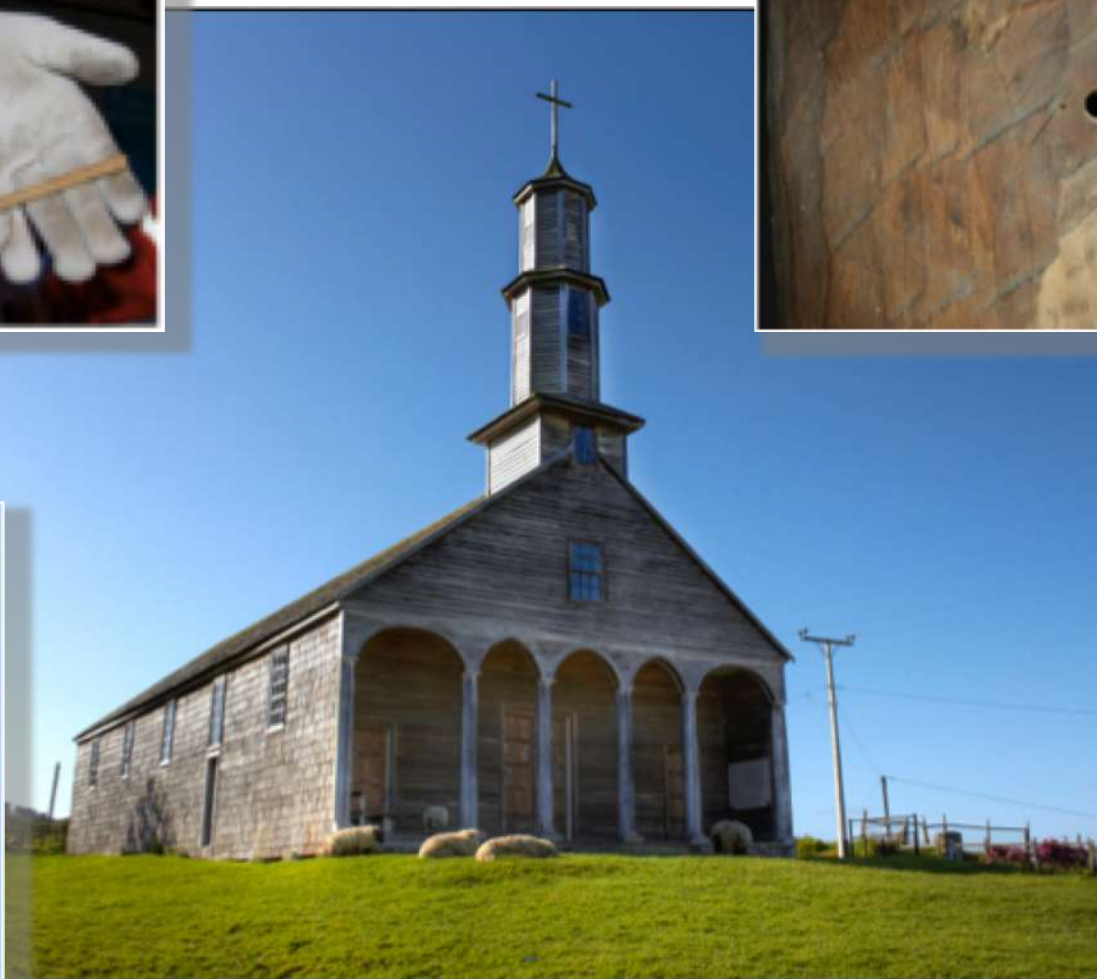


Environmental and Archaeological Research Using Trees Rings – Dave Sauchyn, U of R



