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Bâtir des communautés résilientes

Wildfire Season Forecast

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Forecast 2016

May 4, 2016

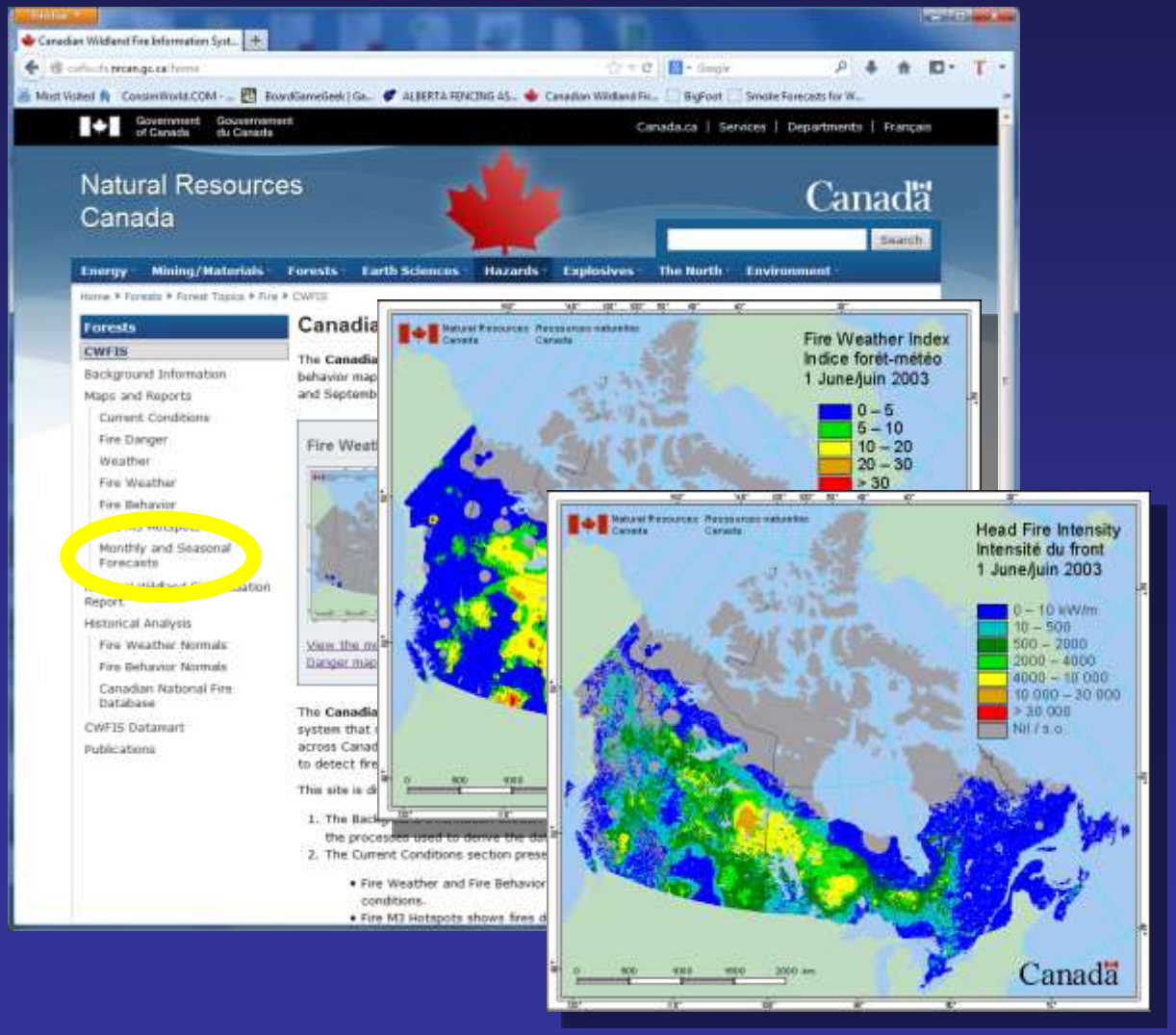
Introduction

The Canadian Forest Service present monthly and seasonal forecast maps through the Canadian Wildland Fire Information System (CWFIS).

These are based on Environment Canada's monthly and seasonal forecasts, information contained in the CWFIS, and advice provided by provincial agencies.

This presentation will summarize the current conditions in Canada and a forecast for the 2016 fire season.

Canadian Wildland Fire Information System



The Canadian Wildland Fire Information System calculates the fire weather and fire behaviour conditions across the country.

Maps are displayed over the Internet.

http://cwfis.cfs.nrcan.gc.ca/

Methodology

1. Calculate spring start-up conditions based on fall drought code (DC) values and over-winter precipitation amounts,

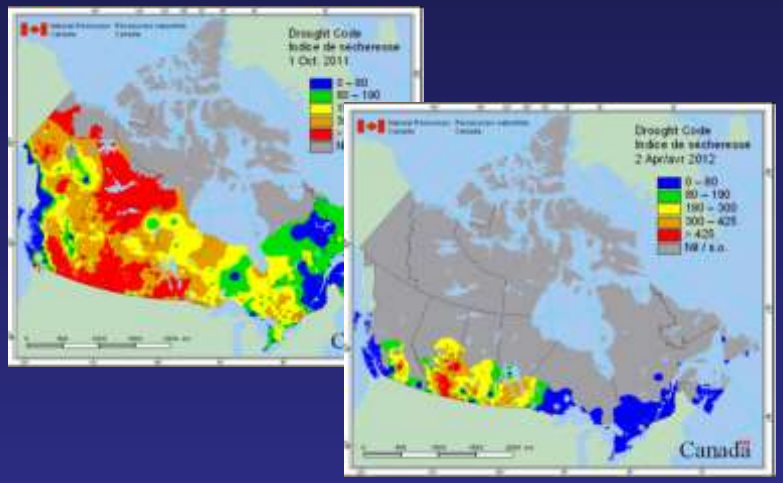
2. Calculate average daily weather for weather stations across country,

3. Incorporate Environment Canada's seasonal predictions,

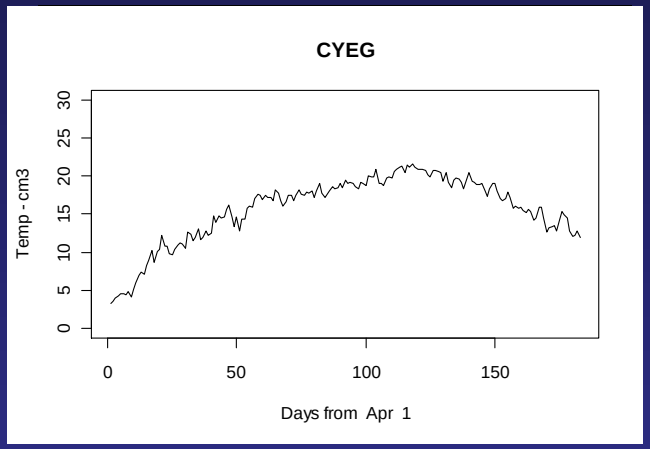
4. Determine the fire severity based on the ratio of forecasted over average monthly severity rating (MSR).

Methodology

1. Fall conditions to Spring startup

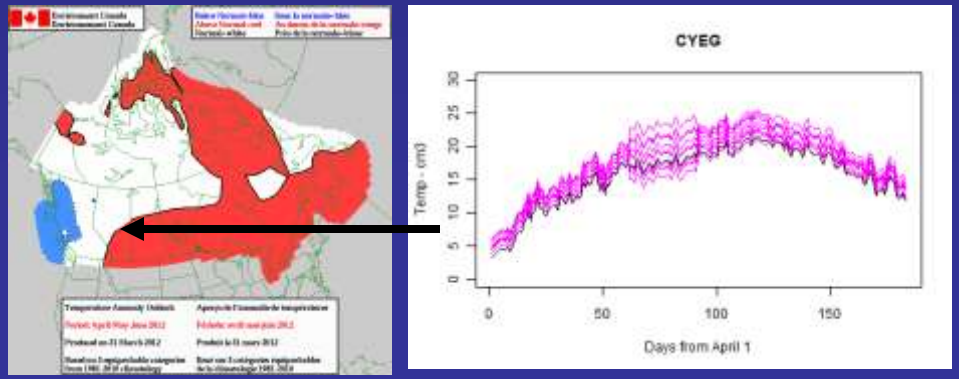


2. Calculate average daily weather



4. Calculate fire weather anomaly

3. Apply seasonal predictions



Ensemble Forecasts

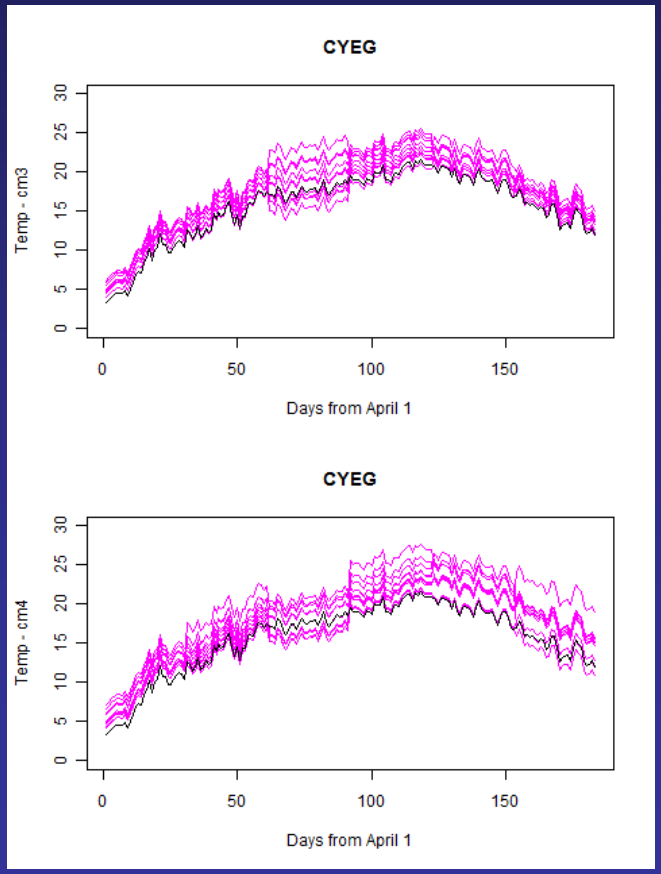
The Canadian Meteorological Centre (CMC) of Environment Canada has been providing temperature and precipitation probabilistic forecasts based on an ensemble of ten integrations of two climate models developed by Canadian Center for Climate modeling and analysis (CCCma)

1. CANCM3 (which uses the atmospheric model CANAM3 (also known as model AGCM3))
2. CANCM4 (which uses the atmospheric model CANAM4 (also known as model AGCM4))

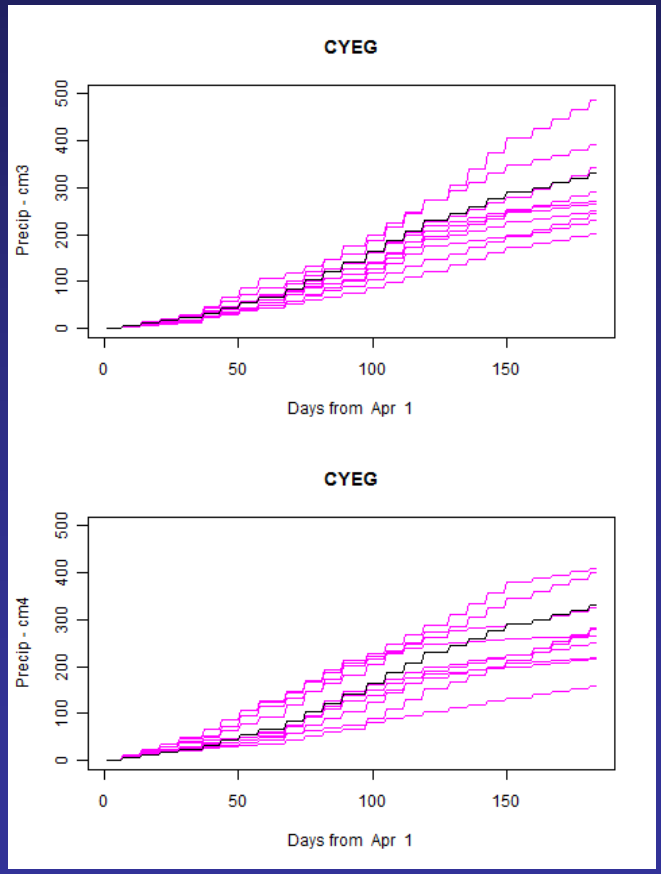
Forecasts are provided for the next twelve months.

