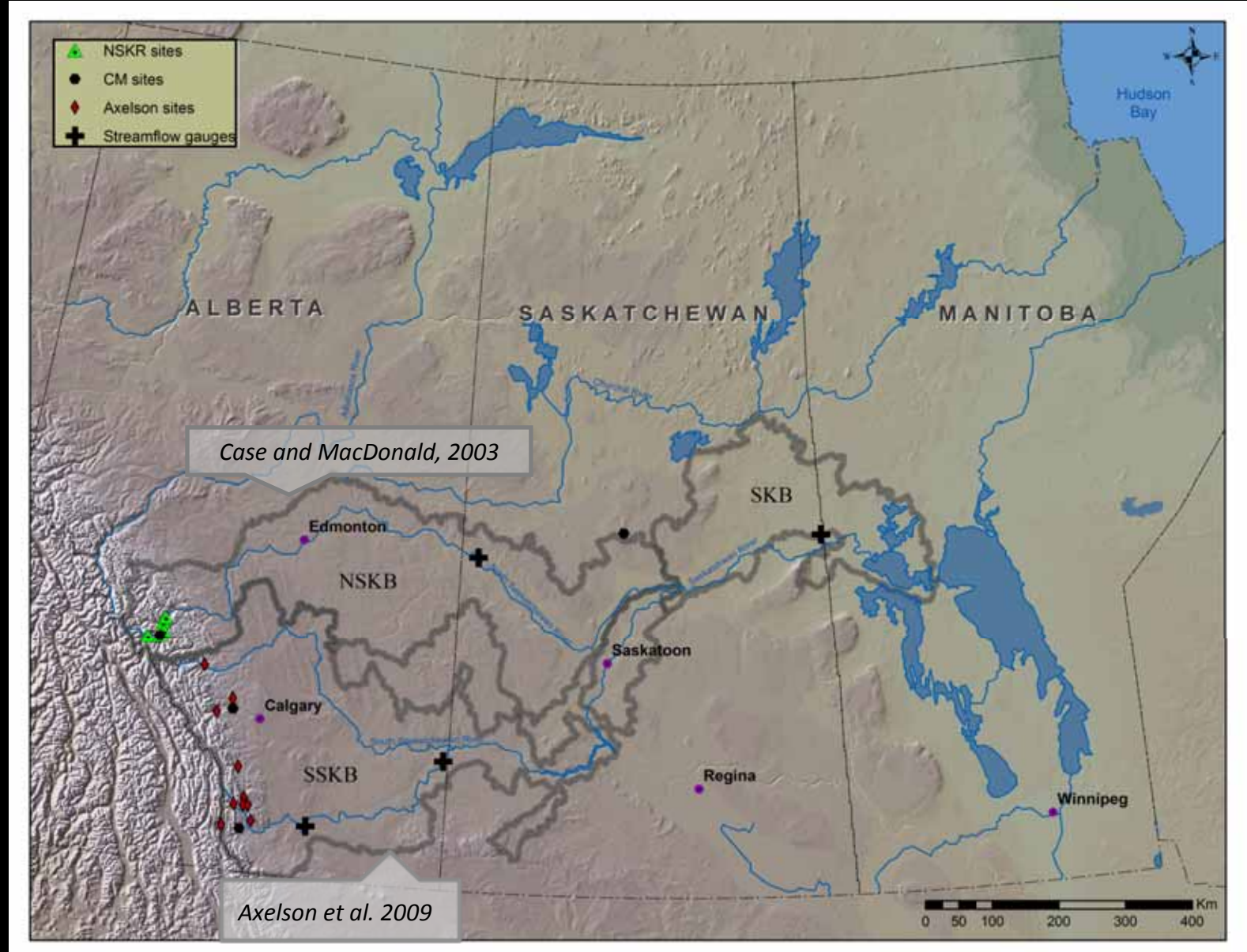
A scenic landscape photograph of a mountain range with a dense forest and a calm lake reflecting the scene. The mountains are rugged and rocky, with patches of snow or ice. The forest is a dense, dark green coniferous forest. The lake is a vibrant turquoise color, reflecting the mountains and sky. The sky is a clear, bright blue.

