

# The Changing Cold Regions Network: Workshop on Extreme Weather and Hydrology "Lessons Learned from the Western Canadian Floods of 2013 and Others"

**Howard Wheater** 

Canada Excellence Research Chair in Water Security; Director of the Global Institute for Water Security; Principal Investigator for CCRN

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# CCRN: Changing Cold Regions Network

This Network aims to understand, diagnose and predict interactions amongst the cryospheric, ecological, hydrological, and climatic components of the changing Earth system at multiple scales with a geographic focus on Western Canada's rapidly changing cold interior.



# The Network

- Funded for 5 years under the NSERC Climate Change and Atmospheric Research (CCAR) Initiative
- Leveraging \$24 million in-kind support
- 36 Canadian researchers
  - Additional researchers continuing to join Network
- 15 international collaborators (Australia, China, France, Germany, UK, USA)
- Linked to GEWEX, CLiC, GEO, NCAR, NASA, and more



### Canadian Institutional Partners

- Canadian Universities
  - University of Saskatchewan
  - University of Calgary
  - University of Manitoba
  - University of British Columbia
  - Wilfrid Laurier University
  - McMaster University
  - University of Guelph
  - Université du Québec à Montréal
- Federal Government Partners
  - Environment Canada
  - Natural Resources Canada

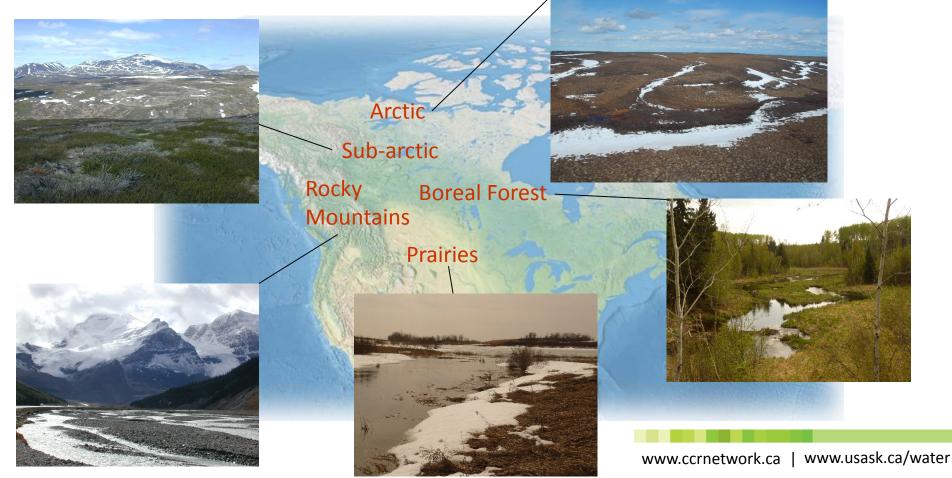
- Agriculture and Agri-Food Canada
- Parks Canada
- Provincial and Territorial Government Agencies
  - Saskatchewan Water Security Agency
  - Government of Northwest Territories
  - Yukon Environment
  - Alberta Environment and Sustainable Resource Development
  - Government of Manitoba

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# **CCRN** Research Programme

 Focused on Canada's western interior cold regions, including the Mackenzie and Saskatchewan River Basins