Ensemble Forecasts

Predicted temperatures and precipitation amounts are entered into the Canadian FWI system.

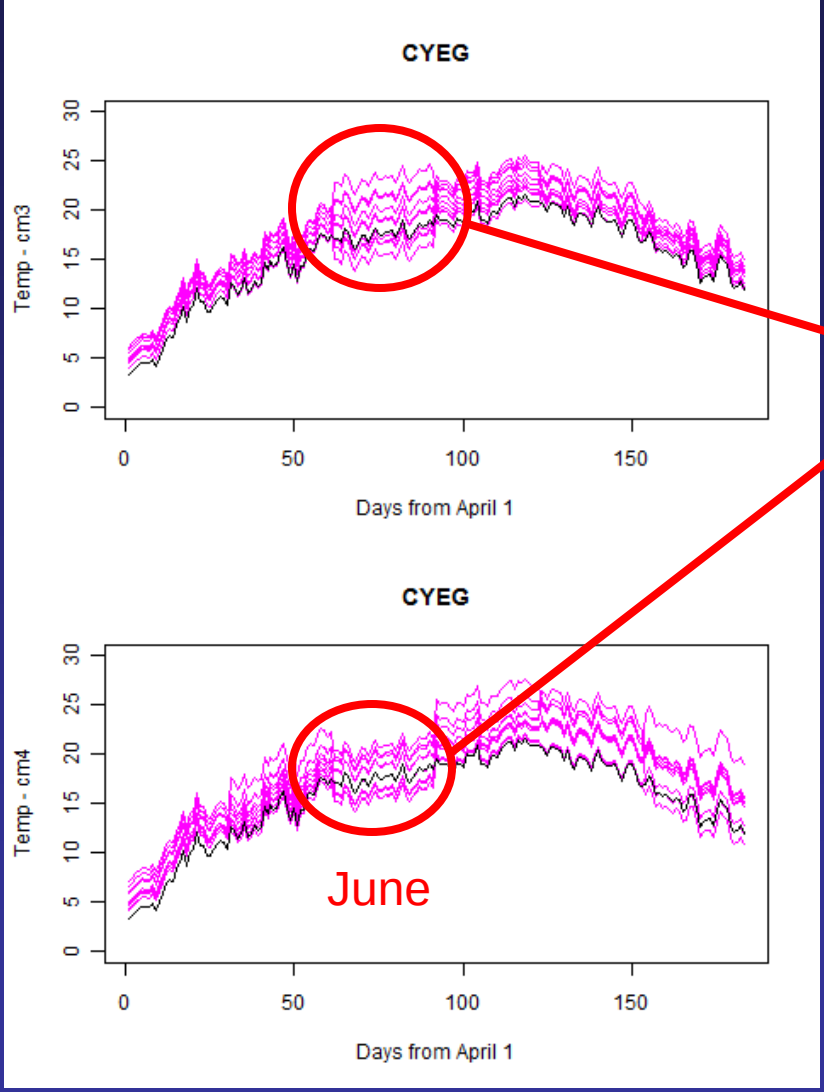


Temperature



Precipitation

Ensemble Forecasts

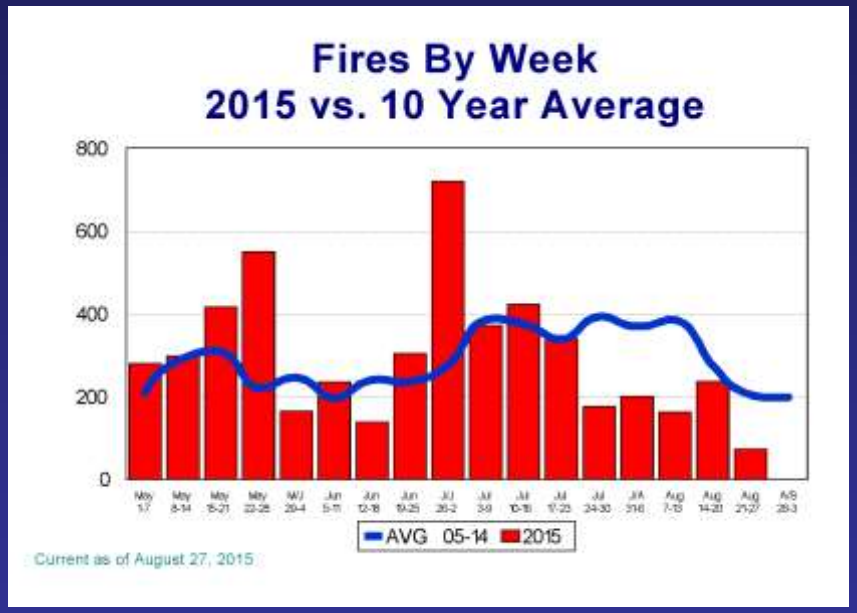


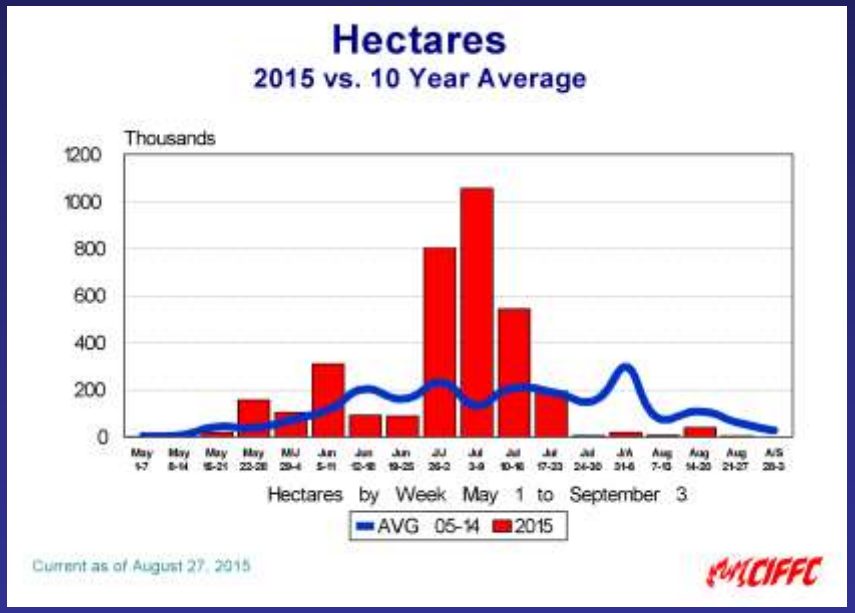
The ensemble approach provides a measure of confidence indicated by the spread of the ensemble members.

2015 Fire Season

2015 Prediction

The 2015 fire season was an extreme year with well-above average number of fires and area burned.





6,765 fires

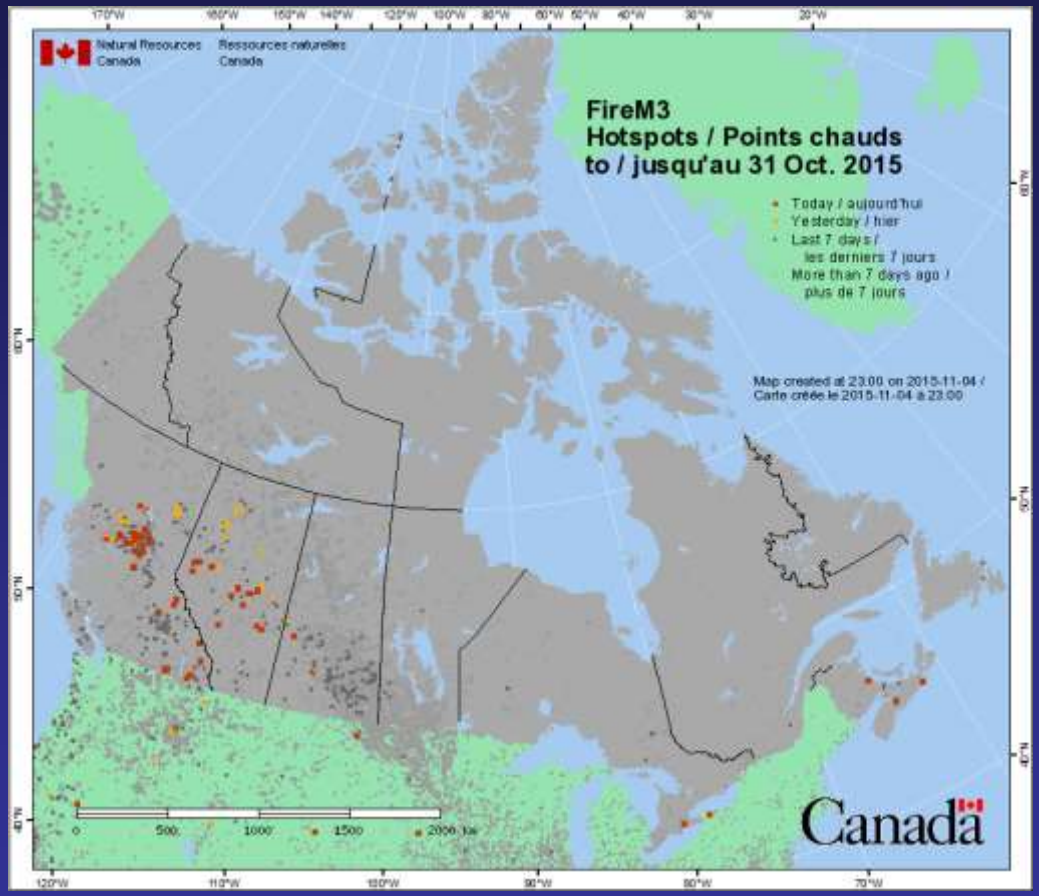
(avg: 3,378)

3,969,504 ha

(avg: 1,176,037 ha)

Numbers based September 17, 2015 CIFFC situational report

2015 Prediction

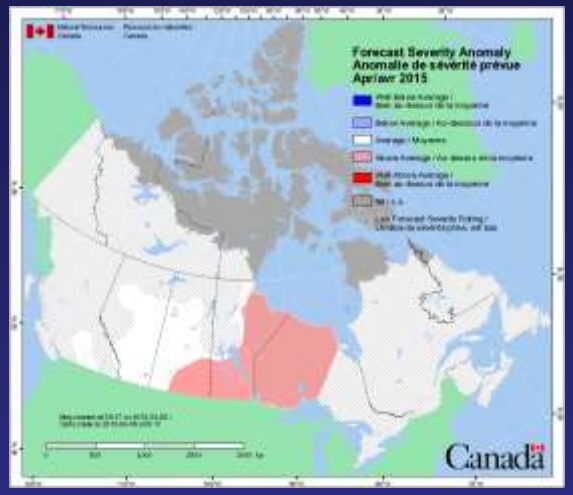


The 2015 fire season started out very early with fires in Alberta and Saskatchewan. In July, the conditions dropped.

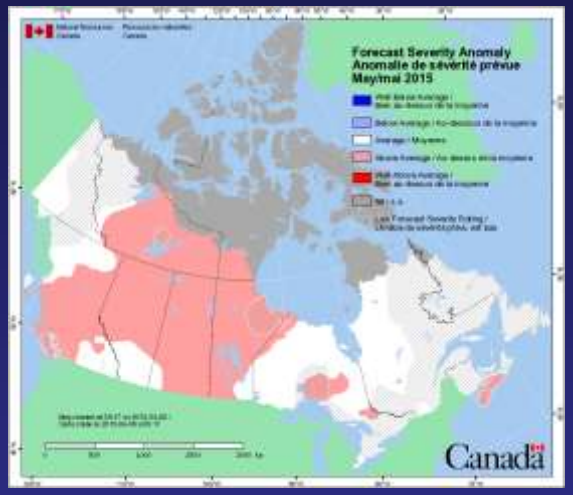
Extreme fire activity then occurred in Washington and Oregon in August.

