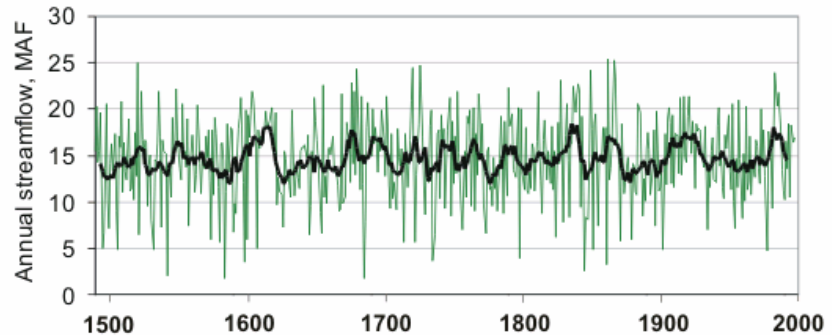


Informational Workshop:

Tree-ring reconstructions of streamflow and their use in water management

Cheyenne, WY, September 6, 2007



Organizer:

Clint Bassett, Cheyenne Board of Public Utilities - cbassett@cheyennebopu.org

Speakers:

Jeff Lukas, University of Colorado - lukas@colorado.edu

Steve Gray, Wyoming State Climatologist, University of Wyoming - sgray8@uwyo.edu

Glenn Tootle, University of Wyoming - tootleg@uwyo.edu

Sponsors:

Cheyenne Board of Public Utilities - <http://www.cheyennebopu.org>

Western Water Assessment - <http://wwa.colorado.edu>

Wyoming State Climate Office - <http://www.wrds.uwyo.edu/wrds/wsc/wsc.html>

Wyoming Water Resources Data System - <http://www.wrds.uwyo.edu/>



Agenda:

9:00 a.m. – Welcome

Introduction: group introductions, purpose of workshop (all)

Background; How tree rings record climate information (Lukas)

Building the tree-ring chronology (Lukas)

Generating the reconstruction of streamflow (Lukas)

10:30 a.m. – Break

How the reconstructions are being used in water management in the West (Lukas)

Existing and forthcoming tree-ring data and flow reconstructions for Wyoming (Gray and Tootle)

12:00 p.m. - End

Selected Resources – Tree rings, streamflow, and climate in the West

Web – Tree-ring data and streamflow reconstructions

WWA Tree-Ring Reconstructions of Streamflow - <http://www.colorado.edu/resources/paleo/>

Primary web resource for information about tree-ring data and application of the data, and access to streamflow reconstructions for the western US. Has links to all of the pages listed below.

Updated Streamflow Reconstructions for the Upper Colorado River Basin -

<http://www.ncdc.noaa.gov/paleo/pubs/woodhouse2006/woodhouse2006.html>

Provides access to the data for the new reconstructions of Lees Ferry and 9 other UpCo gages developed by Woodhouse et al.

Other Hydroclimatic Reconstructions – <http://www.ncdc.noaa.gov/paleo/recons.html#hydro>

Reconstructions of hydroclimatic variables, including drought indices, precipitation, and streamflow, contributed by researchers from around the world, archived by in the World Data Center for Paleoclimatology.

International Tree-Ring Data Bank - <http://www.ncdc.noaa.gov/paleo/treering.html>

Over 2500 tree-ring chronologies from all over the world are archived in the ITRDB. ITRDB can be searched by text query or map-based interface

Ultimate Tree-ring Web Pages - <http://web.utk.edu/~grissino/>

Put together by Henri Grissino-Mayer at the University of Tennessee, these extensive pages have almost everything you need to know about tree-ring science.

Web – Climate and streamflow data

Wyoming Water Resources Data System - <http://www.wrds.uwyo.edu/>

Clearinghouse for hydrological and climatological data for the State of Wyoming.

Wyoming State Climate Office - <http://www.wrds.uwyo.edu/wrds/wsc/wsc.html>

Additional climate and streamflow information, and climate-related links.

Wyoming Drought Monitor - <http://www.wrds.uwyo.edu/wrds/wsc/df/drought.html>

Current drought status and information for Wyoming.

Western Water Assessment's Intermountain West Climate Summary –

http://www.colorado.edu/products/forecasts_and_outlooks/intermountain_west_climate_summary/

Provides the latest climate information for the intermountain West in a single compact source.

Issued 8 times per year.

(Recent research articles on back)

Recent research articles – Tree rings, streamflow, and climate in the West

* = PDF available at <http://wwa.colorado.edu/resources/paleo/otherweb.html>.

+ = PDF available from Jeff Lukas (lukas@colorado.edu)

= PDF available from Steve Gray (sgray8@uwyo.edu)

^ = PDF available from Glenn Tootle (tootleg@colorado.edu)

+Cook, E.R., C.A. Woodhouse, C.M. Eakin, D.M. Meko, and D.W. Stahle (2004), Long-term aridity changes in the western United States. *Science*, 306, 1015-1018.

#Gray, S.T., J.L. Betancourt, C.L. Fastie and S.T. Jackson. 2004. Patterns and sources of multidecadal oscillations in drought-sensitive tree-ring records from the central and southern Rocky Mountains, *Geophysical Research Letters* 10, p. 1316.

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#Gray, S.T., S.T. Jackson, and J. L. Betancourt (2004) Tree-ring based reconstructions of interannual to decadal-scale precipitation variability for northeastern Utah since 1226 AD. *Journal of the American Water Resources Association* 40 (4), 947–960.

#Gray, S.T., J.L. Betancourt, C.L. Fastie and S.T. Jackson. 2007. Annual precipitation in the Yellowstone National Park region since AD 1173. *Quaternary Research*, 68(1), 18-27

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^Piechota, T.C., Hidalgo, H., Timilsena, J., and G.A. Tootle, 2004. Western U.S. drought: How bad is it? *EOS Transactions*, 85(32), 301-308.

^Timilsena, J., T. C. Piechota, H. Hidalgo and G. Tootle, 2007. Five Hundred Years of Hydrological Drought in the Upper Colorado River Basin. *Journal of American Water Resources Association*, 43(3), 798-812.

^Tootle, G. A., and T. C. Piechota, 2006. Relationships between Pacific and Atlantic ocean sea surface temperatures and U.S. streamflow variability. *Water Resources Research*, 42, W07411.

*Woodhouse, C.A. 2003. A 431-year reconstruction of western Colorado snowpack from tree rings. *Journal of Climate* 16: 1551-1561.

*Woodhouse, C.A., S.T. Gray, and D.M. Meko. 2006. Updated streamflow reconstructions for the Upper Colorado River basin. *Water Resources Research* 42(5): W05415

*Woodhouse, C.A. and J.J. Lukas. 2006. Multi-century tree-ring reconstructions of Colorado streamflow for water resource planning. *Climatic Change* 78: 293-315

*Woodhouse, C.A. and J.J. Lukas. 2006. Drought, Tree Rings, and Water Resource Management in Colorado. *Canadian Water Resources Journal* 31(4): 1-14.

*Woodhouse, C.A. and J.T. Overpeck. 1998. 2000 years of drought variability in the central United States. *Bulletin of the American Meteorological Society* 79: 2693-2714.