Vilupulli
Church,
Isla de
Chiloé

Regina Archaeological Society, 15 March 2016

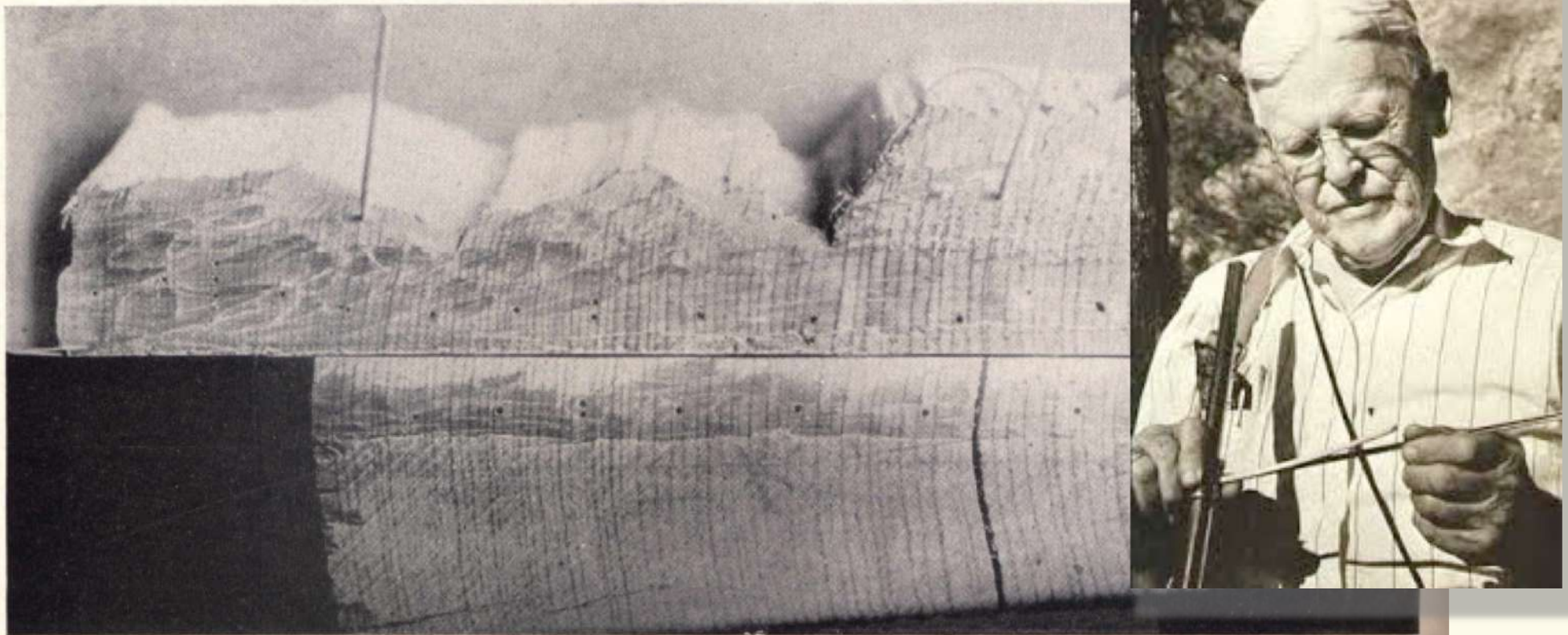
DATING OUR PREHISTORIC RUINS

HOW GROWTH RINGS IN TIMBERS AID IN ESTABLISHING THE RELATIVE AGES OF THE RUINED PUEBLOS OF THE SOUTHWEST

NATURAL HISTORY

BY
A. E. DOUGLASS*

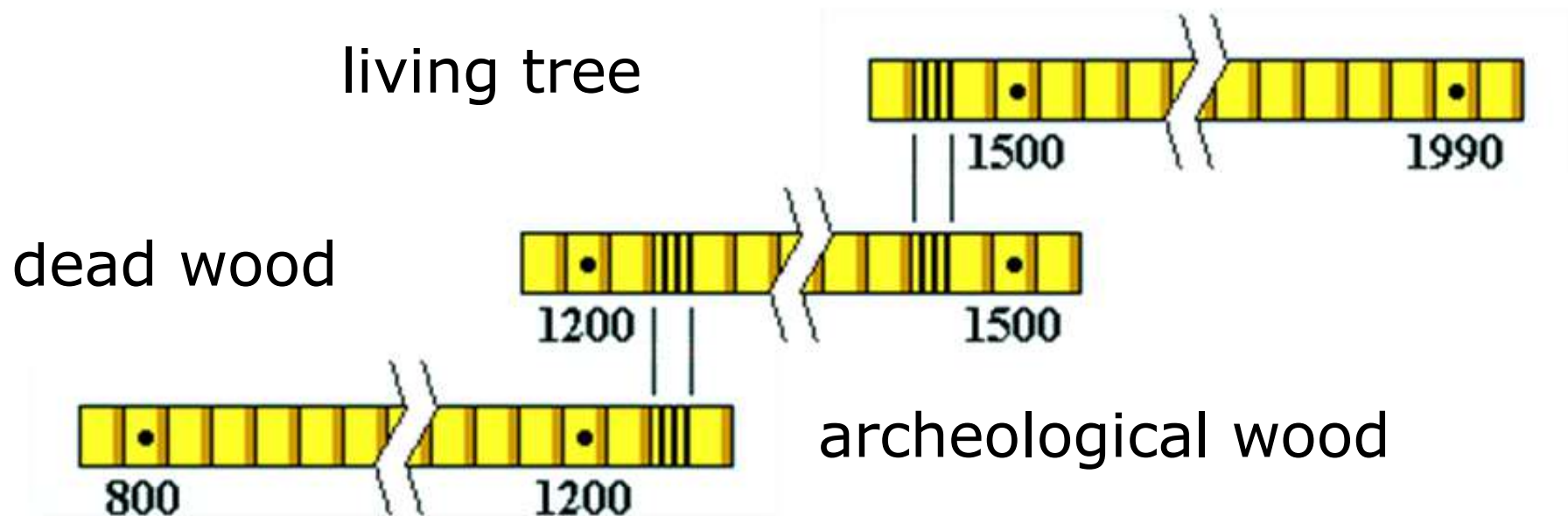
JANUARY-FEBRUARY, 1921



Sections of two beams, the upper from Aztec and the lower from Pueblo Bonito, placed side by side with their rings matching, to show how much the Aztec timbers grew after the Pueblo Bonito timbers had been cut

The Principle of Crossdating

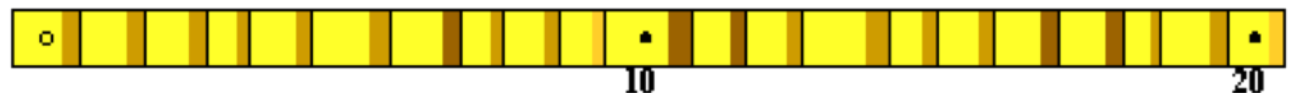
The outer growth of dead trees crossdates with inner portions of living trees



Sensitive



Complacent



Timbers from Farwell's Trading Post

For Parks Canada (Donalee Deck)



Results: The timbers were from trees dating to 1715-1853

Timbers from Fort Edmonton

For Royal Alberta Museum (Jack Brink)





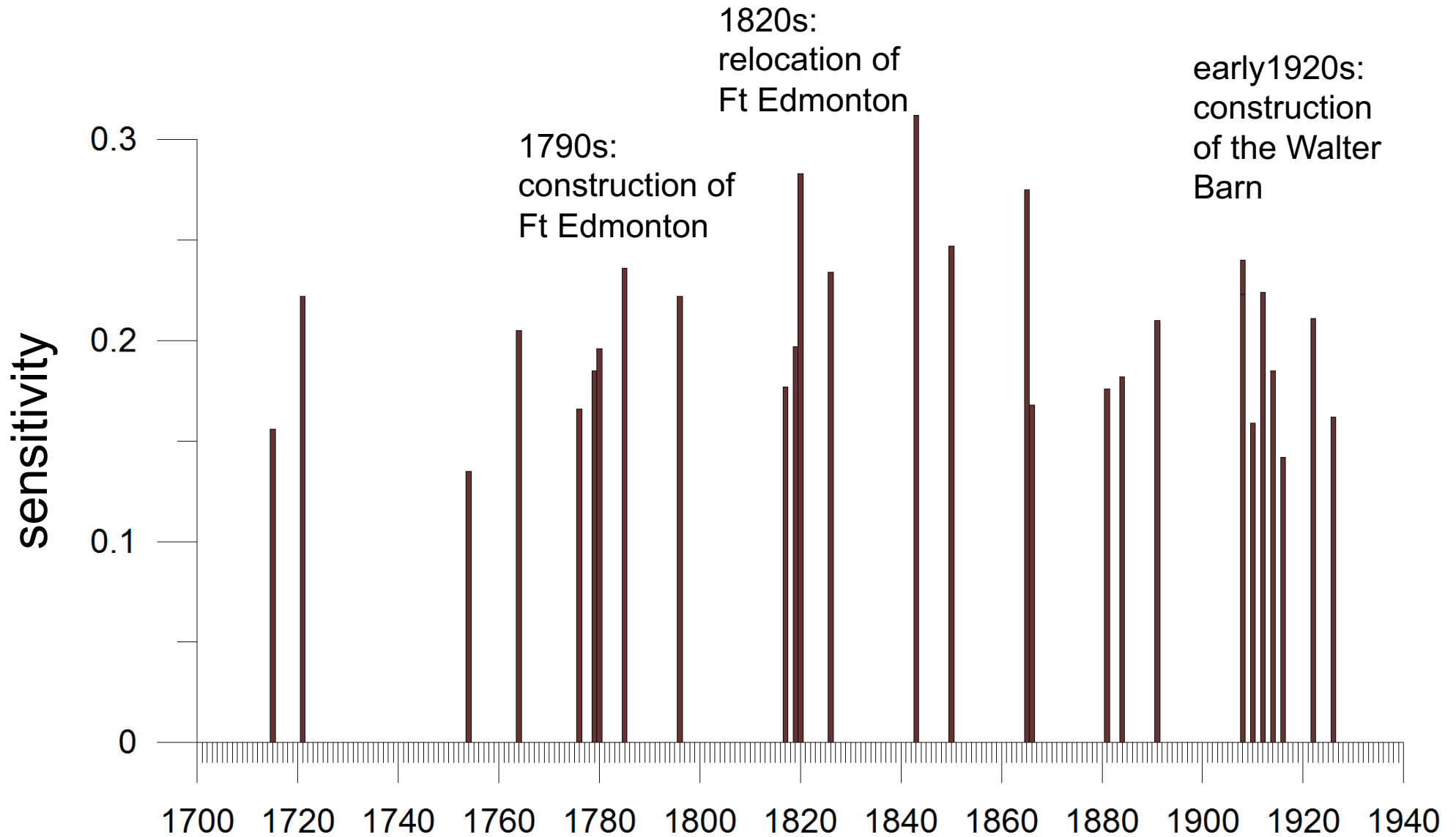
Short (40 yrs) complacent
ring-width series

