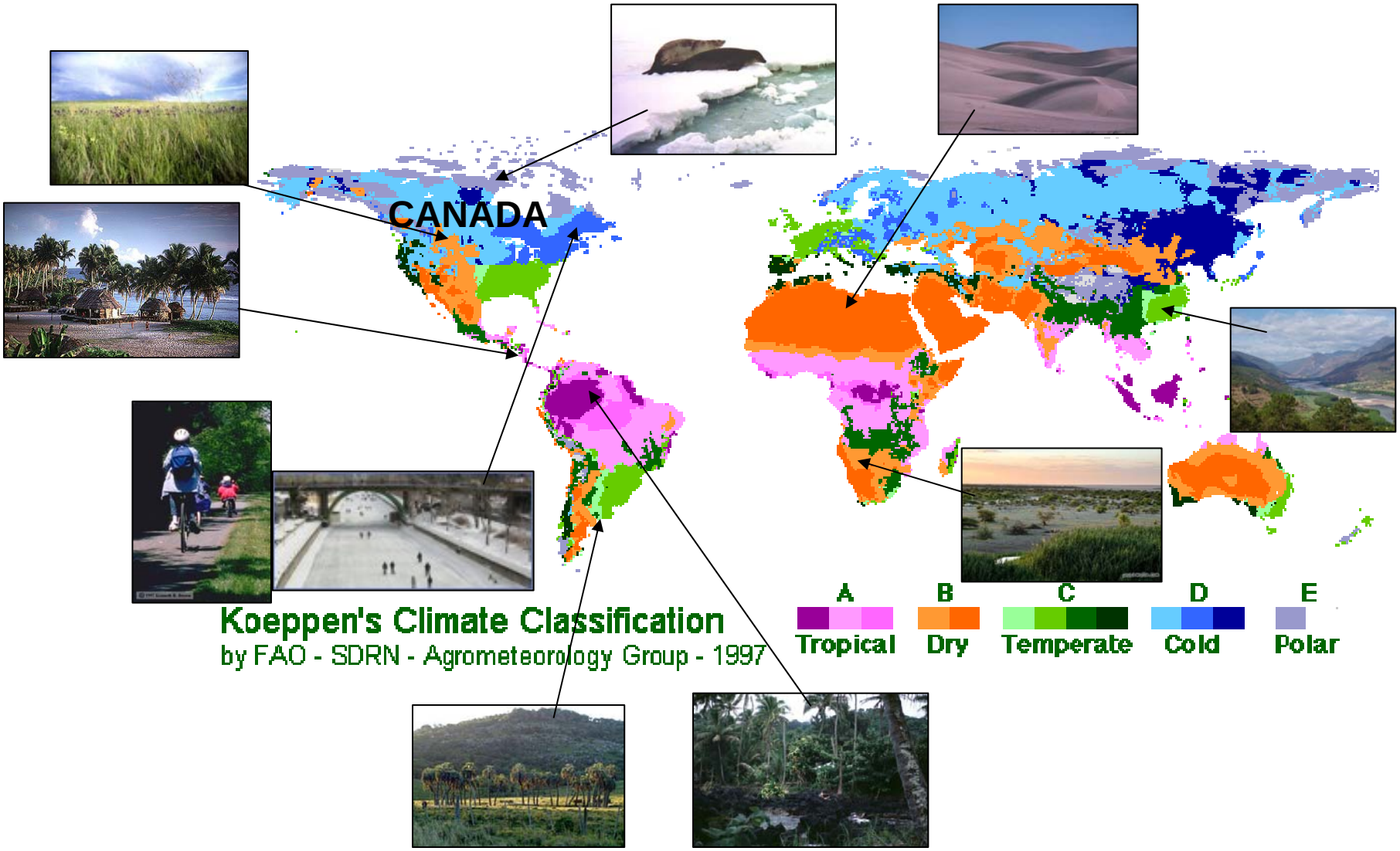
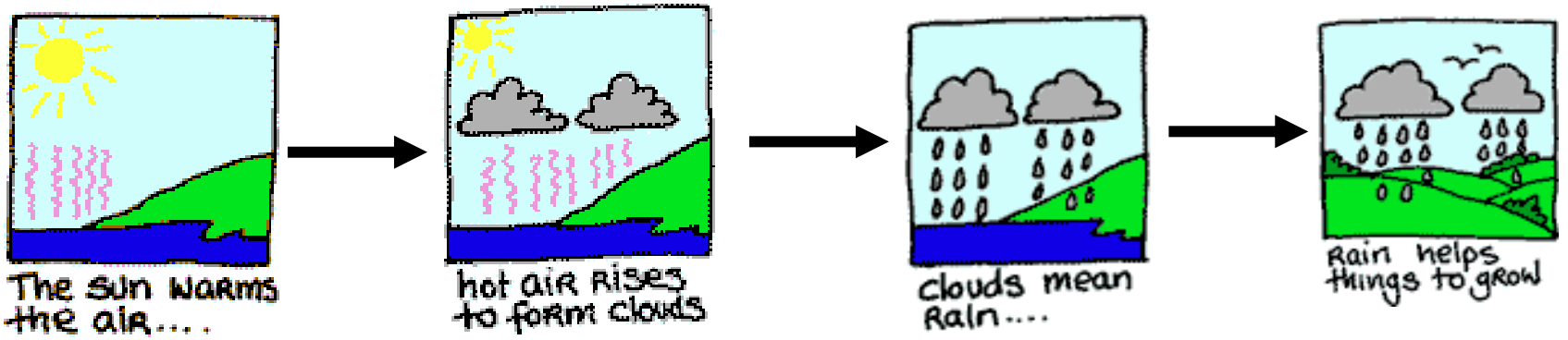
What is climate change?

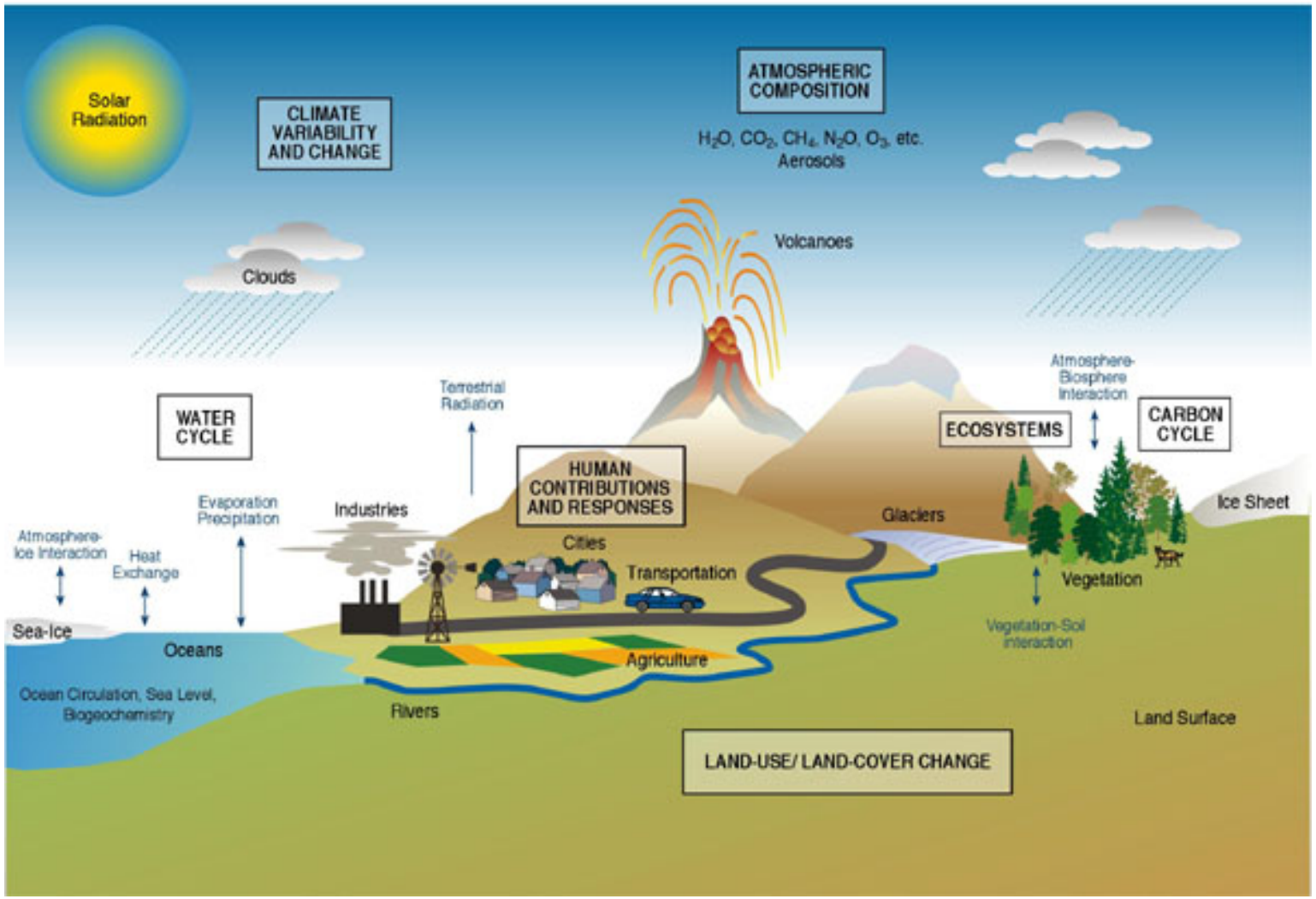
What is the difference between climate and weather?

CLIMATES OF THE WORLD



What does drive the climate?




Solar Radiation
CLIMATE VARIABILITY AND CHANGE
ATMOSPHERIC COMPOSITION
H_2O, CO_2, CH_4, N_2O, O_3, etc.
Aerosols
Volcanoes
Clouds
Terrestrial Radiation
WATER CYCLE
HUMAN CONTRIBUTIONS AND RESPONSES
Atmosphere-Biosphere Interaction
ECOSYSTEMS
CARBON CYCLE
Evaporation Precipitation
Industries
Glaciers
Ice Sheet
Atmosphere-Ice Interaction
Heat Exchange
Cities
Transportation
Vegetation
Sea-Ice
Oceans
Agriculture
Vegetation-Soil Interaction
Ocean Circulation, Sea Level, Biogeochemistry
Rivers
Land Surface
LAND-USE/ LAND-COVER CHANGE

CLIMATE CHANGE IS:

Variation in climate over many years,

from decades to millions of years.

