Climate Change and Variability in Saskatchewan and Some Implications for Agriculture

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

Vulnerabilidad y Adaptación a los Extremos Climáticos en las Américas

Principal Investigators:

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IDRC CRDI

NSERC CRSNG

Social Sciences and Humanities Research Council of Canada

www.parc.ca/vacea/

Swift Current

Weather will always be different. If it is going to get a little warmer and that is trend and a little more rain in spring, as a cattle producer, I say bring it on. That is **the best thing that can happen to us**.

I don't want to sound like some radical right-winger shooting off saying there is no such thing as climate change but **I think we can deal with it.**

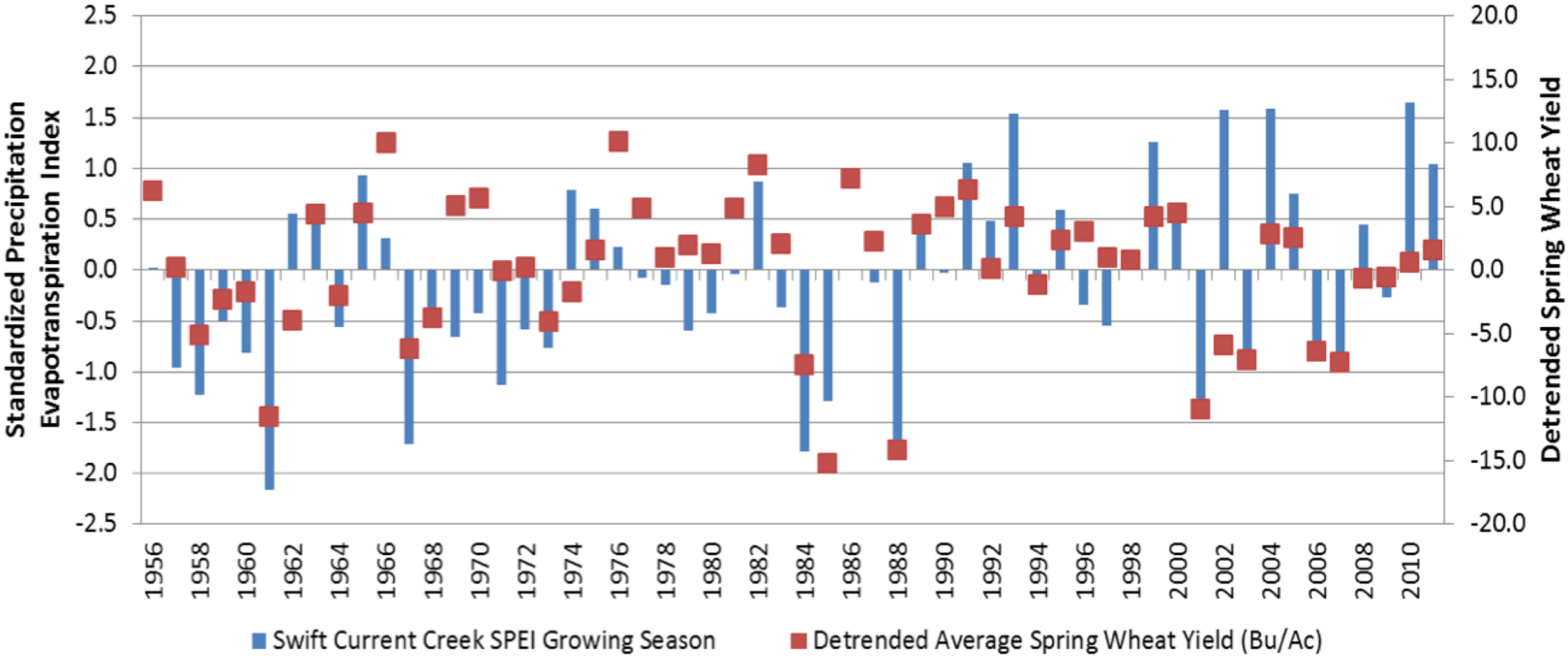
So it is almost like a **30 or 40 year cycle**. I don't know if that has anything to do with climate change, I don't think so.