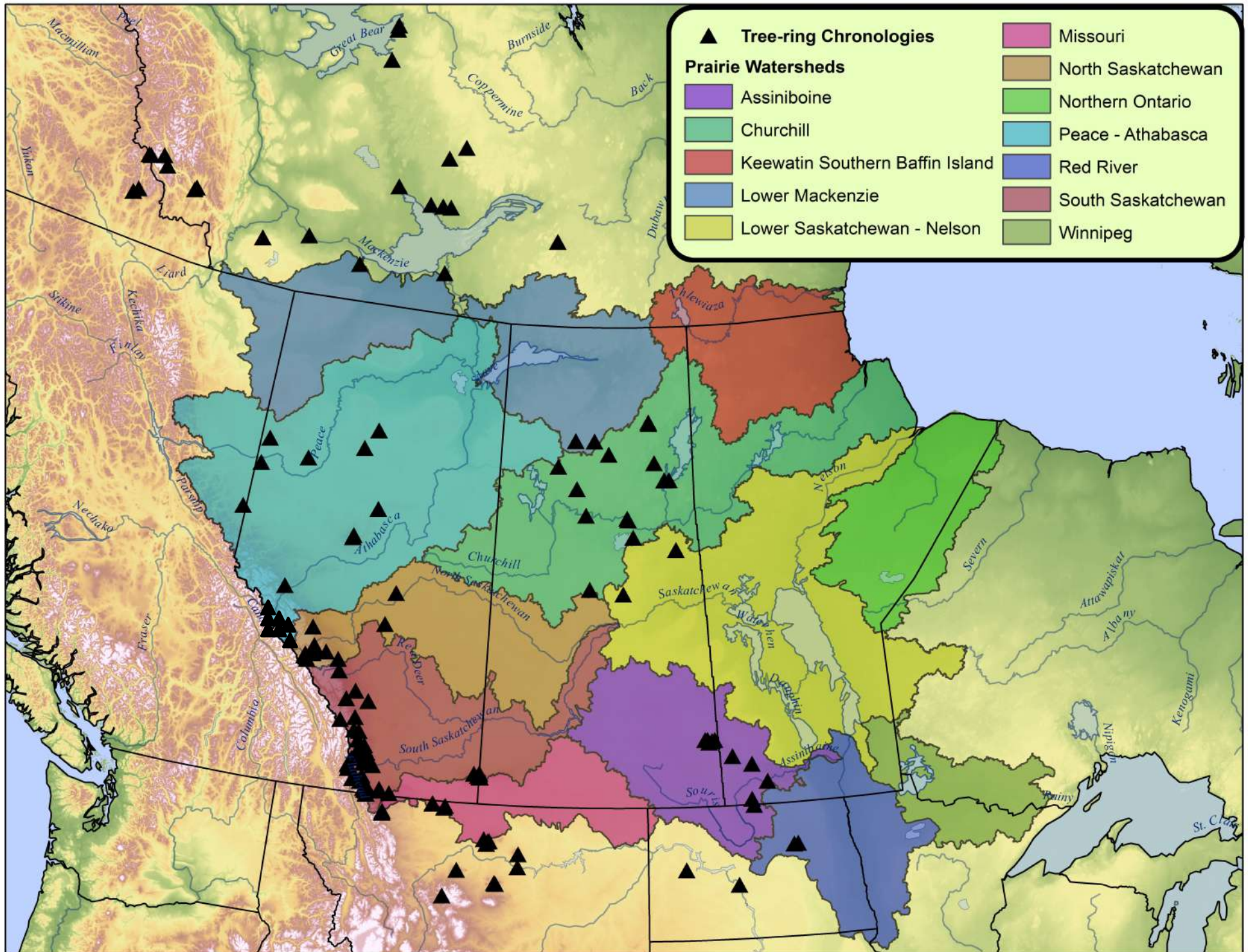
Note: final year often not preserved

Long (174 yrs) sensitive
ring-width series



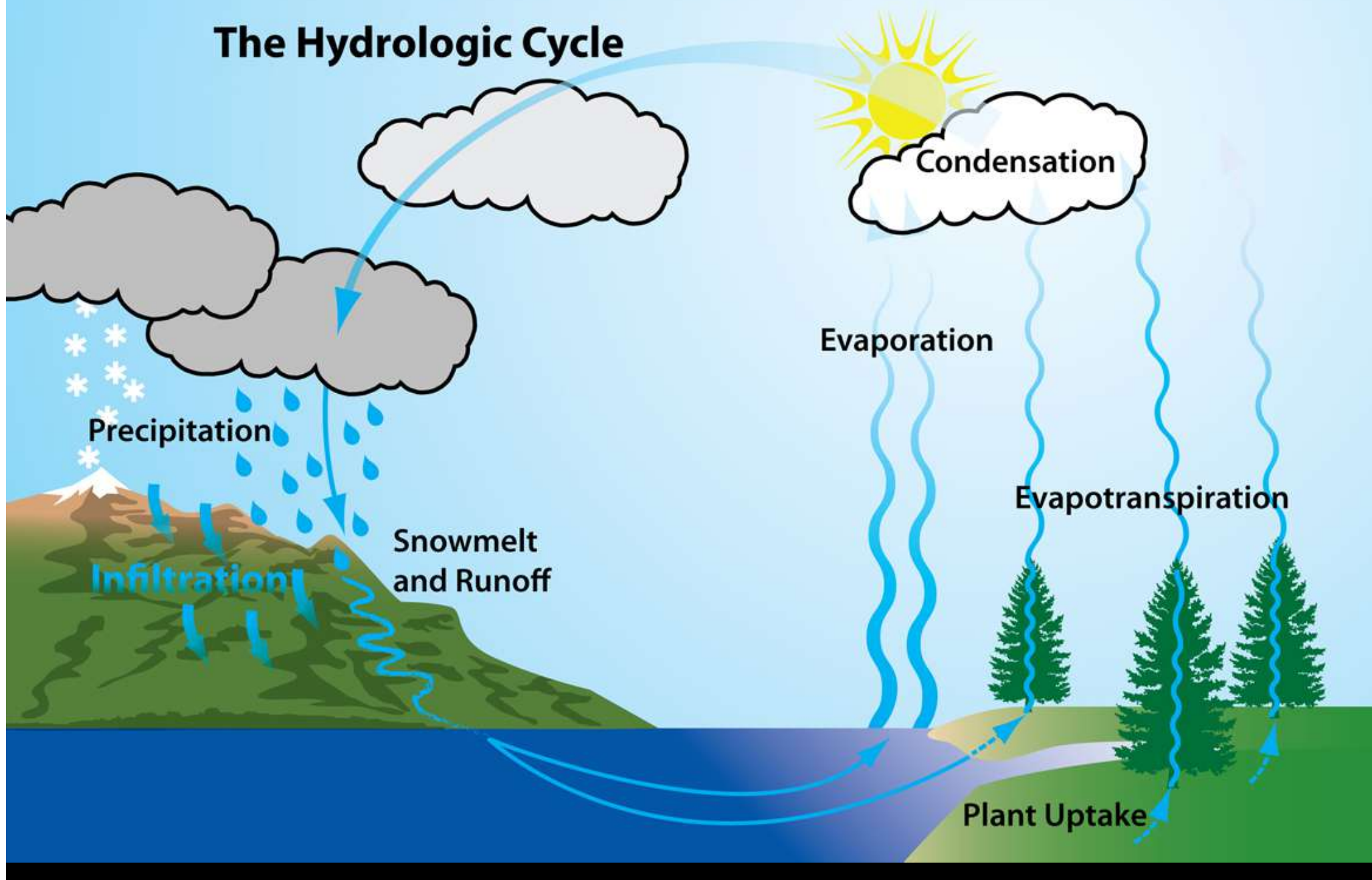
Most likely harvesting dates of 30 timbers





