Adaptation Planning in the Agricultural and Water Sectors in Western Canada

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Levers to Mainstream Adaptation Effectively: Lessons and Best Practices from Western Canada, Adaptation Canada 2016, Ottawa, 14 April, 2016

- In 1998, the federal government proposed the **Canadian Climate Impacts and Adaptation Research Network** and a physical node where the effects of climate are significant and where some adaptation research capacity and coordination already exists.
- In the Prairies, the agricultural community has a history of adapting to climate variability.
- The level of agricultural adaptation effort already resident in the **Prairie Farm Rehabilitation Administration** (PFRA) in Regina, and the supporting activities of Agriculture and Agri-food Canada, made Regina the logical base for pursuing climate impacts and adaptation research.
- On March 24, 2000, in Regina, Minister Ralph Goodale (Natural Resources Canada) announced the establishment of the **Prairie Adaptation Research Collaborative** (PARC).

Vulnerability and Adaptation to Climate Extremes in the Americas (VACEA)

Vulnerabilidad y Adaptación a los Extremos Climáticos en las Américas

Principal Investigators:

Los investigadores principales

Dr. Dave Sauchyn, University of Regina, Canada
Dr. Fernando Santibañez, Universidad de Chile, Santiago

IDRC CRDI

NSERC CRSNG

Social Sciences and Humanities Research Council of Canada

www.parc.ca/vacea/


RUSH LAKE


CONTEXT
UNDERSTANDING
DATA
INFORMATION
KNOWLEDGE
WISDOM

Cypress Hills, September 2015

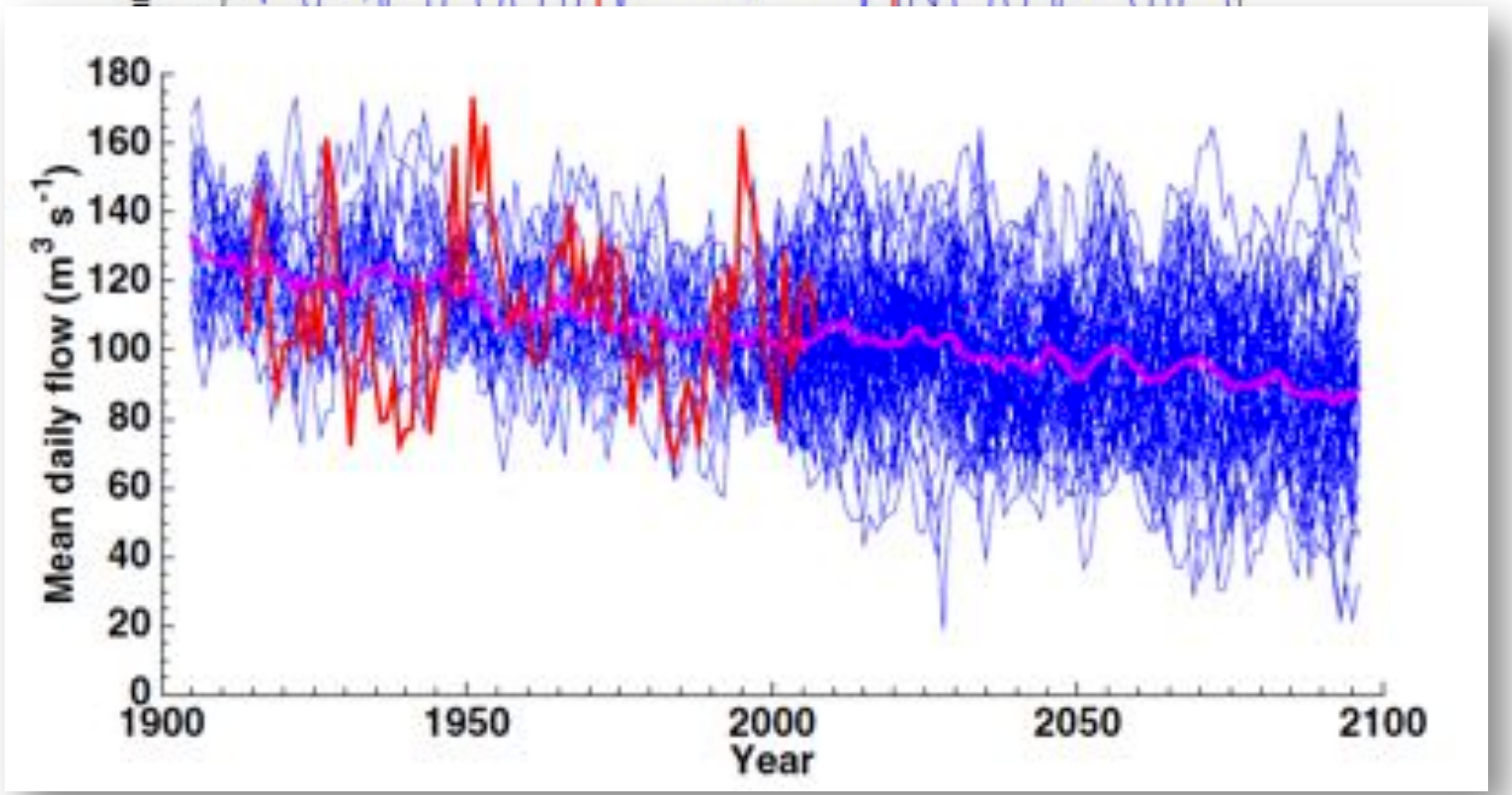
RECOMMENDATIONS