This talk about climate change or **I like to call it climate variability**,

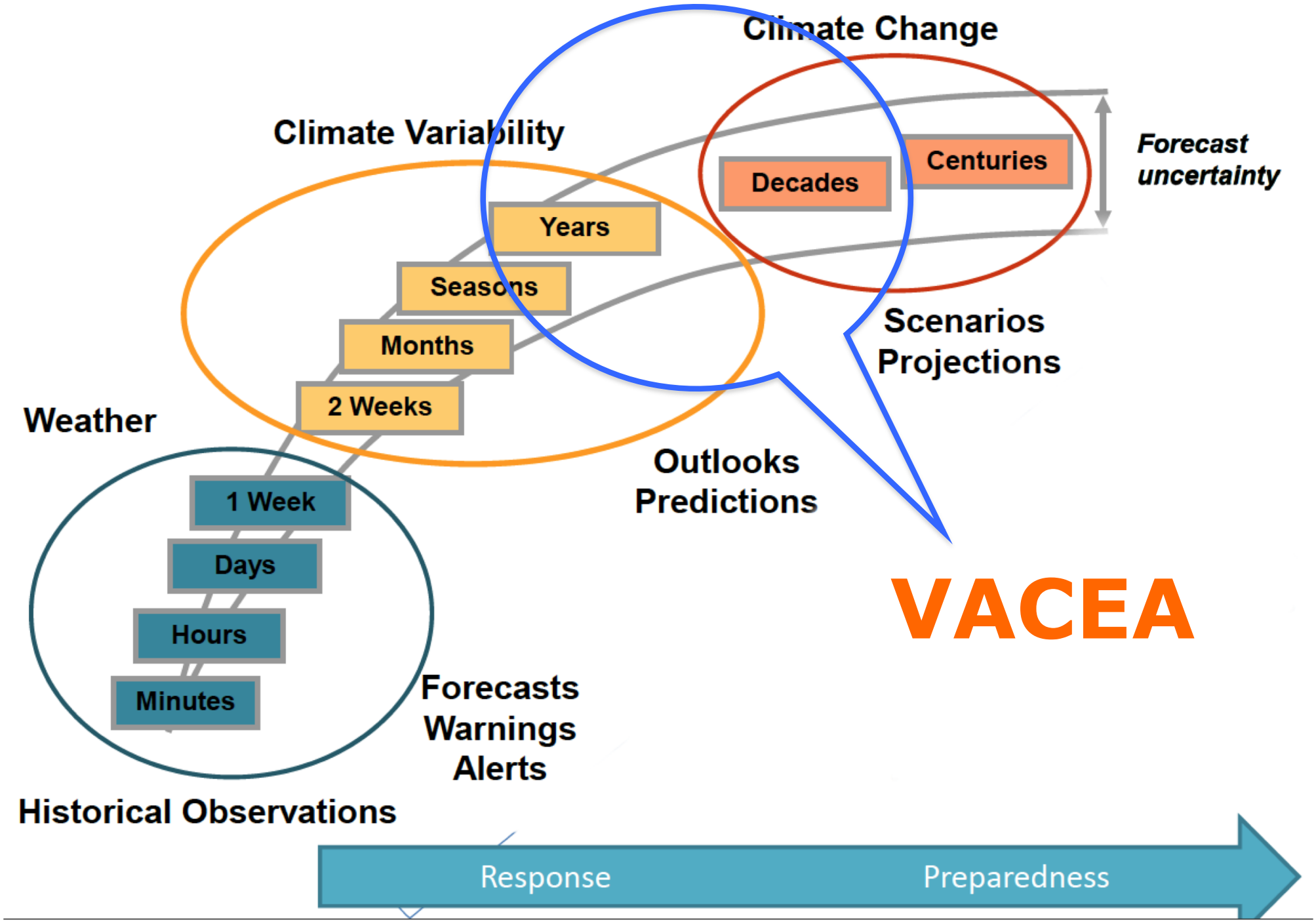
So, **climate change happens to be our game right now**. And that's not to say that I don't think that we should be working hard to reduce resource use, to increase efficiency, to increase resiliency, I think those are always important. But climate change per se is **nothing new, and the variability probably over the last thousand years is at least as much as the predicted variability** according to all the models, some of which was maybe driven by human impact.