2015 Prediction

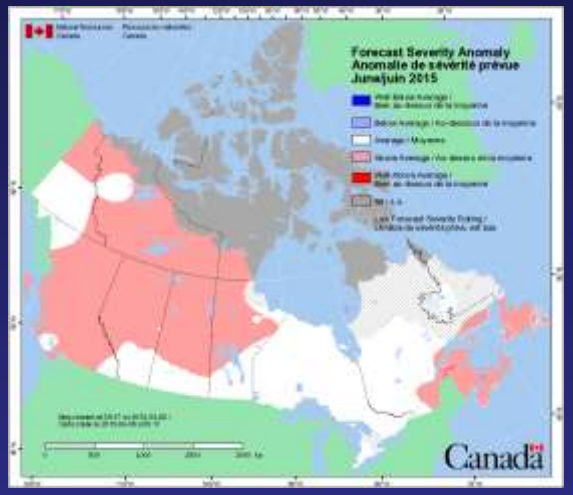
April



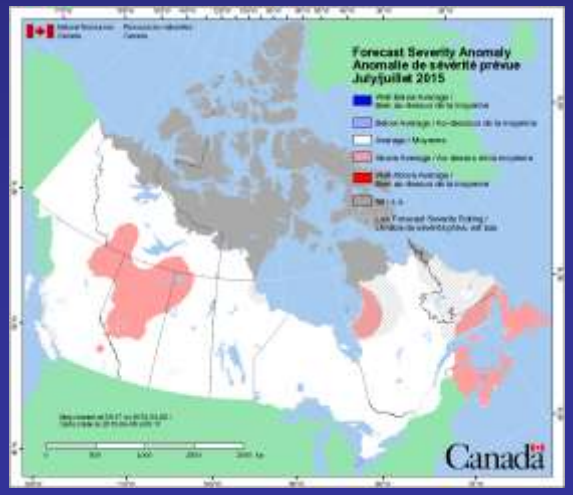
May



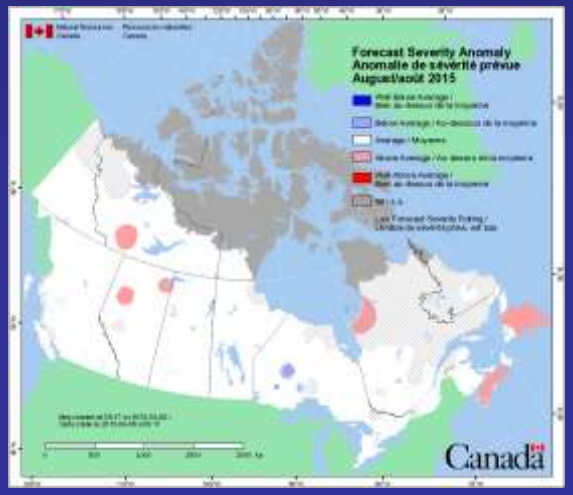
June



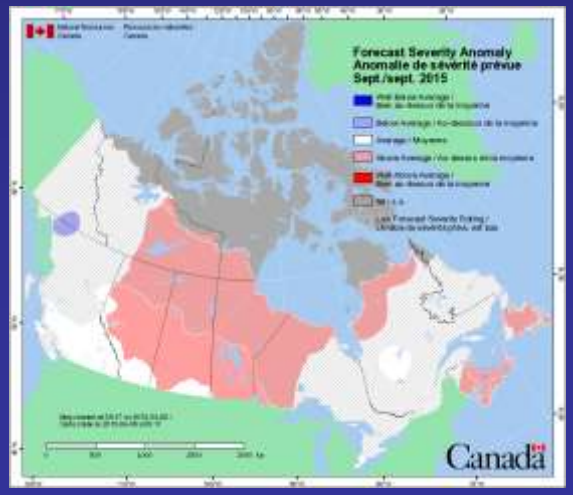
July



August

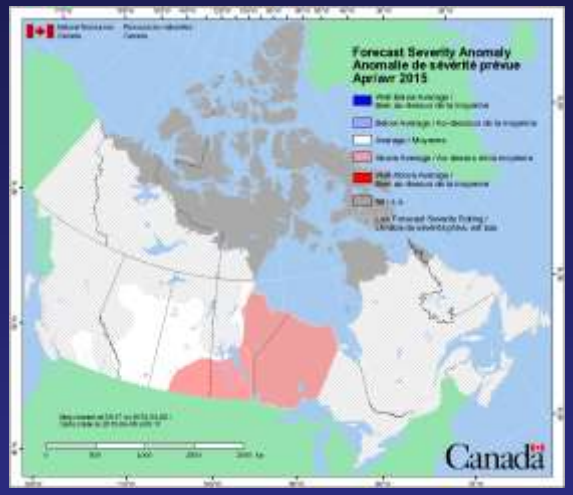


September

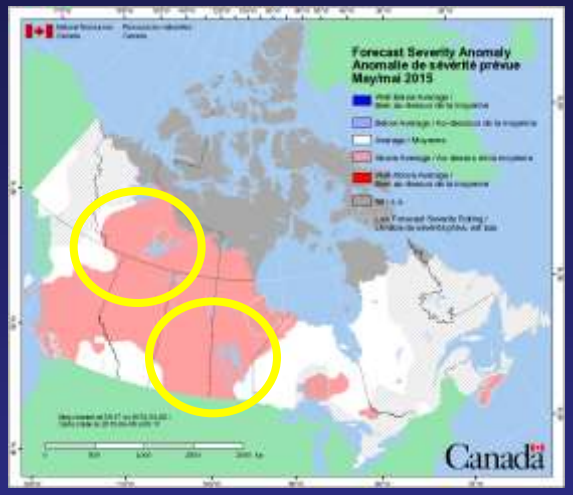


2015 Fire Activity

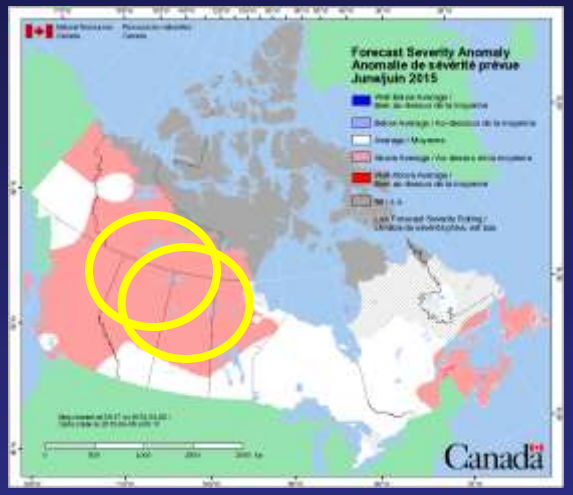
April



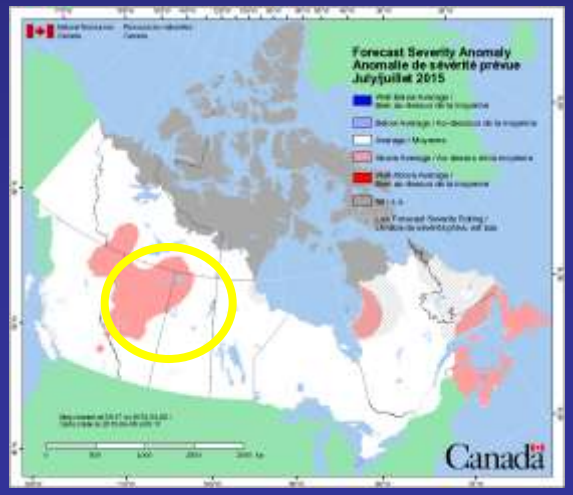
May



June

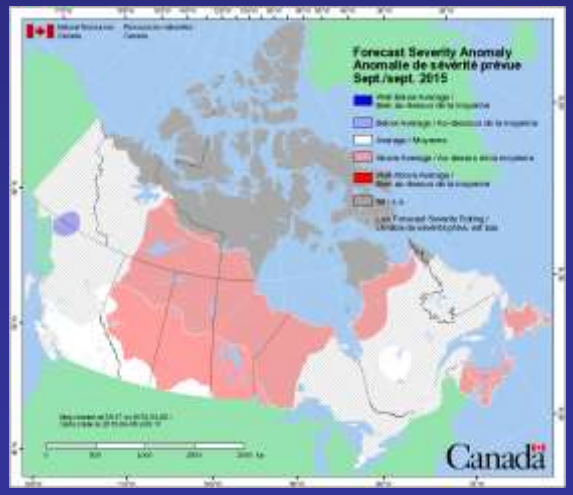


July

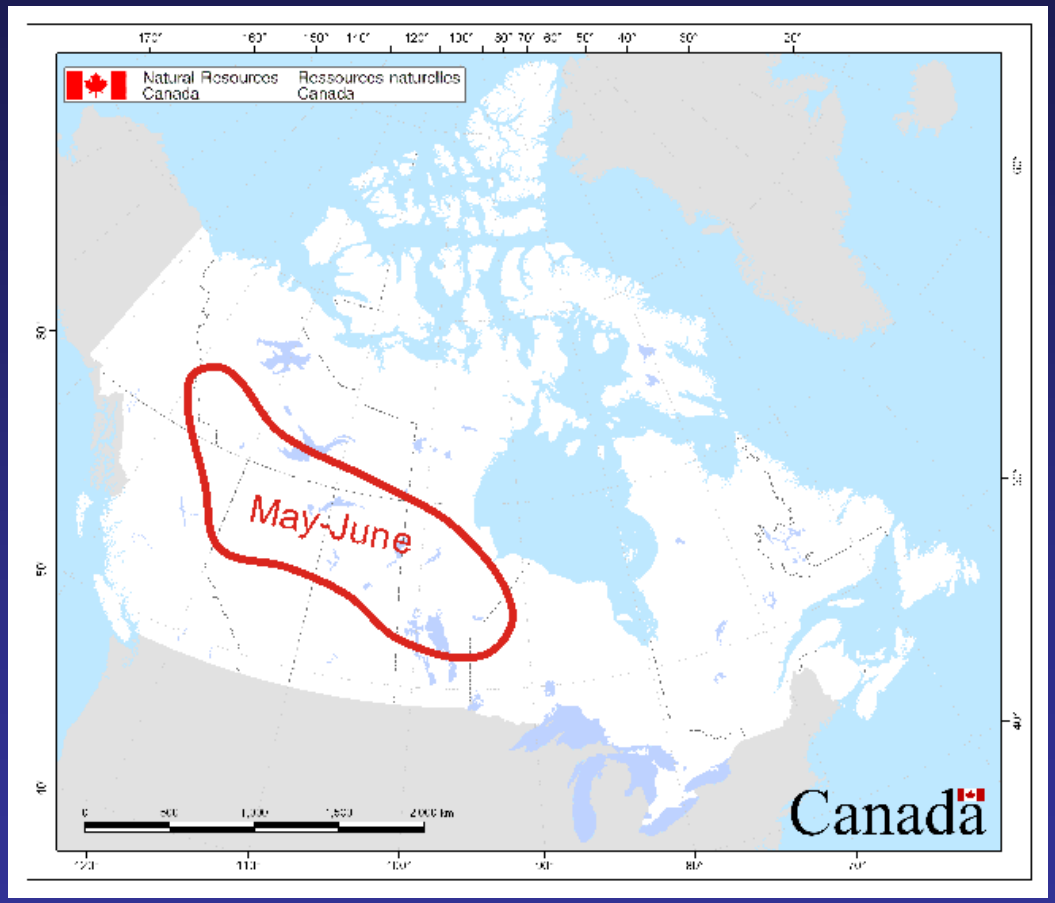


August

September



North American Seasonal Assessment



The North American Seasonal Assessment (produced in April) focused on the Prairie provinces and Territories for May and June.

2015 Prediction

In summary, the April forecast correctly predicted the spring fire activity in NWT, Alberta and Saskatchewan. It also predicted a mid-summer drop in activity.