- **Regional proactive planning**, involving multiple agencies and orders of government, because individuals have limited capacity to cope with water scarcity and excess water. **Plan and be prepared** even if the risk seems remote and when time are “good”.
- **Institutional capacity** matters - it is not very practical for local stakeholders to implement their own adaptation practices without a broader information and policy plan for climate change adaptation.
- **Watershed groups** are well positioned to test and implement local adaptations, and to develop preparedness plans. They should be supported and capacity enhanced.
- With the dissolution of government and university extensions programs**, a technical knowledge gap** is a significant problem when implementing new adaptation practices.
- Need for a collaborative **coordinating network** of stakeholders, watershed groups, researchers and all orders of government.
- **A single coordinating agency** to link science to the interests and concerns of local people; delivering technical expertise on climate, water and adaptation practice to local groups and rural communities.

The South Saskatchewan River Basin (SSRB) - Adaptation to Climate Variability Project

Sauchyn, St-Jacques, Barrow, Nemeth, MacDonald, Sheer, Sheer (2015) Adaptive Water Resource Planning in the South Saskatchewan River Basin: Use of Scenarios of Hydroclimatic Variability and Extremes
Journal of American Water Resources Association

albertawatersmart.com/featured-projects/south-saskatchewan-river-basin.html



Oldman River

River Basin Model

Modeling Workshop
Cochrane, Alberta

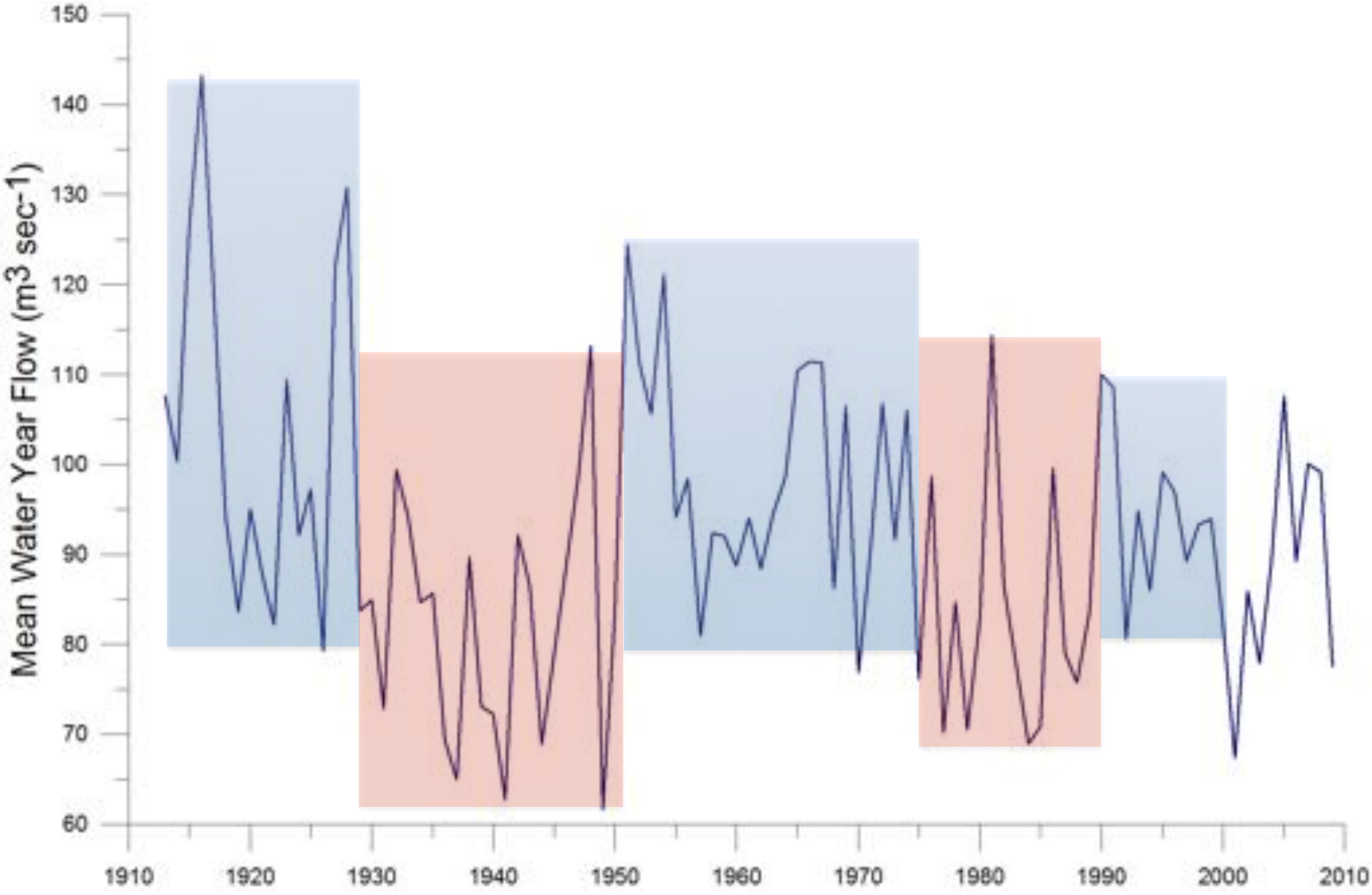
Sustainable urban water management in the context of climate variability and change