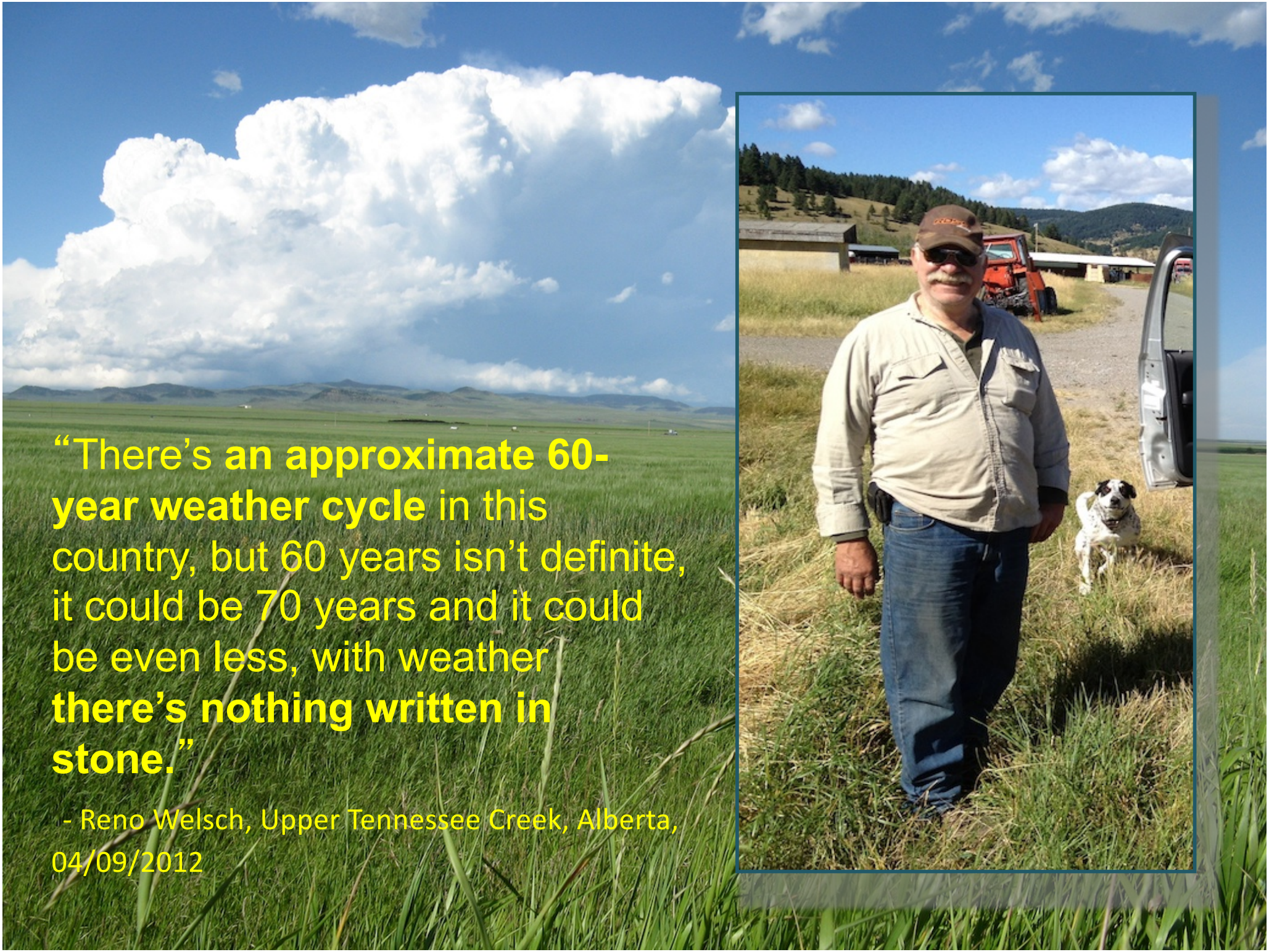
Precipitation/Evaporation (SPEI) and Wheat Yields

