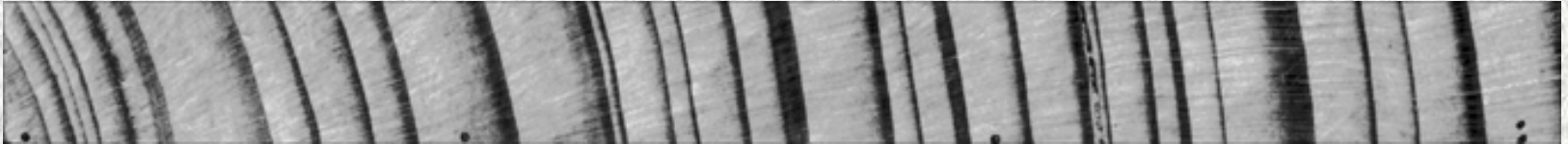


# Assessing the Instrumental Record

- How do conditions during the past 30-100 years compare to those over the past 750+ years?
- What levels of drought severity and duration should we expect and plan for?

# Long-Term Perspective

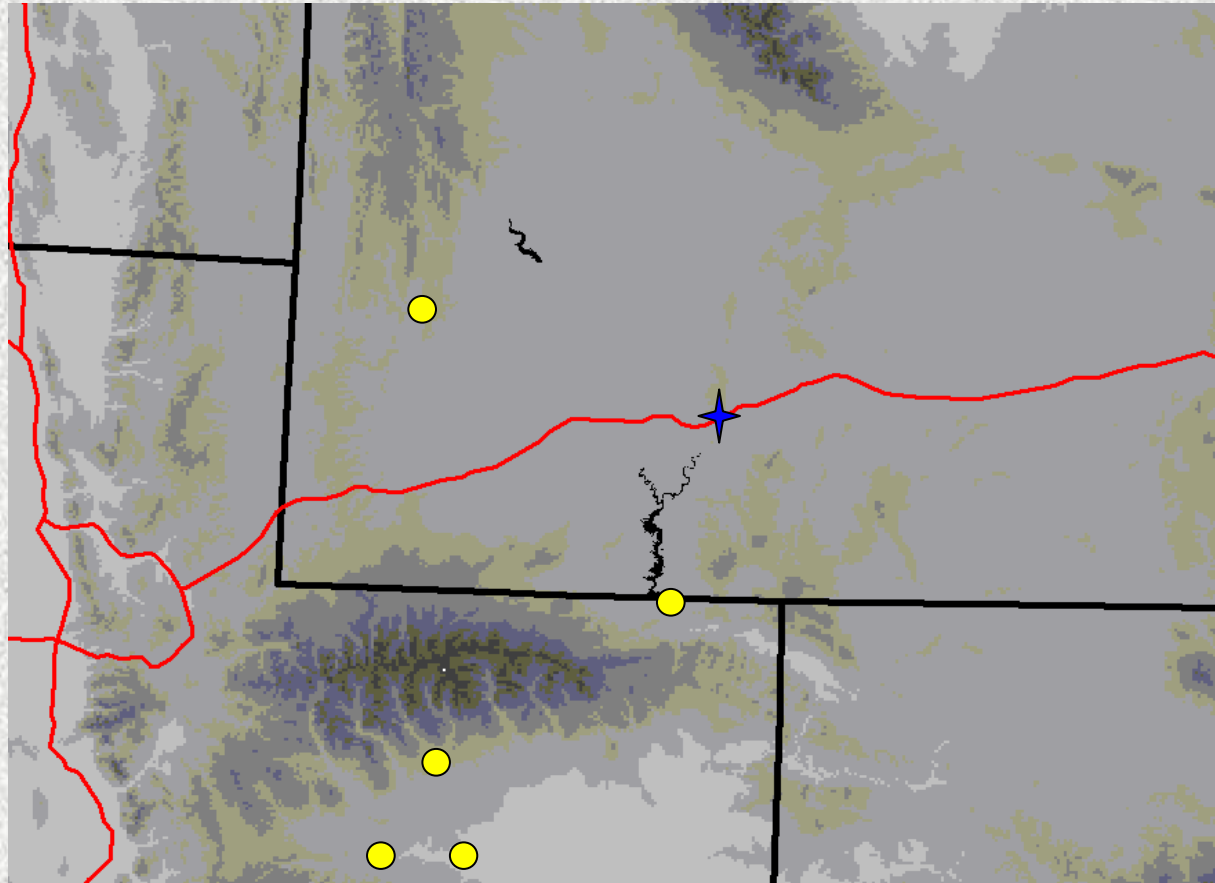
- Tree-Ring Archives



- Provide long duration (centuries to millennia) records
- Provide annual resolution
- Have been used successfully to document droughts worldwide