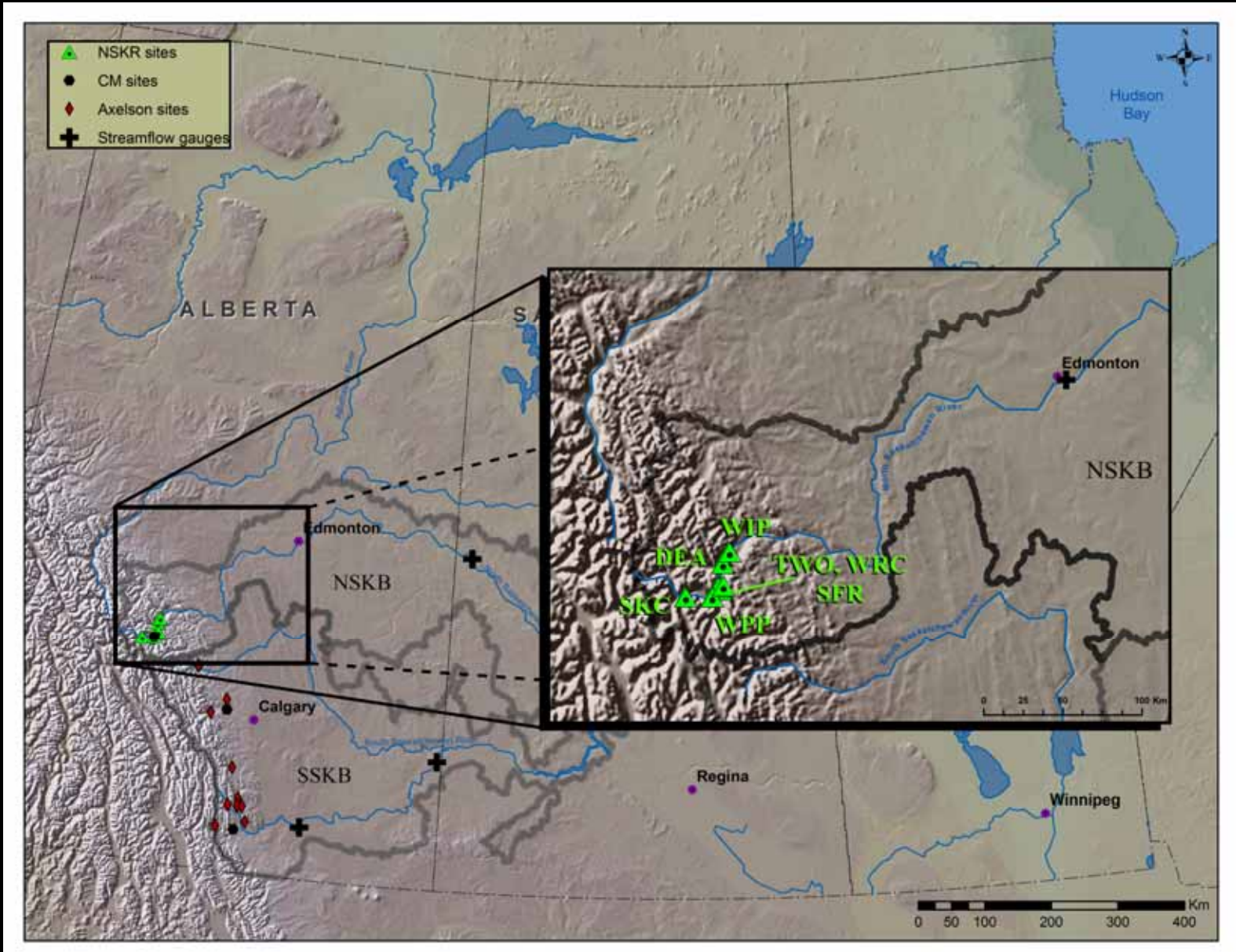
# Nine hundred year streamflow reconstruction of the North Saskatchewan River

Jessica Vanstone, Cesar Perez-Valdivia, and Dave Sauchyn  
Prairie Adaptation Research Collaborative  
University of Regina