Swift Current Creek Watershed, May-June-July, 1956-2012



VACEA: Bonsal, Wheaton, Wittrock

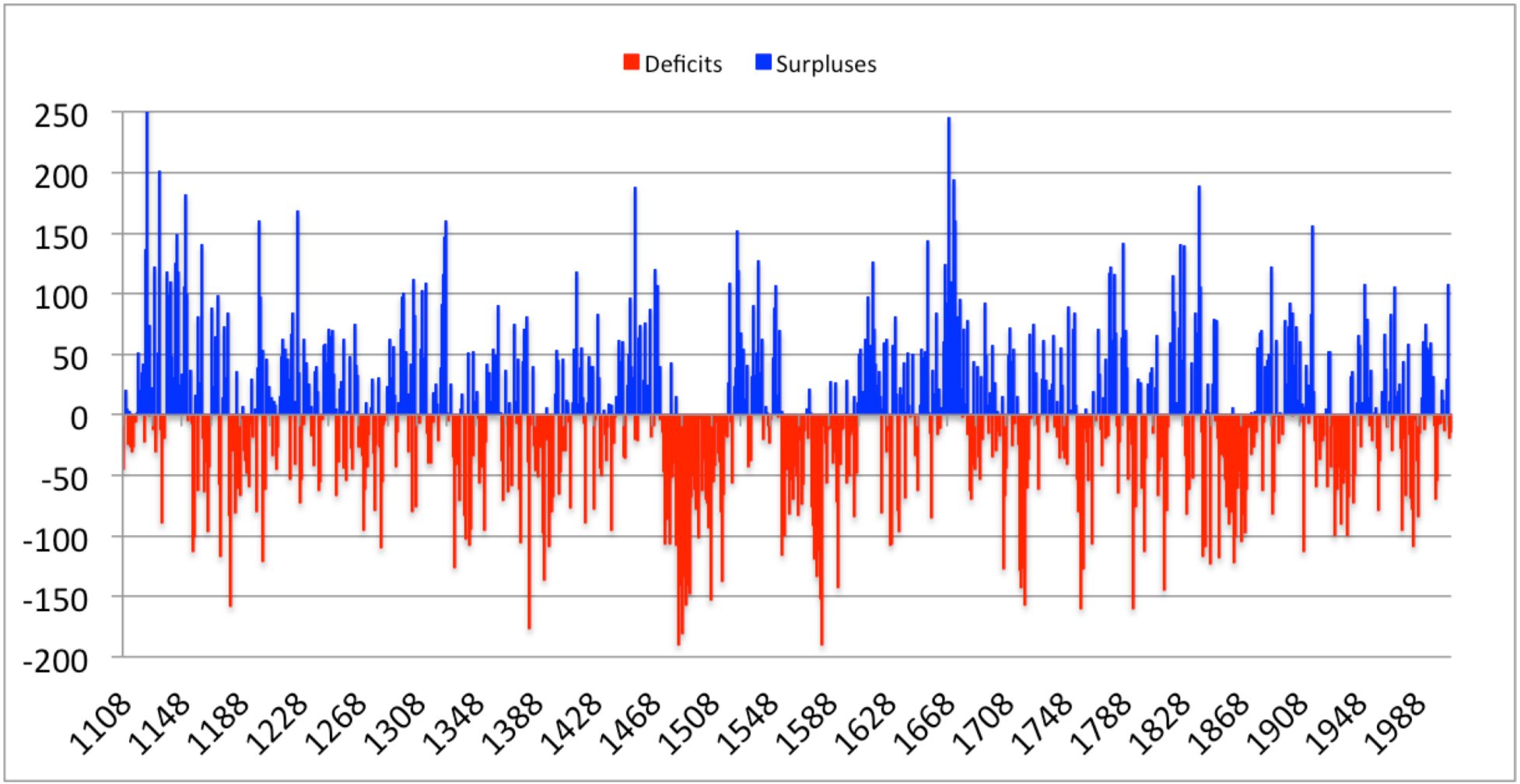

Climate Change
Climate Variability
Weather
Decades
Centuries
Forecast uncertainty
Years
Seasons
Months
2 Weeks
1 Week
Days
Hours
Minutes
Scenarios
Projections
Outlooks
Predictions
Forecasts
Warnings
Alerts
Historical Observations
VACEA
Response
Preparedness


"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

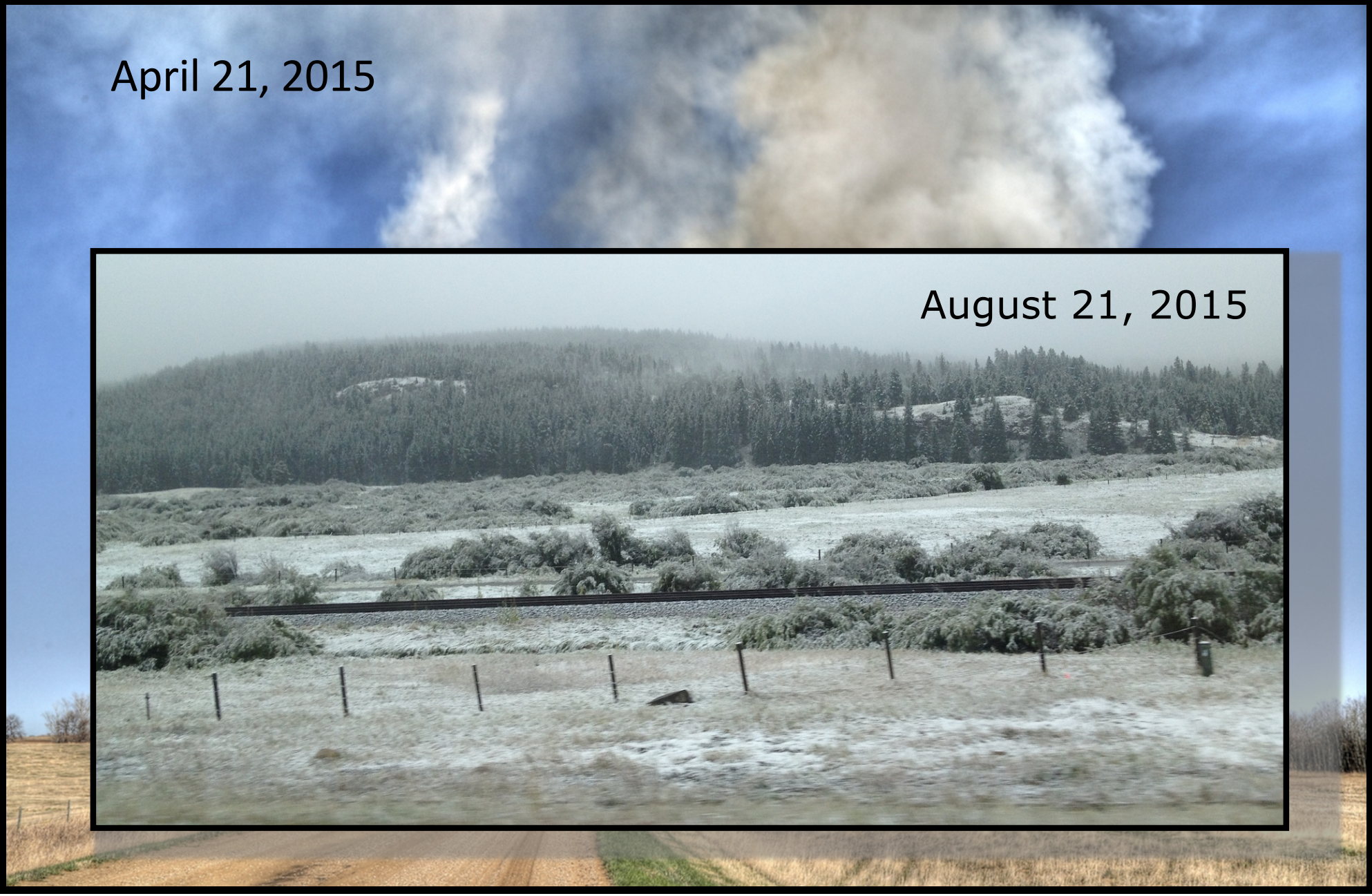
"The farther back you can look, the further forward you are likely to see."