Because of the severity of the situation, later North American Seasonal Assessments extended conditions into August, which did not occur.

2016 Seasonal Prediction

Starting Conditions

Spring Start-up Conditions

The Canadian Forest Fire Weather Index (FWI) System allows for the carry-over of fall conditions to the spring.

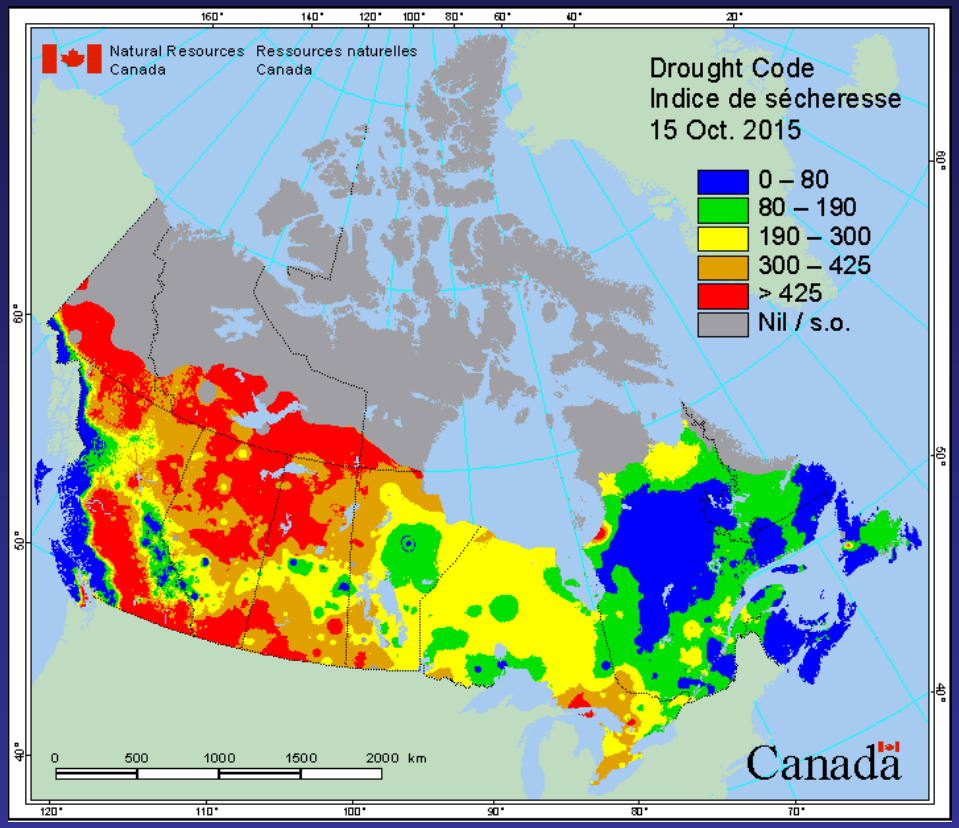
This is handled by the Drought Code (DC).

All other moisture codes in the FWI system are reset.

Fall Conditions

Fall DC values show extreme (dry) conditions throughout much of Western Canada and the Territories. Also, conditions in western Ontario were drier than normal.

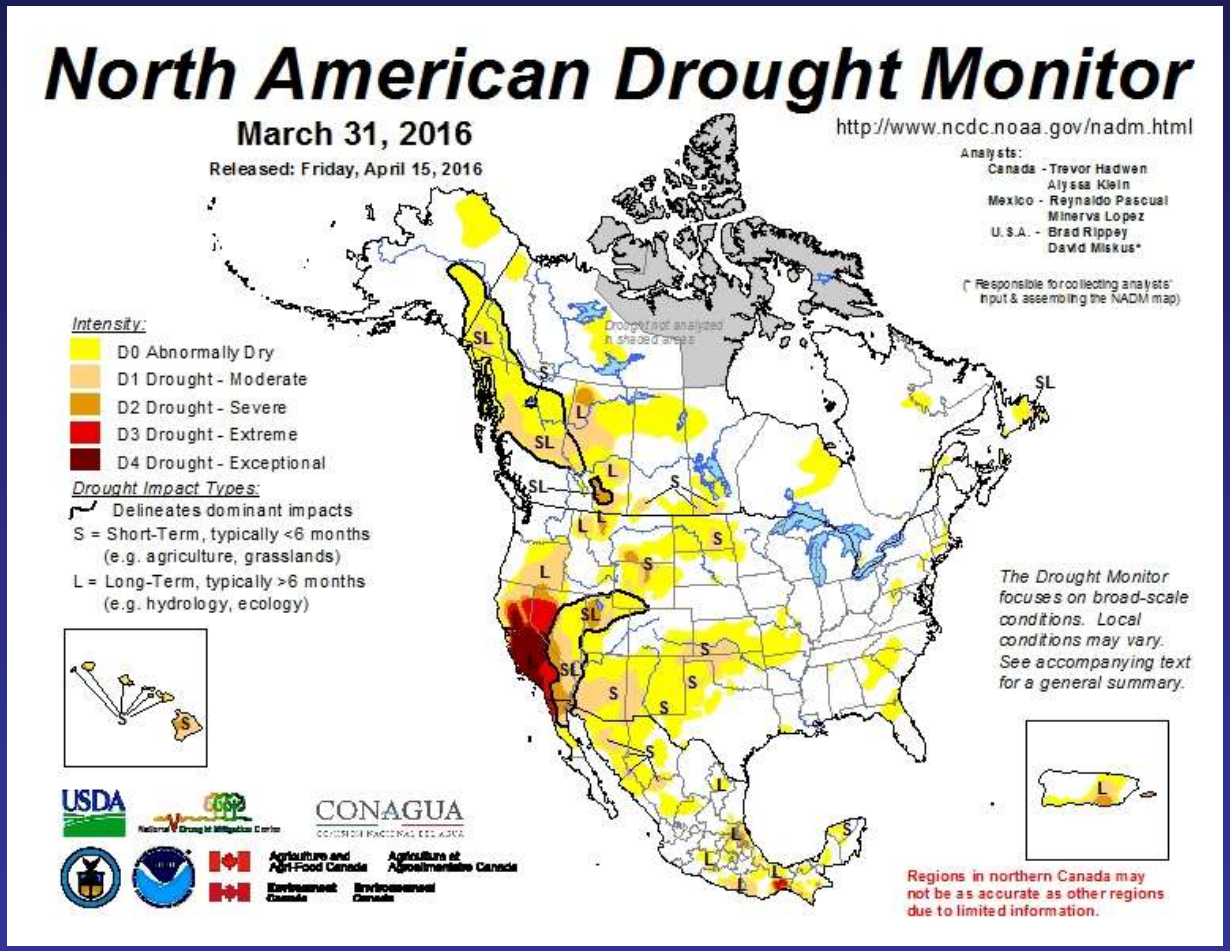
Most of Canada experienced a warm winter with less than normal snow due to the El Niño event.



Oct 15, 2015

http://cwfis.cfs.nrcan.gc.ca/maps/fw?type=dc&year=2015&month=10&day=15

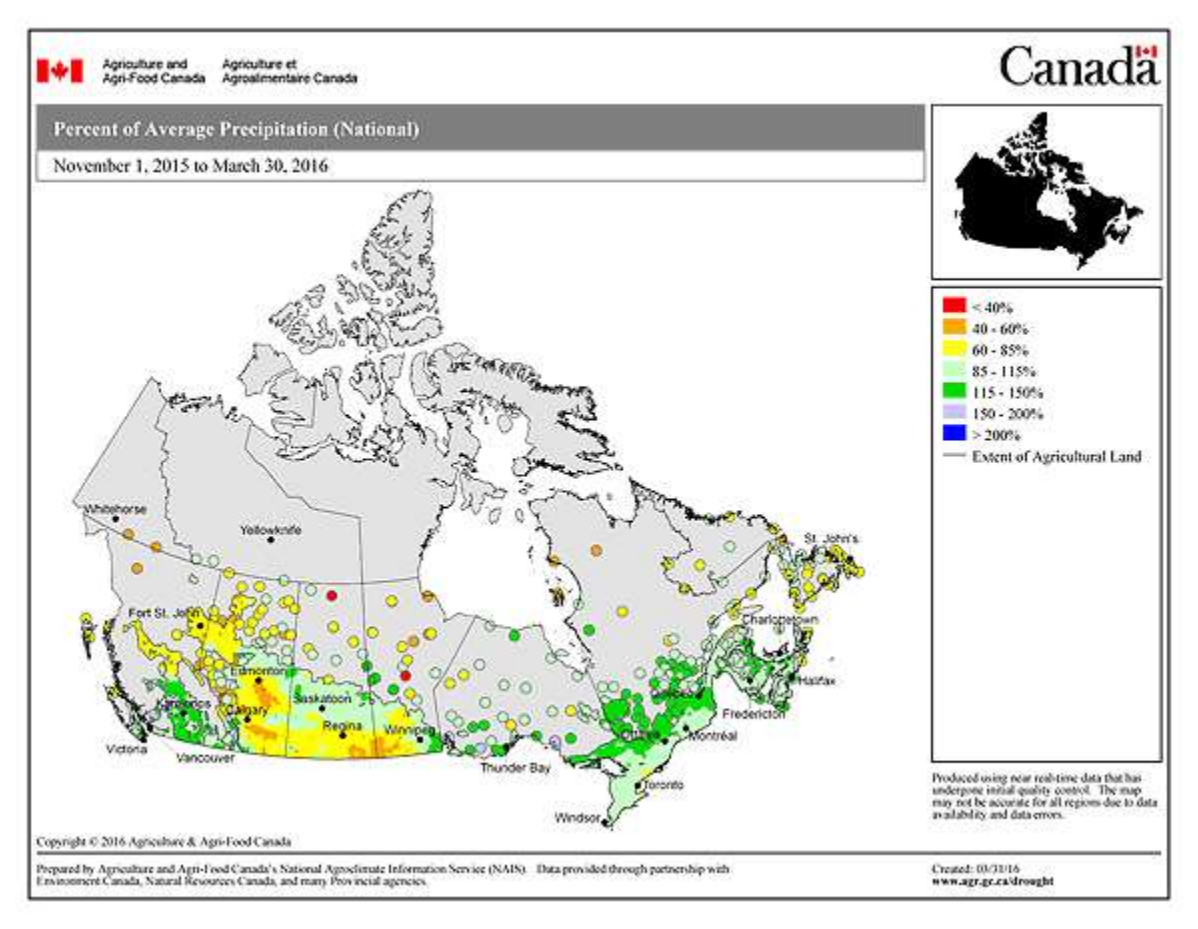
Spring Start-up Conditions



North American Drought Monitor indicates dry to moderate drought conditions in northern BC and Alberta, and parts of Saskatchewan and the Yukon.