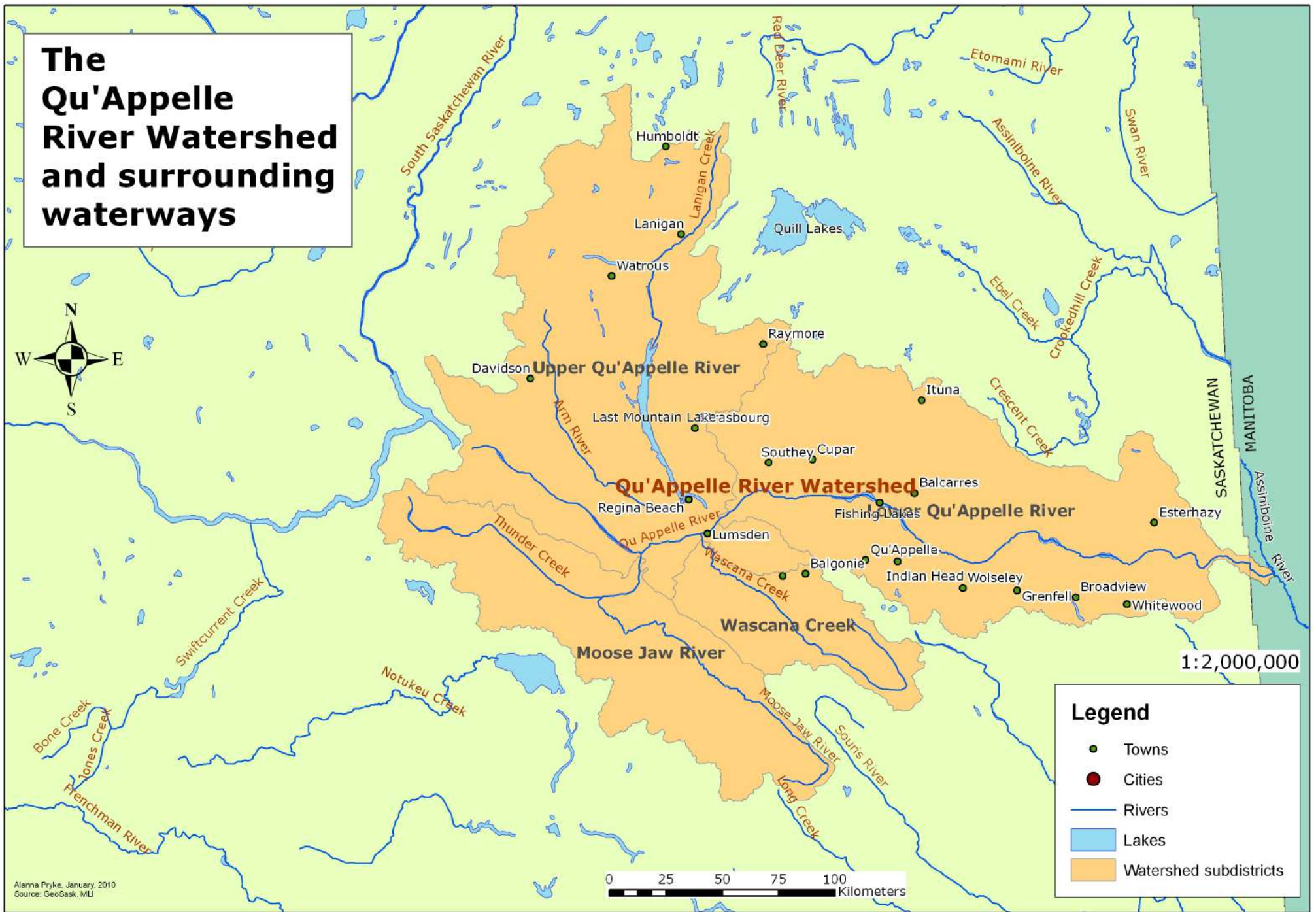
Trees are part of the hydrological cycle

The Hydrologic Cycle





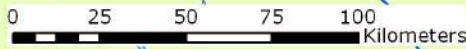
The Qu'Appelle River Watershed and surrounding waterways



1:2,000,000

Legend

- Towns
- Cities
- Rivers
- Lakes
- Watershed subdistricts



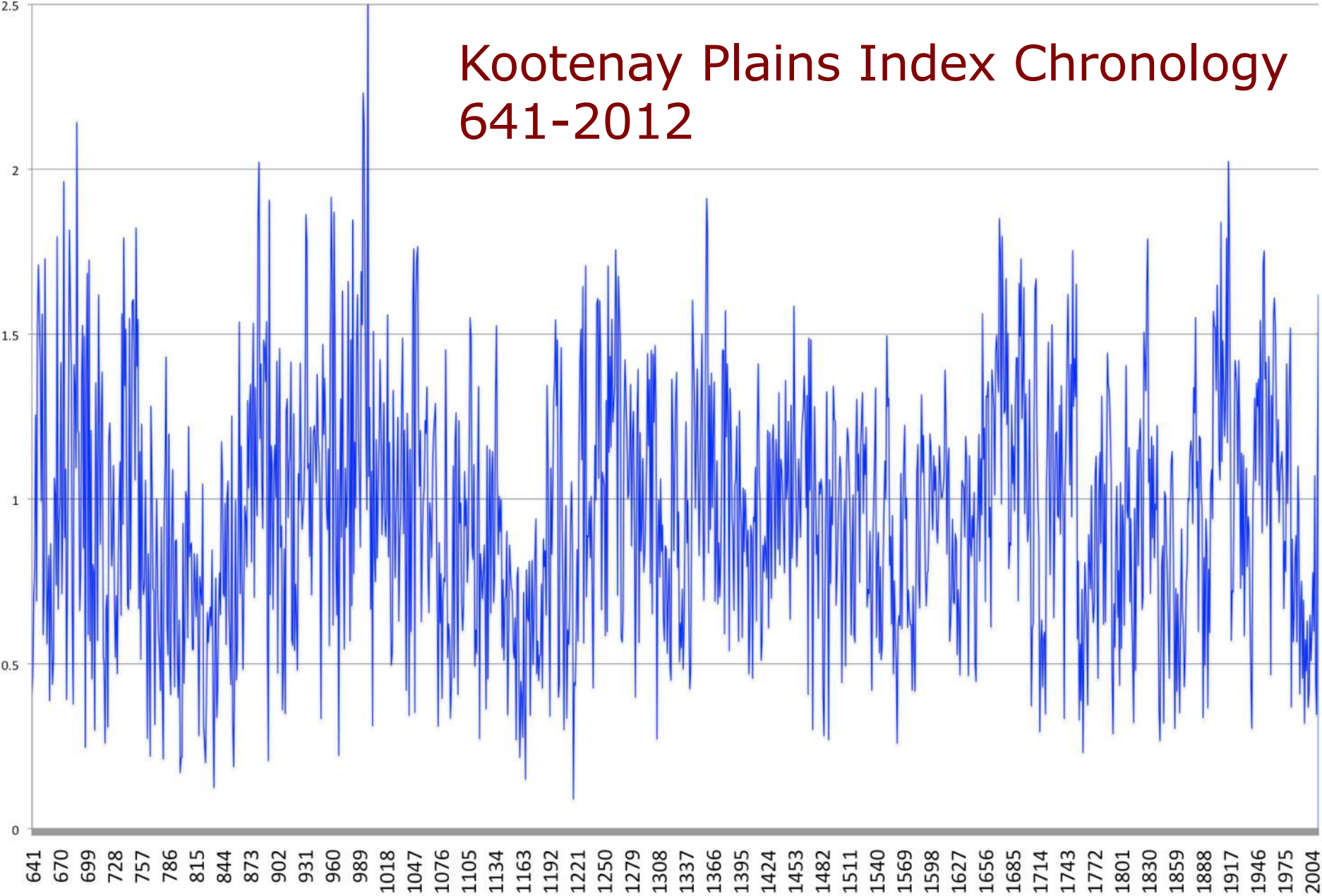
Alanna Fryke, January, 2010
Source: GeoSask, MLI