Alberta Innovates Energy and Environment Solutions

EPCOR

THE CITY OF CALGARY
Proudly serving a great city

Naturalized Flow, Bow River at Calgary, 1912-2009



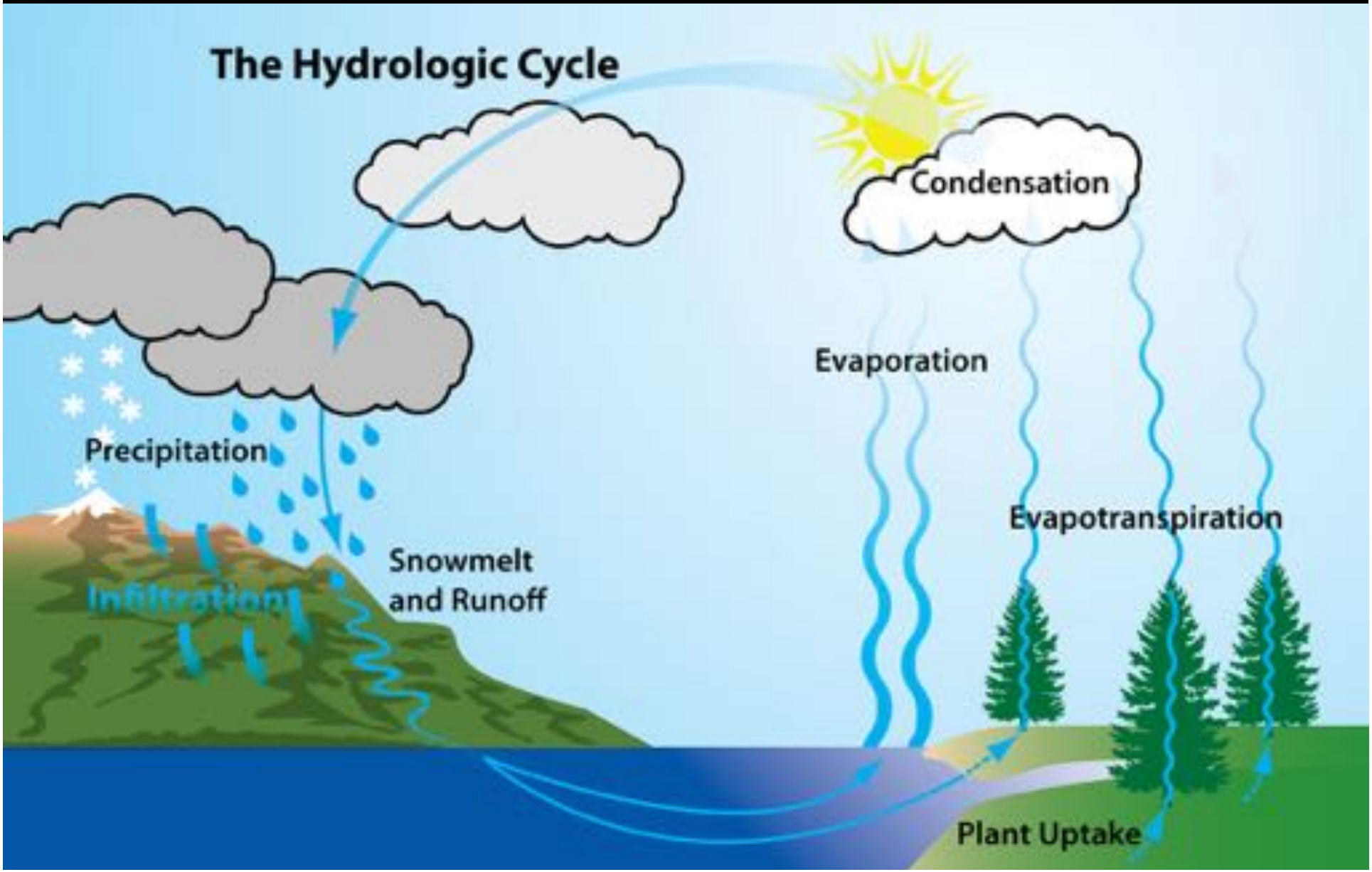
Climate Change Projections and Uncertainty