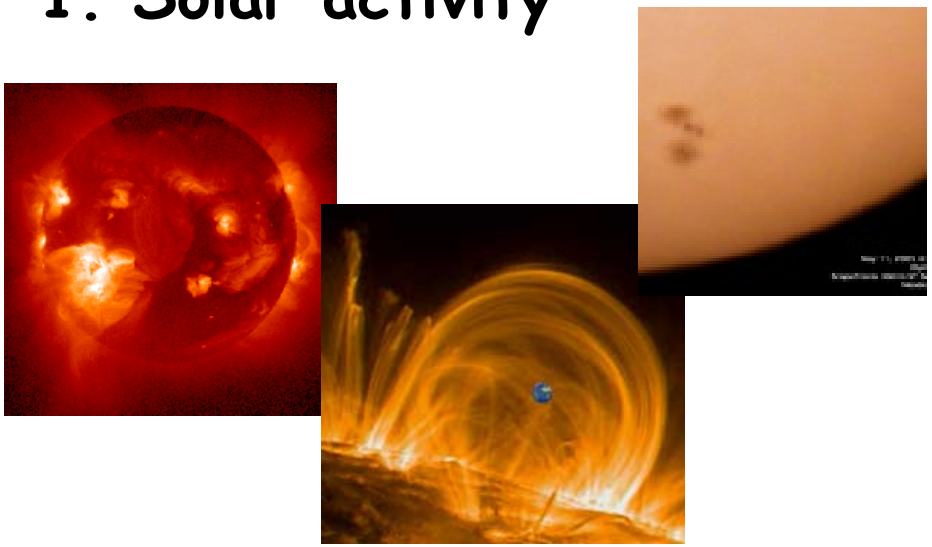
CLIMATE CHANGE INCLUDES

EXTREME EVENTS

(frequency and intensity)

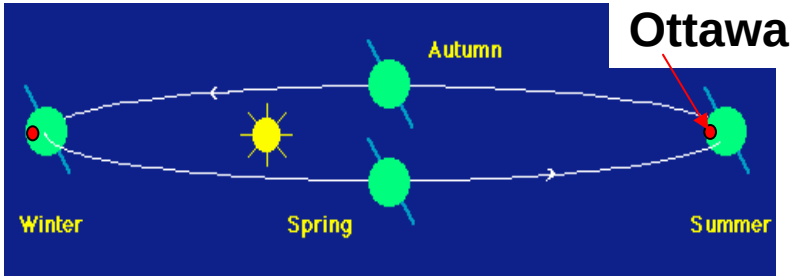
Natural causes:

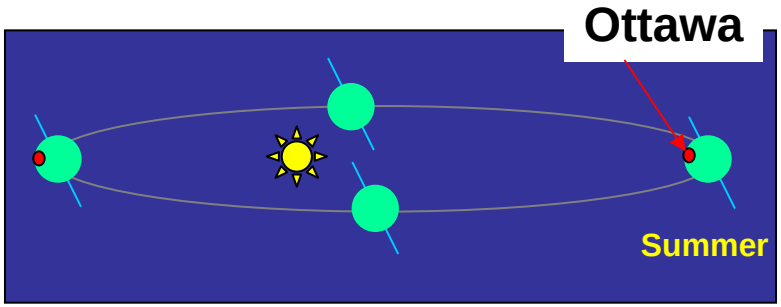
1. Solar activity



2. Volcanic activity

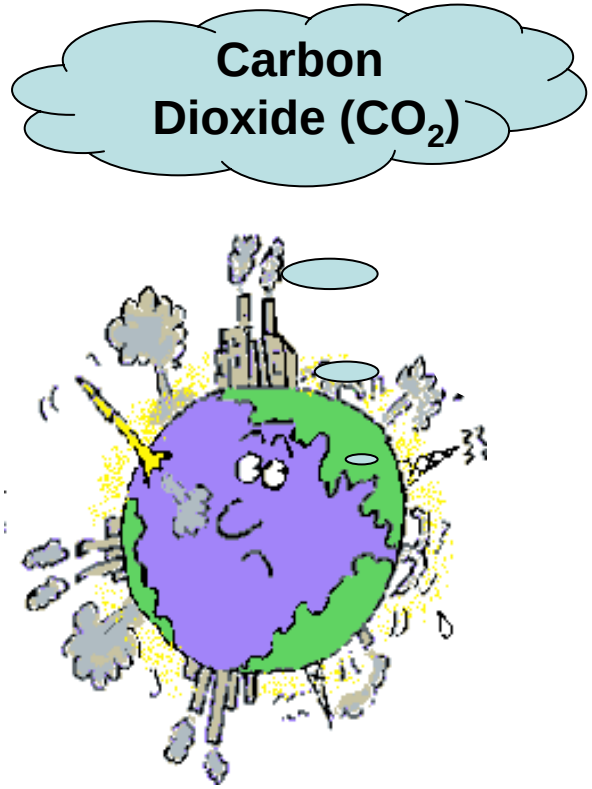
3. Changes in the Earth's orbit



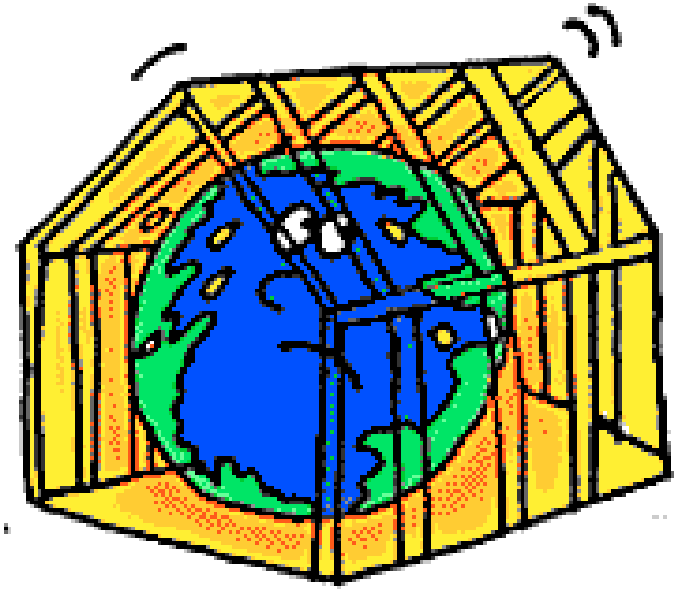


Human causes:

Pollution



Greenhouse effect

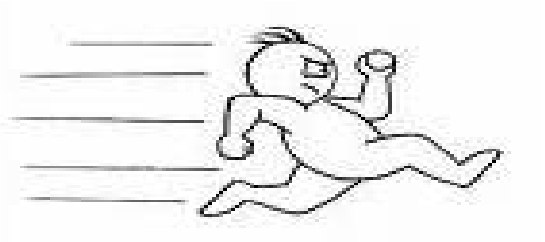


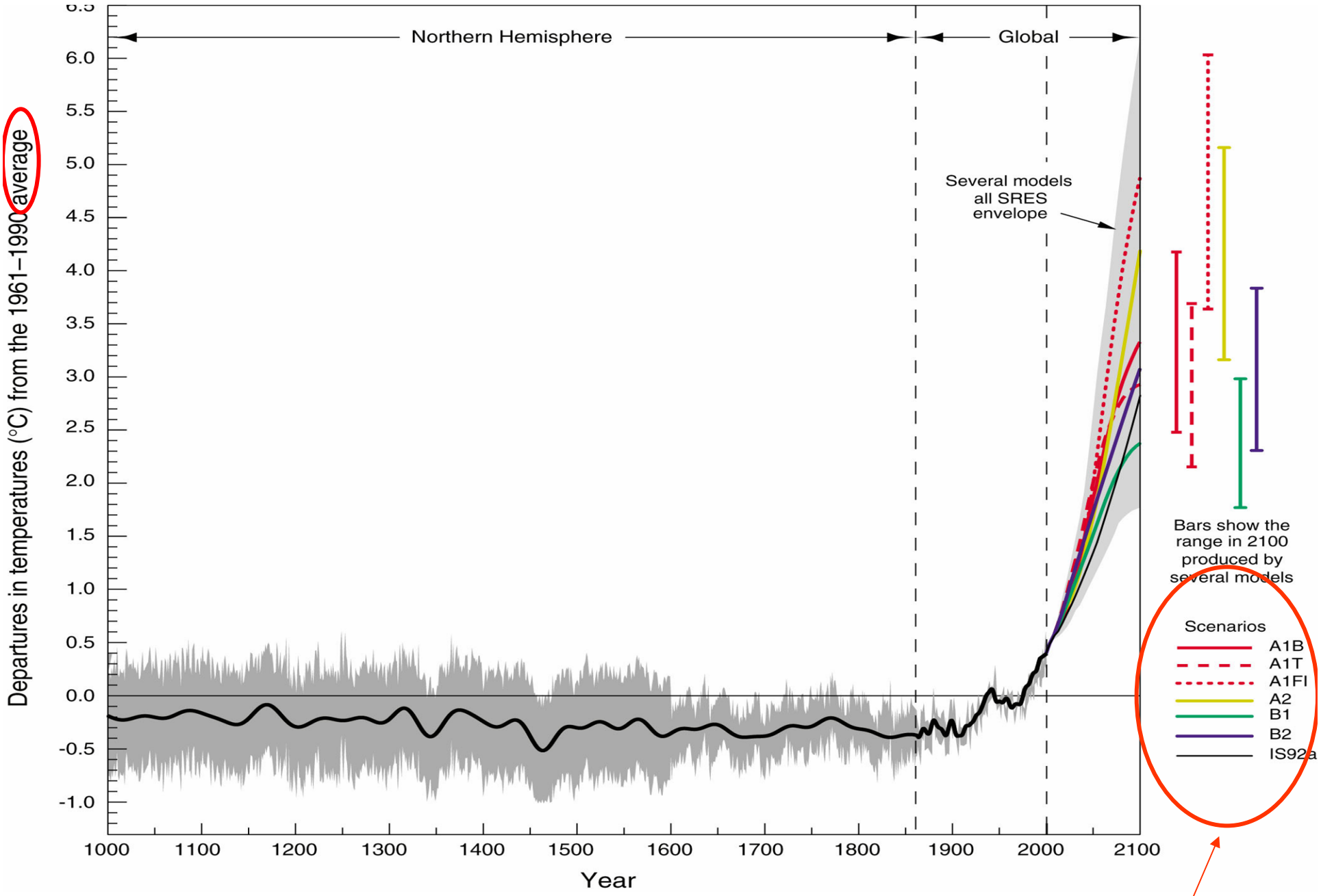
Global warming

What does make this climate change different from past climate changes?

This climate change is happening

FASTER.





Courtesy of Dr. David Sauchyn. Prairie Adaptation Research Collaborative.