# Sampling Sites:

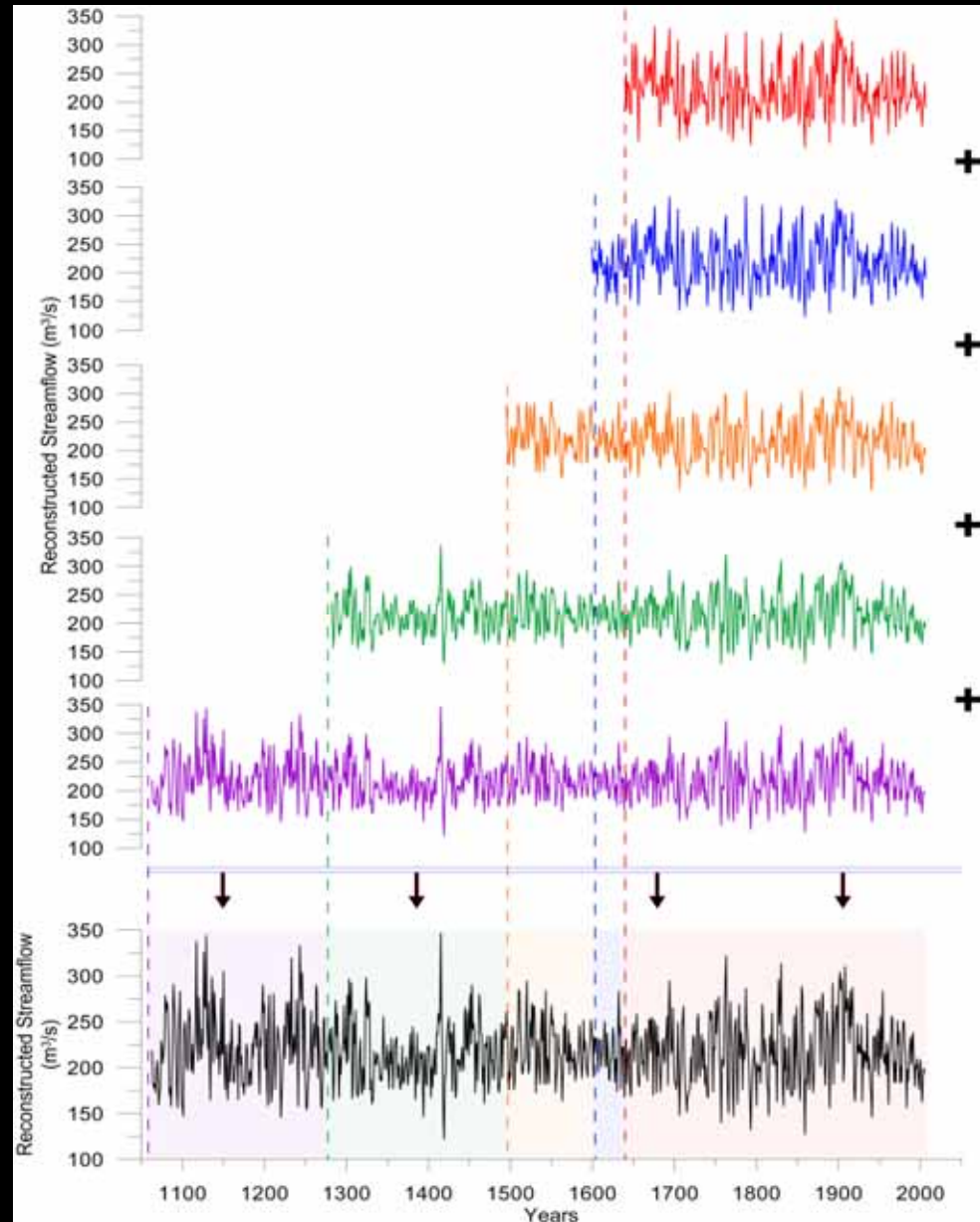


# Sampling Sites:

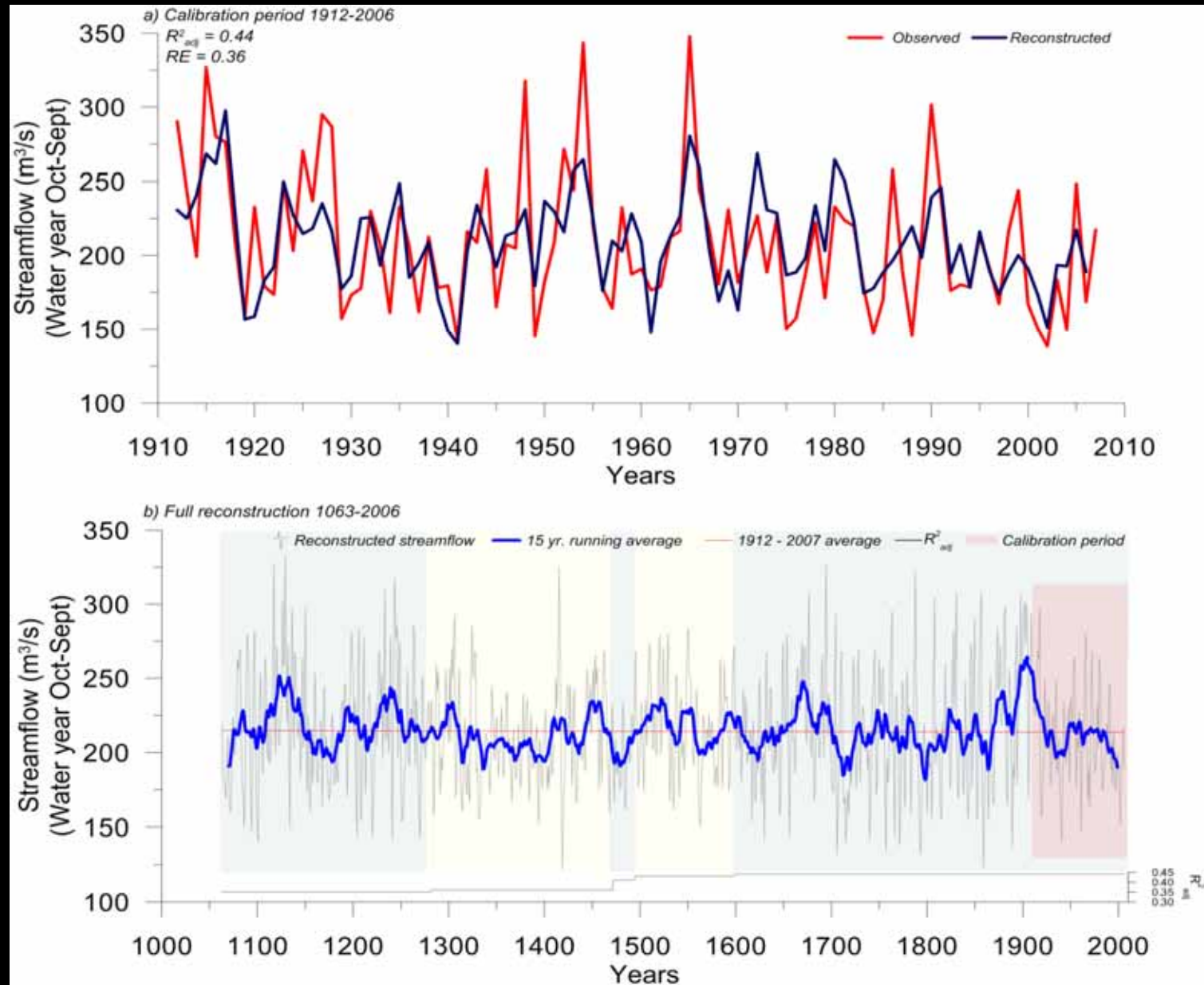


## Streamflow reconstructions:

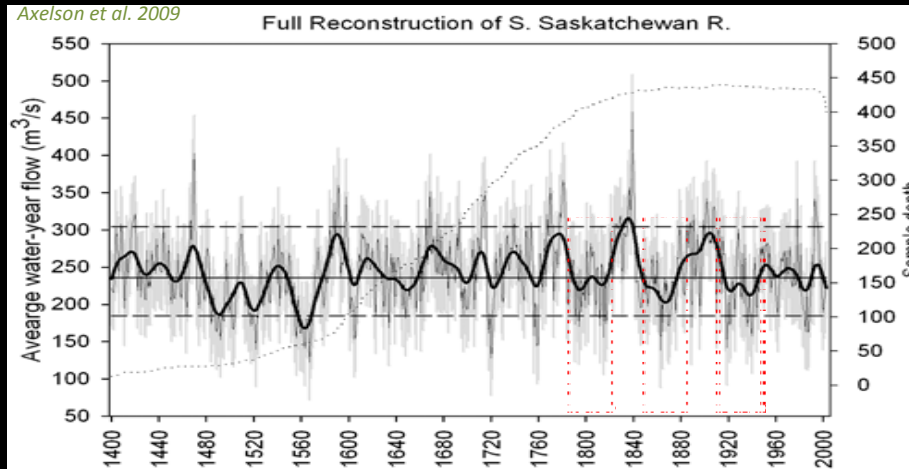
- Stepwise multiple linear regression
- Pool of predictors:  
DEA, SFR, SKC, TWO  
WIP, WPP, WRC
- Nested reconstruction approach