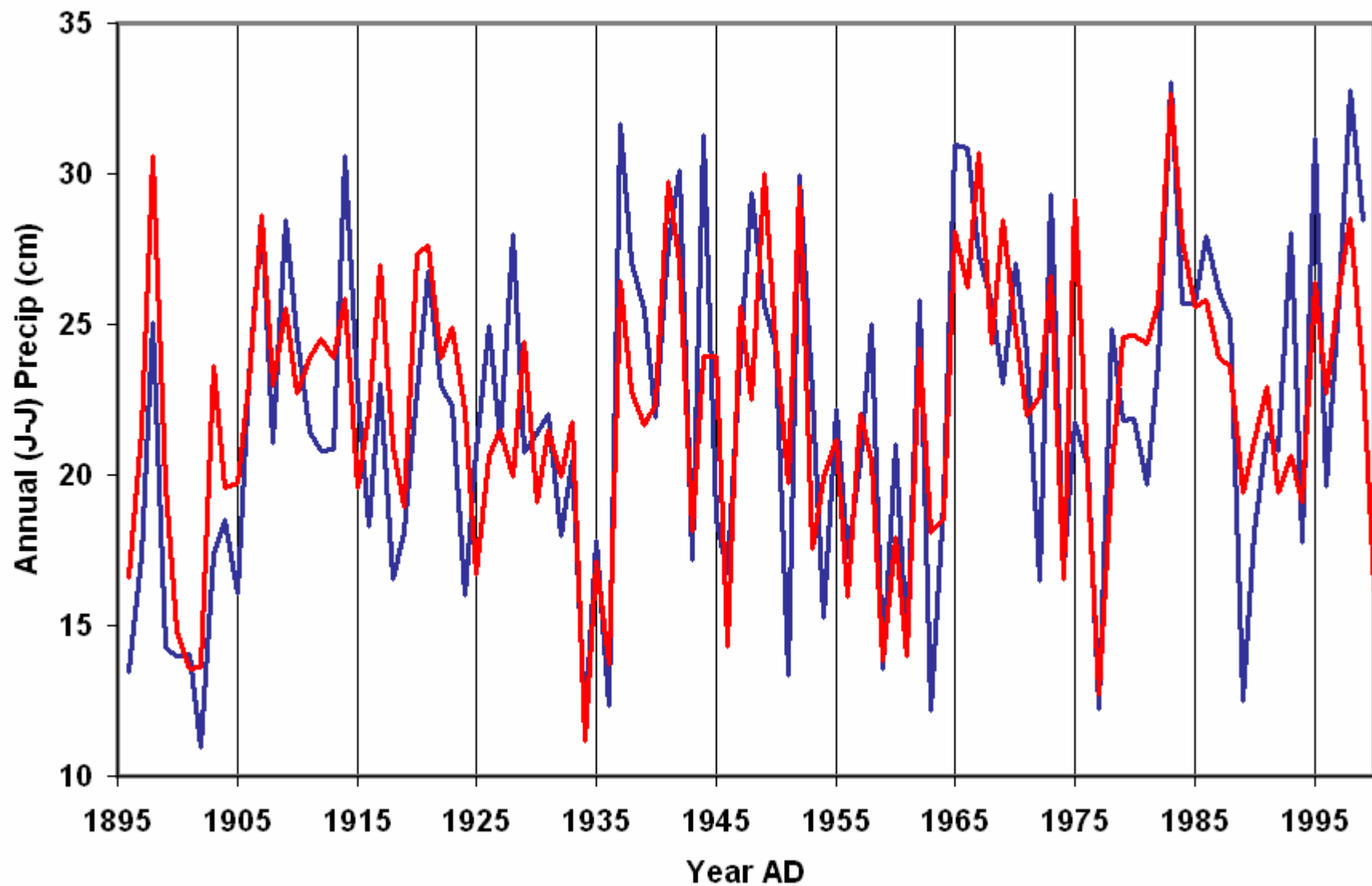
# Site Locations