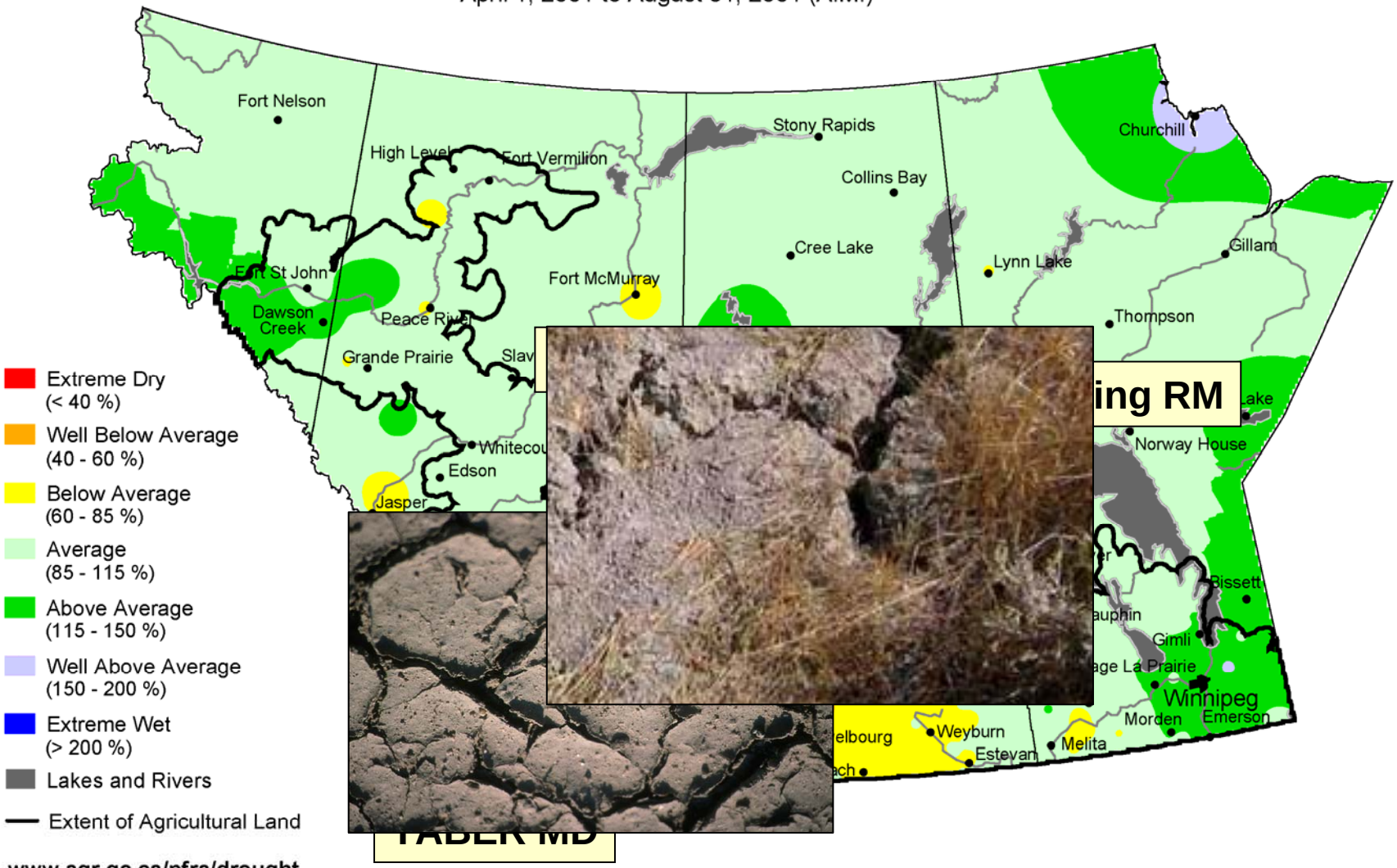
Plausible alternative futures

Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

South Saskatchewan River Basin DROUGHT

Percent of Average Precipitation

April 1, 2001 to August 31, 2001 (A.M.)



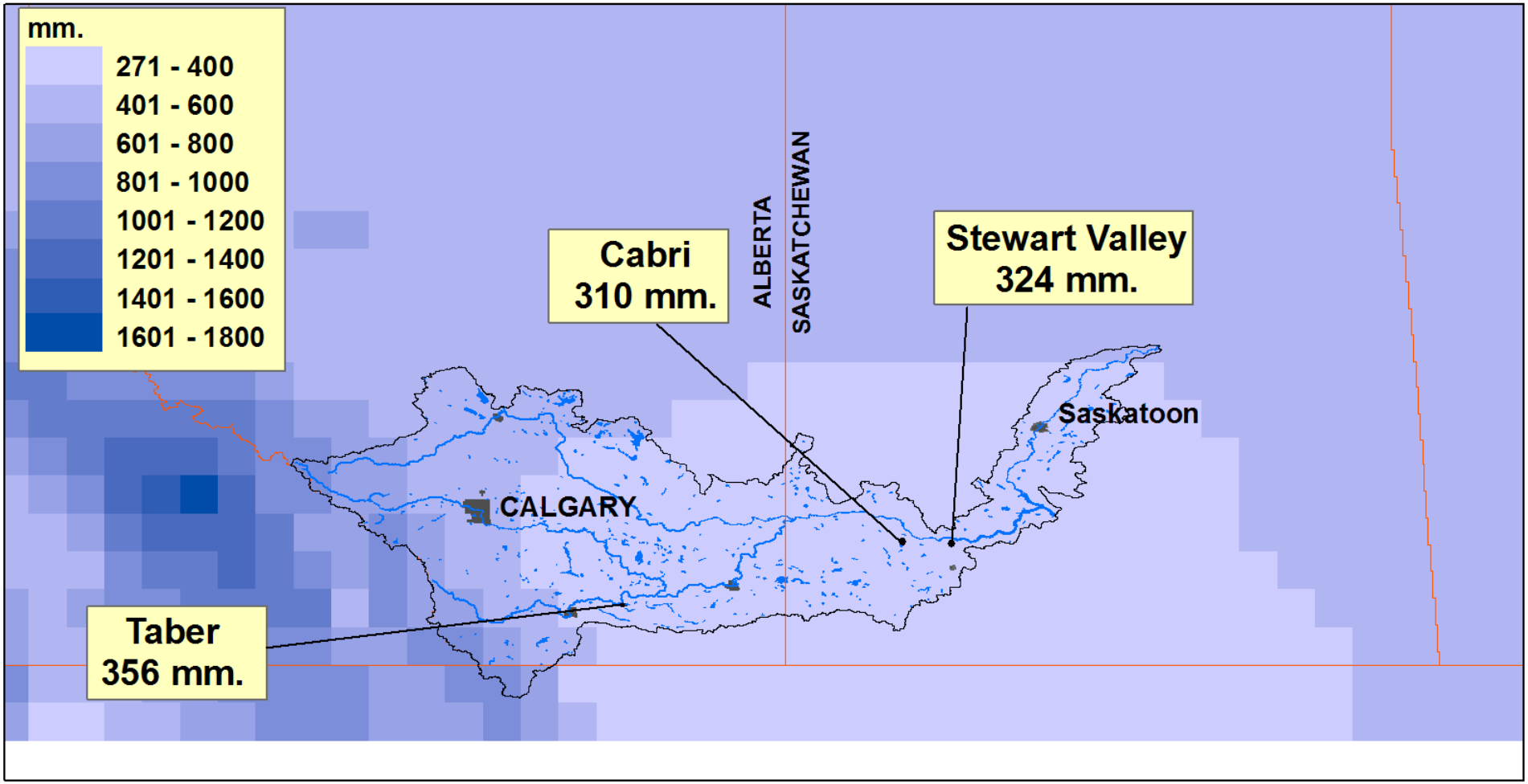
www.agr.gc.ca/pfra/drought

Prepared by Agriculture and Agri-Food Canada (PFRA) using data from the Timely Climate Monitoring Network and the many federal and provincial agencies and volunteers that support it.

Canada

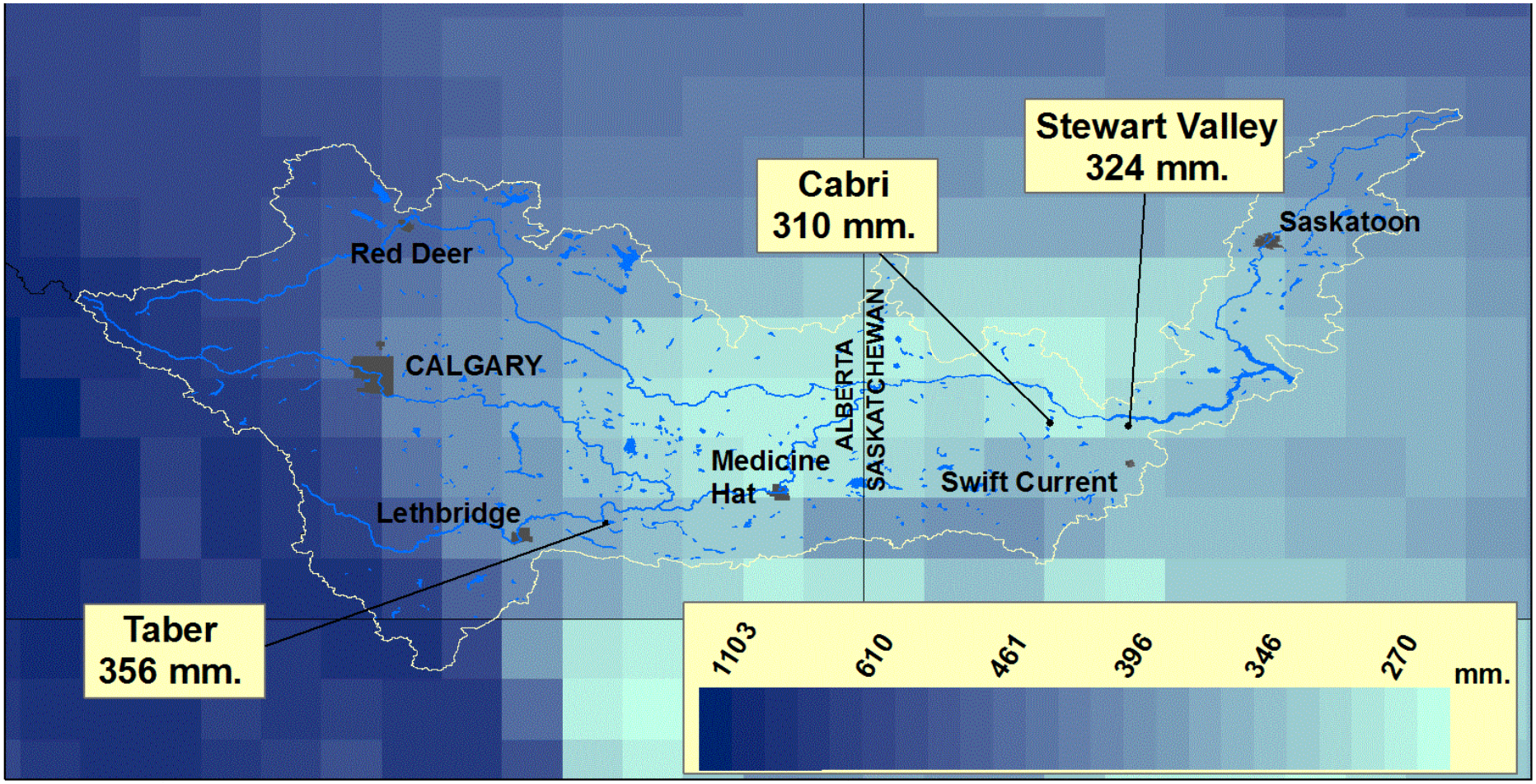
PRECIPITATION

Annual Total Precipitation 1961 - 1990 . South Saskatchewan River Basin.

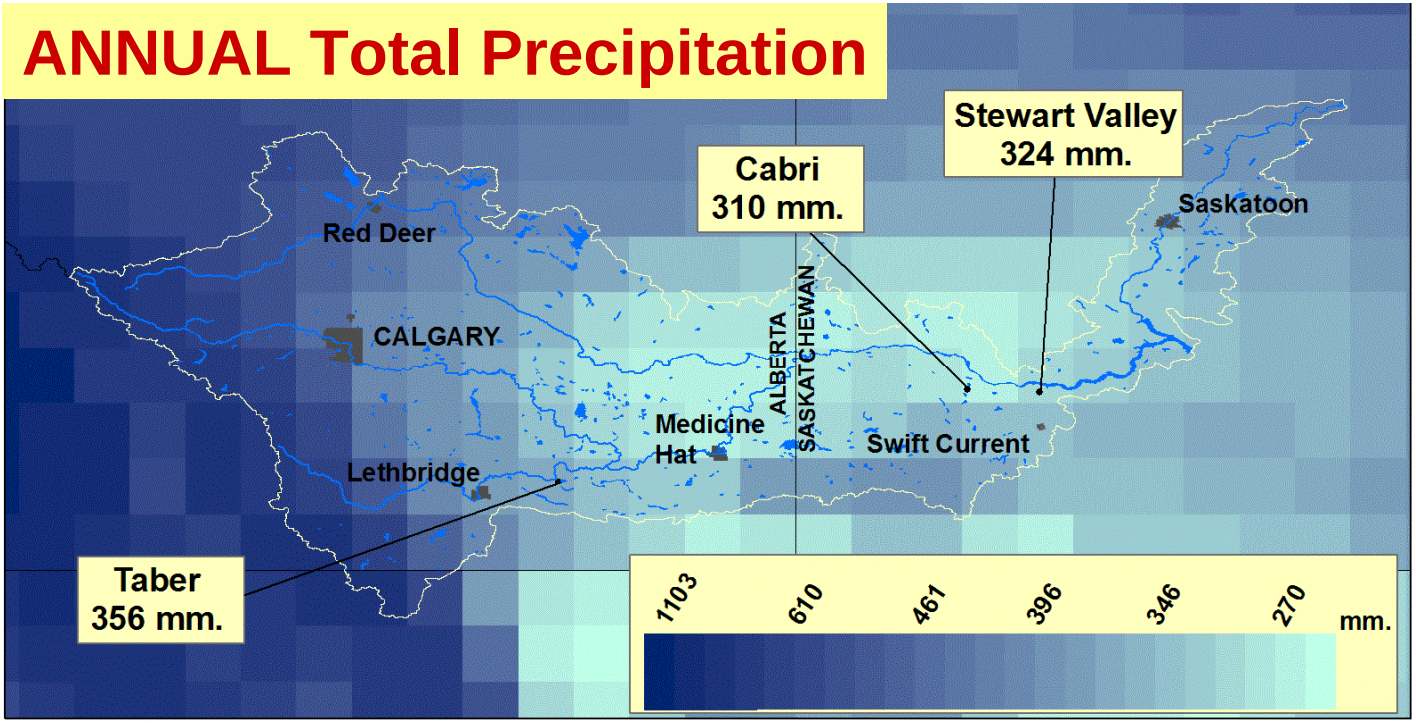


Source: Suzan Lapp, 2007. (Normals from Mckenney et al. 2006).