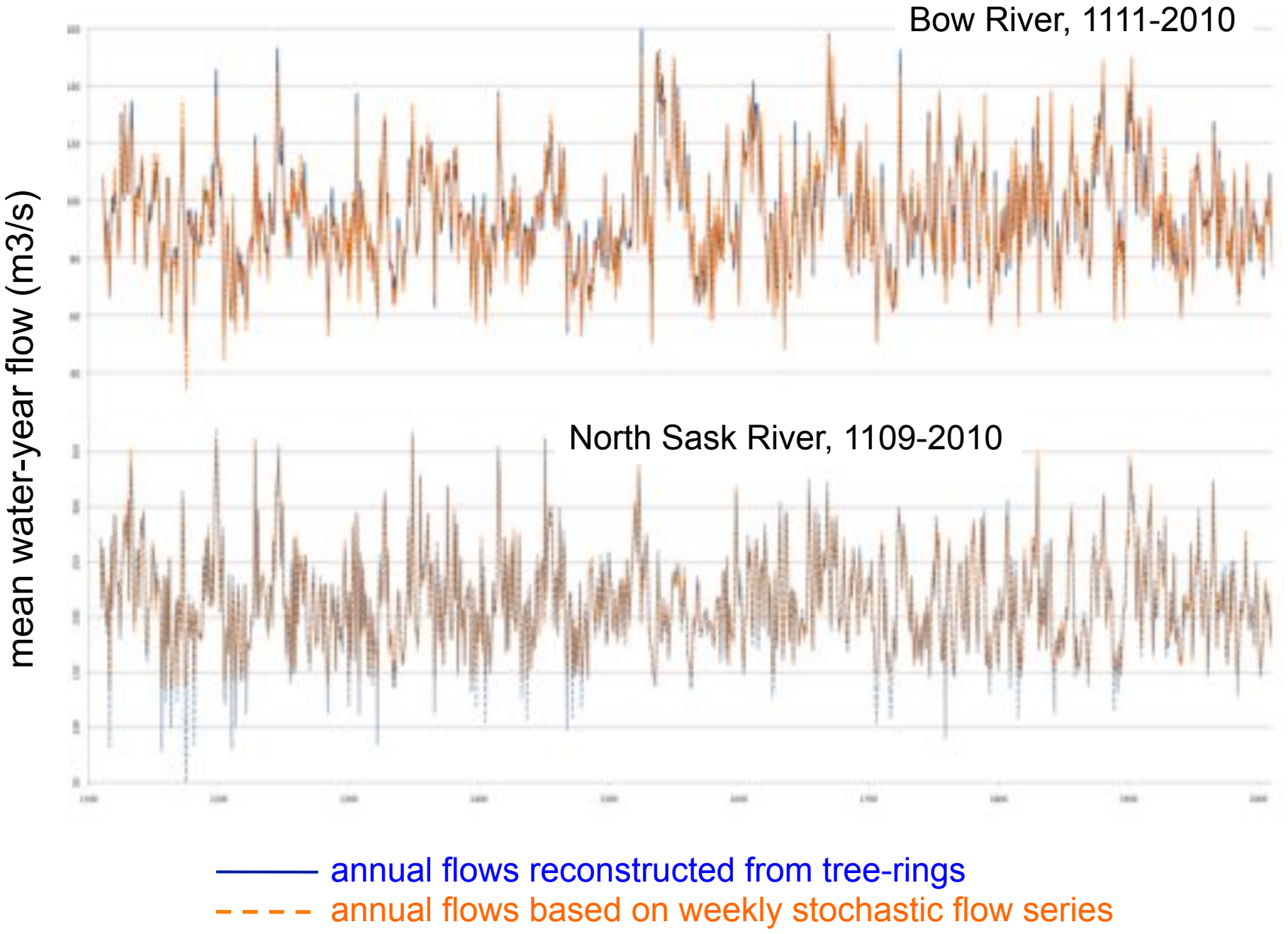
Natural climate variability ***poses inherent limits to climate predictability*** *… contributes substantial uncertainty to temperature and precipitation trends over North America,* ***especially in winter at mid and high latitudes…*** **is** ***unlikely to be reduced*** *as models improve*
Deser et al. (2012)