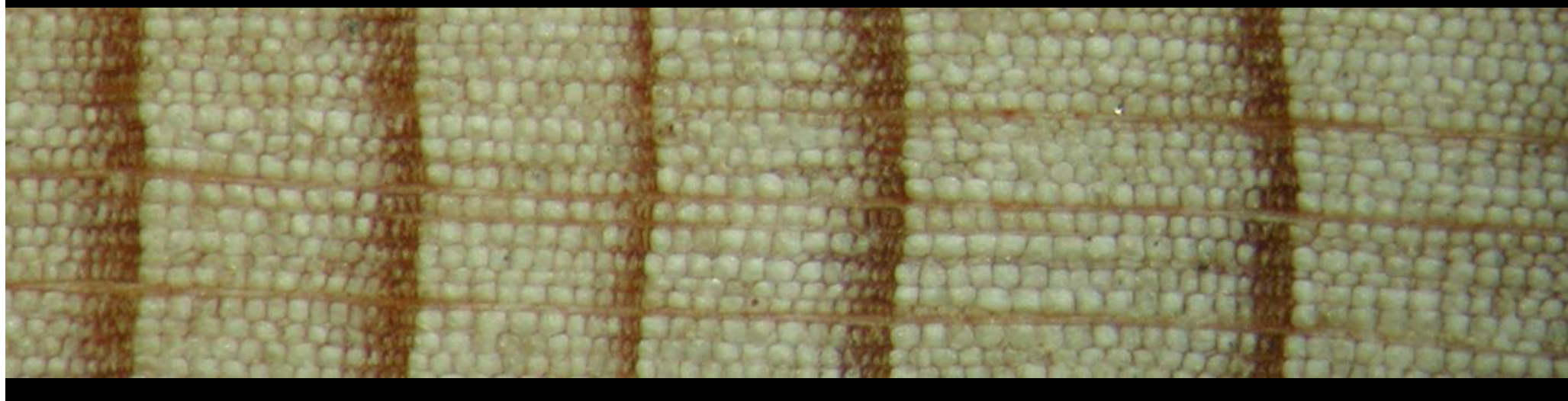






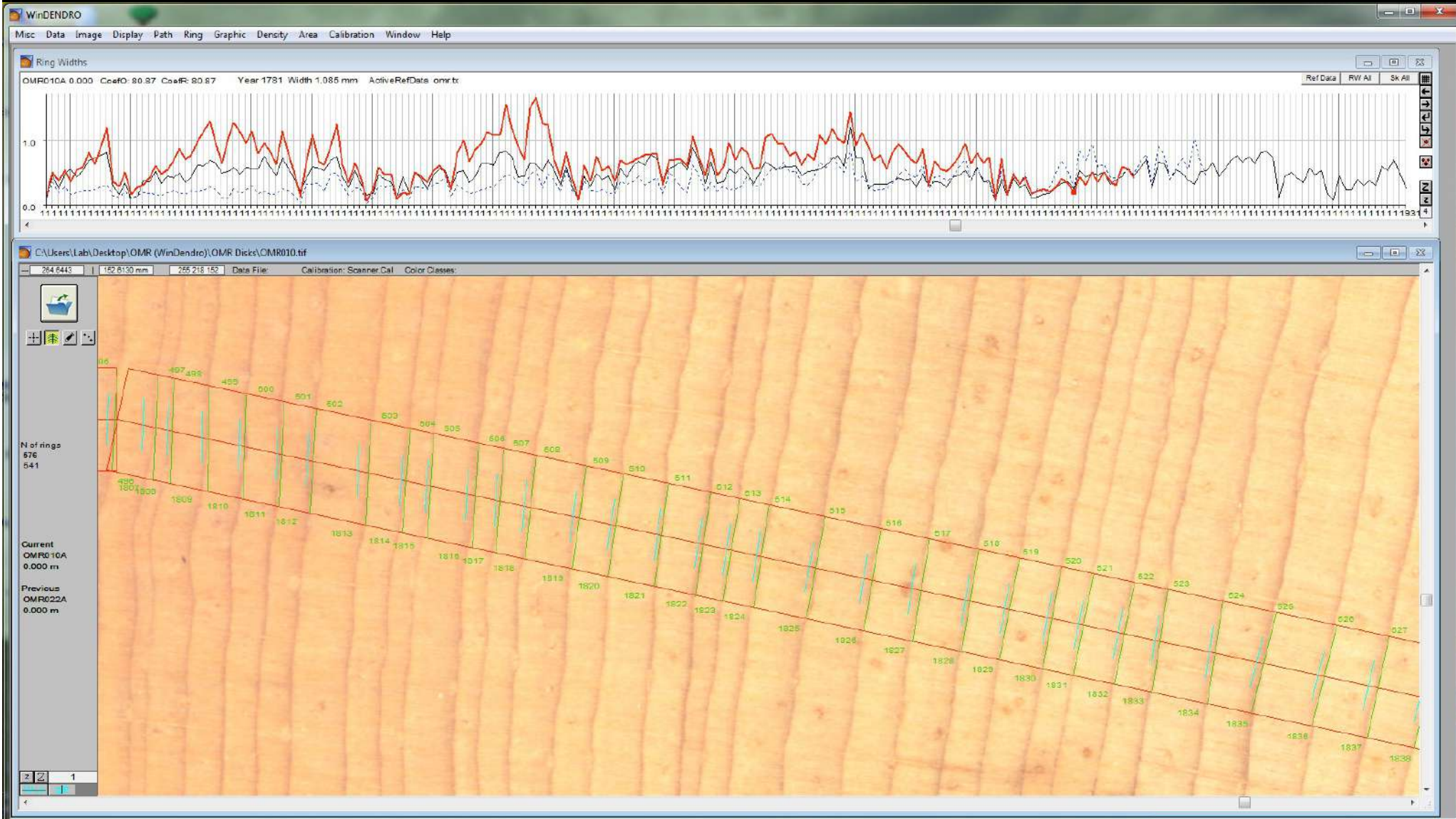
Kootenay Plains Index Chronology 641-2012