http://www.ncdc.noaa.gov/temp-and-precip/drought/nadm/nadm-maps.php

Overwinter Snowfall

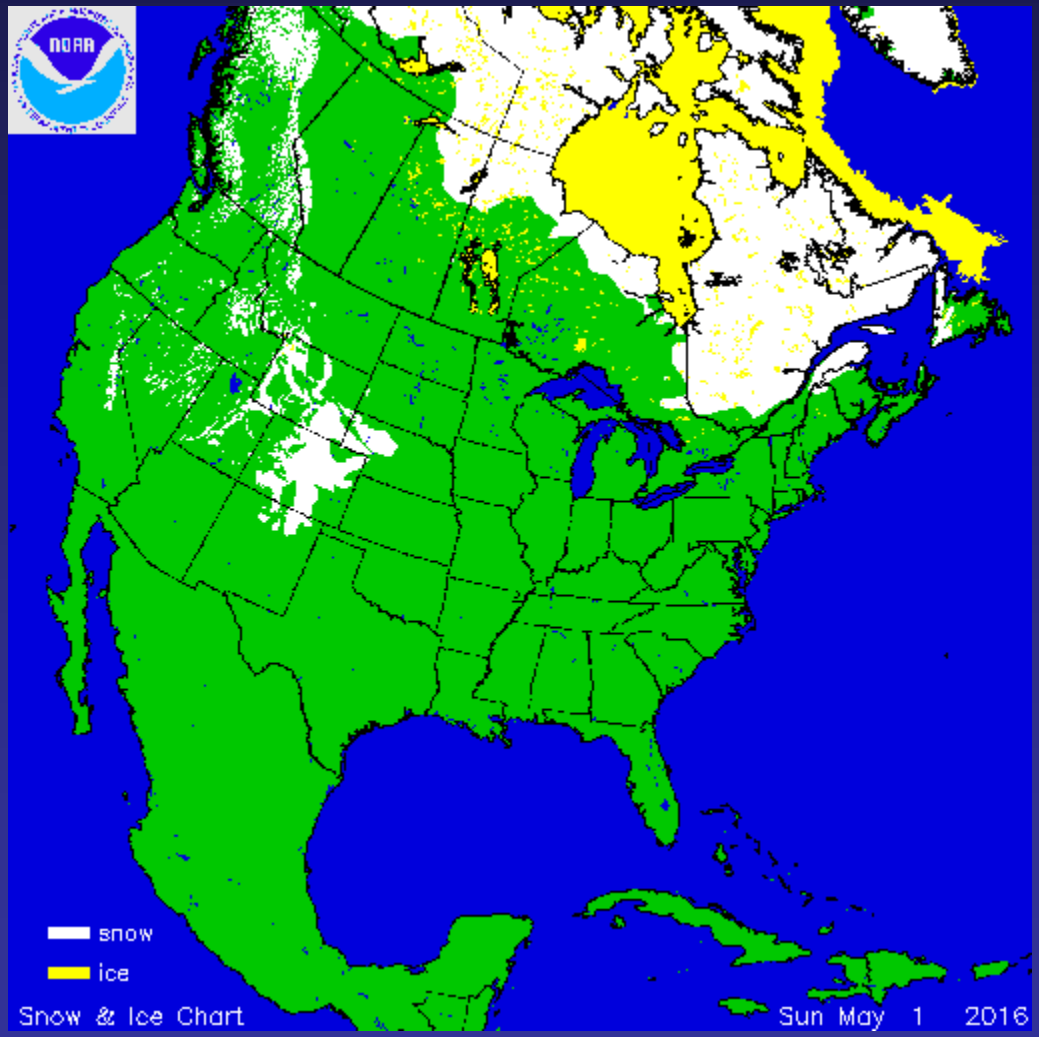


Snow amounts ranged from 40% to 150% of normal in Canada.

British Columbia and Alberta experienced were affected the most.

http://www4.agr.gc.ca/DW-GS/current-actuelles.jspx?lang=eng&jsEnabled=true

Overwinter Snowfall

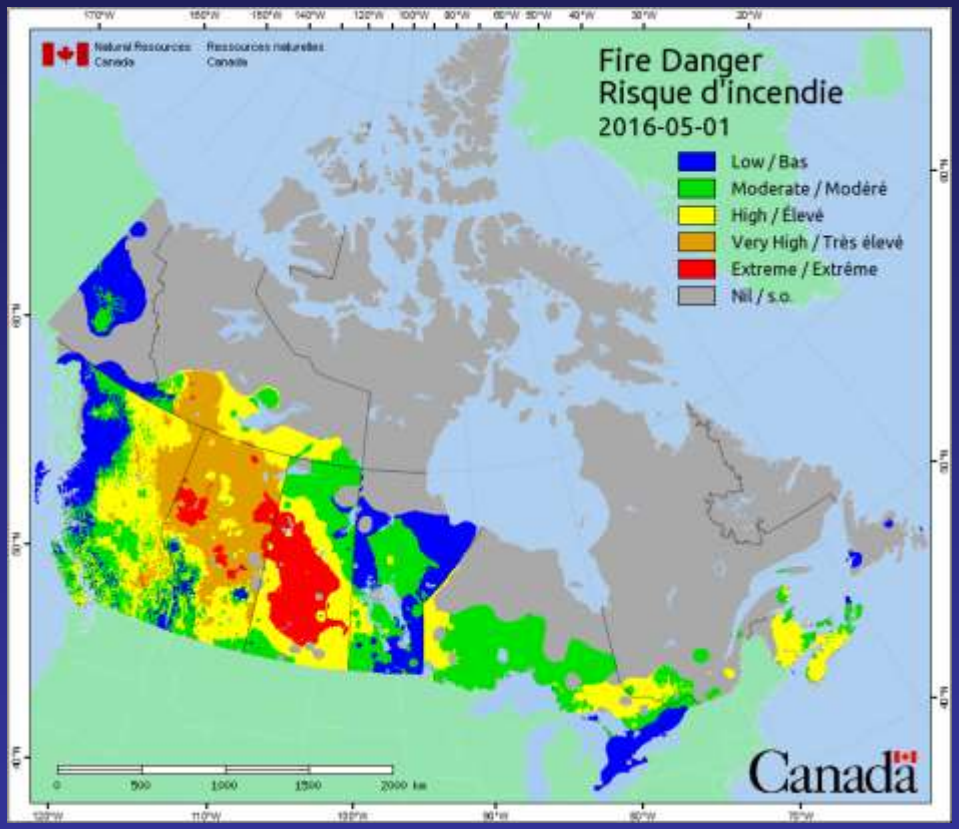


Snow is rapidly melting in western Canada. Much of Quebec is still under snow cover.

We are already experiencing an early start to the fire season in the west.

http://www.natice.noaa.gov/pub/ims/ims_gif/DATA/cursnow_usa.gif

Spring Start-up Conditions



The early spring has resulted in elevated fire danger conditions in BC, Alberta, Saskatchewan and southern NWT.

It is expected that Ontario may not experience total recharge of deep fuel moistures this year.

http://http://cwfis.cfs.nrcan.gc.ca/

2016 Seasonal Prediction

ENSO Pattern

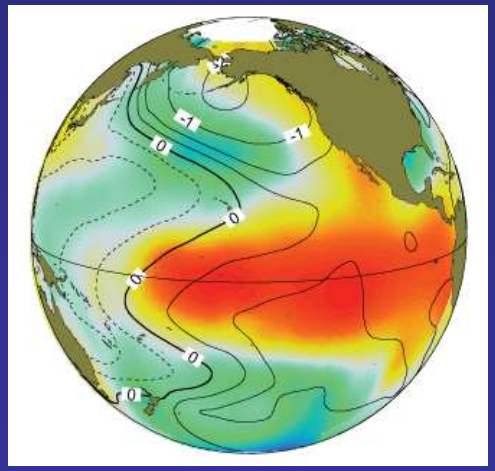
ENSO Pattern

El Niño–Southern Oscillation is a band of warm ocean water that can develop off the western coast of South America.

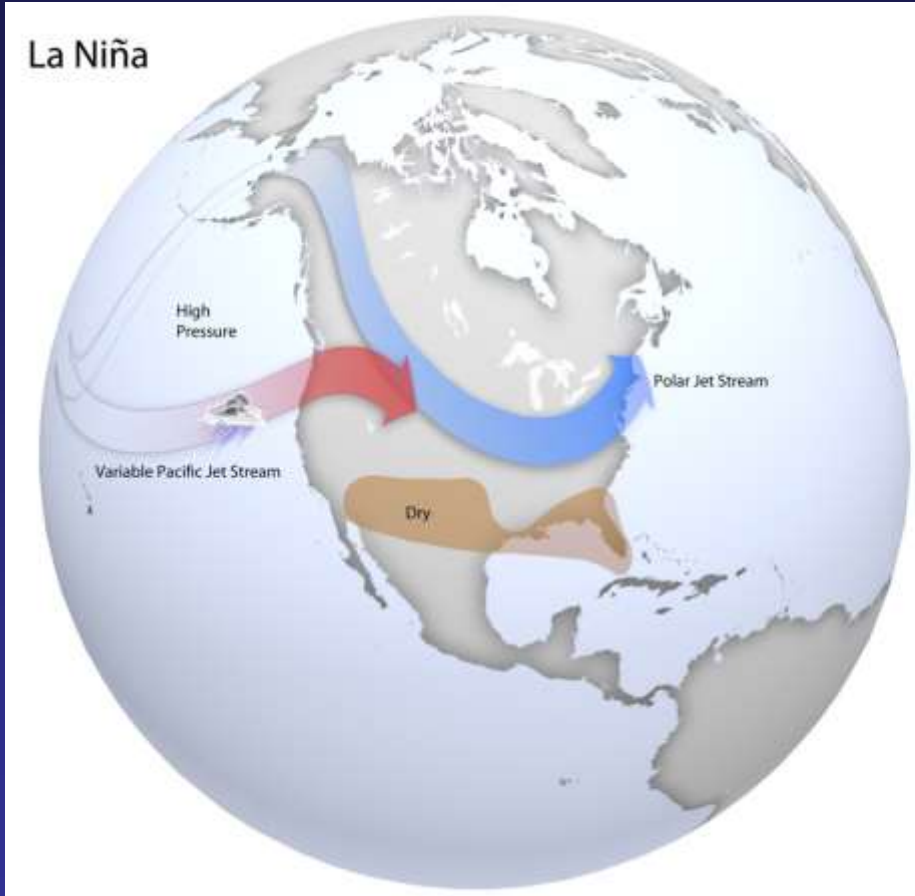
Extremes in this oscillations cause extreme weather (such as floods and droughts) in many regions of the world.

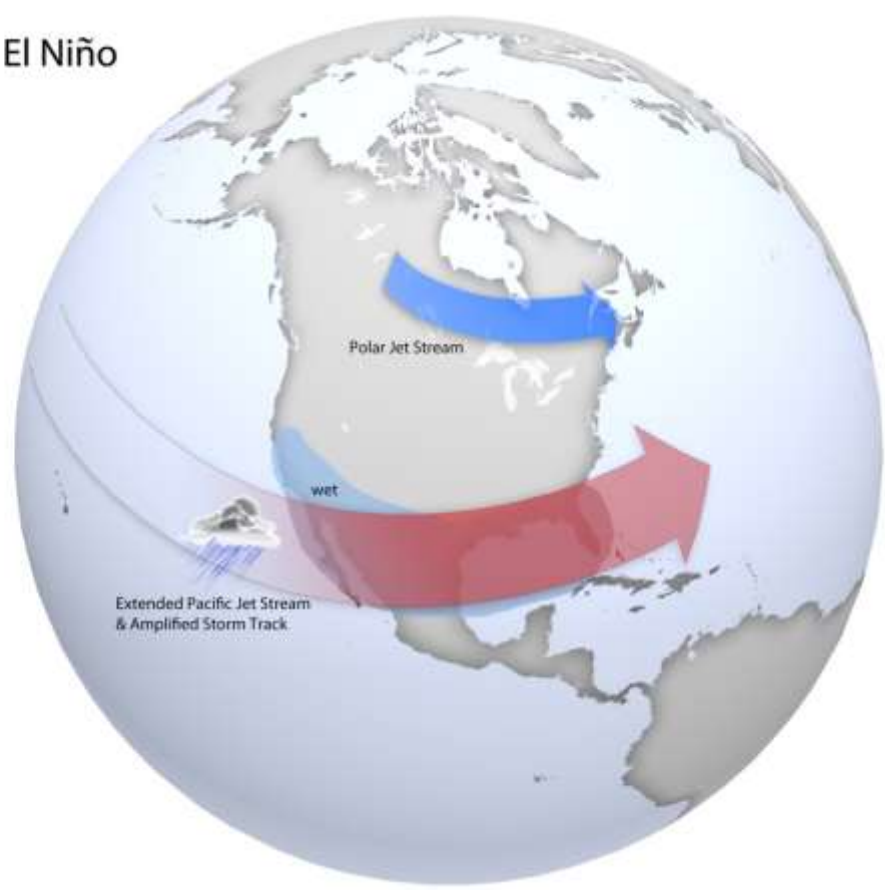
El Niño and La Nina events tend to develop during the period April-June and they

- tend to reach their maximum strength during Dec-Feb,
- typically persist for 9-12 months, though occasionally persisting for up to 2 years,
- typically recur every 2 to 7 years.