The ***local model spread has not changed much*** *despite substantial model development and a massive increase in computational capacity. …[it] is* ***irreducible*** *owing to internal variability in the climate*
Knutti and Sedláček (2012)

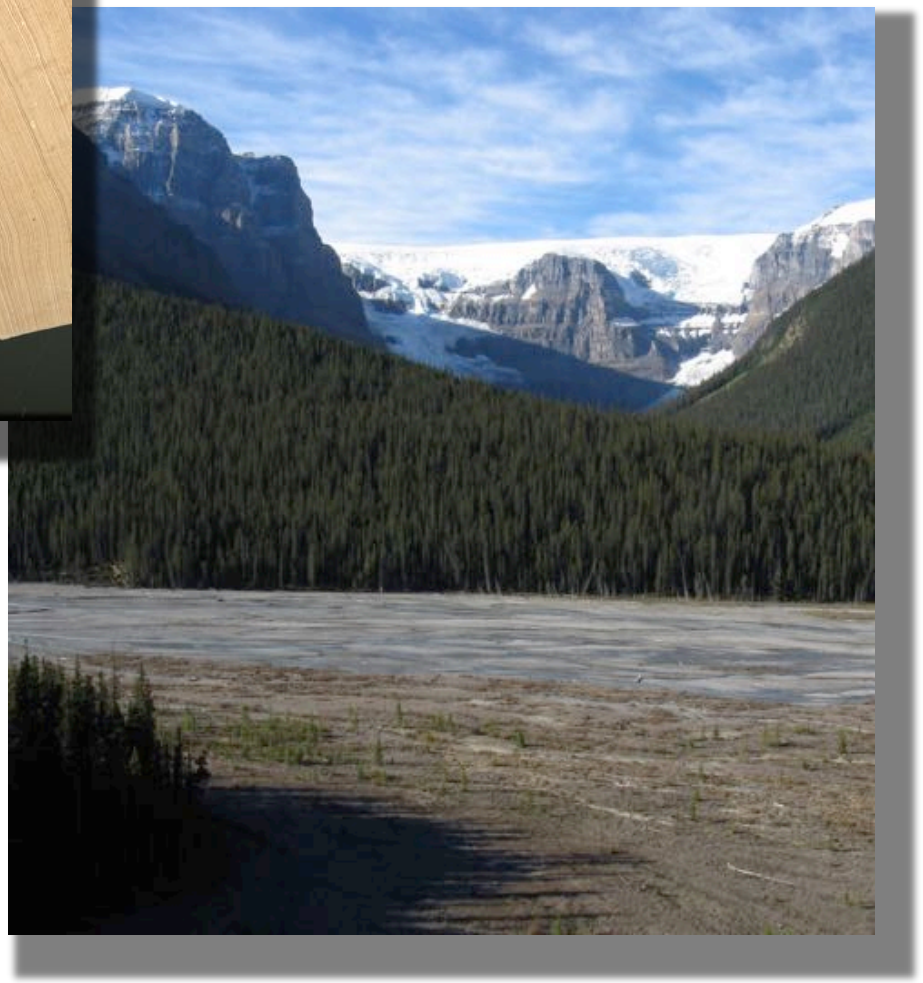
"it ***will not be possible*** *to provide the information on local changes in extremes ... The* ***uncertainty*** *owing to internal variability is dominant and is* ***essentially irreducible****"*
Fischer et al. (2013)