- Sir Winston Churchill

South Saskatchewan River Flow (m^3/s), 1108-2010



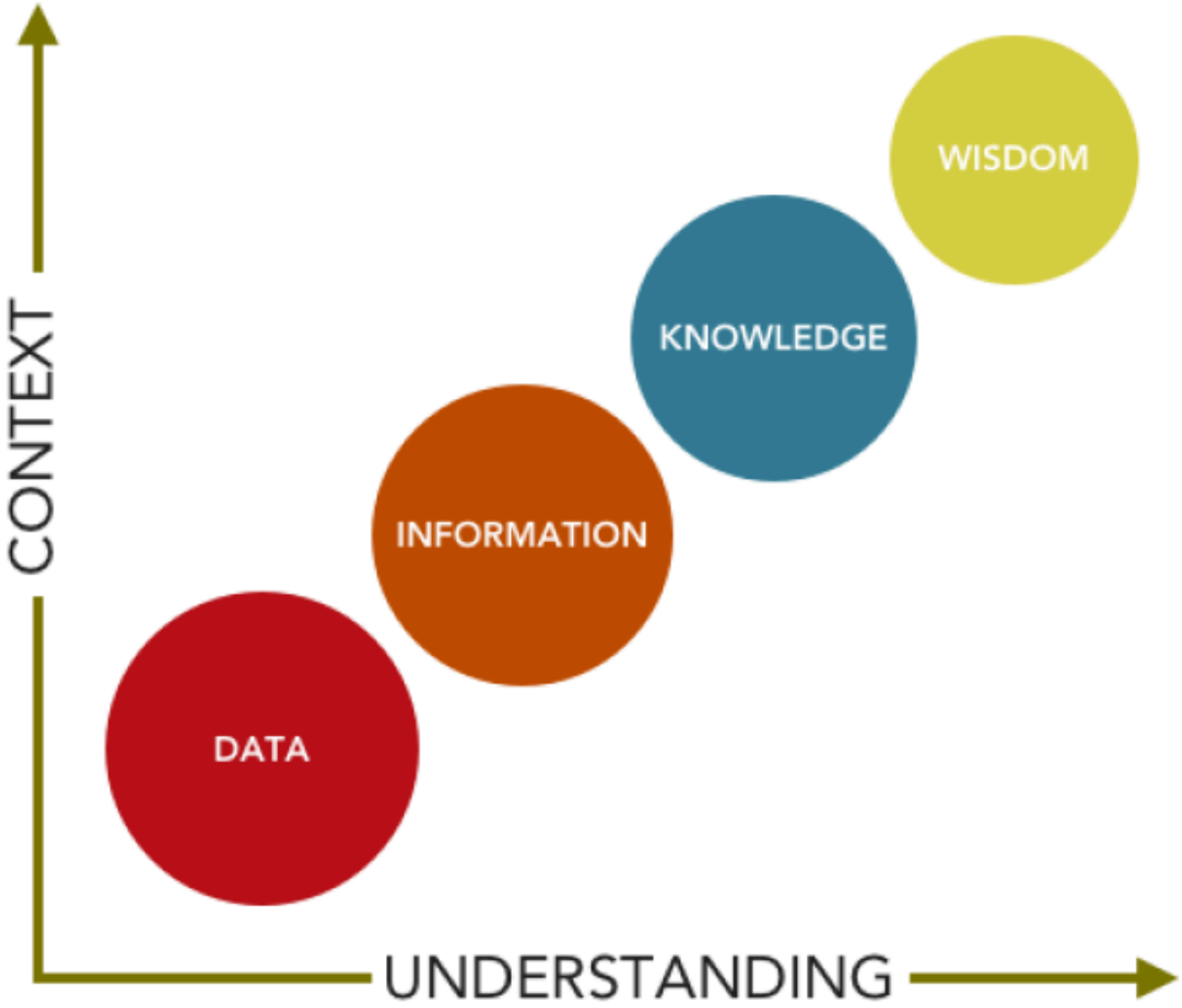
“I’ ll believe in climate change when we get unexpected weather” - *Irrigation District manager*



