

PRECIPITATION-RELATED EXTREMES

BACKGROUND

MARCH 26, 2019



Climate-Related Precipitation Extremes
Les précipitations extrêmes liées au climat





Meeting objectives

- To update the project status
- To review key accomplishments to date and plan to meet outstanding project deliverables
- To provide partners an opportunity to communicate feedback and needs
- To discuss the potential funding renewal of years 4-7



Meeting agenda

The meeting is organized as follows:

- Introduction to GWF and climate extremes project
- Updates from partners
- Updates from researchers
- Discussion and actions
- Next steps



Project objective

- To help users cope with the environmental, health and economic impacts of their identified critical climate-related precipitation extremes

Users/Partners

BC MoTI, ECCC, NRC

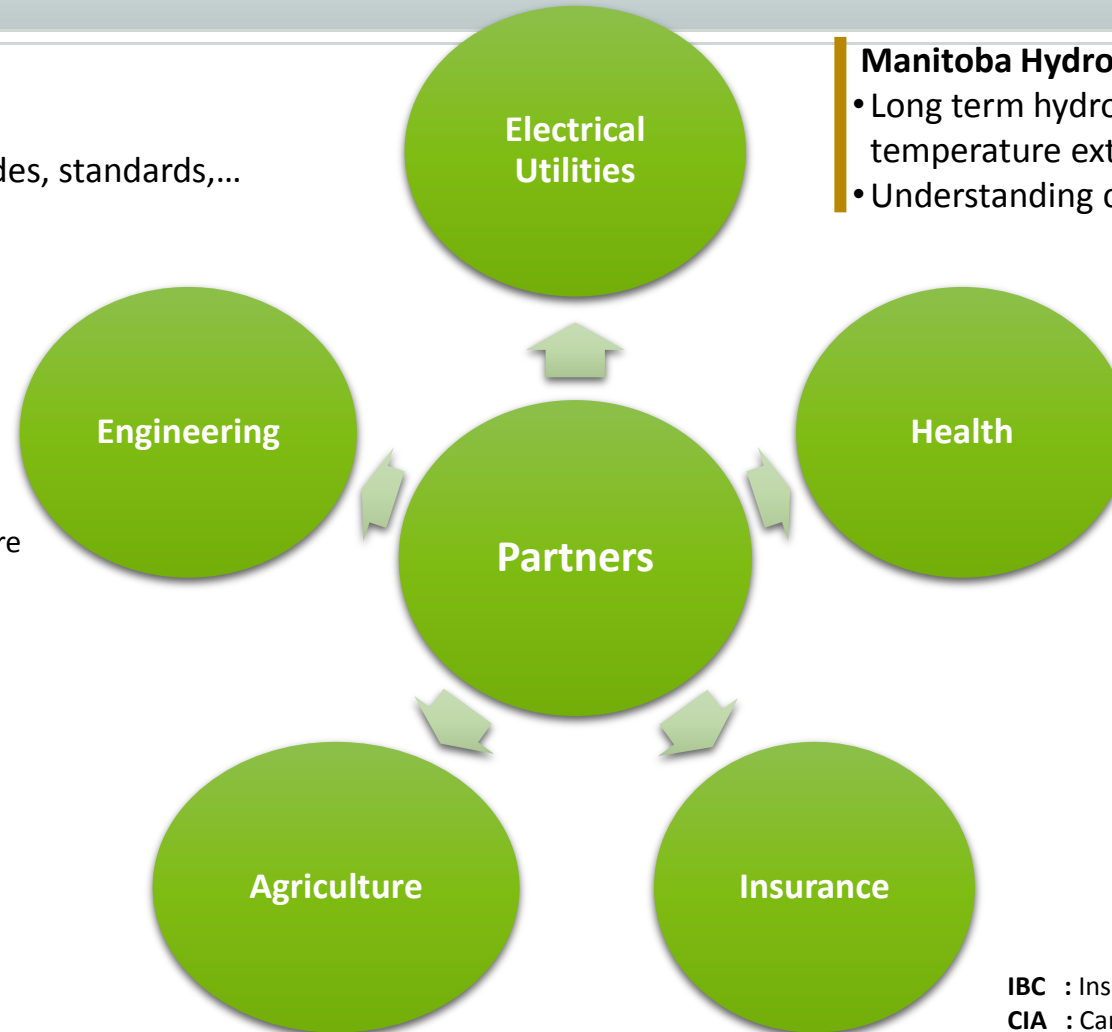
- Implications for building codes, bridges codes, standards,...
- Return periods
- Non-stationarity
- Projecting future change in extremes

BC MoTI: Ministry of Transportation and Infrastructure
ECCC : Environment and Climate Change Canada
NRC : National Research Council

Agriculture and Agri-Food Canada, CCME

Impact of future precipitation extremes on crop yields

CCME: Canadian Council of Ministers of the Environment



Manitoba Hydro, NB Power, BC Hydro

- Long term hydrological drought, freezing rain, wind, temperature extremes
- Understanding climate change, adapting and planning.