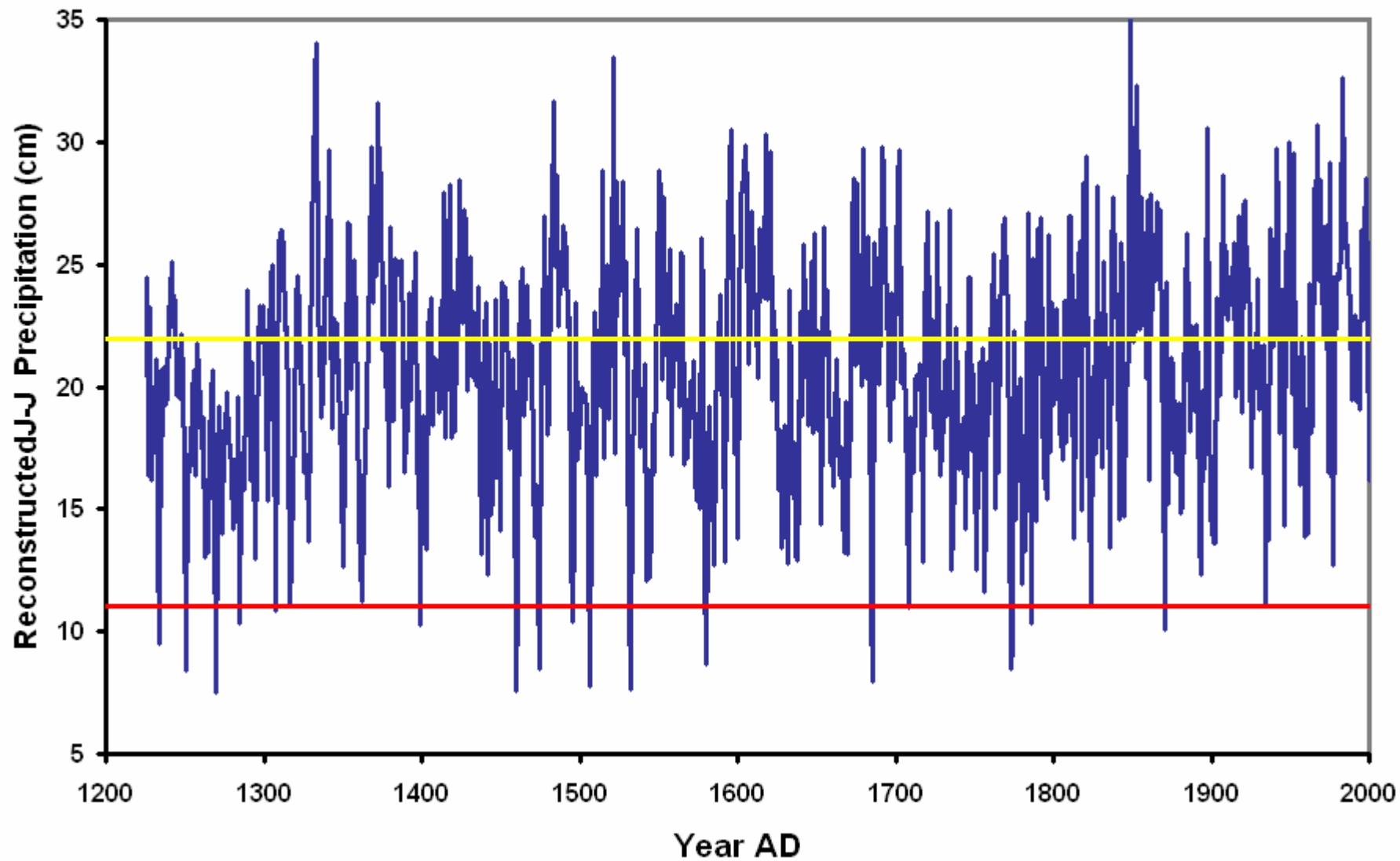
- 174 trees used in study
- Piñon and Limber Pines