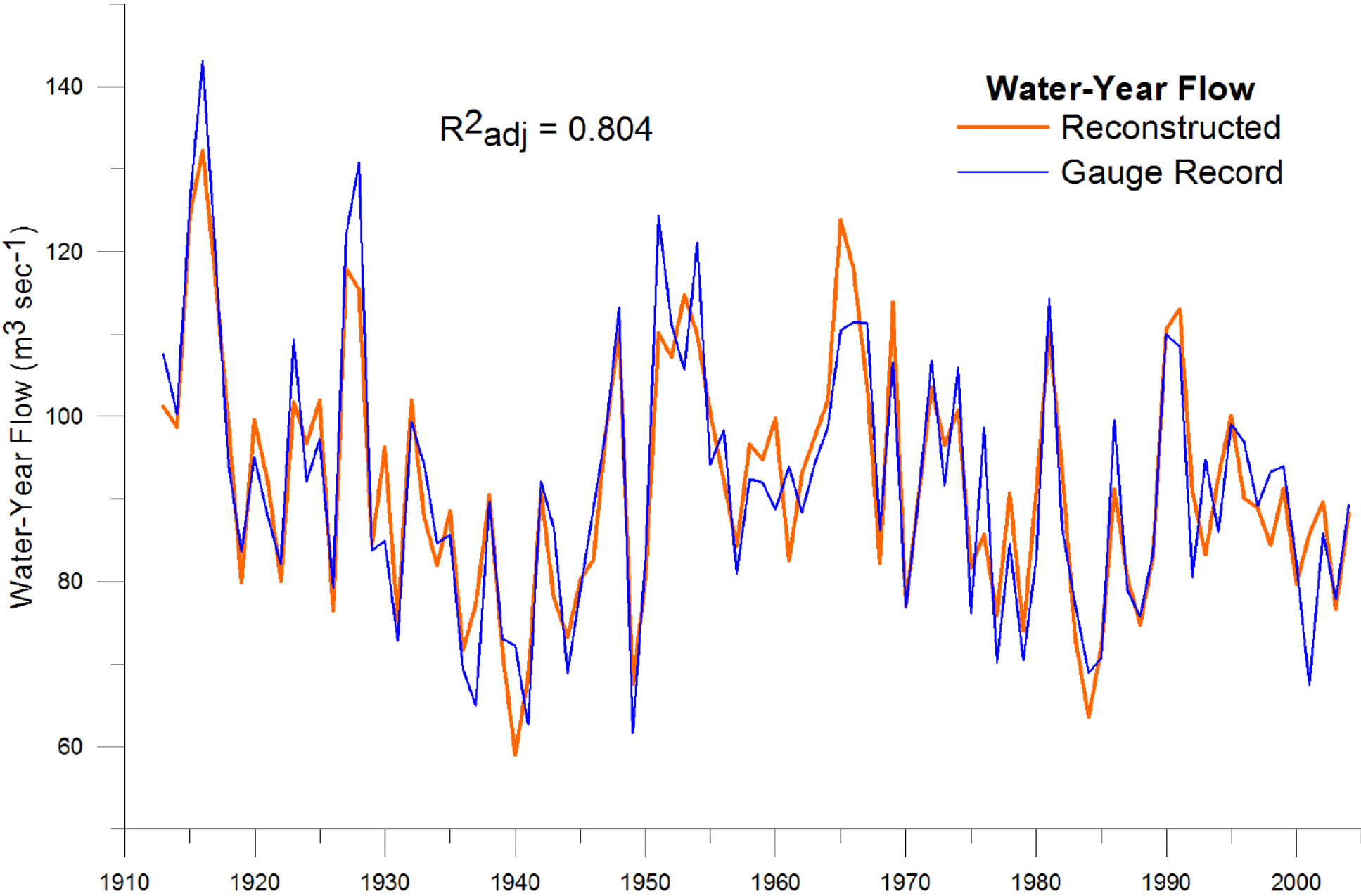




Semi-automated image analysis and measurement of tree rings



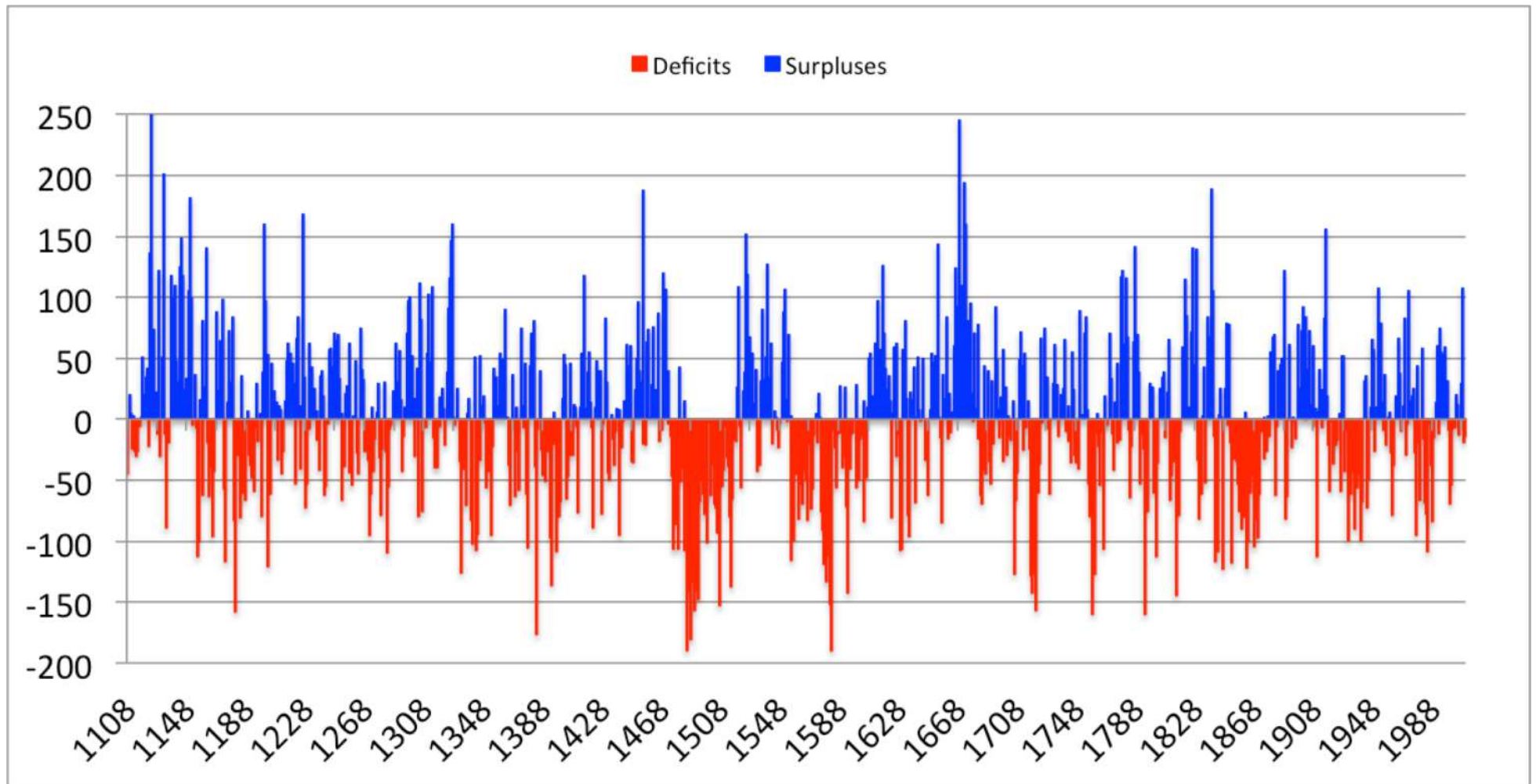
Calibration Curve, Bow River Model #2, 1525-2004