Key Principles of Sustainable Agriculture and Planned Adaptation to Climate Change

Planned Adaptation	Sustainable Agriculture
Sustainable	Sustainable
Engage the local community	Developed by local communities
Evidence-based	Science-based
A balanced / holistic approach	Integrated: complement existing programs and policies
Prioritized	Targeted
Flexible and adaptive	Flexible and adaptive
Transparent	Accountable

From: Sauchyn, D.J. **Sustainable Agriculture as Adaptation to Climate Change**, Farming for Tomorrow, Spring 2016


CONTEXT
UNDERSTANDING
DATA
INFORMATION
KNOWLEDGE
WISDOM

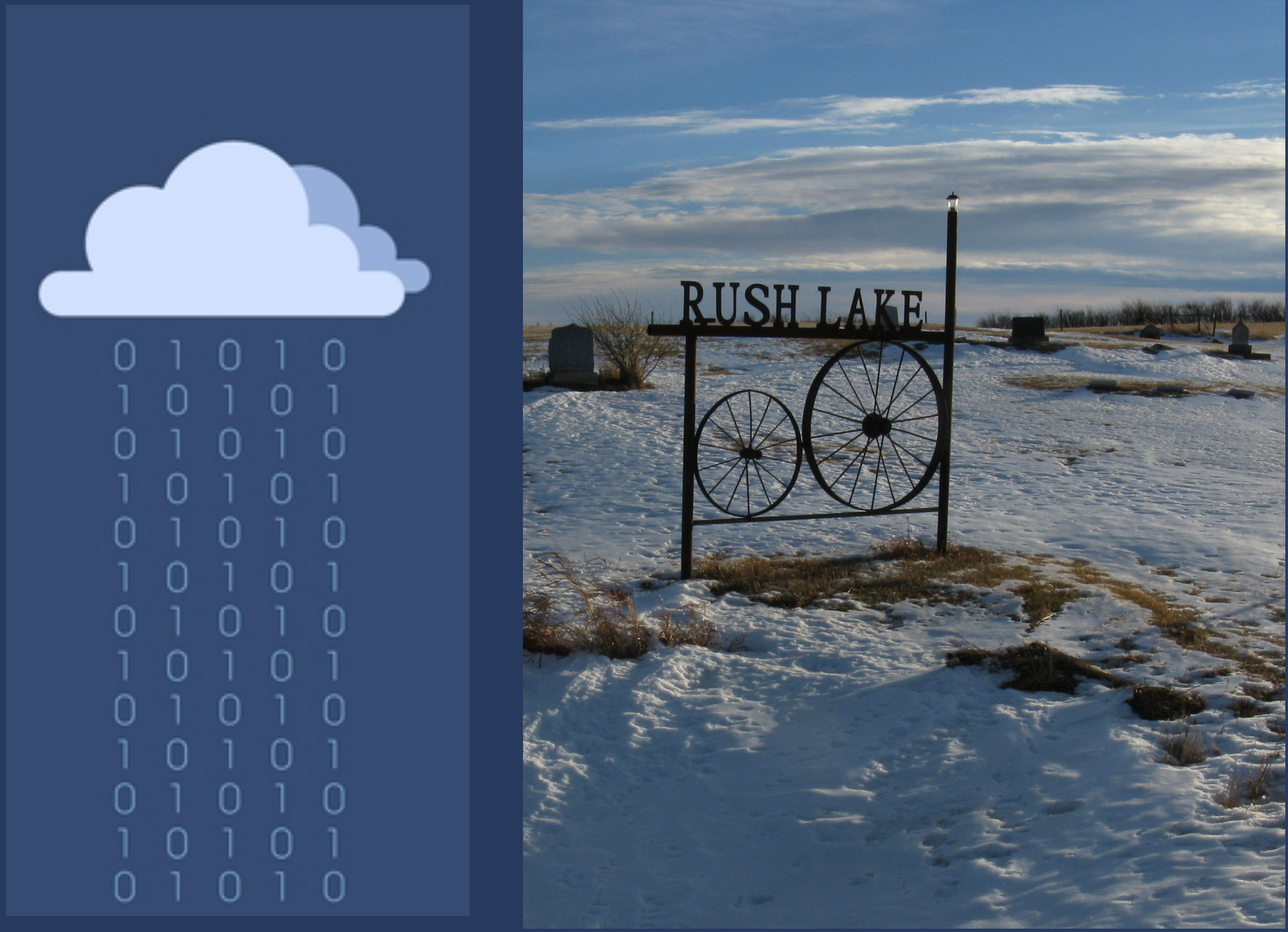
VACEA team gathering the local perceptions about the effects of **climate change** and best **adaptation strategies**.