Streams and Trees Respond to the Same Hydroclimatic Processes



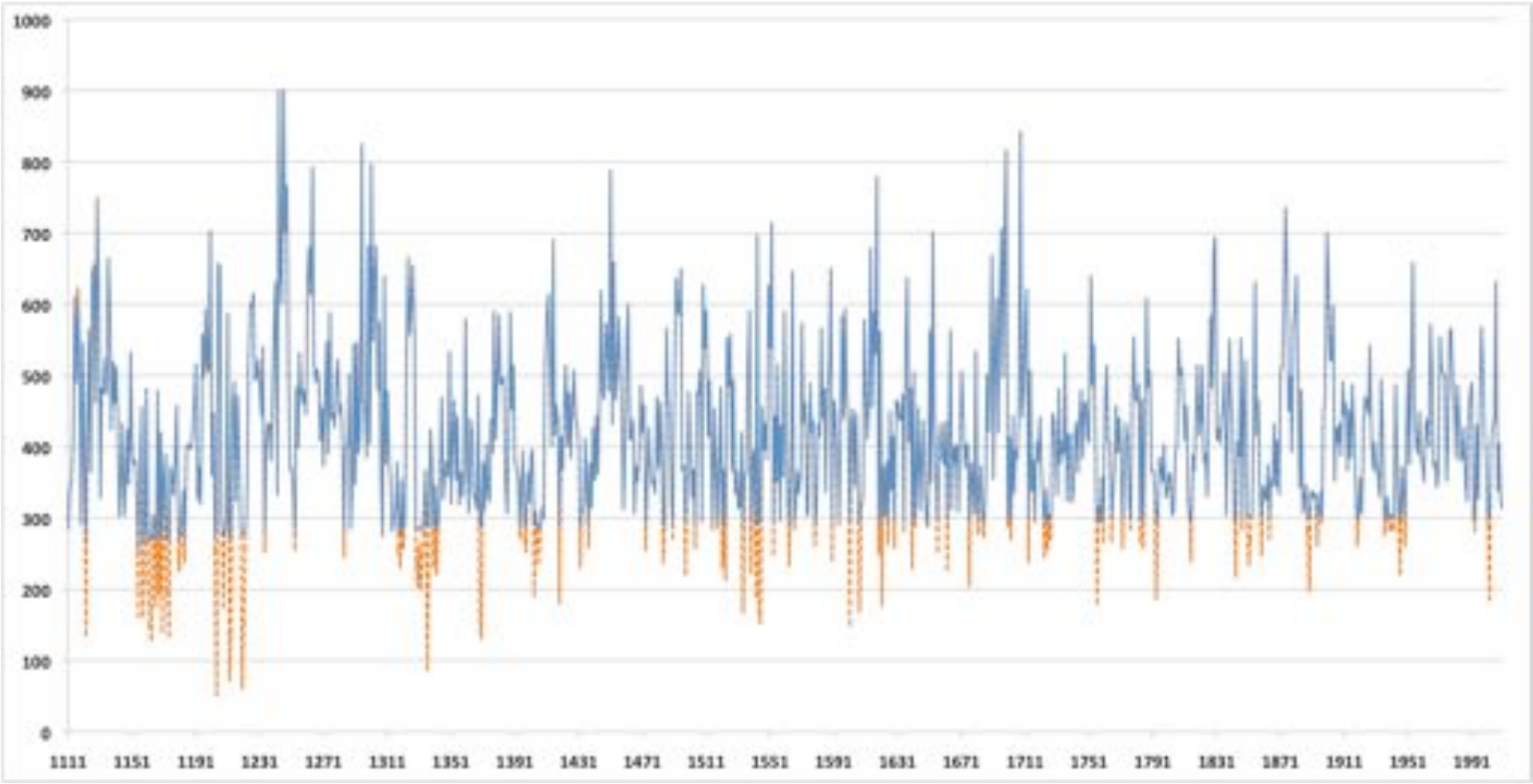

Bow River, 1111-2010
North Sask River, 1109-2010
mean water-year flow (m3/s)
annual flows reconstructed from tree-rings
annual flows based on weekly stochastic flow series