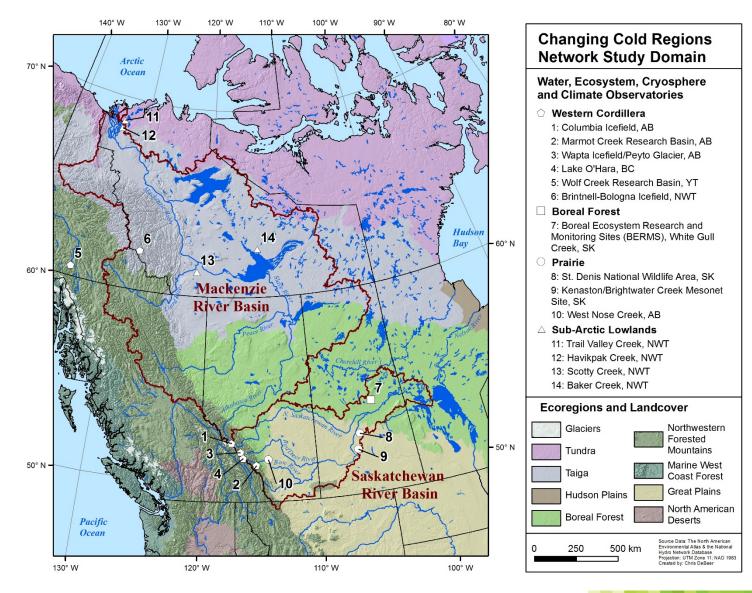
# Water, Ecosystem, Cryosphere, and Climate (WECC) Observatories

- A network of WECC Observatories combine meteorological, hydrological, ecosystem, and cryospheric observations with multi-scale coupled models from the surface to the atmosphere.
- Observatories contain long-term legacy data sets, including hydro-meteorological variables, remote sensing observations, LiDAR topography, and soils, geology, and vegetation characterization





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### CCRN Research: Thematic Approach

- A. Observed Earth System Change in Cold Regions inventory and statistical evaluation
- B. Improved Understanding and Diagnosis of Local Scale Change
- C. Upscaling for improved Atmospheric Modelling and River Basin Scale Prediction
- D. Analysis and Prediction of Regional and Large Scale Variability and Change
- E. User Community Outreach and Engagement



### The Future

- Over the next five years, CCRN will:
  - Improve our understanding of recent Earth system change in the cold interior of western and northern Canada (<u>CCAR</u> <u>Theme 3</u>)
  - Advance water, weather, climate and environmental prediction (<u>CCAR Theme 2</u>)
  - Improve our understanding of Earth system processes and their representation in hydrological, atmospheric and ecological models (<u>CCAR Theme 1</u>)
    - Enhance our capability for water management
    - Train the next generation of Earth System Scientists
    - Provide high quality datasets for change assessment and model verification



# **CCRN List of Participants**

### Network Co-Investigators and

### **Collaborators**

- V. Arora (EC)
- J. Baltzer (WLU)
- A. Barr (EC)
- P. Bartlett (EC)
- A. Berg (UG)
- A. Black (UBC)
- B. Bonsal (EC)
- S. Carey (MU)
- G. Clarke (UBC)
- M. Demuth (NRCan)
- V. Fortin (EC)
- J. Hanesiak (UM)
- M. Hayashi (UC)
- W. Helgason (US)
- A. Howard (AAFC)
- D. Hudak (EC)
- A. Ireson (US)
- R. Janowicz (YE)

- E. Johnson (UC)
- J. Johnstone (US)
- N.Khaliq (US)
- B. Kochtubajda (EC)
- Y. Li (US)
- K. Lindenschmidt (US)
- M. MacKay (EC)
- P. Marsh (WLU)
- S. Marshall (UC)
- J. McDonnell (US)
- A. Pietroniro (EC)
- J. Pomeroy (US)
- W. Quinton (WLU)
- C. Spence (EC)
- R. Stewart (UM)
- K. Szeto (EC)
- J. Thériault (UQAM)
- M. Turetsky (UG)
- G. van der Kamp (EC)
- W. Wu (PCA)

- H. Wheater (US)
- D. Yang (EC)
- X. Zhang (EC)

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- Ming-Ko Woo (MU, ret.)

#### International Advisory

#### **Committee**

- Eric Kasischke (U Maryland)
- Don Cline (NOAA)
- Richard Harding (UK Centre Ecology and Hydrology)
- Larry Hinzman (U Alaska)

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\*Bold indicates member of Science Committee