Health Canada

- Temperature and precipitation-related extremes
- Water-borne diseases, seasonality and shifts

IBC, CIA, ICLR, CatIQ

- Assistance in incorporating forecasts into pricing models
- Return periods and short term forecasts

IBC : Insurance Bureau of Canada

CIA : Canadian Institute of Actuaries

ICLR : Institute of Catastrophic Loss Reduction

CatIQ: Catastrophe Indices and Quantification Inc.



Methodology

Our research is accomplished through:

- innovative **analysis techniques**
- state-of-the art **observational data** station/gridded precipitation, remote sensing
- climate simulations from **three modelling pillars**: GCMs (~200-100km), RCMs (50-10km) and convection permitting WRF model (4km)



Main Research topics

- **Regional Climate Simulations using WRF model**
- **Droughts:**
 - Evaluation of WRF model during Canadian Prairie drought
 - Drought evolution and projected change
- **Precipitation extremes:**
 - Projected changes in annual maximum hourly precipitation
 - Projected changes in probable maximum precipitation
 - Exploring the behavior of extreme precipitation for very long return levels
- **Severe summer and winter storm events:**
 - Hazardous hail, heavy rain and winter storm events (WRF simulations)
 - Extreme Ice storm events (GEM model)
 - Hazardous winter freezing rain and wet snow events (WRF simulations)



Key activities- second year

- A project logo has been designed and is available for use by project participants
- The project website has been designed and published
- A progress report has been circulated to partners and researchers
- A list of variables to be archived from the new WRF runs has been circulated
- Instructions on the access to the WRF data on Compute Canada have been circulated to researchers



Key activities- second year

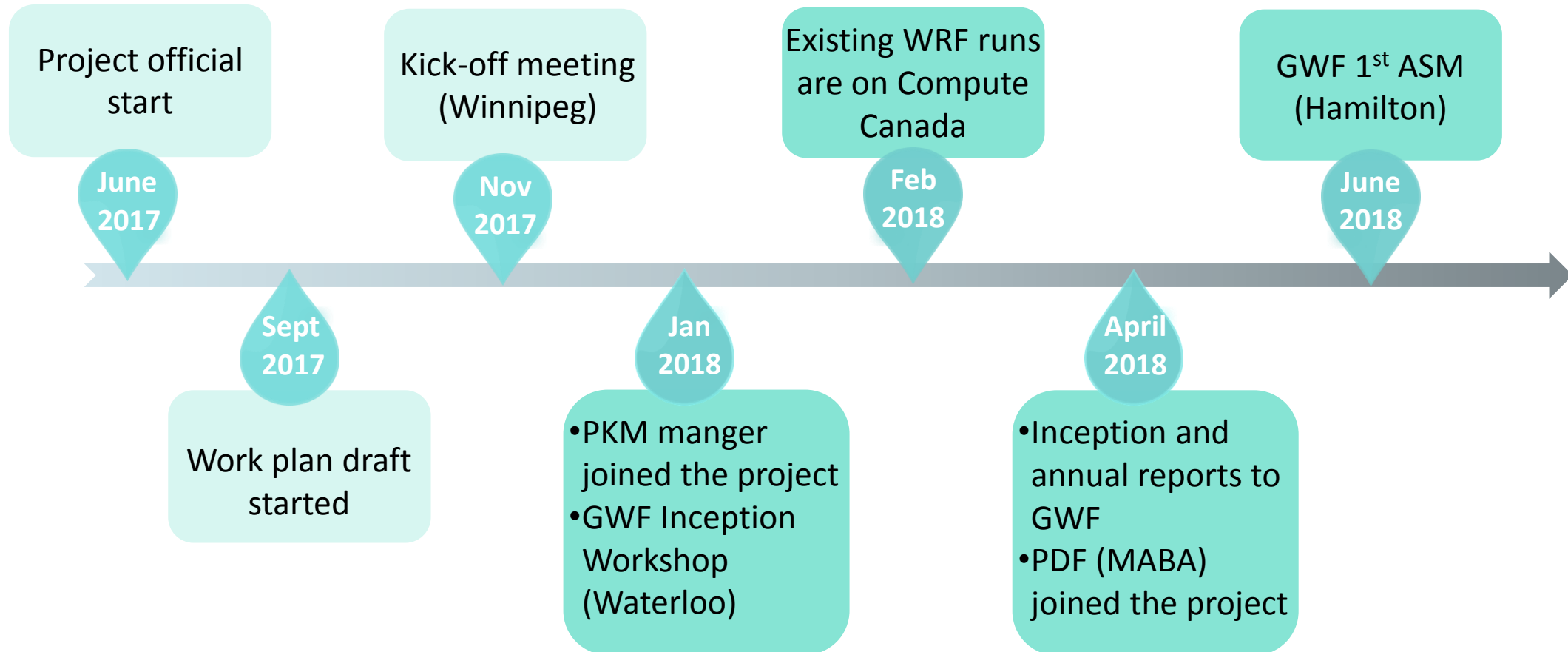
- A new postdoctoral fellow joined the project in collaboration with NCAR; he is working on temperature and precipitation relationships using WRF model.
- A new graduate student has recently joined the project (UQAM); continue to analyse storms that affected NB Power infrastructure using WRF runs.
- A new postdoctoral fellow in statistics of climate extremes has been recently recruited; collaboration between GWF, CANSSI and PCIC. The PDF will join the project in August, 2019
- New HQPs are joining the project's previously recruited HQP: Mohamed Ali Ben Alaya (PDF) and Brock Tropea (MSc student)