# Streamflow reconstructions:

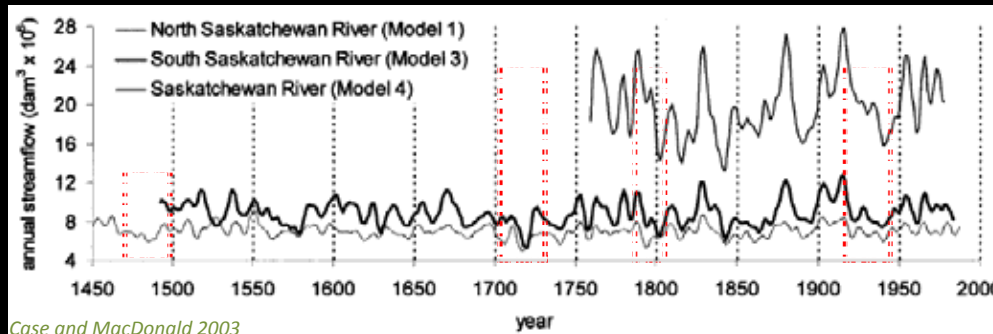


# Top 10 worst drought years:



## South Saskatchewan River

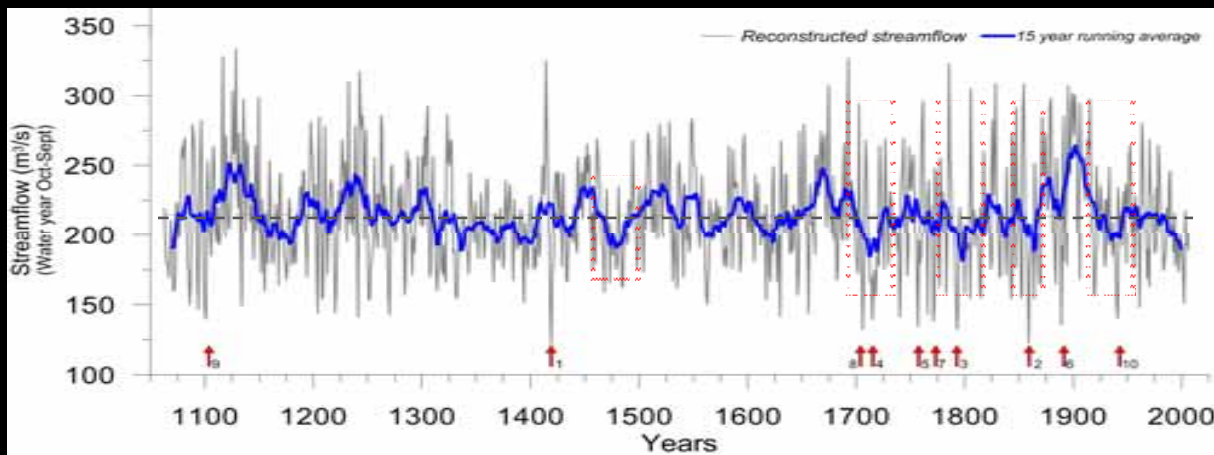
Rank	CM	Axelsson
1	1721	1567
2	1720	1720
3	1717	1863
4	1815	1522
5	1844	1563
6	1630	1919
7	1488	1759
8	1718	1761
9	1859	1721
10	1843	1568



