

An IP3 Users/Stakeholders Community Workshop

Prediction of Future Water Resources in the Mountains and Northern Canada: What is Needed, What Can be Done

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<http://www.cfcas.org>

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Prediction of Future Water Resources in the Mountains and Northern Canada:

- Why it's necessary ?
Research on water resources is pivotal to Canadians
- What's being done ?
- What's still needed ?



Prediction of Future Water Resources in the Mountains and Northern Canada:

The Why ?

- 1) An increase in water scarcity represents the most serious climate risk in the Prairie provinces

Recent Government of Canada Report by NRCan – 2008
entitled “From Impacts to adaptation: Canada in a Changing Climate 2007

- 2) Drought has huge implications to water allocation and water management strategies in the Prairie provinces
- 3) The effects of climate change will exacerbate both water scarcity and the effects of drought



Prediction of Future Water Resources in the Mountains and Northern Canada

What's needed - Many things !

- Resources – both people and funding
- Time – to develop new and improved tools
- Long term, targeted research capabilities, which includes training for HQP
- Sharing of Information



Prediction of Future Water Resources in the Mountains and Northern Canada

What's being done

Canadian Foundation for Climate and Atmospheric Sciences (CFCAS) was set-up in 2000 and governed by a tripartite agreement between: Environment Canada, CMOS and CFCAS. It has a 10 year mandate, which finishes in March 2011.

Funds research in the areas of:

- Climate Change and Climate Science

- Air Quality

- Extreme Weather

- Marine Environmental Prediction / Oceanography

Total CFCAS funding ▪ \$110 million
 ▪ 75% Networks – 25% Projects



Prediction of Future Water Resources in the Mountains and Northern Canada

What's being done (Cont.)

CFCAS provides focused research to be undertaken in collaboration with federal, provincial, private sector and other partners

Uses a competitive (peer review) process.
Looks for scientific excellence and project relevance

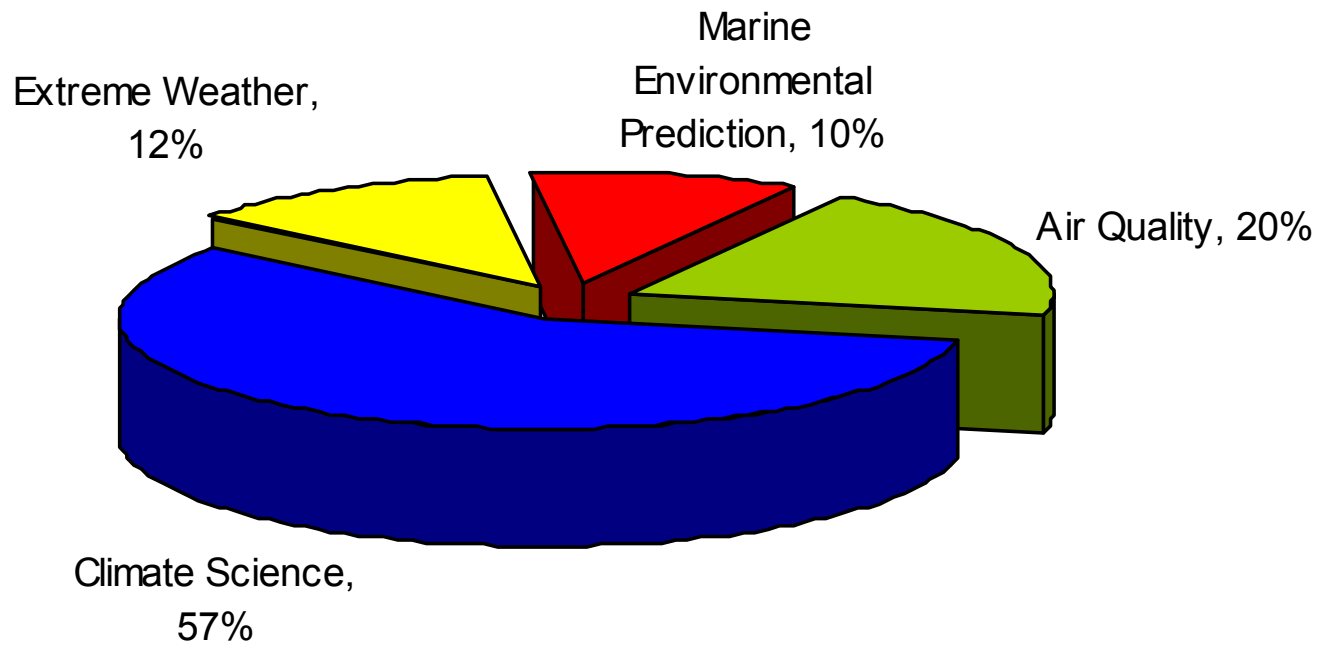
CFCAS has awarded a total of 24 networks with
12 awards since April 2005

Funded 24 Networks totaling \$73 million; and
131 Project Grants totaling \$27 million

Network Duration - Normally 4 or 5 years



CFCAS Grants Awarded 2000 to July 2006



What's being done ?