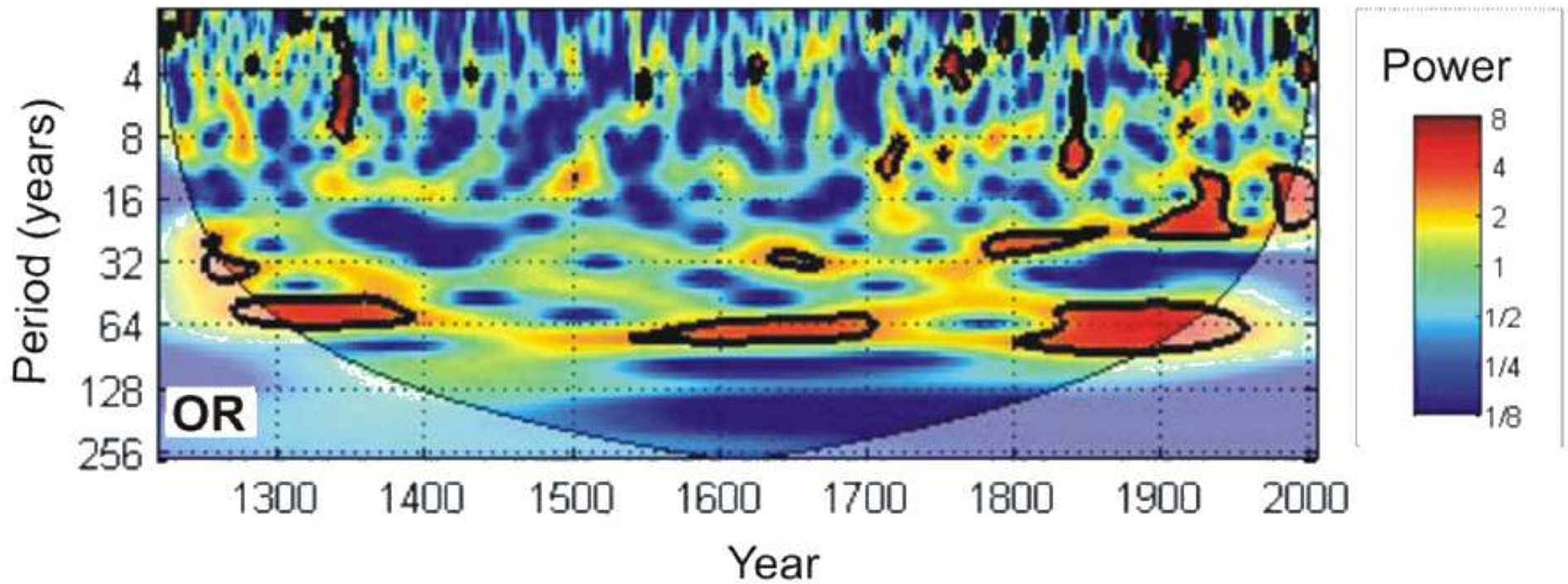
Bow River at Stoney Trail, Calgary



Mean Water Year Flow (m³/s) South Saskatchewan River at Medicine Hat, 1108-2010



Cycles in the tree rings



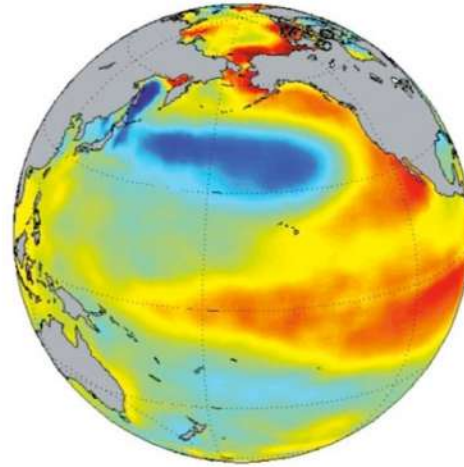
“I found looking at the **tree-ring growth**, that there’s an **approximate 60-year weather cycle** in this country, but 60 years isn’t definite, it could be 70 years and it could be even less, with weather **there’s nothing written in stone.**”

Reno Welsch, Upper Tennessee
Creek, Alberta, 04/09/2012

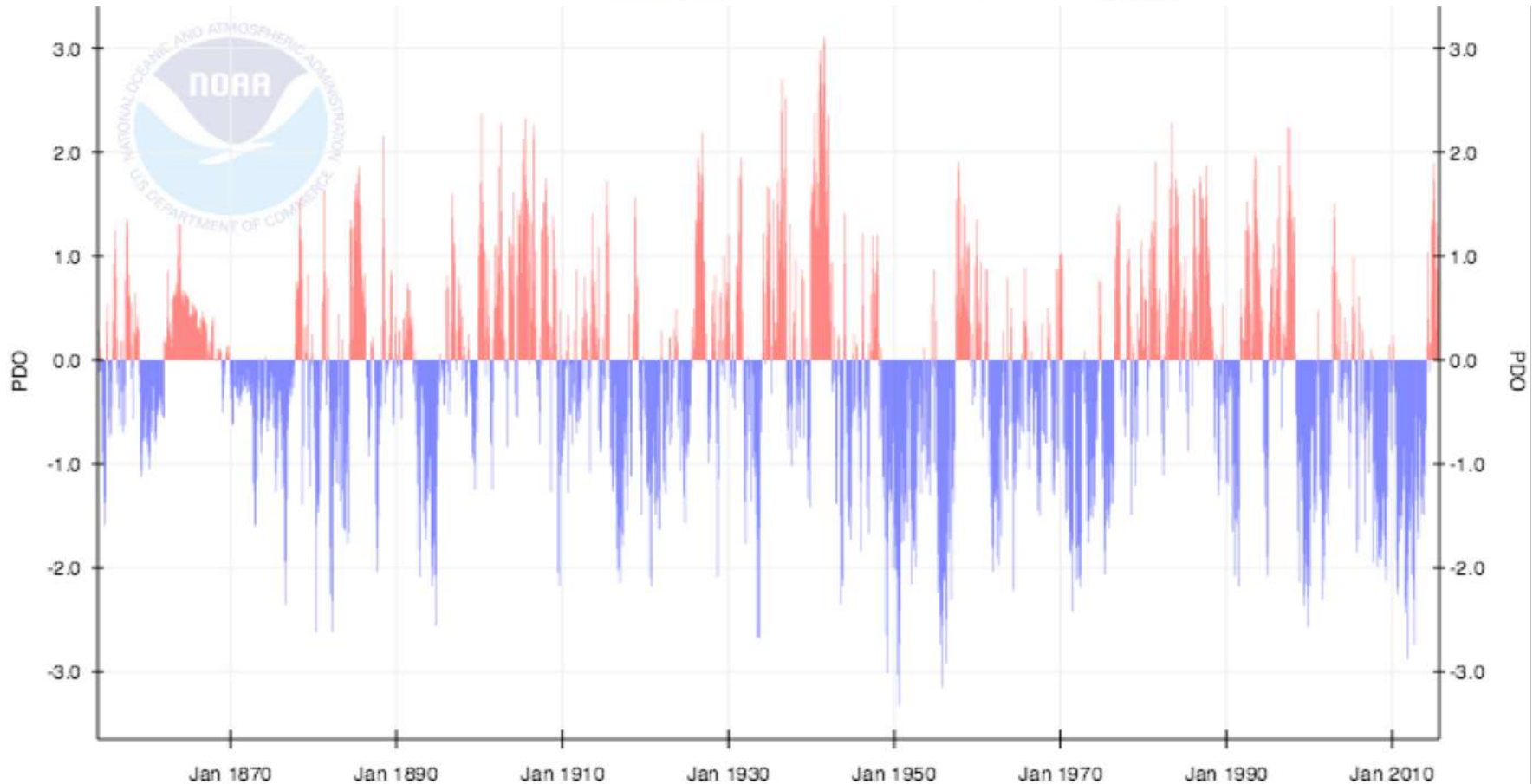
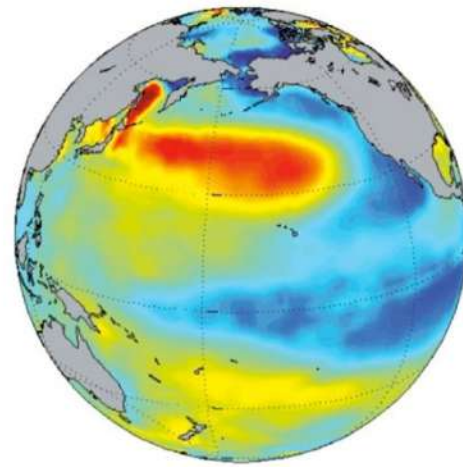