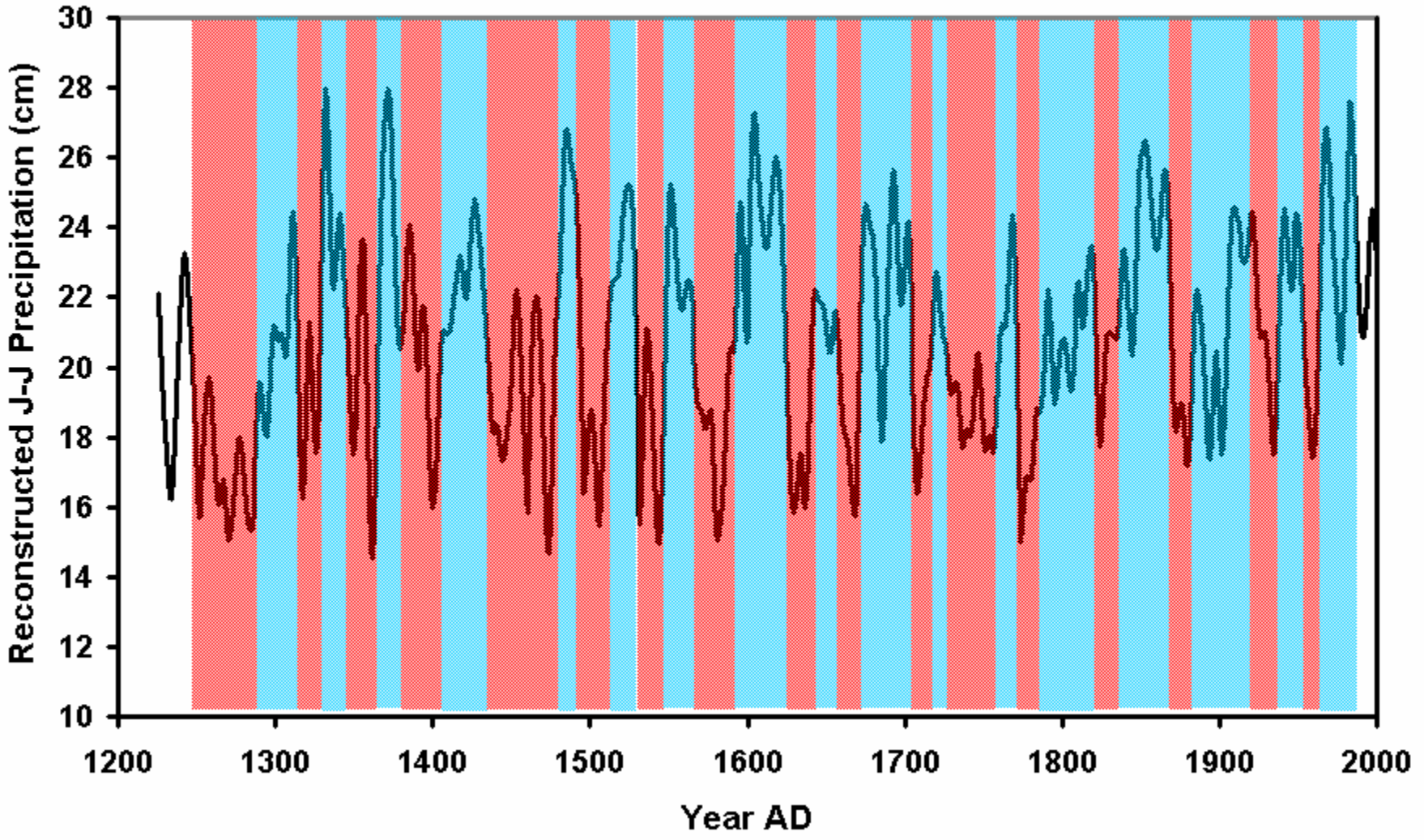
Calibration for Green River Basin Reconstruction (Obs vs. Pred)