CFCAS Network Grants



Three existing CFCAS Networks are associated with water resource issues:

IP3 Improved Processes & Parameterization for Prediction in Cold Regions
PI – Prof. John Pomeroy, Univ. of Saskatchewan (USask)
CFCAS Funding: \$2.5 Million over 4 years – 2006 to 2010
Web site: <http://www.usask.ca/ip3/>

WC2N Western Canadian Cryospheric Network
PI – Prof. Brian Menounos, Univ. of Northern British Columbia
CFCAS Funding: \$2.1 Million over 5 years – 2006 to 2010
Web site: <http://wc2n.unbc.ca/>

DRI Drought Research Initiative
PI's – Prof. Ron Stewart, McGill & Prof. John Pomeroy, USask
CFCAS Funding: \$3.0 Million over 5 years – 2005 to 2010
Web site: <http://www.drinetwork.ca/>



IP3 - Improved Processes & Parameterization for Prediction in Cold Regions

Scientific Focus: Cold regions high latitude and high altitude hydrology and hydrometeorology

Theme I

Processes

Establish cold regions hydrometeorological processes related to snow, frozen ground, glaciers and open water

Monitoring at 8 major field (research) basins.

Theme II

Parameterization

Developing a Cold Regions Hydrological Model

Theme III

Prediction

Develop an integrated hydrology-land surface model (MESH)

- Stand alone hydrological model; or
- Operate within EC GEM as part of NWP model



WC2N - Western Canadian Cryospheric Network

Scientific Focus: Understand the behaviour of the climate system and its effects on glacier mass balance in the mountain ranges of British Columbia and Alberta

Theme IA Present and former glacier extent
Examination of the spatial patterns and rates of glacier retreat in B.C. and Alberta over the past 400 years

Theme IB North Pacific Climate Variability
Focus on proxy climate indicators (tree rings and ice cores)

Theme II Processes and Process Models
Glacier – climate process studies & climate down-scaling analysis

Theme III Integrative Modeling
Climate and glacier studies leading to the development of regional glaciation model(s) for Western Canada to examine glacial history/future trends



DRI – Drought Research Initiative

Scientific Focus:

Understand the physical characteristics of and processes influencing Canadian Prairie droughts, and contribute to their prediction, through a focus on the recent severe drought of 1999-2004

- Theme I Quantify physical features of the 1999-2004 drought
- Theme II Improve the understanding of processes and feedback mechanisms governing the formation, evolution, cessation and structure of drought
- Theme III Assess and reduce the uncertainties in the prediction of drought



Network Annual Workshops

2nd Annual IP3 Workshop – November 8-10, 2007, Waterloo
Over 80 scientists and researchers attended.

1st Annual WC2N Workshop – September 28-29, 2007, Banff
Over 30 scientists and researchers attended.

3rd Annual DRI Workshop – January 17-19, 2008, Calgary
Over 60 scientists and researchers attended.



Also two smaller workshops:

DRI Evaporation Workshop – May 17, 2007
University of Saskatchewan, Saskatoon, SK