Annual Total Precipitation 1961 - 1990 . South Saskatchewan River Basin.

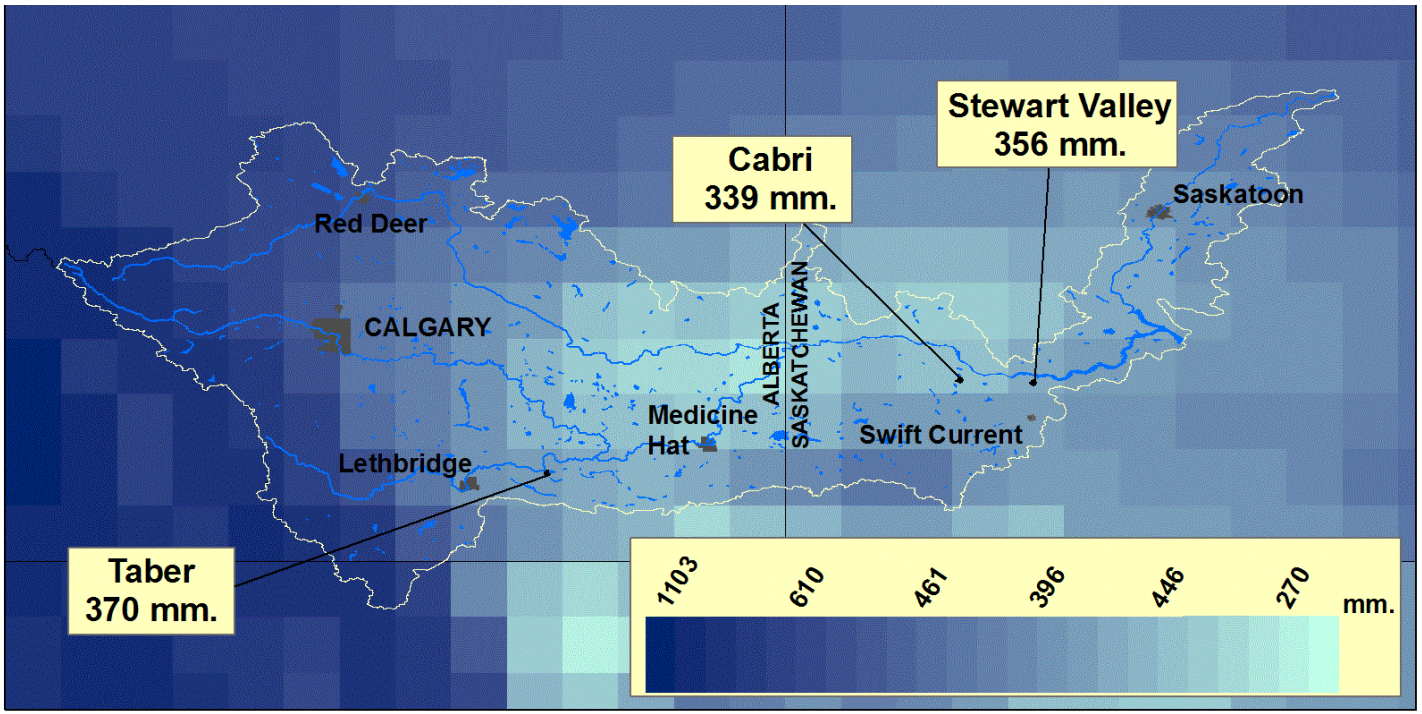


Source: Suzan Lapp, 2007. (Normals from Mckenney et al. 2006).



Annual Total Precipitation 1961 - 1990. South Saskatchewan River Basin.

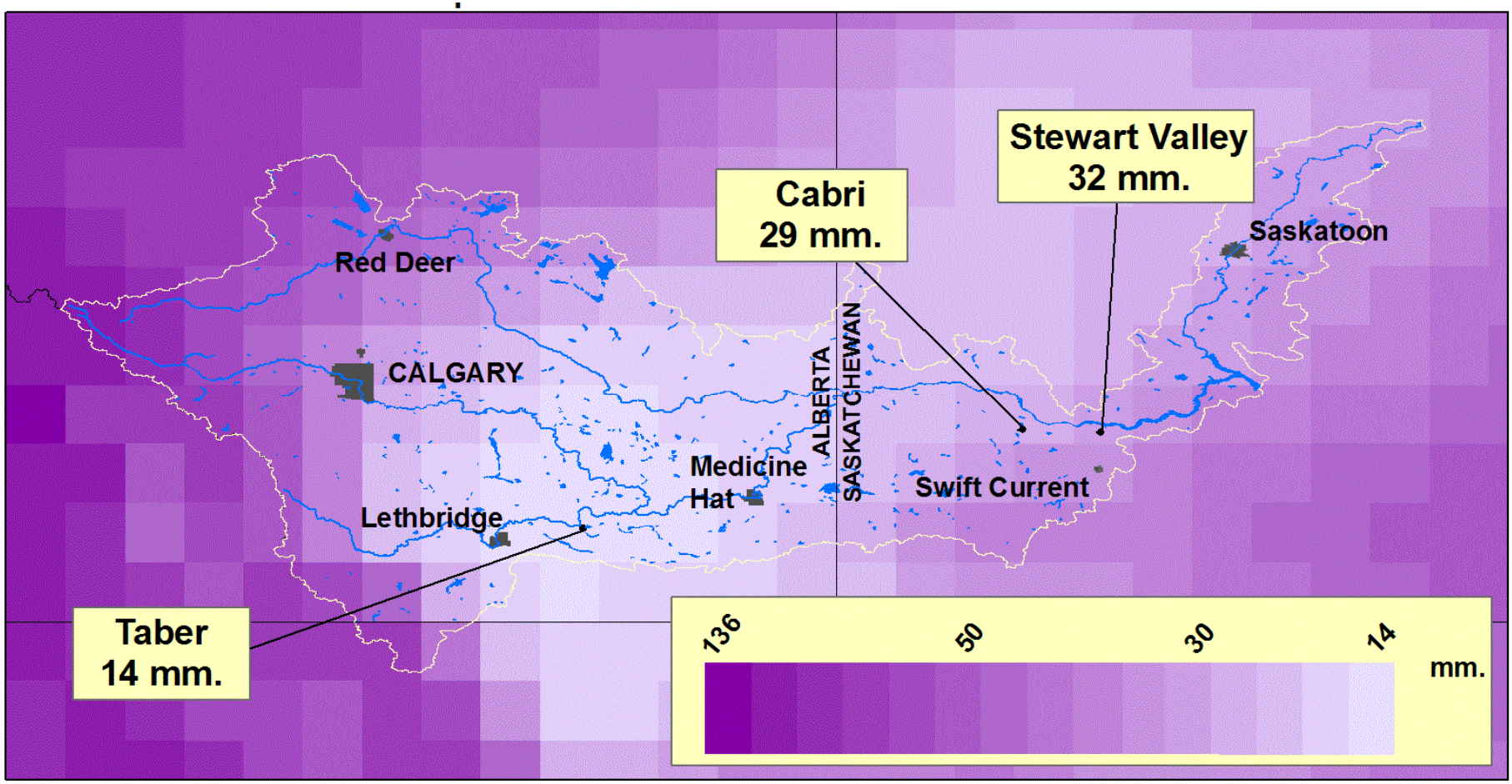
Source: Suzan Lapp, 2007. (Normals from Mckenney et al. 2006).



Annual Total Precipitation 2050. South Saskatchewan River Basin.

Source: Suzan Lapp, 2007. (GCM data from WCRP CMIP3 multi-model database).

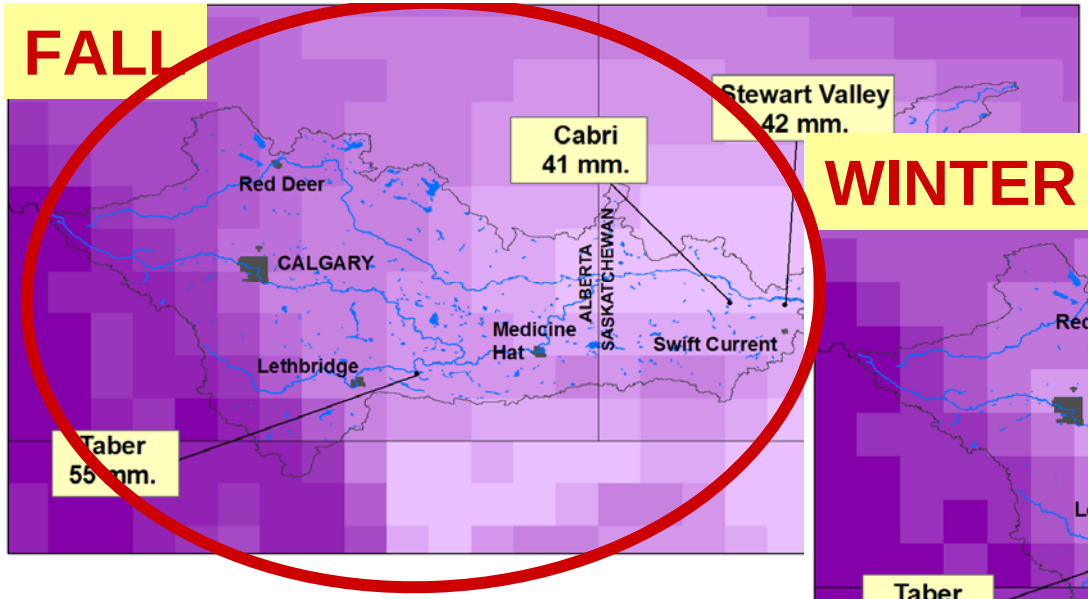
Increase in Annual Total Precipitation by 2050