INTERVIEWS

Community Vulnerability 100

Governance 70

Exposure	Impacts	Sensitivities	Adaptation
DROUGHT			
Shaunavon and the surrounding area have historically experienced drought as an ongoing stressor.	Ranchers are affected by reduction in hay yields and lack of water for livestock. Crop producers are affected by declining crop yields/quality. Surface water quality is affected by drought conditions.	Some older farmers reflected that the movement away from mixed farms and toward single-commodity farms may cause additional sensitivity, since crop and cattle prices tend to operate conversely.	The area has a history of utilizing adaptive practices to adjust and adapt to dry conditions. Historically, these include: • Rotational grazing • Crop rotation • Contour tillage • Zero-till farming (more recently) • Crop selection

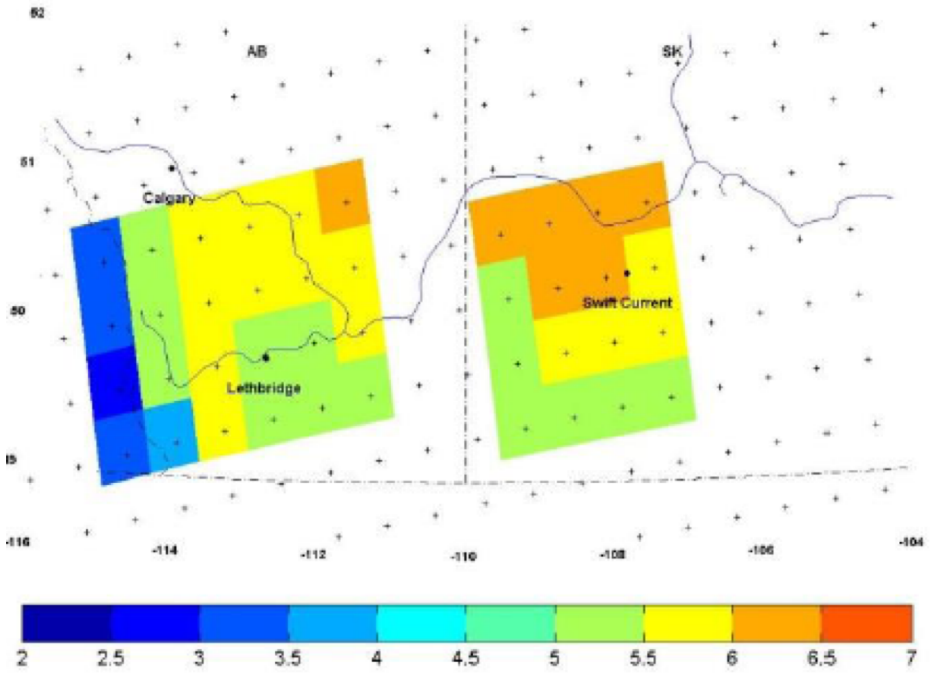

RUSH LAKE

Mean Minimum Temperatures - 2041-70 versus 1971-2000

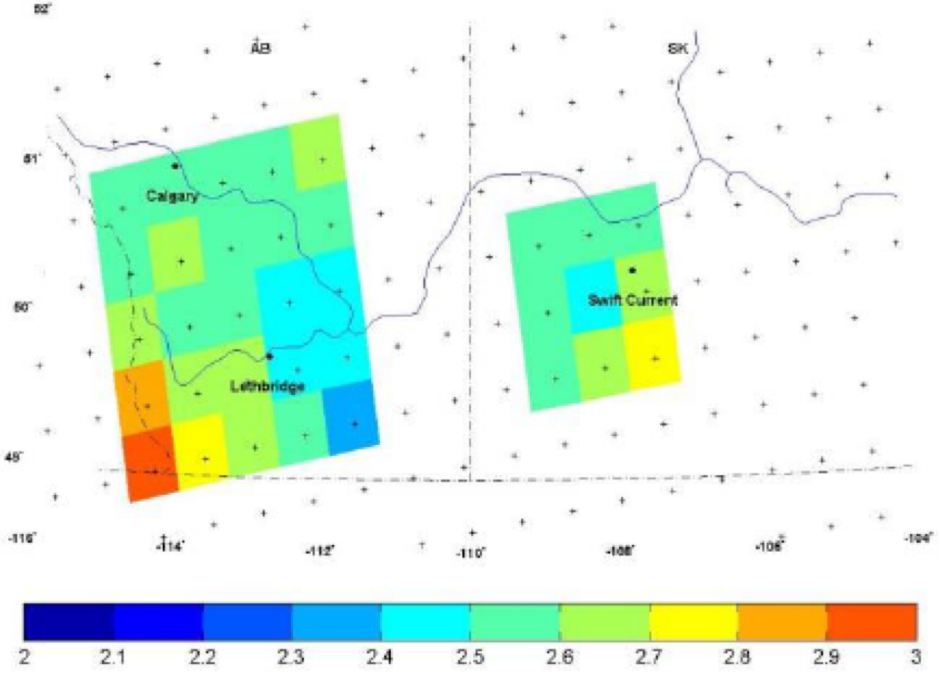
Winter

Summer

Corrected: HRM3 GFDL Δ=5.34°C



Corrected: RCM3 CGCM3 Δ=2.57°C



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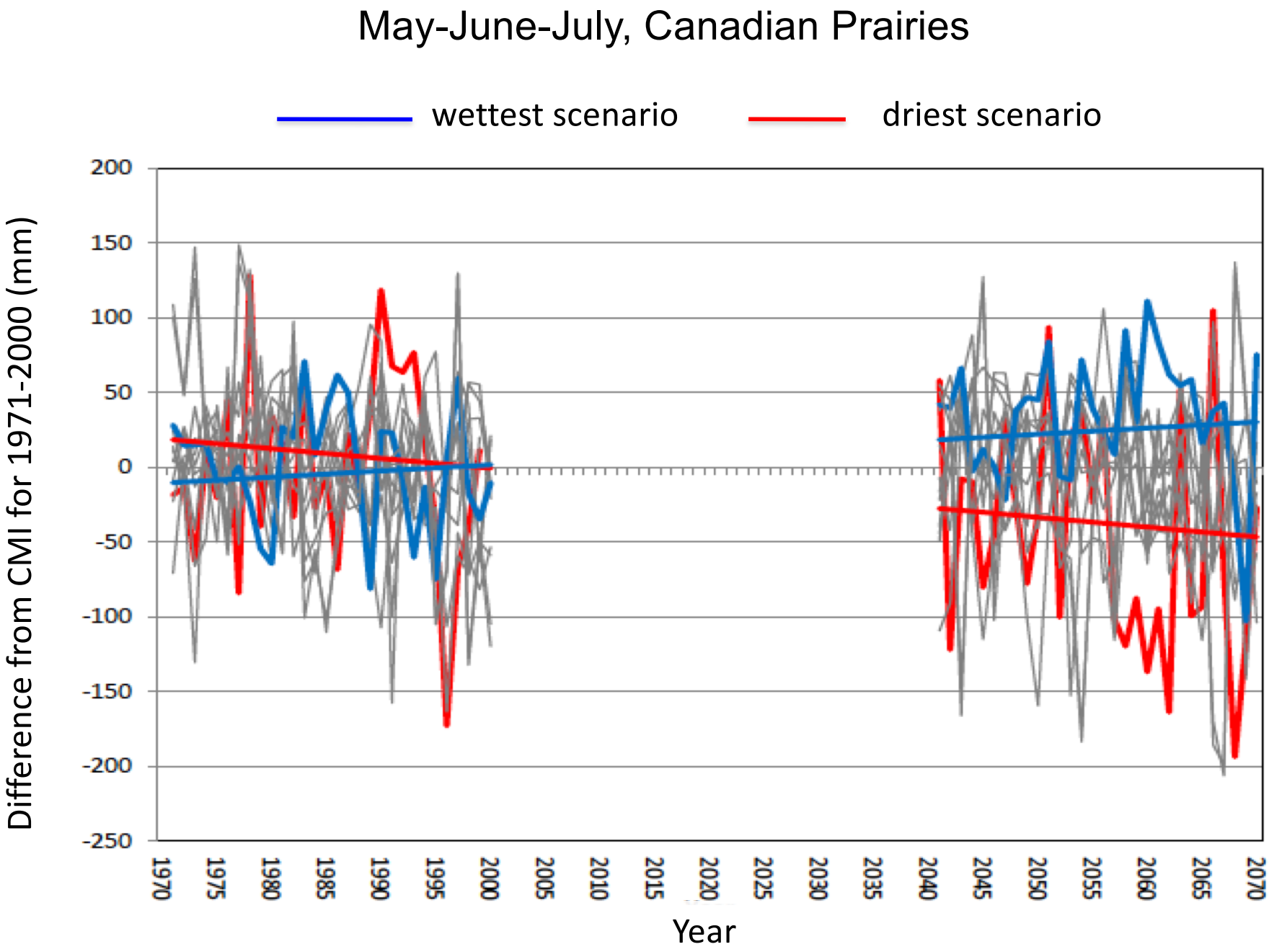
Environment Canada

Climate Moisture Index, 1971-2000, 2041-2070



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)

Southwestern Saskatchewan, September 2015

VACEA Project Stakeholder Workshop

Stakeholder 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.