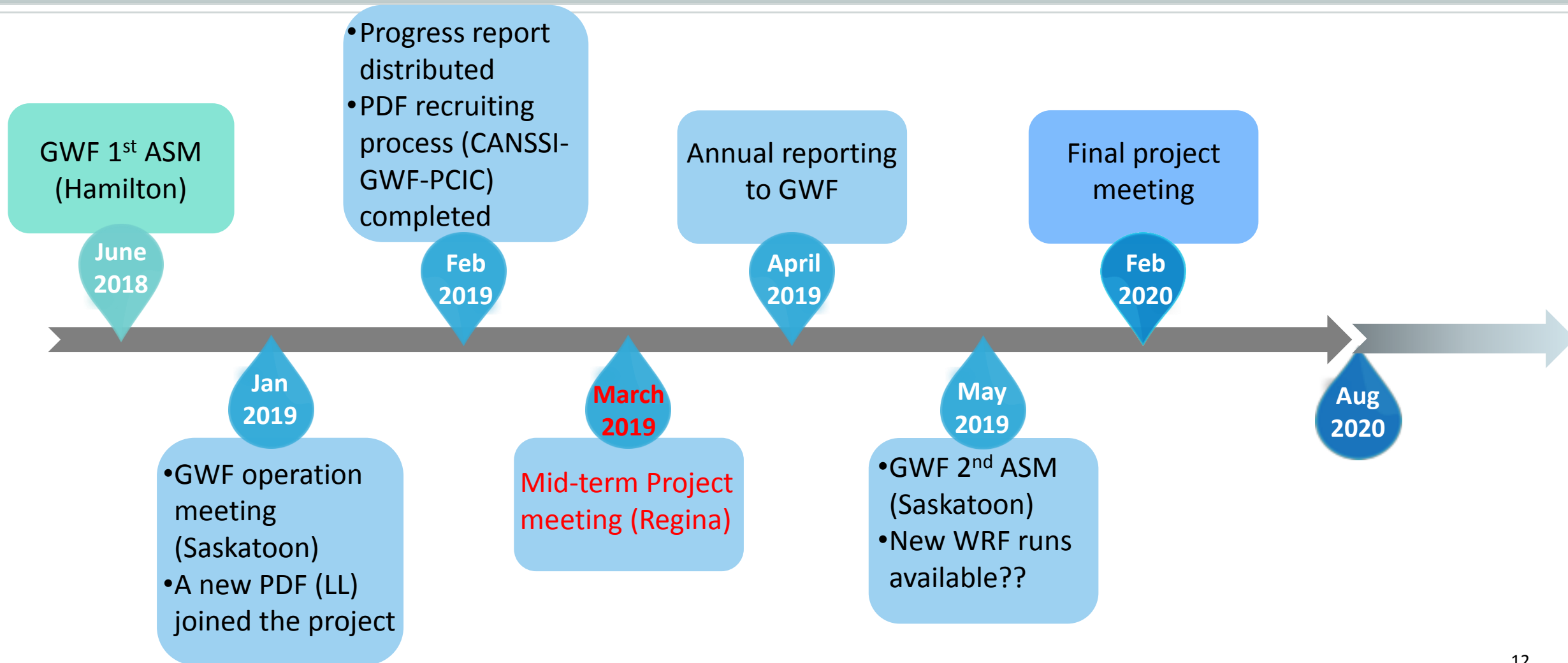
Highly qualified personal

Name	Role	Academic Institution
Mohamed Ali Ben Alaya	PDF, FZ & XZ	Pacific Climate Impacts Consortium, University of Victoria
Julien Chartrand	Student, JT	University of Quebec at Montreal
Fei Huo	PDF, YL	University of Saskatchewan
Lintao Li	PDF, YL	University of Saskatchewan
Seoncheol Park	PDF, RS &FZ	Pacific Climate Impacts Consortium, University of Victoria
Brock Tropea	MSc student, RS	University of Manitoba

Project timeline



Project timeline





Project network

University Investigators

John Hanesiak
Mary Kelly
Yanping Li
Ronald Stewart
Julie Theriault
Francis Zwiers

Collaborators/Users

Ahmed Attar
Barrie Bonsal
Julian Brimelow
Peter Berry
Les Dandridge
Bob Kochtubajda
Zoubir Lounis
Jenny Fraser
Mark Greenwood
David McGown
Harry Moss
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