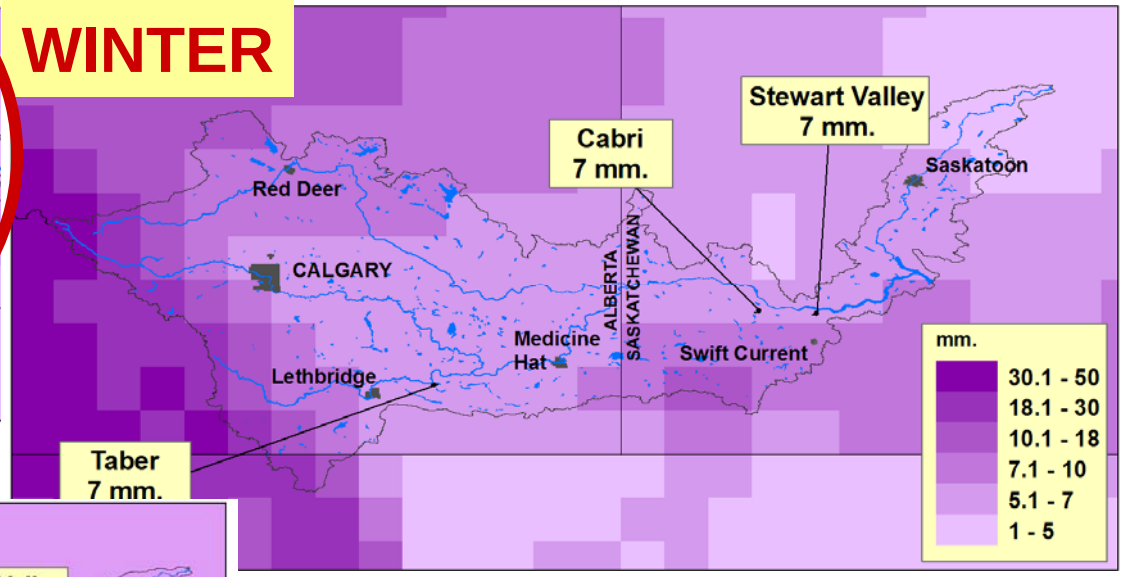


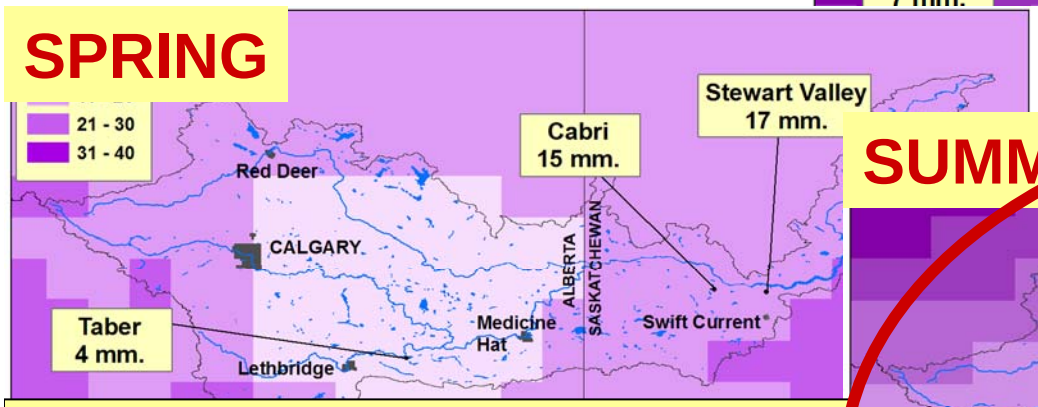
Source: Suzan Lapp, 2007. (GCM data from WCRP CMIP3 multi-model database).

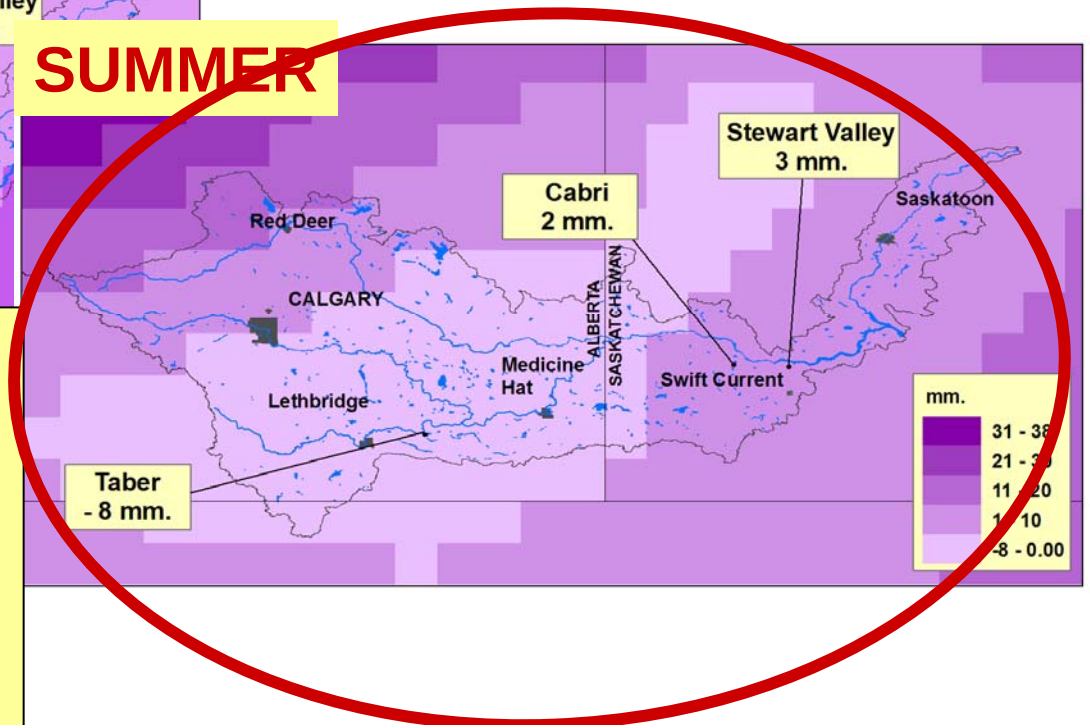
Expected increase in annual total precipitation by 2050:

Cabri	**29 mm.**
Taber	**14 mm.**
Stewart Valley	**32 mm.**





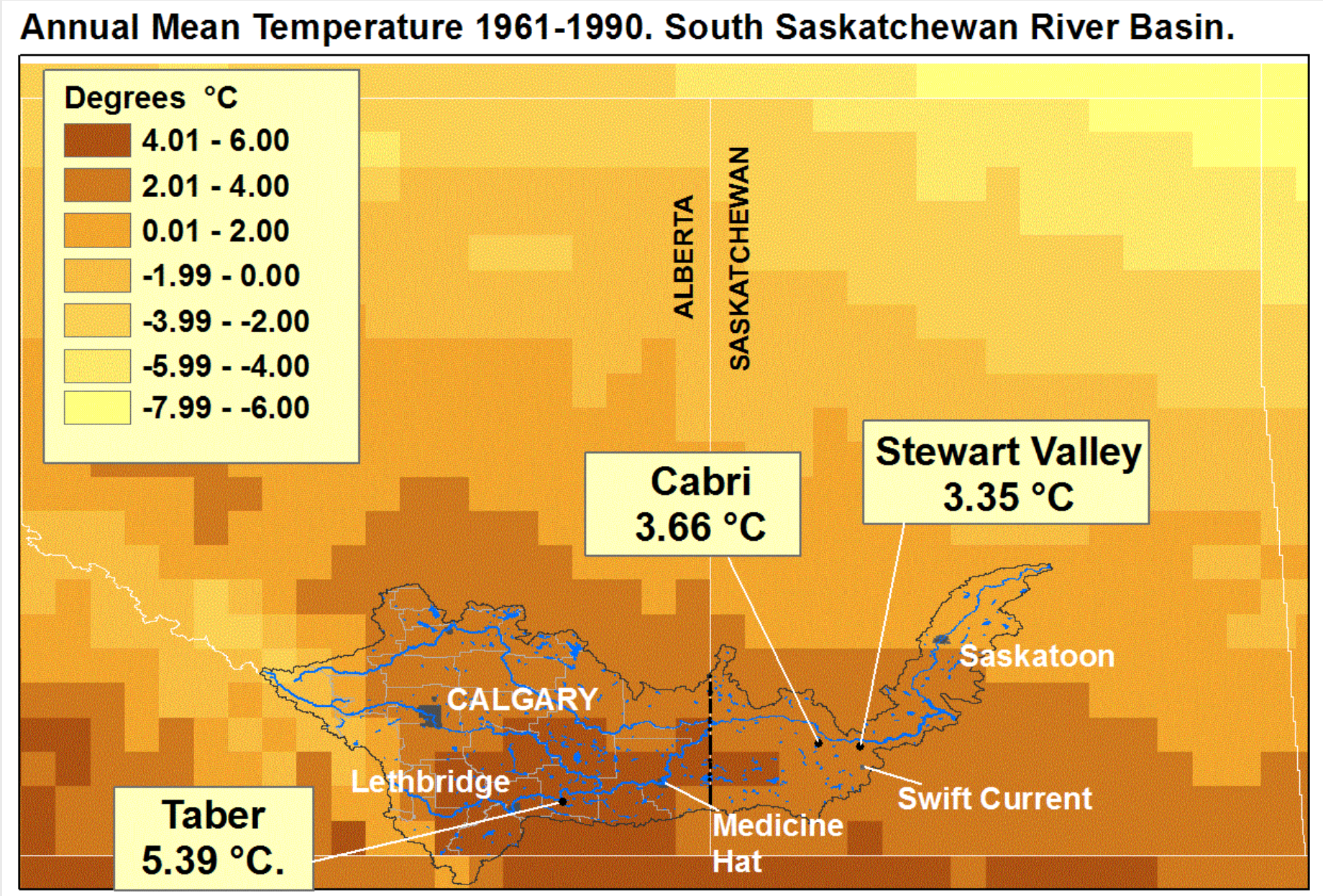




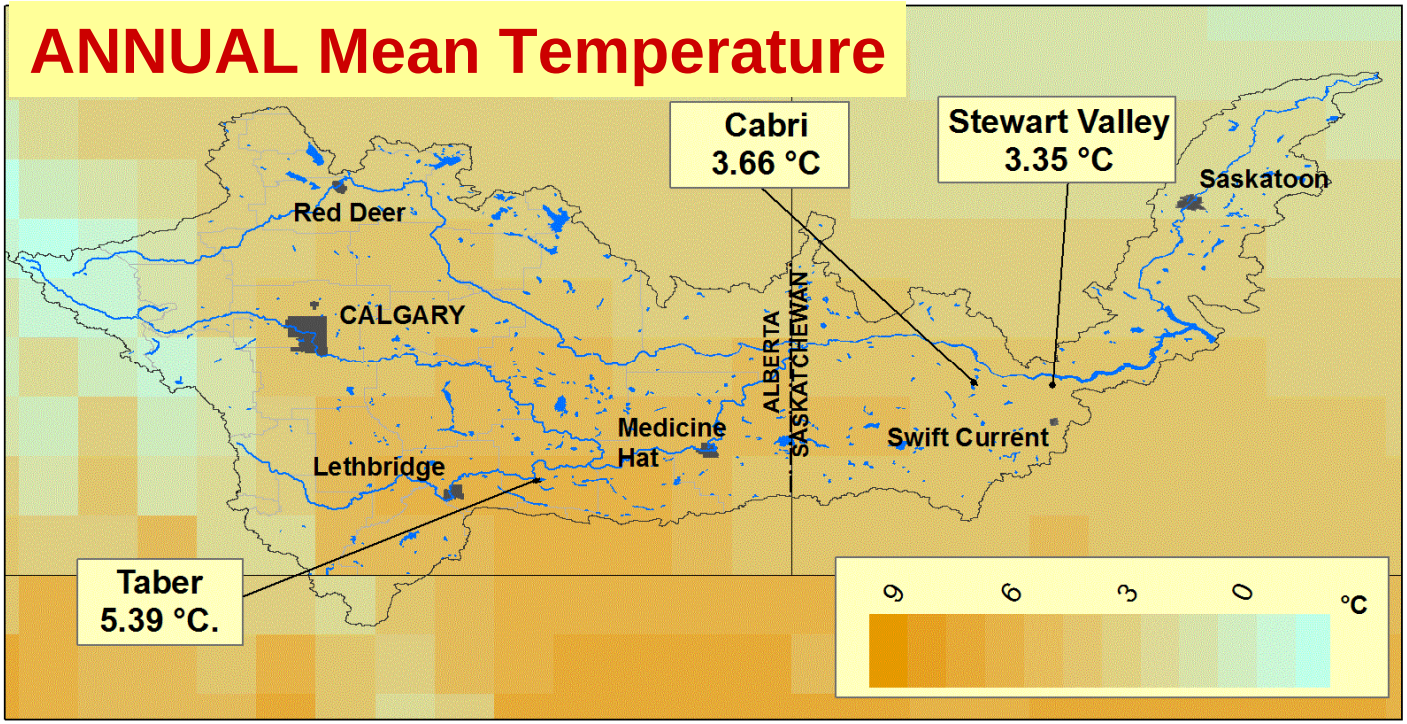
Change in Total Precipitation (mm) by 2050:

	Taber	Cabri	Stewart V.
Fall	55	41	42
Spring	4	15	17
Winter	7	7	7
Summer	-8	2	3

TEMPERATURE

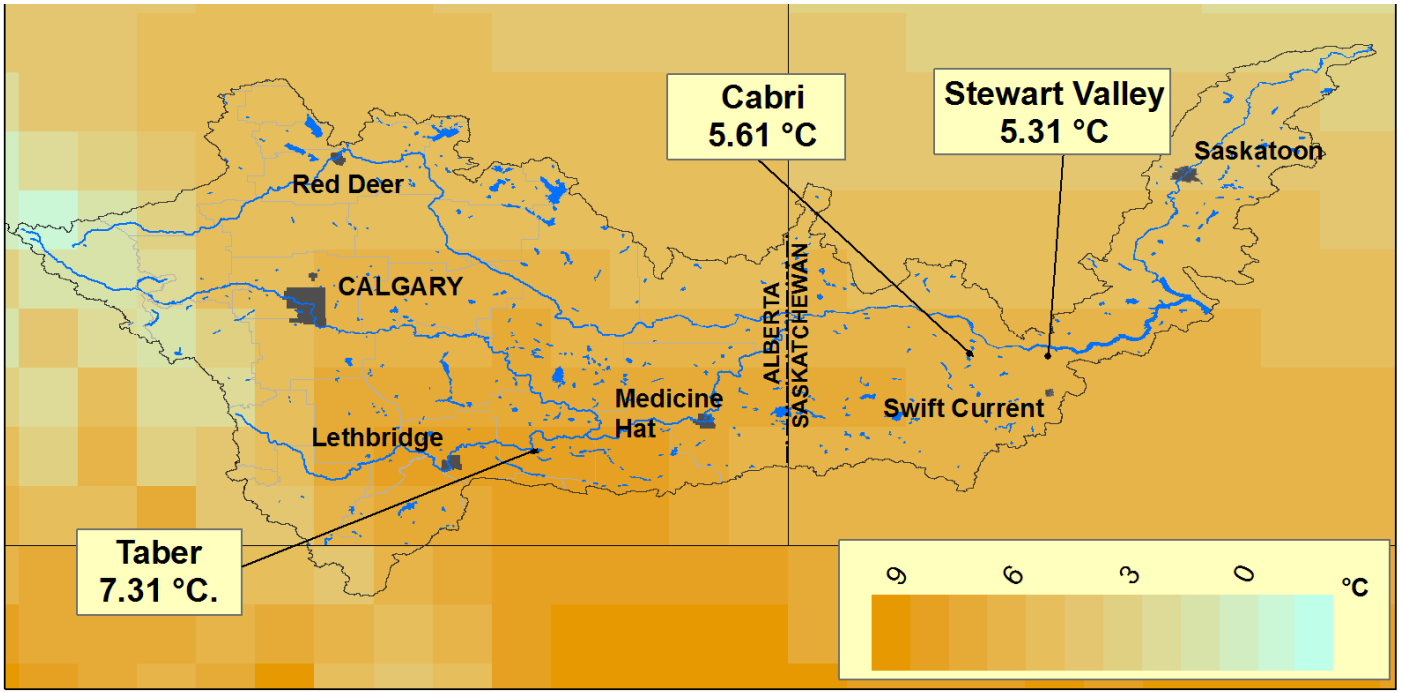


Source: Suzan Lapp, 2007. (Normals from Mckenney et al. 2006).



Annual Mean Temperature 1961 - 1990. SSRB.

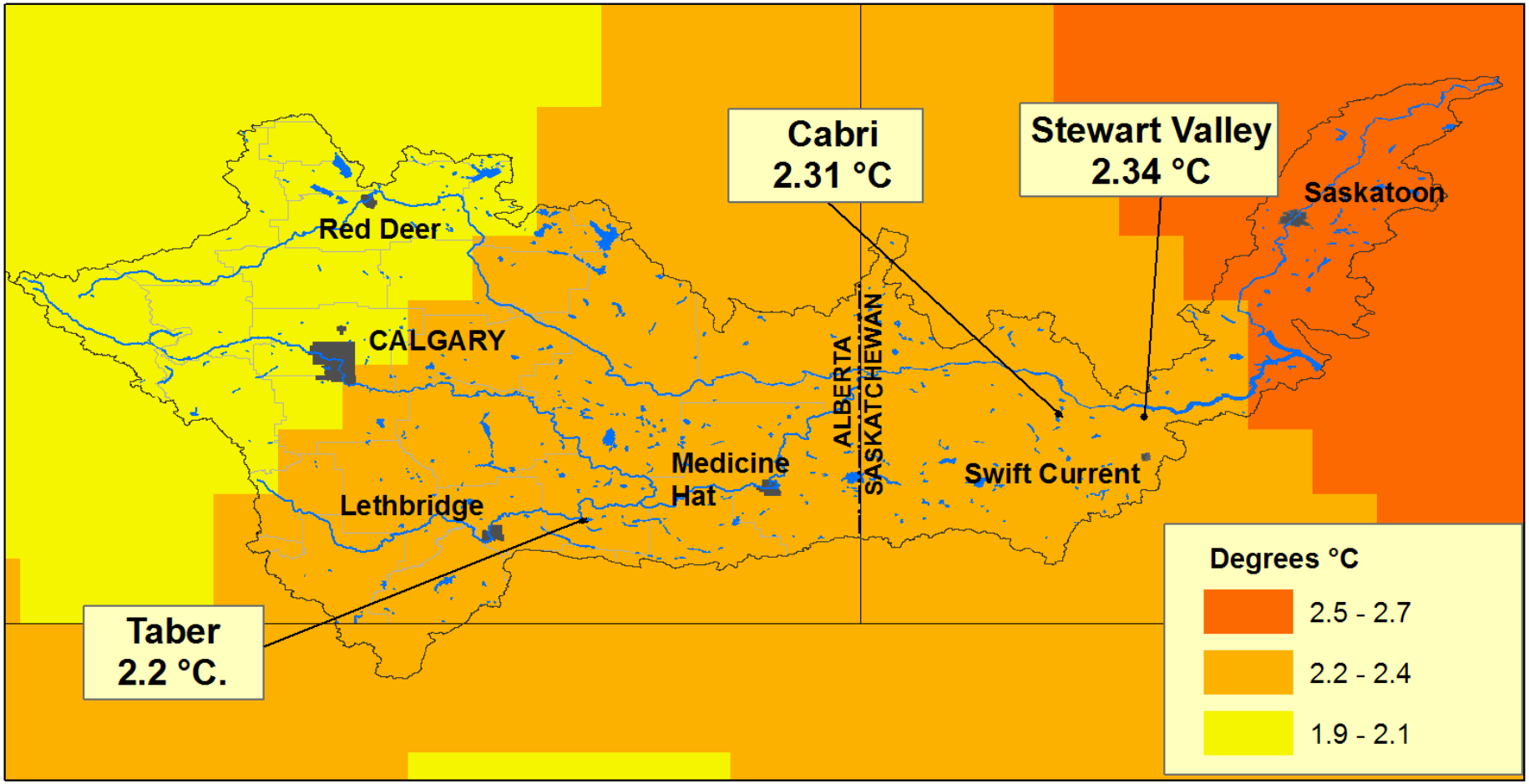
Source: Suzan Lapp, 2007. (Normals from Mckenney et al. 2006).



Annual Mean Temperature Scenario for 2050. Median model: CGCM3.1 T47 B1(2). SSRB.

Source: Suzan Lapp, 2007. (GCM data from WCRP CMIP3 multi-model database).

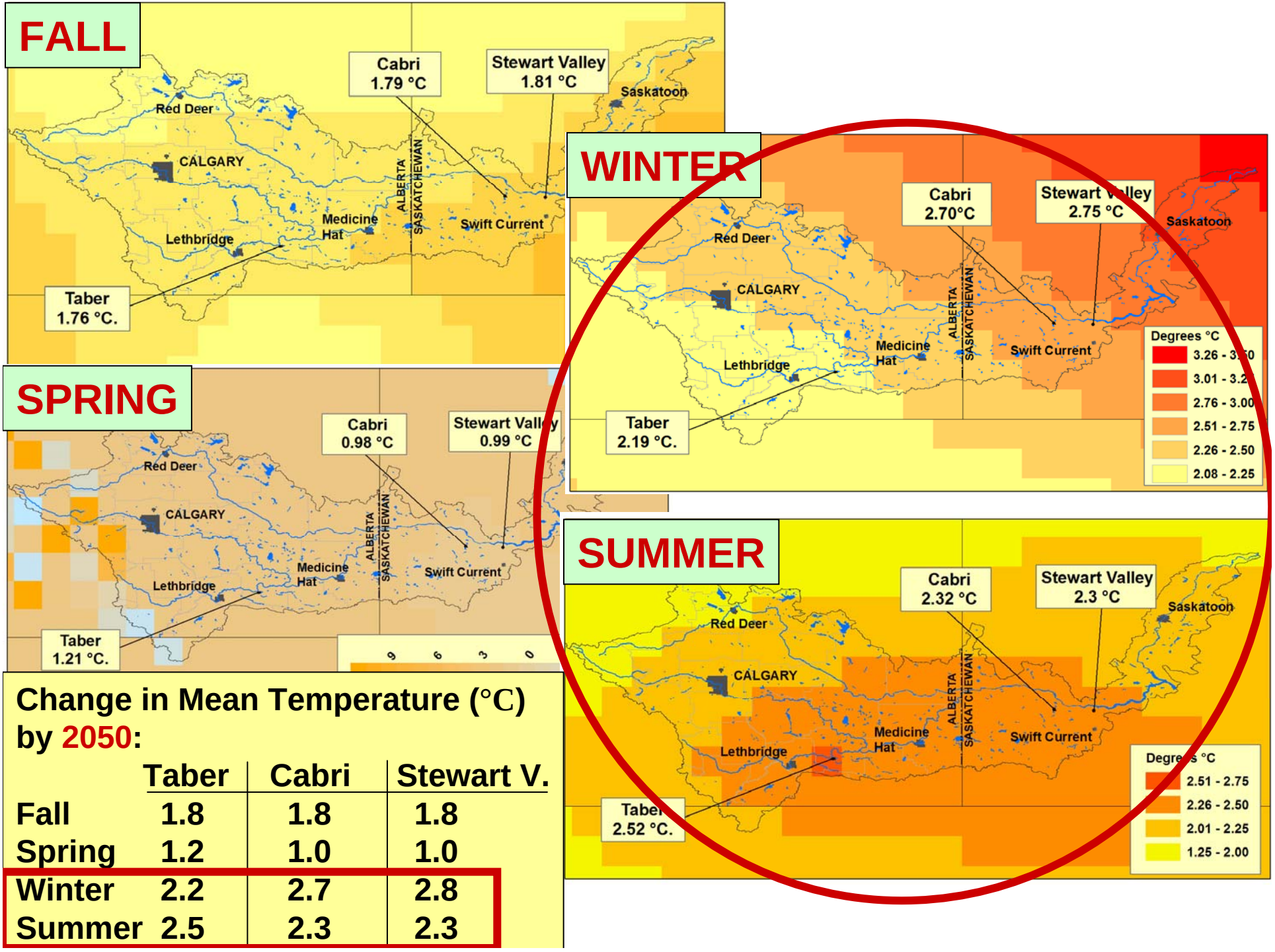
Increase in Annual Mean Temperature by 2050



Source: Suzan Lapp, 2007. (Normals from Mckenney et al. 2006).