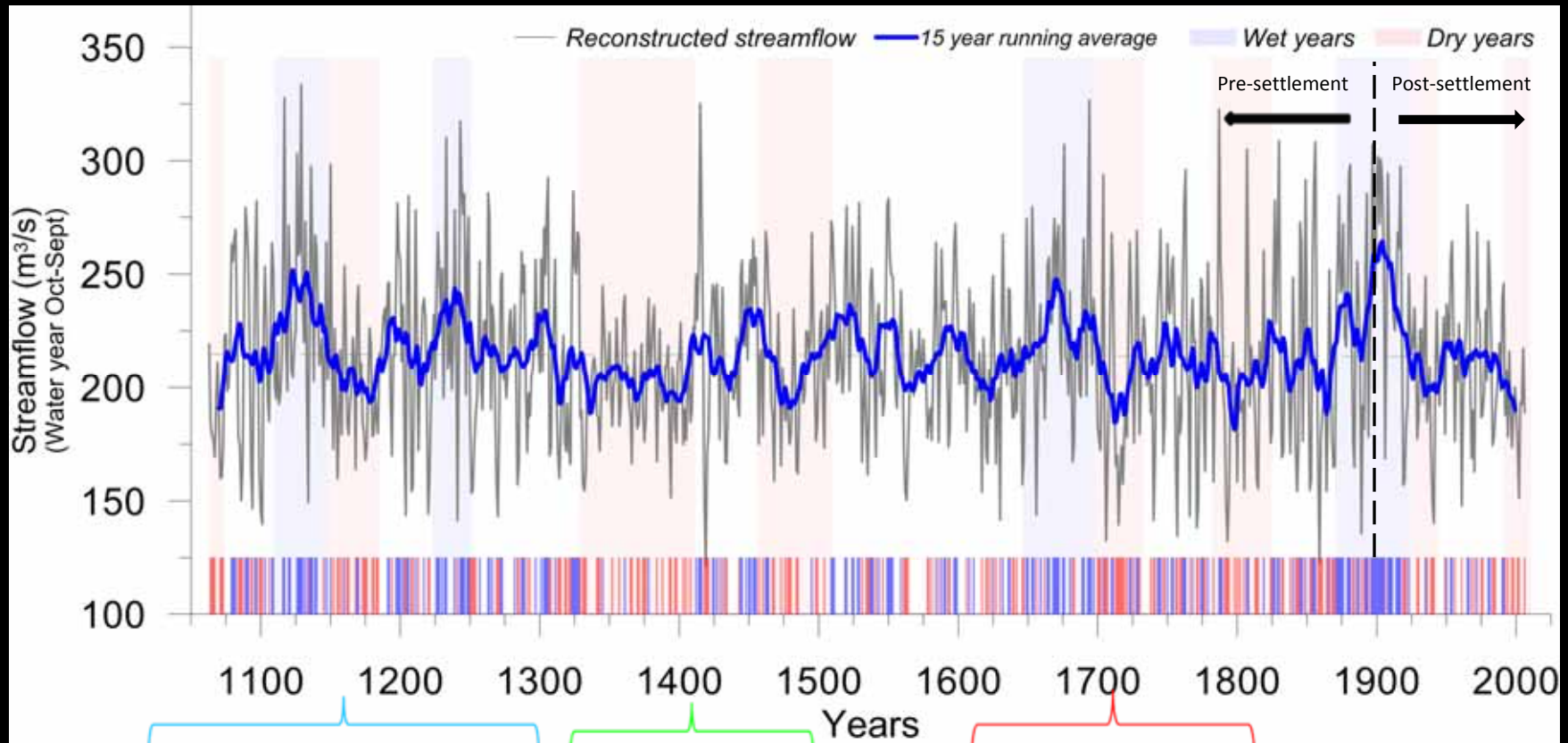
Case and MacDonald 2003

## North Saskatchewan River

Rank	'2010'	CM
1	1419	1793
2	1859	1030
3	1793	1251
4	1706	906
5	1757	1084
6	1889	1269
7	1771	965
8	1715	1042
9	1101	1238
10	1941	1716



# Megadroughts:



-Sridhar et al. 2006 – NE, Sand dunes  
 -Tian et al. 2006 – MN, lake sediments,  $O^{18}$   
 -Fritz et al 1991 – ND, diatom salinity  
 -Laird et al. 1996/98 – SD, diatom salinity

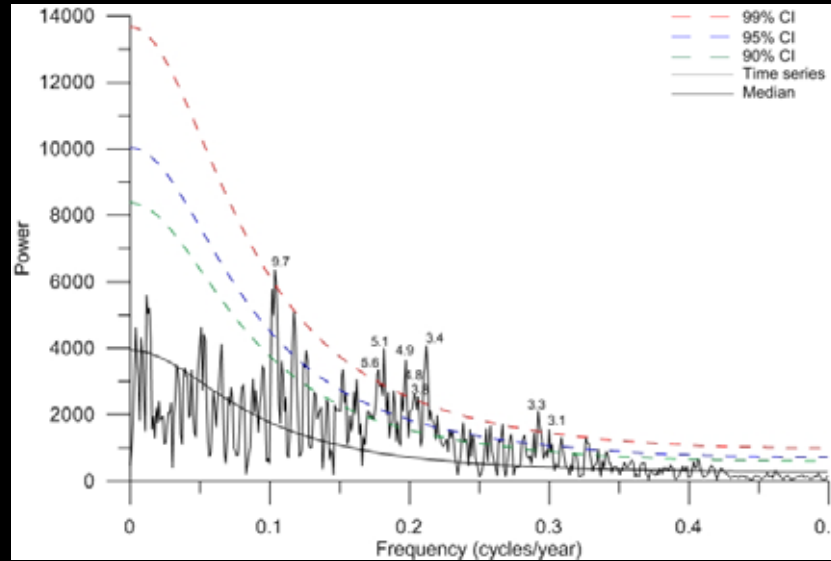
Cook et al. 2007  
 - Mississippian droughts