Long-term variability and reliability of the flow of the Athabasca River



NSERC
CRSNG

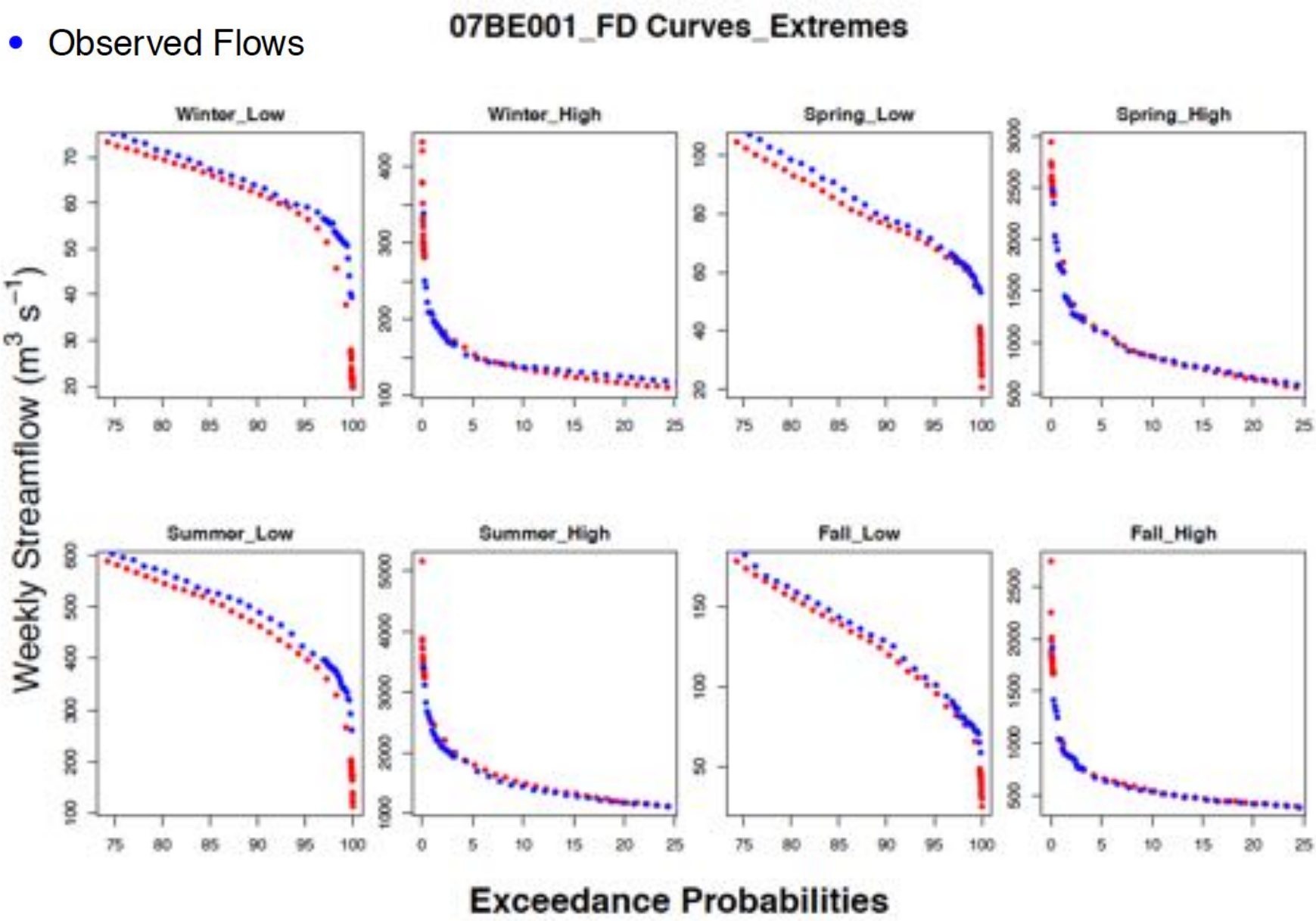
Mean Annual Flow (m3/s), Athabasca River at Athabasca, 1111-2010