Expected change in annual mean temperature by 2050:

Cabri	**2.31 °C**
Taber	**2.20 °C**
Stewart Valley	**2.34°C**

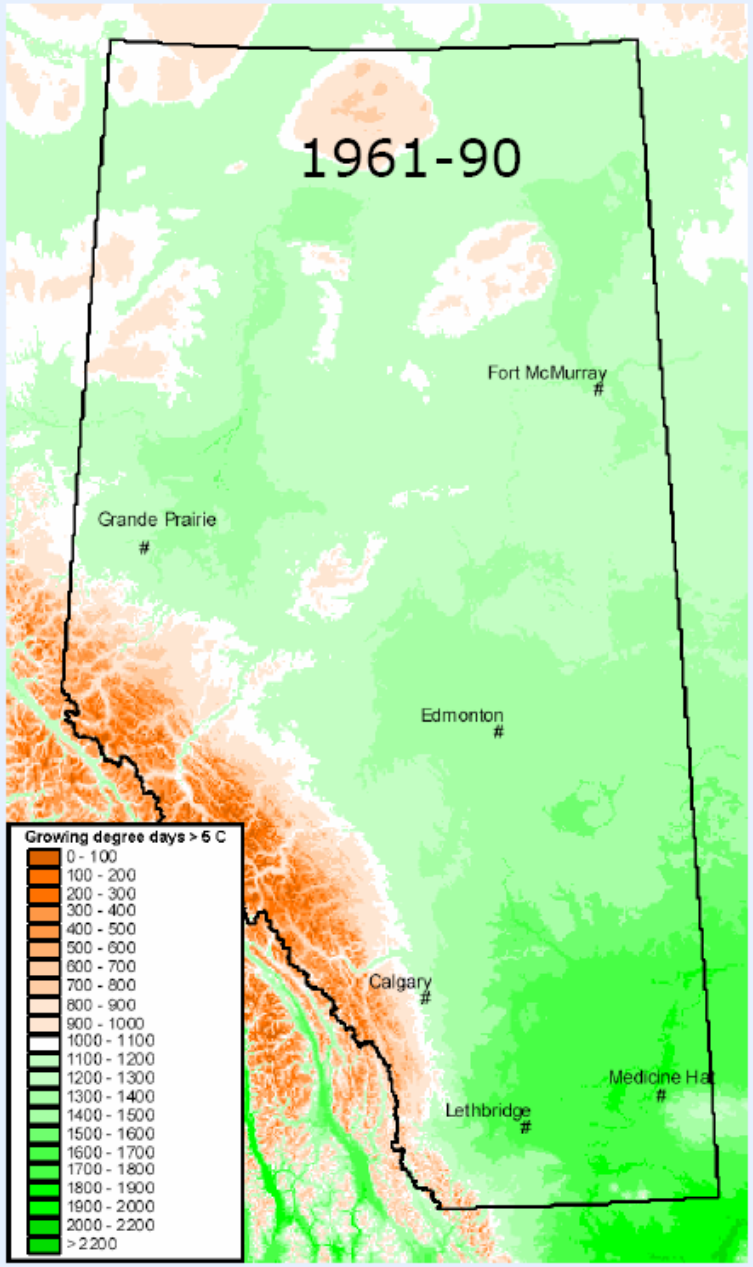


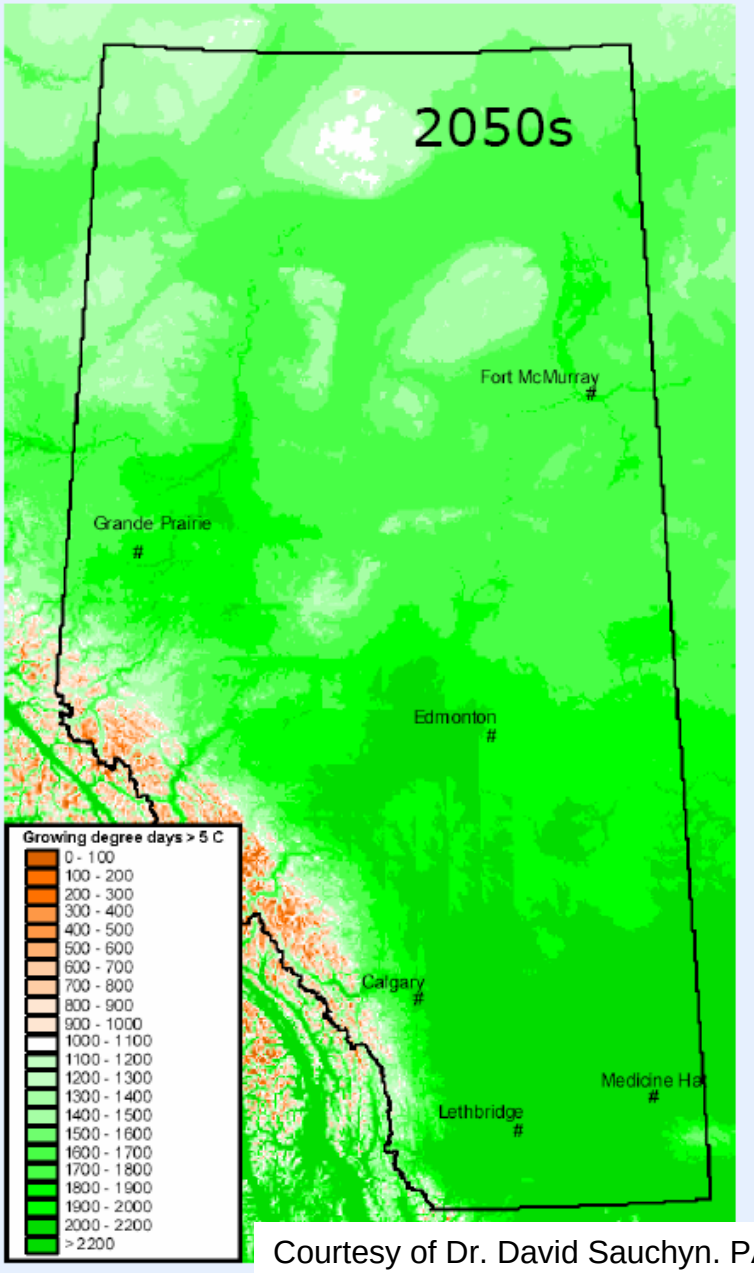
Change in Mean Temperature (°C) by 2050:

	Taber	Cabri	Stewart V.
Fall	1.8	1.8	1.8
Spring	1.2	1.0	1.0
Winter	2.2	2.7	2.8
Summer	2.5	2.3	2.3