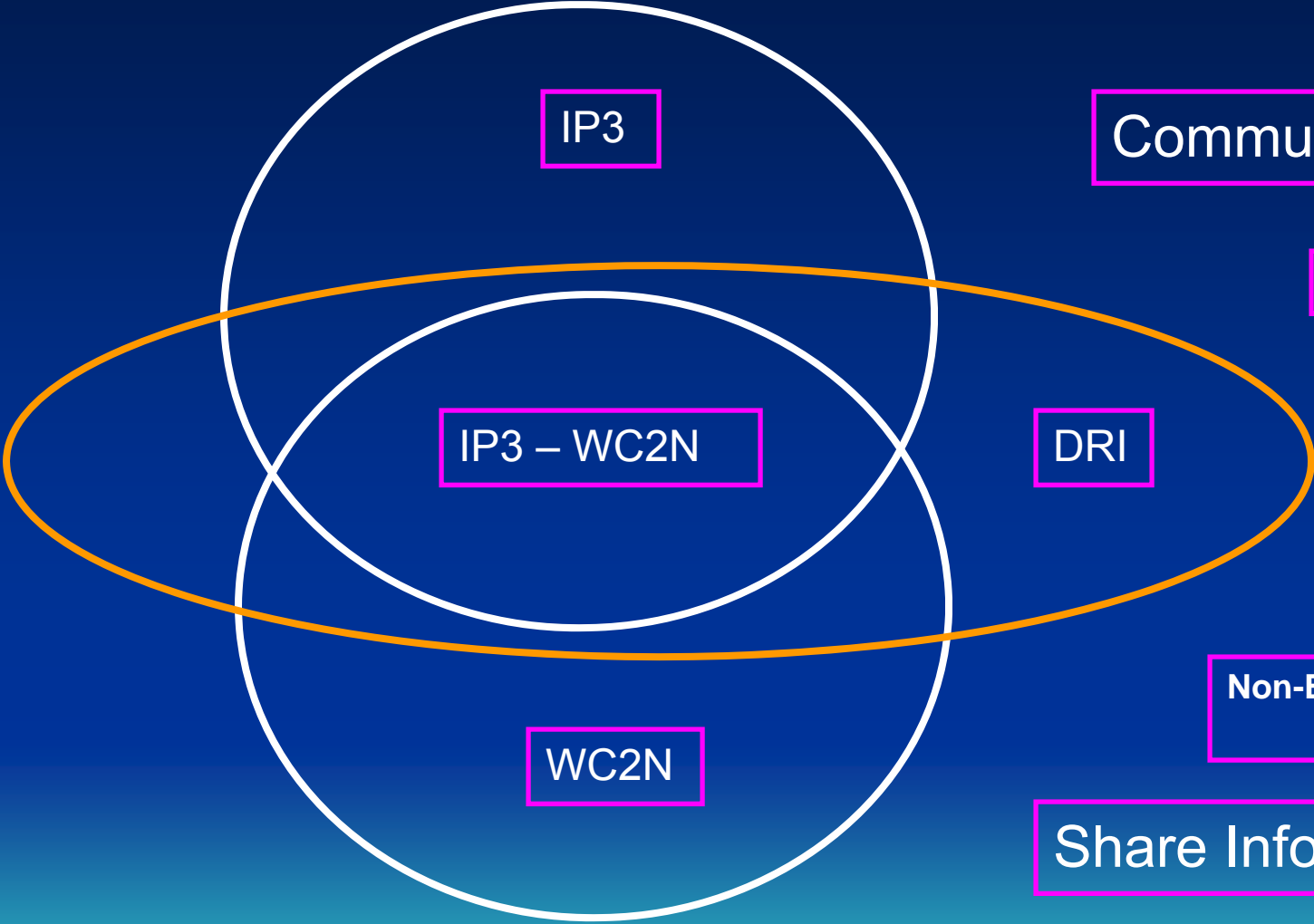
Featured a series of state-of-the-art presentations on evaporation.

DRI Predictability Workshop – September 20, 2007
McGill University, Montreal PQ

Examined progress being made on the modeling, sensitivity
and simulation studies for the 1999-2004 drought



Integrate Research Activities



Communicate

Decision Makers

Policy Makers

Elected Officials

Non-Elected Officials

Share Information



What's being done ?

CFCAS

Project Grants



- **Assessment of Water Resources Risk and Vulnerability to Changing Climatic Conditions**

- Prof. Slobodan P. Simonovic, Western

- Study to assess the vulnerability of river basins with respect to climate forcing. Developed tools for identifying the spatial distribution of the vulnerability and risk.

- Vulnerability is seen as the basis for risk mitigation measures for hydrologic extremes at the basin level. A particular attention throughout the project has been paid to the involvement of the end-users in this process – Upper Thames River Conservation Authority (UTRCA).

- Over 130 decision makers, scientists and members of the public attended a one day workshop on October 4, 2007, entitled:
“Creating a Climate for Change in the Upper Thames Watershed”



- **Deriving open tundra snow information for climatological analysis from spaceborne passive microwave data**
- Prof. Michael English, Wilfrid Laurier University
- There are two major components to this project: (1) the development of a new capability to estimate snow water equivalent (SWE) across the Canadian tundra from satellite passive microwave data, and (2) the determination of the fate of SWE in the study watershed including its residence time, evapo-transpiration, sublimation loss, and retention on land and in lakes after melt via geochemical and isotopic analysis.



What's still needed

Need to integrate work research activities and share knowledge

Communicate results with decision makers, policy makers, elected officials and non-elected officials

Need to establish long term targeted funding and resources

A lot of work has been already been done and much knowledge gained, but a lot still needs to be done, particularly in terms of societal, administrative, technical and environmental considerations



Thank You