St. Jacques et al. 2008  
 -pollen and lake sediments  
 -Lake Mina, Minnesota  
 St. George & Nielsen, 2002  
 -tree-rings, MB

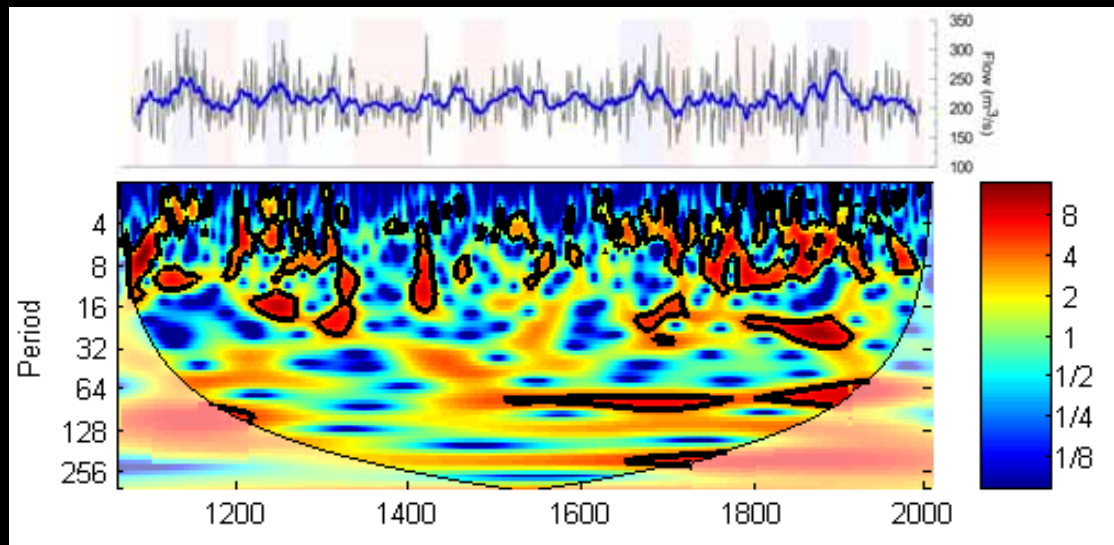
# Components of variability:

North Saskatchewan (Water year):