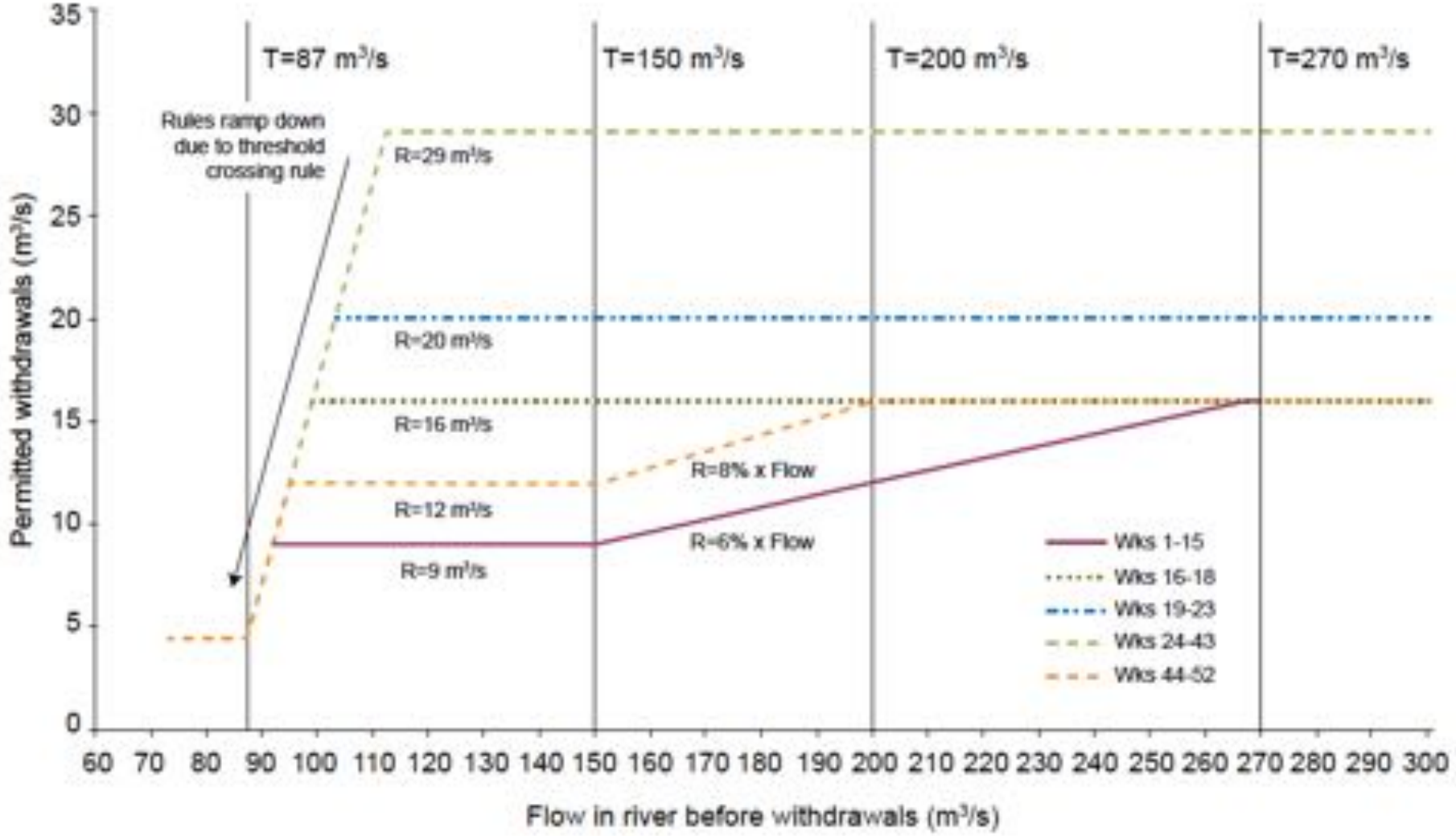
annual flows based on weekly stochastic flow series

annual flows based reconstructed from tree rings

- Reconstructed Flows
- Observed Flows



Weekly Flow Triggers (T) and Cumulative Water Withdrawal Limits (R)



Government of Alberta. 2015. Surface Water Quantity Framework for the Lower Athabasca River

Sauchyn, DJ, St Jacques, J-M, Luckman, BH. 2015. Long-term reliability of the Athabasca River (Alberta, Canada) as the water source for oil sands mining, **Proceedings of the National Academy of Sciences,** vol. 112 no. 41, 12621-12626, DOI10.1073/pnas.1509726112

Saturday September 26, 2015

The Oilsands and the Athabasca River's Fickle Flows

Teck Named to the Global 100 Most Sustainable Corporations List

Teck

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