La Niña and El Niño Effects





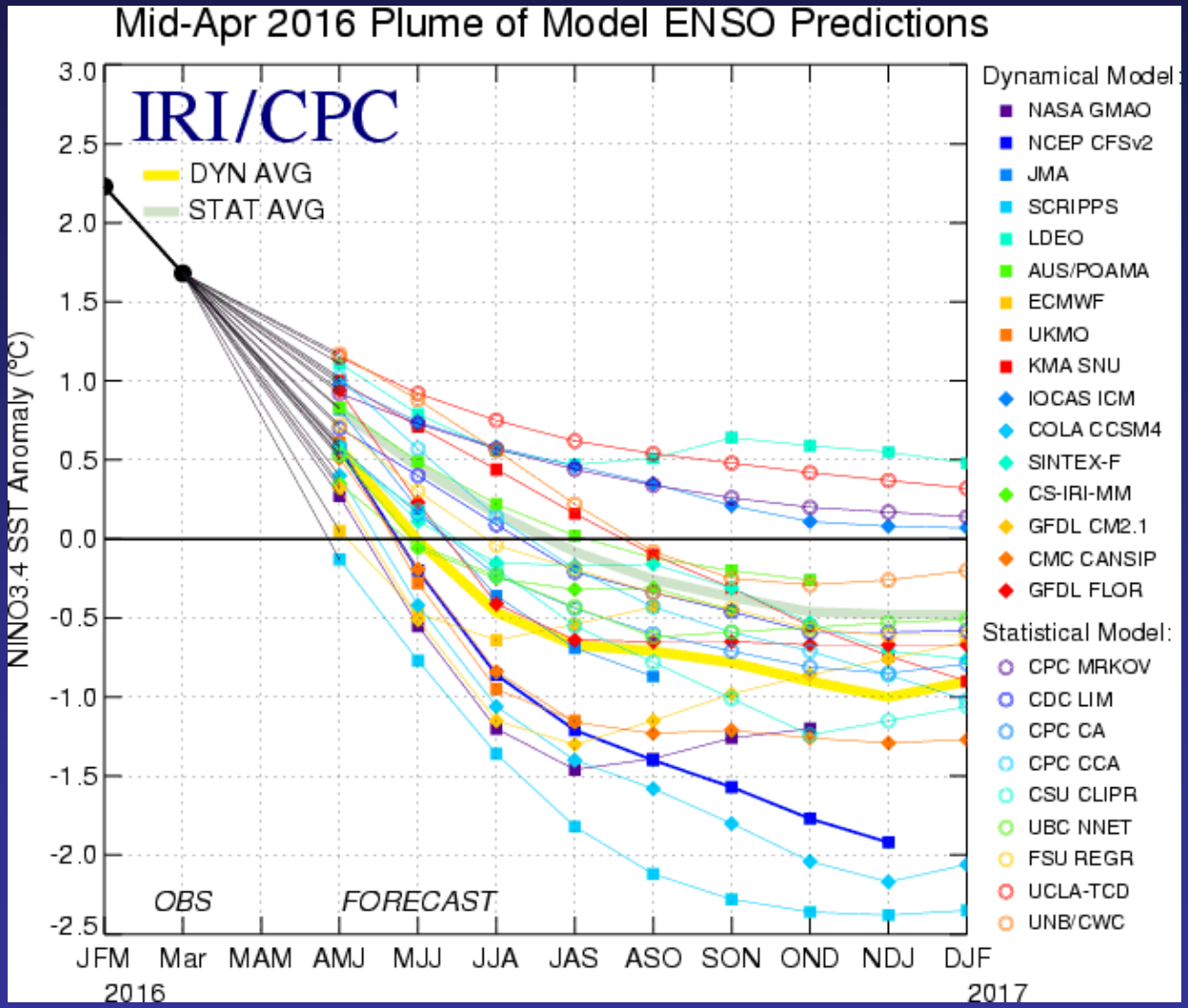
La Niña

El Niño

La Niña and El Niño affects the jet stream pattern, which has significant impacts on temperature and precipitation patterns in Canada.

ENSO Pattern

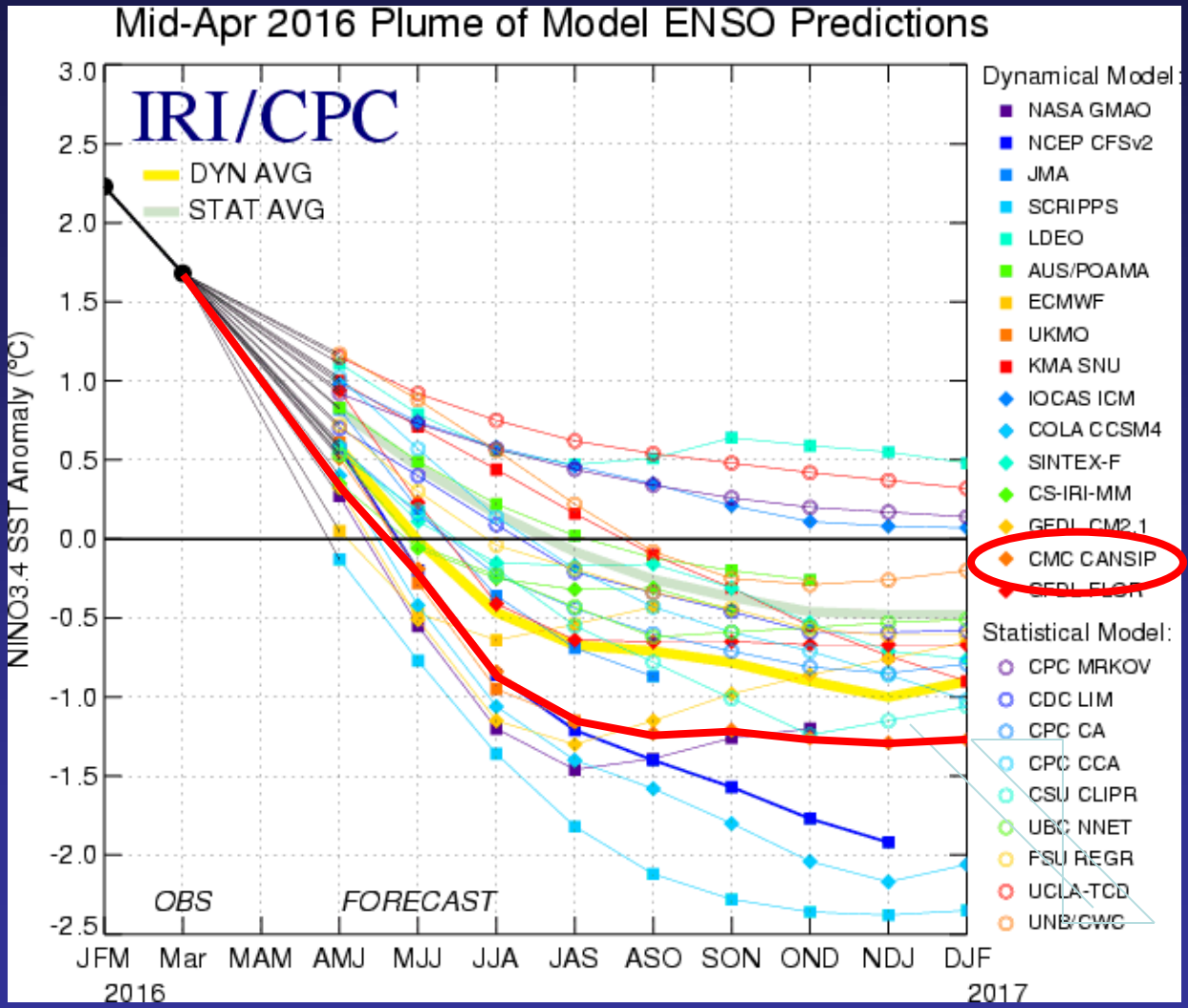
Following the extreme El Niño conditions, the models are predicting a drop to neutral or La Niña.



http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/figure6.gif

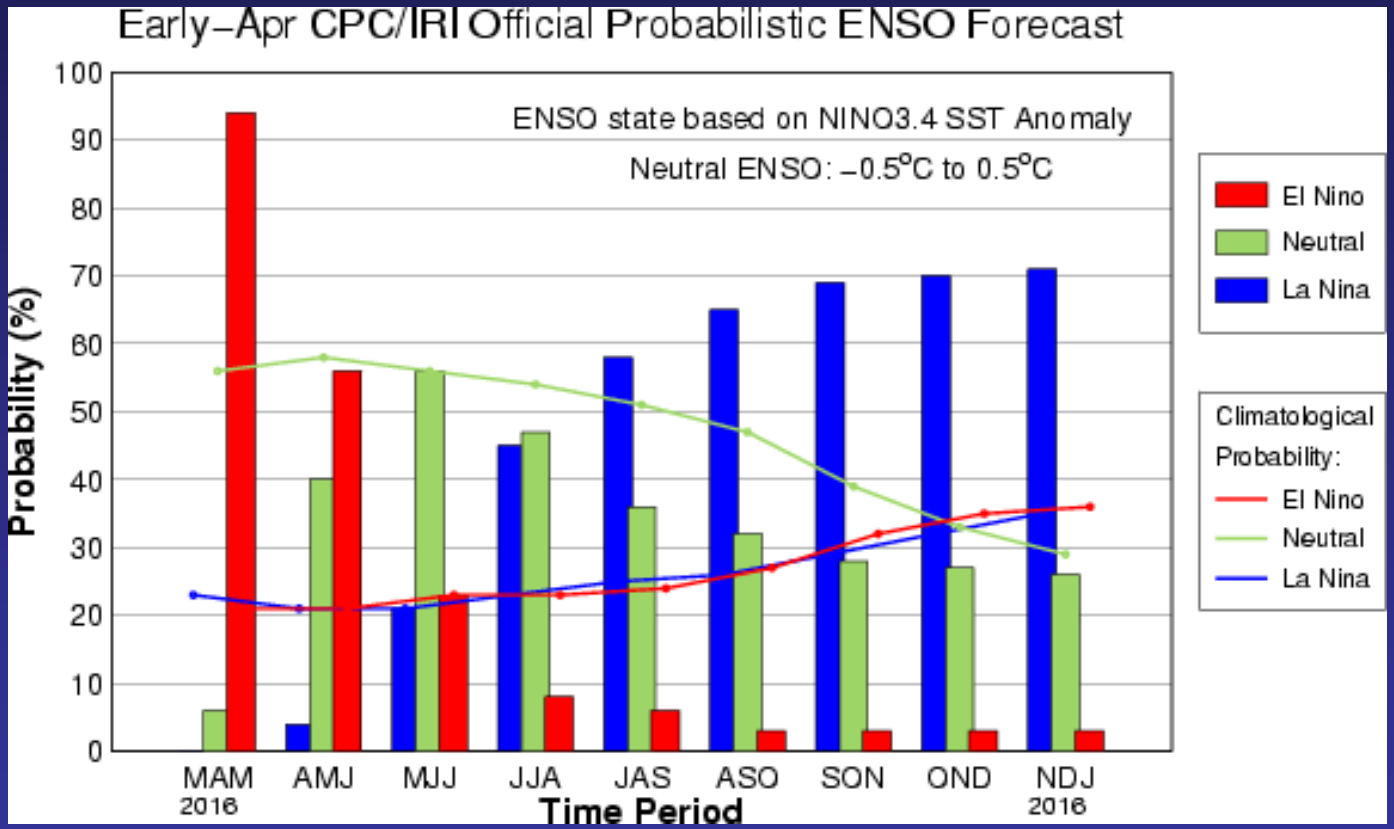
ENSO Pattern

The Canadian CMC CANSIP model is predicting La Niña conditions in July (lower than most models).