Pacific Decadal Oscillation

Warm Phase



Cold Phase



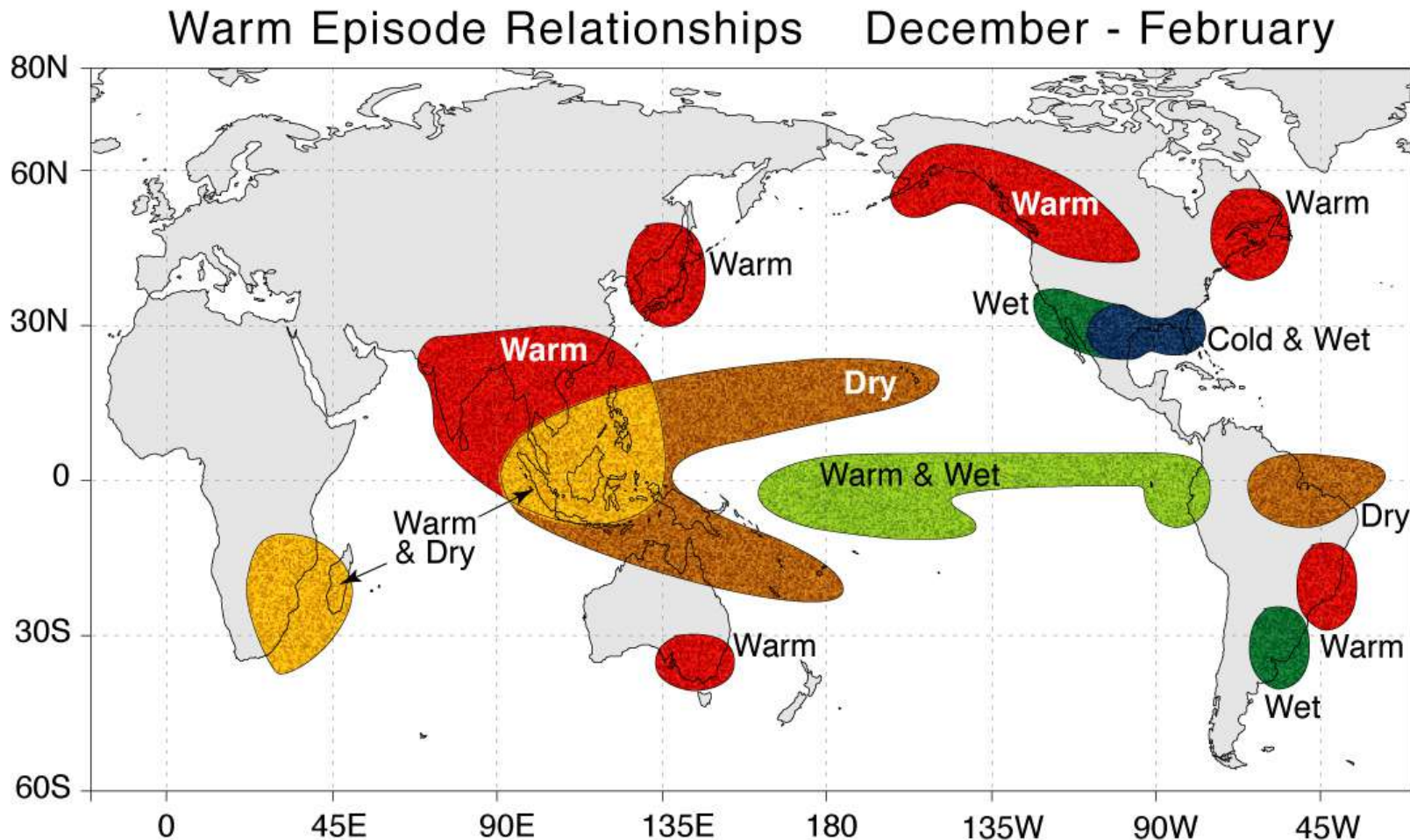
Cooking Lake, September 2008





El Niño remote impacts: Teleconnections

La Niña teleconnections have the opposite effect



Address Information Gaps:

2011

City of Calgary: Drought Management Plan

“In order to expand The City’s understanding of historical drought conditions it is important to **reevaluate historical drought using tree ring analysis** historically conducted by the David Sauchyn (University of Saskatchewan [*sic*])”



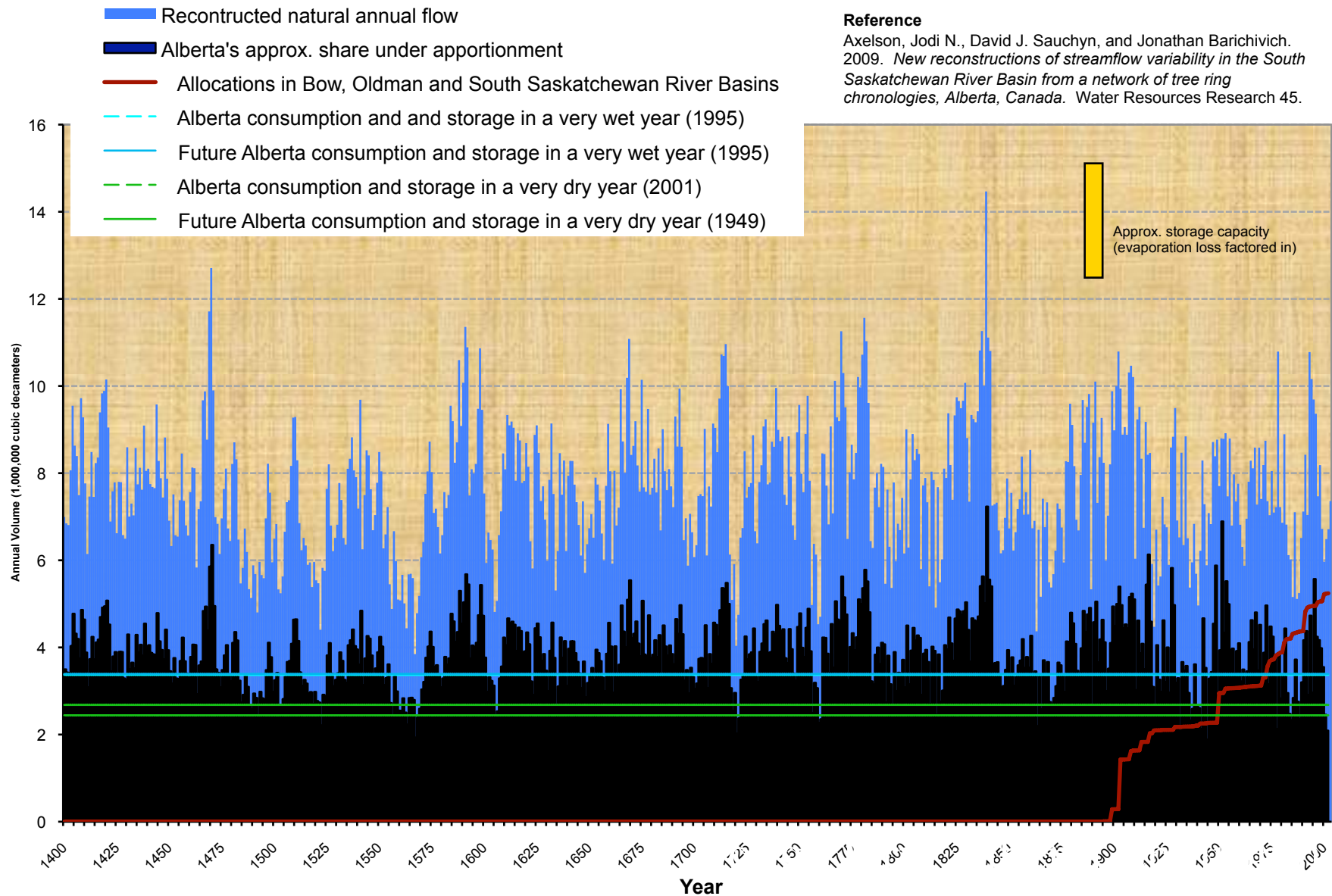
Sustained **Historical** and **Pre-Settlement** Droughts, SSRB

Sustained Historical Drought		Sustained Proxy Drought	
Year	% <u>dep</u> ¹	Year	% <u>dep</u>
1935	-5%	1717	-30%
1936	-24%	1718	-46%
1937	-12%	1719	-20%
1938	2%	1720	-41%
1939	-15%	1721	-34%
1940	-29%	1722	-1%
1941	-1%	1723	3%
1942	23%	1724	20%

¹ departure from a 1961-90 baseline



Since August 2006, the **Alberta government no longer accepts applications for new allocations of water in the Oldman, Bow, and South Saskatchewan sub-basins.**



Teck Named to the Global 100 Most Sustainable Corporations List

Teck

“to inform future stages of planning of a proposed oil sands mining project”





- EPCOR Water Canada provides water, wastewater, and distribution services to more than 50 communities
- Traditional planning would **consider flow characteristics of the raw water streams as “knowns”** in the system.





On May 2nd [1796] William Tomison wrote to James Swain that furs could not be moved as **“there being no water in the river.”**

A Dry Oasis: The Canadian Plains in late Prehistory

James Daschuk

- **Climate change** beginning in the mid-13th century triggered a large-scale abandonment of cultivation and reorientation to large-scale bison hunting in the grasslands from Texas to the Canadian border.
- The inhabitants of the dry landscape of western Saskatchewan and Alberta developed a water management strategy that buffered them from the effects of even **long-term drought**.... Beaver ponds purposely maintained through non-exploitation served as dependable water sources for groups even during periods of **extended drought**.
- During the most **lengthy drought periods**, when water could not be maintained in tributaries, human, bison and beaver populations would have all sought refuge along main channels of waterways.

Mean Water Year Flow (m³/s) South Saskatchewan River at Medicine Hat, 1108-2010