Growing Degree Days > 5⁰ C

Barrow and Yu, 2005

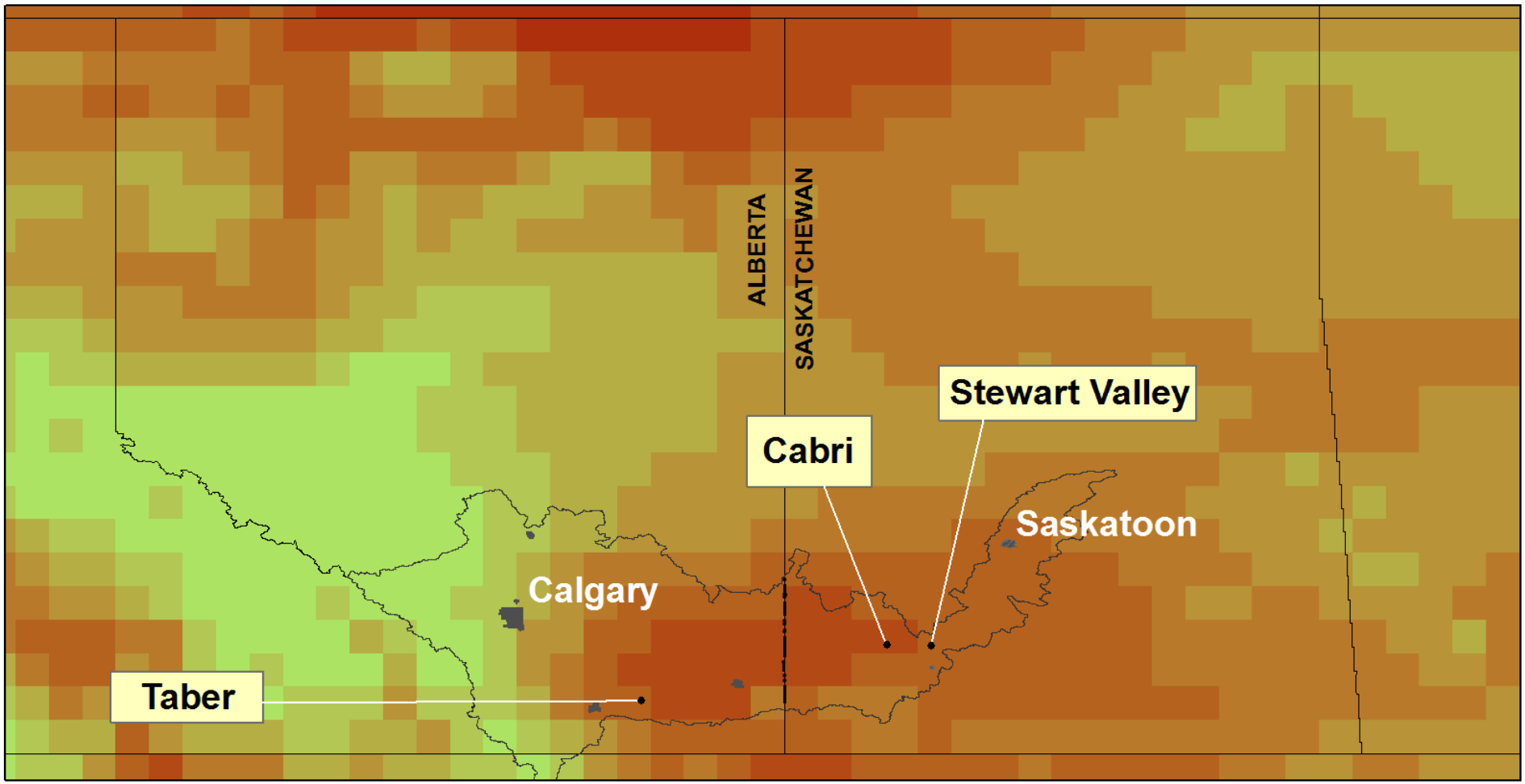




Courtesy of Dr. David Sauchyn. PARC

CLIMATE MOSITURE INDEX: GROWING SEASON

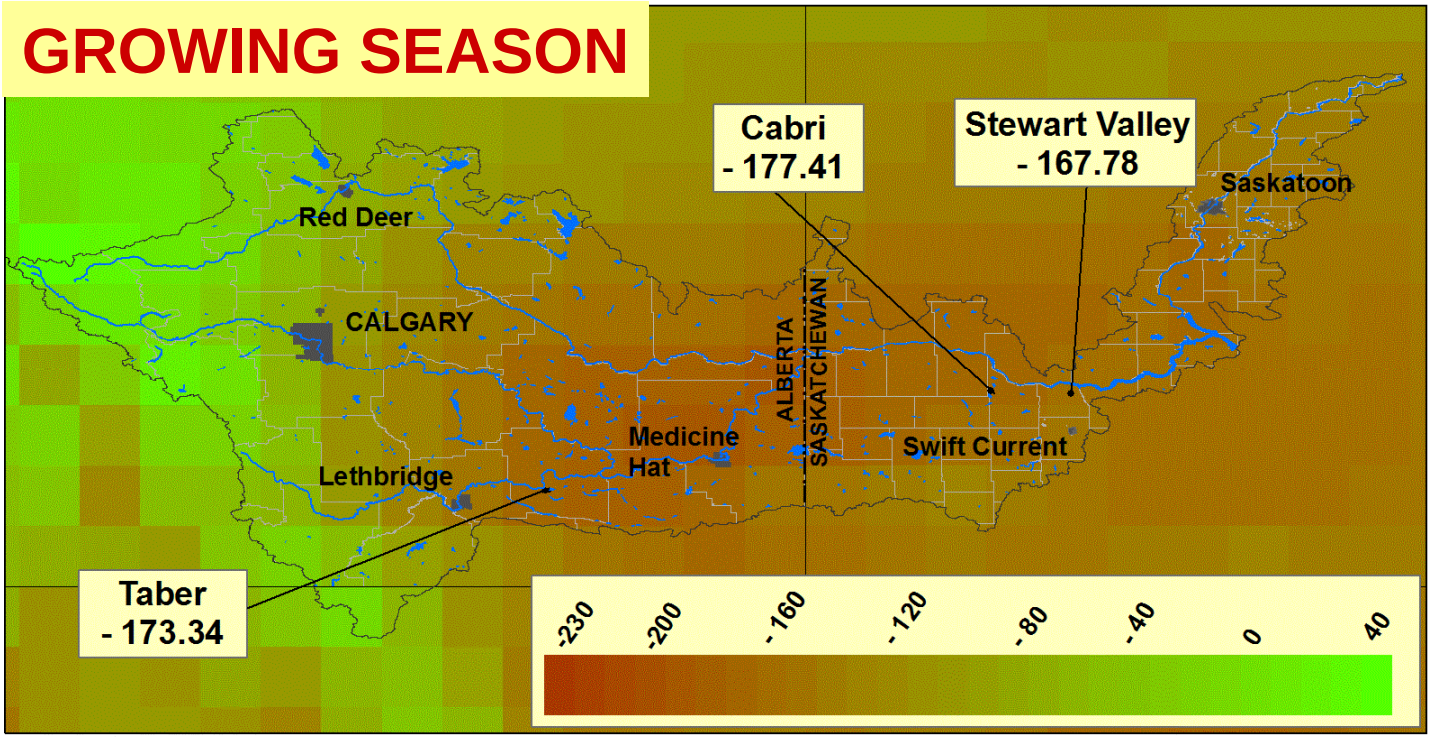
Climate Moisture Map: May-June-July, 1961-1990 . South Saskatchewan River Basin.



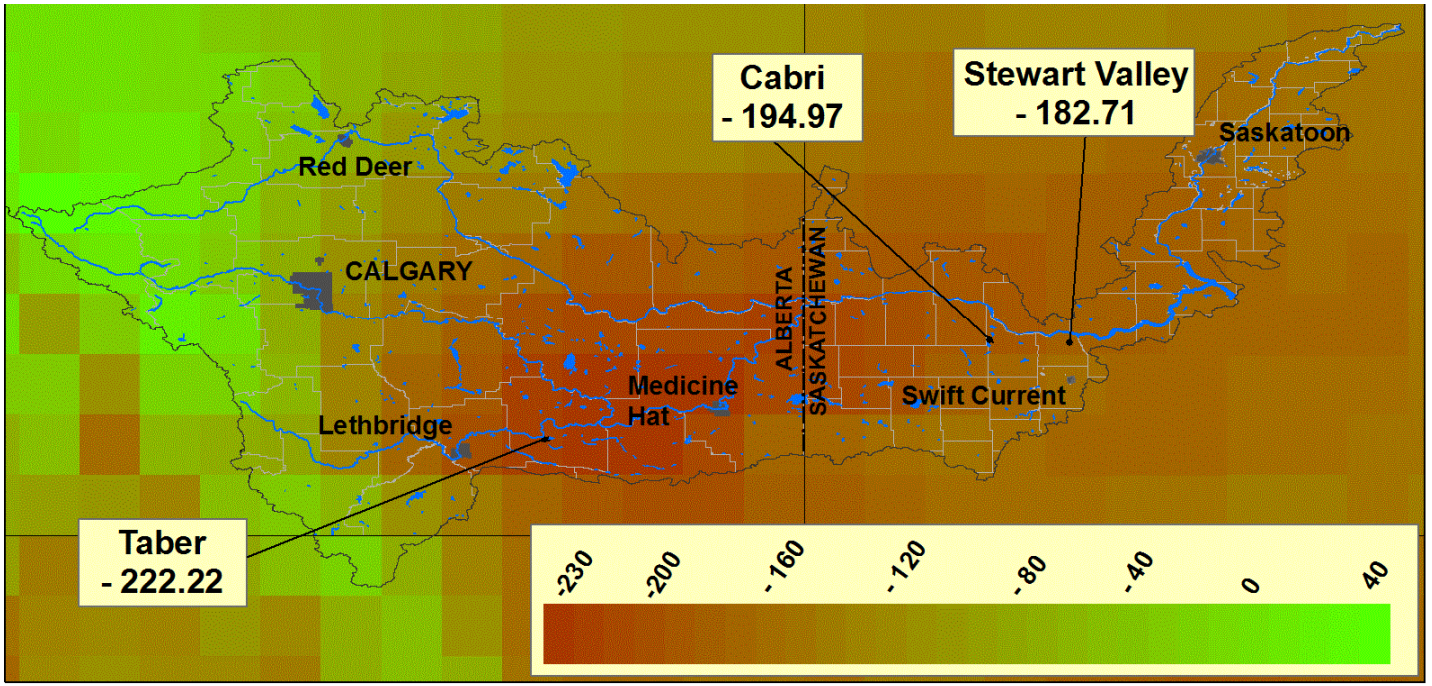
Median: CGCM3.1 T47 B1(2)

Source: Suzan Lapp, 2007. (GCM data from WCRP CMIP3 multi-model database).

GROWING SEASON



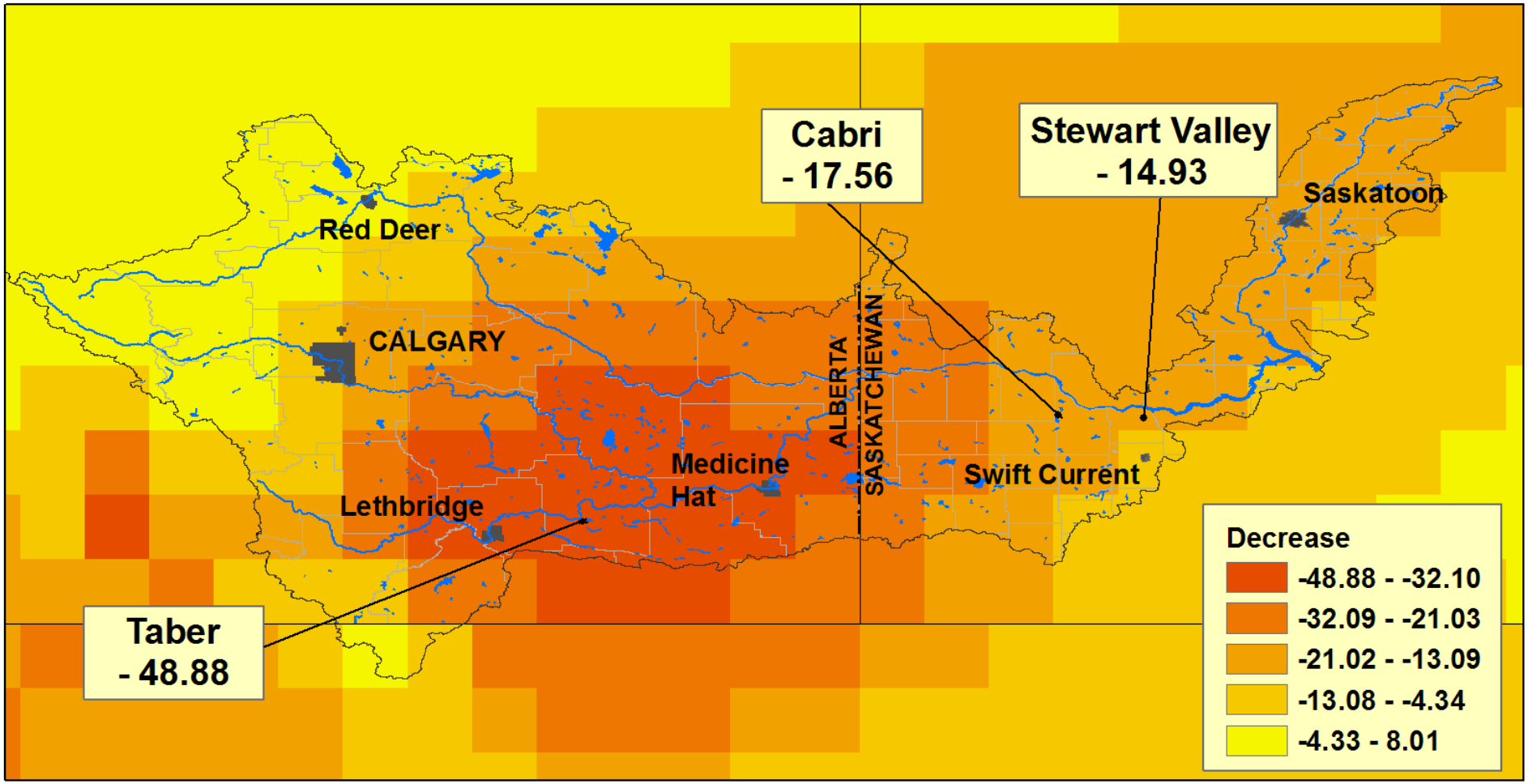
May-June-July Climate Moisture Map, 1961 - 1990. South Saskatchewan River Basin.



May-June-July Climate Moisture Map, 2050 . South Saskatchewan River Basin. Median model: CGCM3.1 T47 B1(2). SSRB.

Source: Suzan Lapp, 2007. (GCM data from WCRP CMIP3 multi-model database).

Decrease in Climate Moisture by 2050: Growing Season (May-June-July)



Expected change in May-June-July climate moisture index by 2050:

Cabri	17.56
Taber	48.88
Stewart Valley	14.93

Vegetative Transition Occurs as the Ecosystem Dries....

Desiccating Grassland southeast of Val Marie in southwestern Saskatchewan.
–photo: Jeanette Pepper

Courtesy: Ron Anderson

Caption: David Sauchyn