http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/figure6.gif

ENSO Pattern

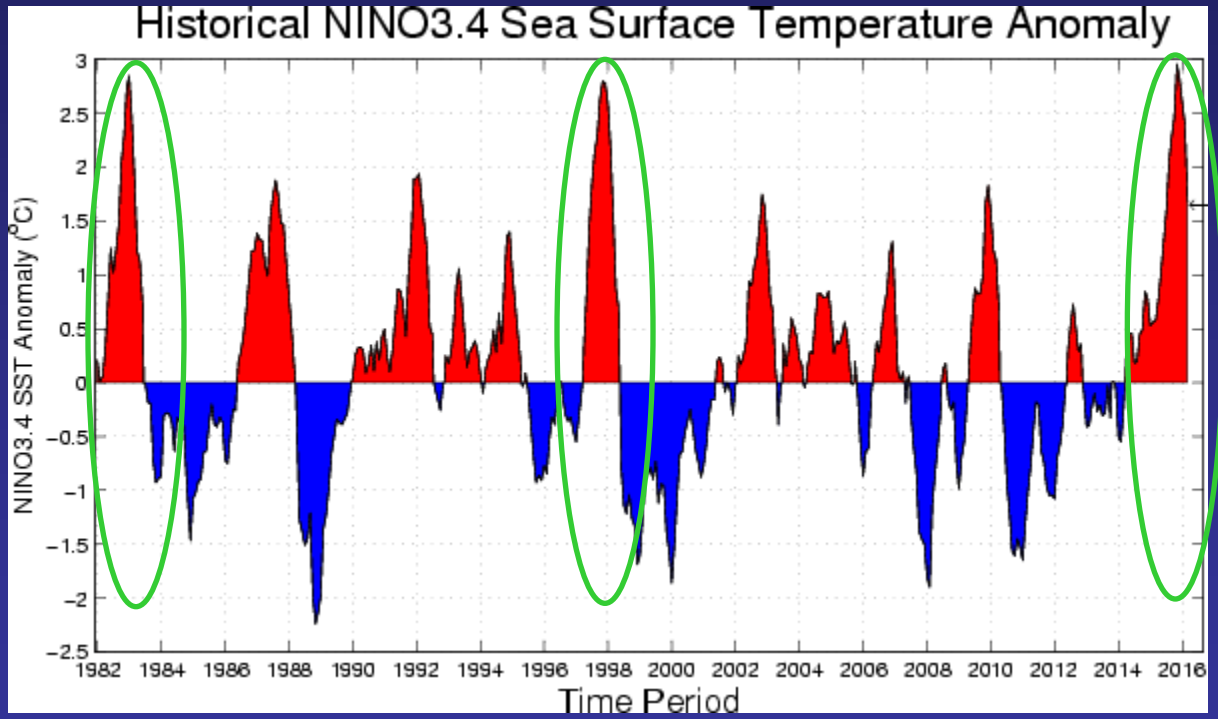


The drop from El Niño to La Niña conditions is illustrated by the consensus of models (though uncertainty increases).

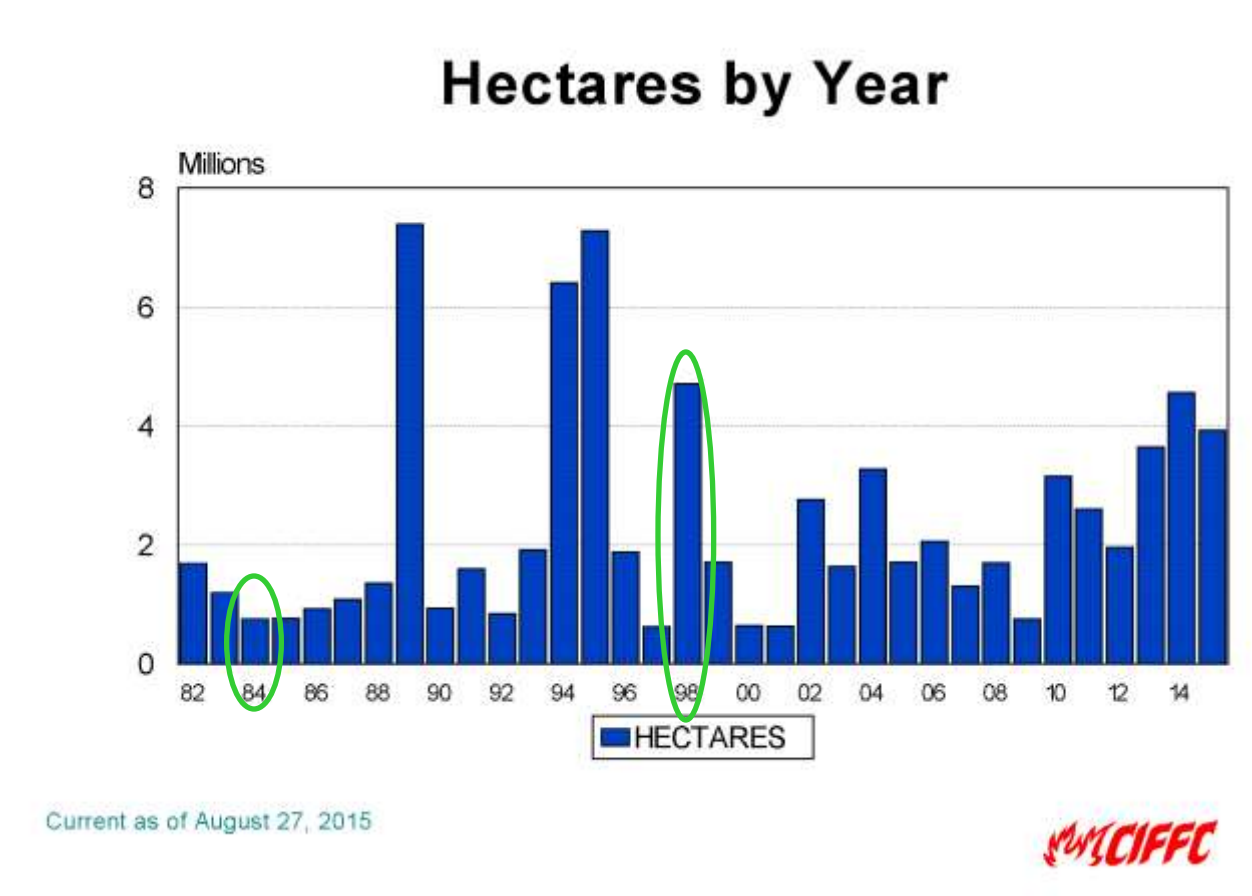
http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-cpc_plume

ENSO Pattern

The last comparable drops from El Niño to La Nina were 1983-1984 and 1997-1998.



ENSO Pattern

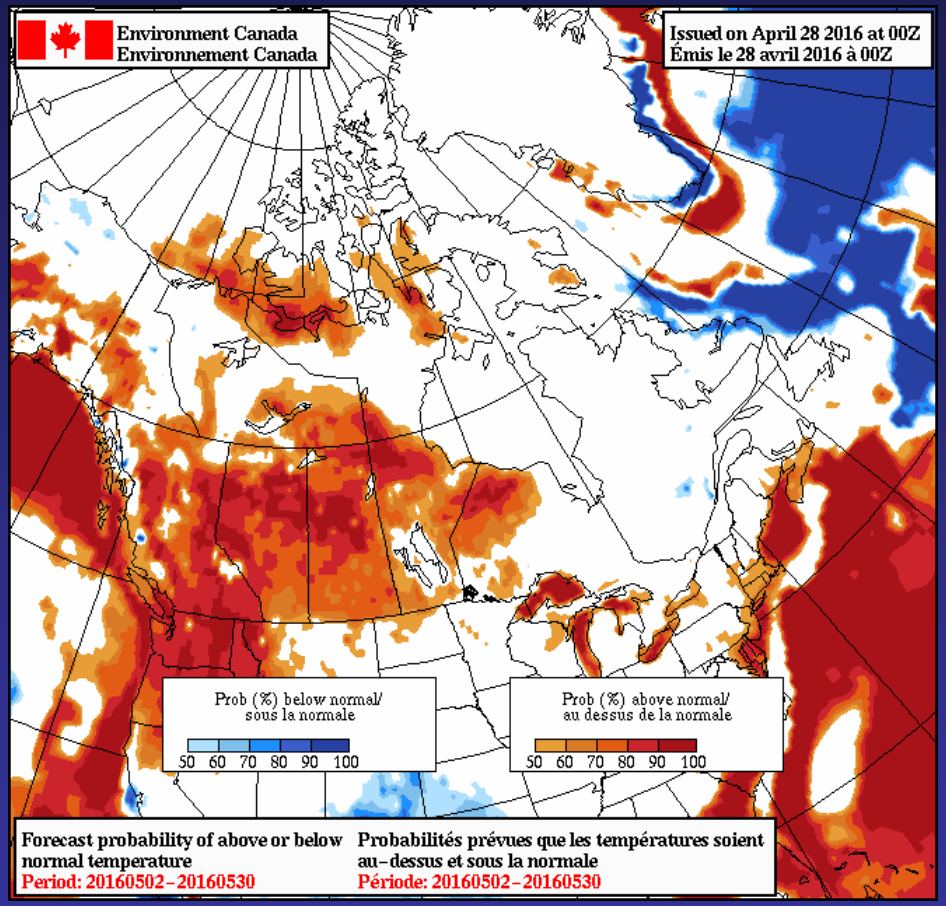


1984 was a low year while 1998 was a high year for area burned showing the volatility of fire seasons.

2016 Seasonal Prediction

CMC Forecasts

Seasonal Forecasts



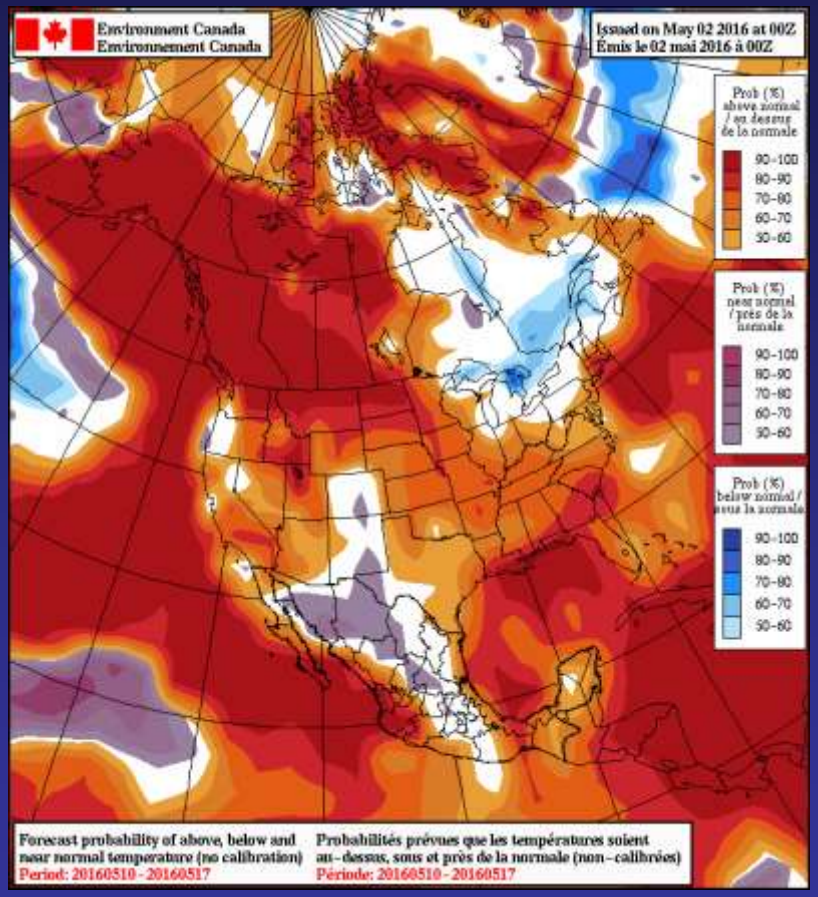
Temperature anomalies are above-average for Western Canada and Ontario.

Below-average conditions are expected only in Quebec and parts of NWT.