MTM



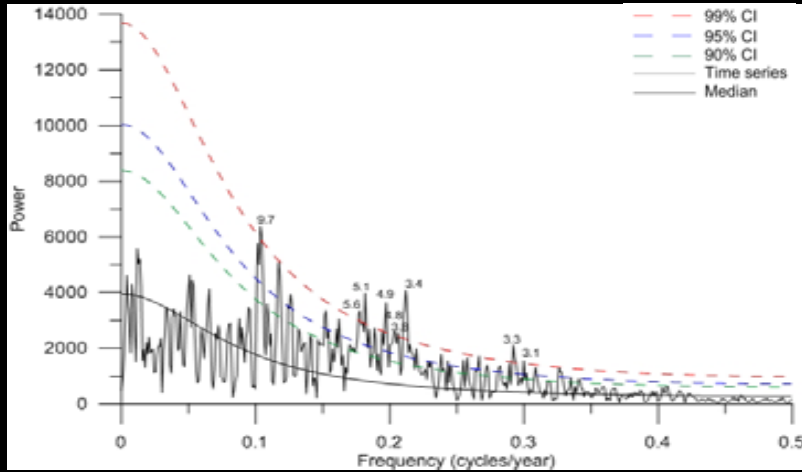
Wavelet



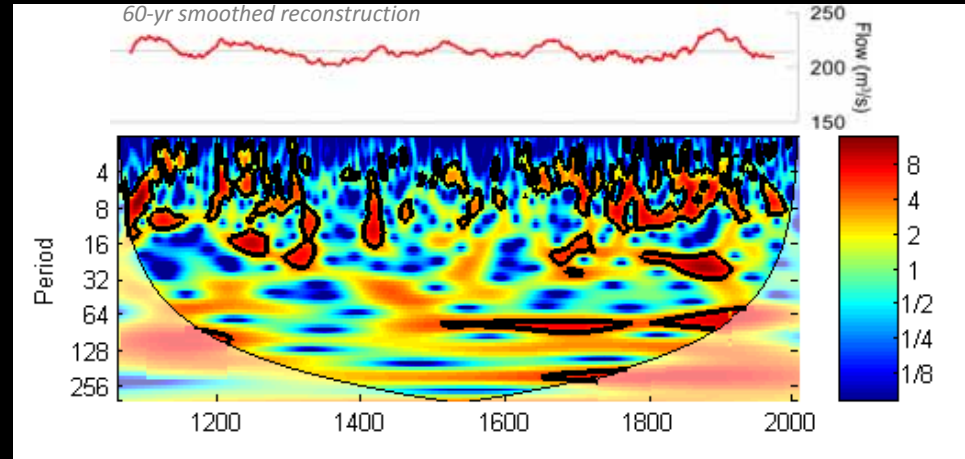
# Components of variability:

North Saskatchewan River

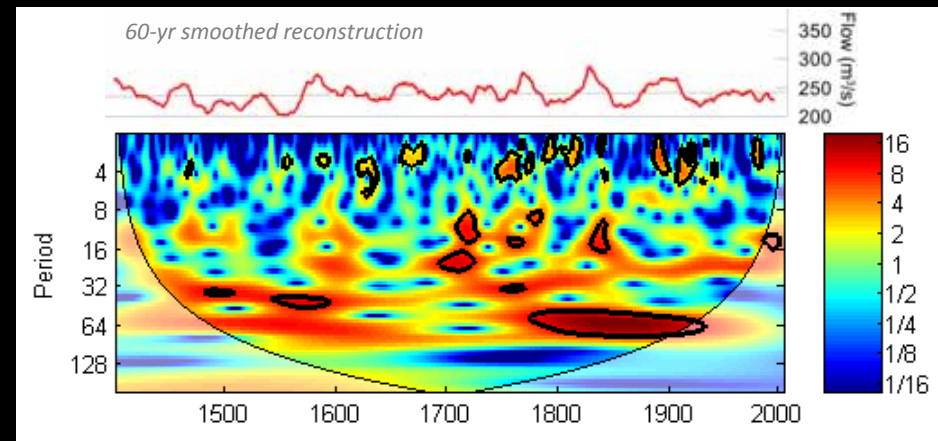
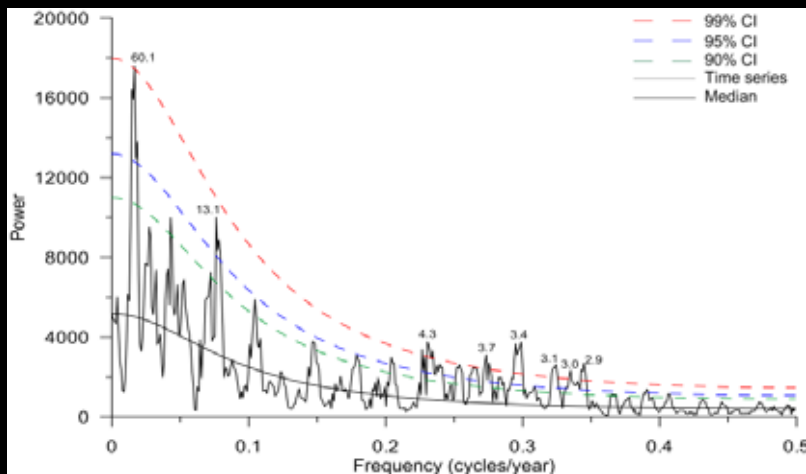
MTM



Wavelet



South Saskatchewan River – Axelson et al. 2009



## *Conclusions:*

- Successful *robust* reconstruction of the North Saskatchewan River (1063-2007)
- Coincidental low flow periods in both the NSKB and SSKBs
- High interannual variability (*4-8 yr band*) - ENSO
- Significant multidecadal variability (*64 yr band*) - PDO
- Extended periods of significant low flows evident in reconstructions compared to what is recorded in instrumental records



## Special thanks:

- *Supervisor:*
  - *Dave Sauchyn*
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  - *Jeannine St. Jacques*
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  - *Sarah Ludlow*
  - *Golden Gooding*
  - *Nataliia Prytula*
- *Sponsors:*