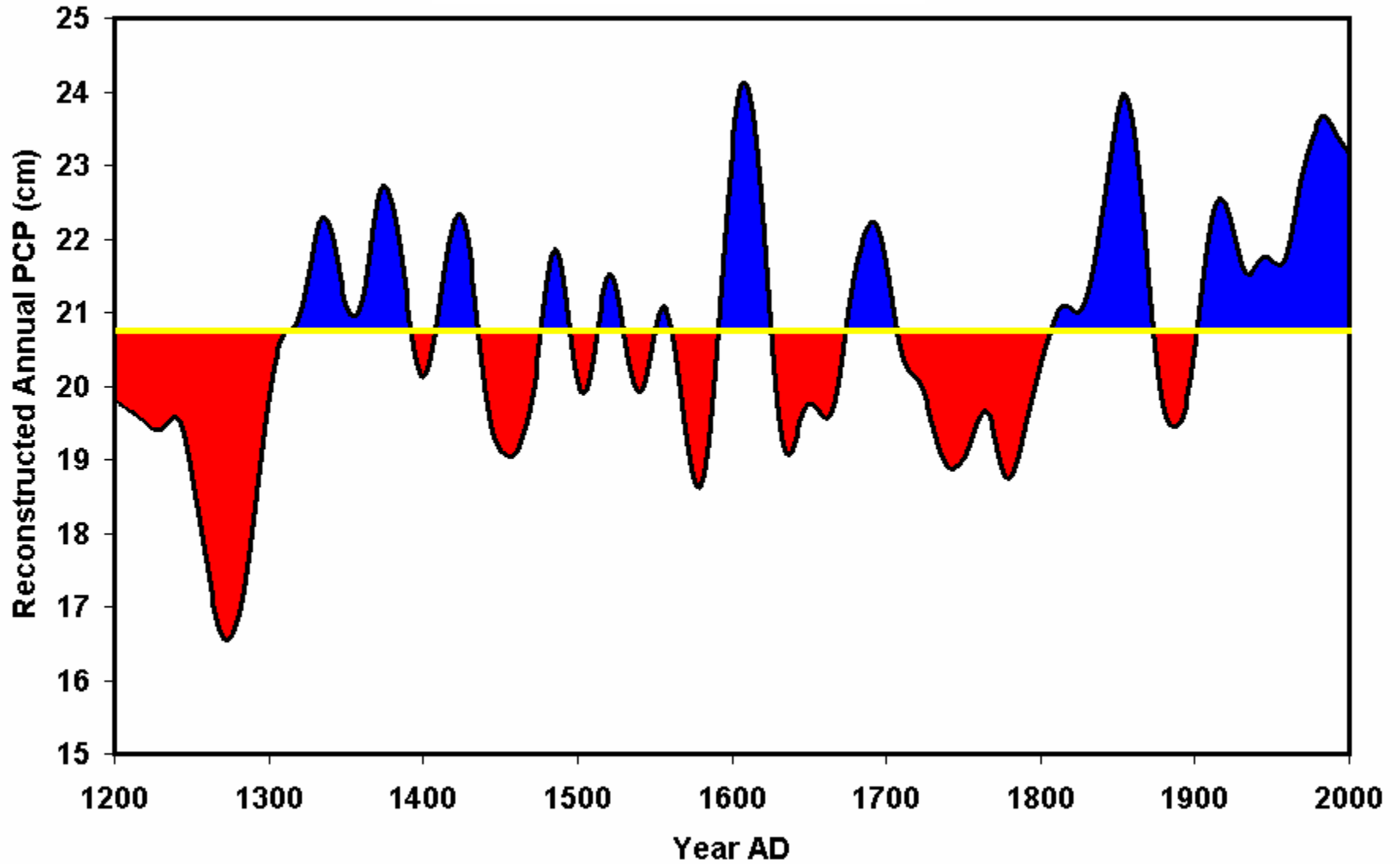
## Green River Basin Reconstructed Precipitation



# Green River Basin Decadal-Scale Wet/Dry Periods



## Green River Basin 50-yr Running Average



# Assessing the Instrumental Record

- **The 20<sup>th</sup> Century is not representative of the full range of climate “possible” in this area**
  - Droughts were relatively short*
  - Unusually wet conditions*
  - Predictions for future water availability based on the 20th Century record may be overly optimistic*

# Planning Strategies

- **What levels of drought severity and duration should the basin expect and plan for?**
  - *Should consider the possibility of severe, long-duration (>20 year) droughts*
  - *Consider tough restrictions on water use and development during severe droughts*

# Thanks

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