May 2 – May 30

http://http://weather.gc.ca/saisons/image_e.html?img=mfe1t_s

Ensemble Forecasts



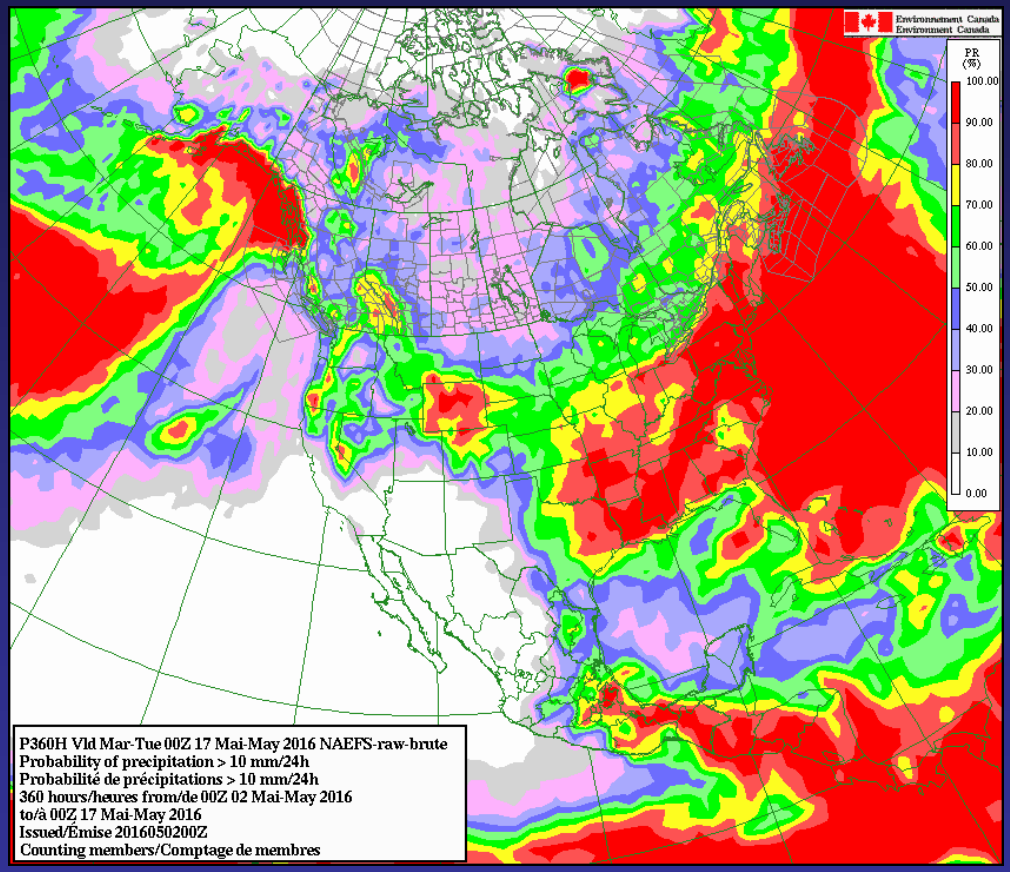
May 10 – May 17

Medium-range predictions based on the North American Ensemble Forecast System (NAEFS) predict above average conditions in the west (very high probabilities).

http://weather.gc.ca/ensemble/naefs/semaine2_combinee_e.html

Ensemble Forecasts

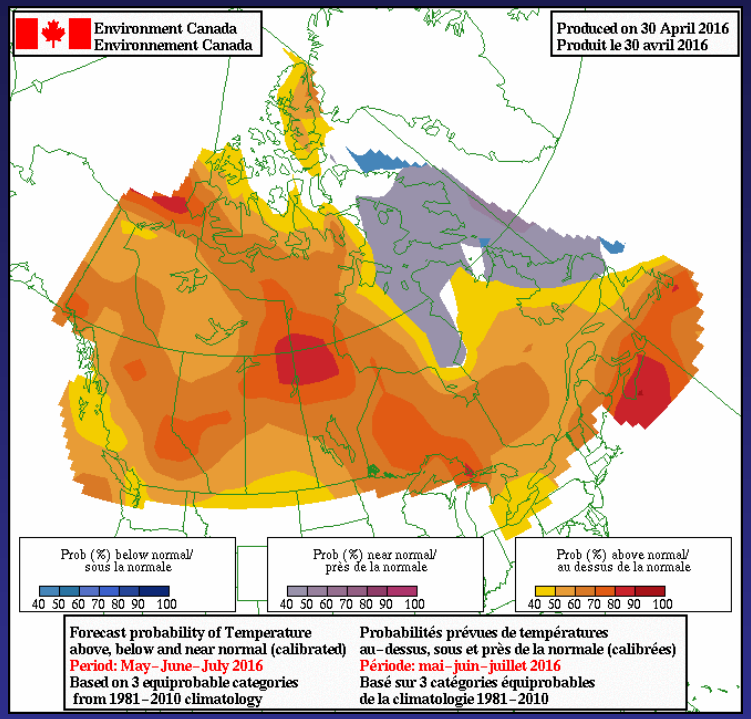
The probability of precipitation over 10 mm at least one day over the next two weeks is high for southeastern BC, southern Alberta and parts of eastern Canada and the Maritimes.

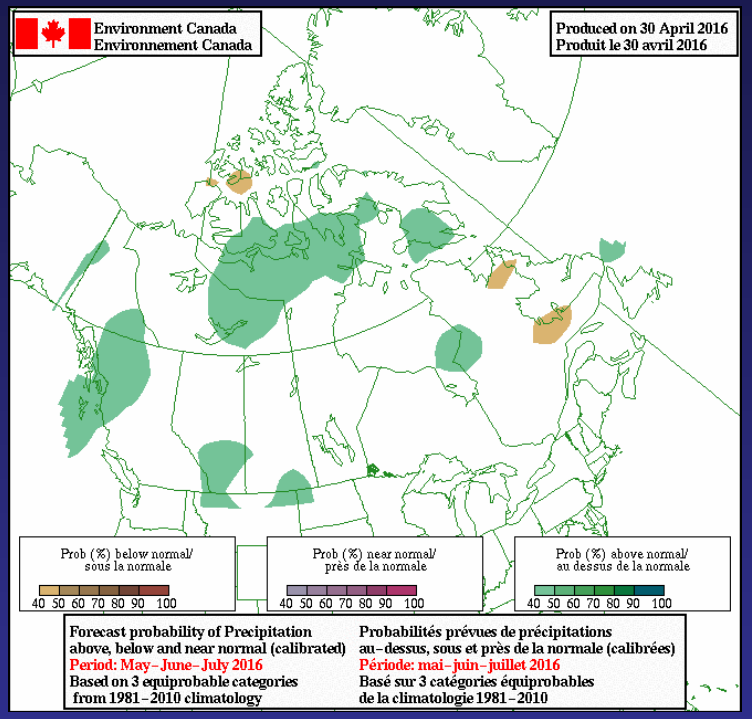


May 2 - May 17

http://weather.gc.ca/ensemble/naefs/produits_e.html

Seasonal Forecasts





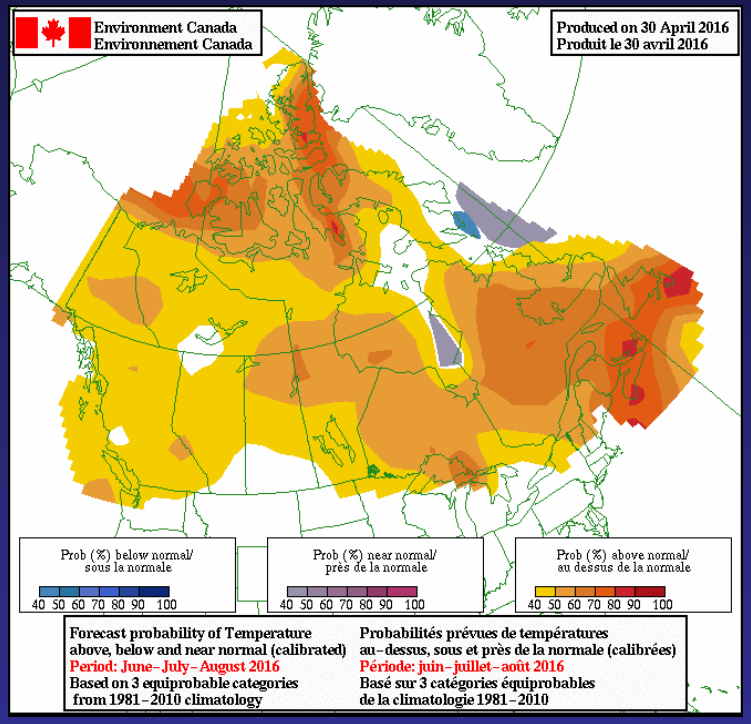
May-June-July

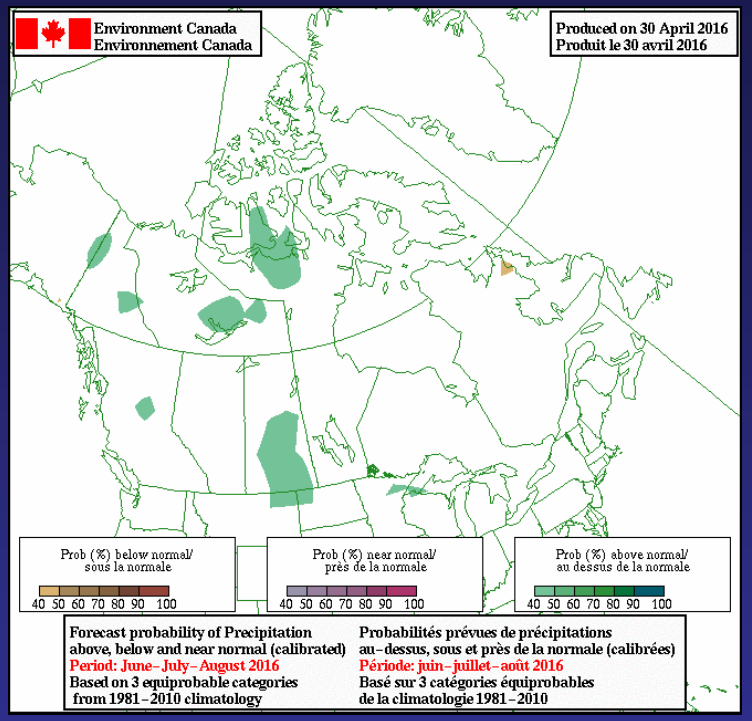
Above-average temperature are highly likely for most of Canada.

Above-average precipitation is likely for northwestern BC, southern Alberta and part of the NWT.

http://weather.gc.ca/saisons/prob_e.html

Seasonal Forecasts





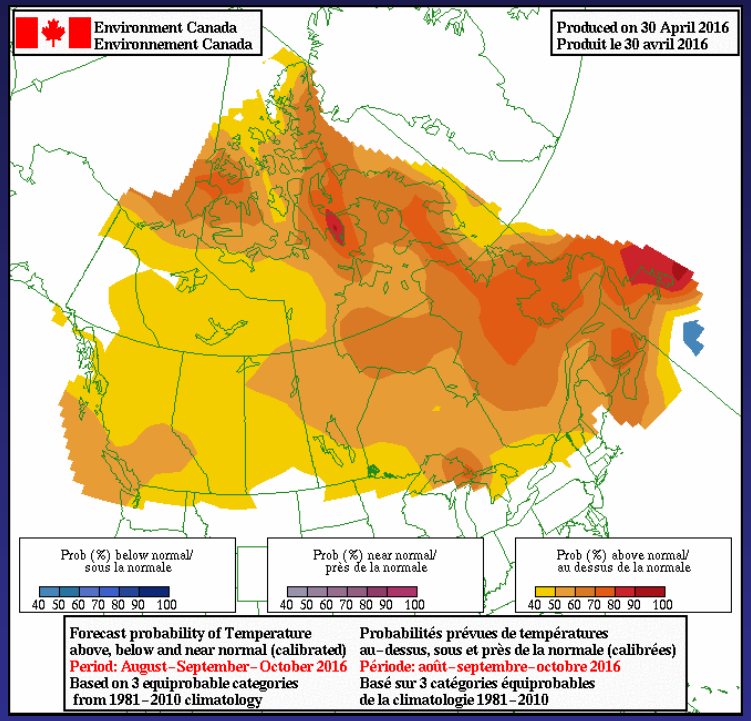
June-July-August

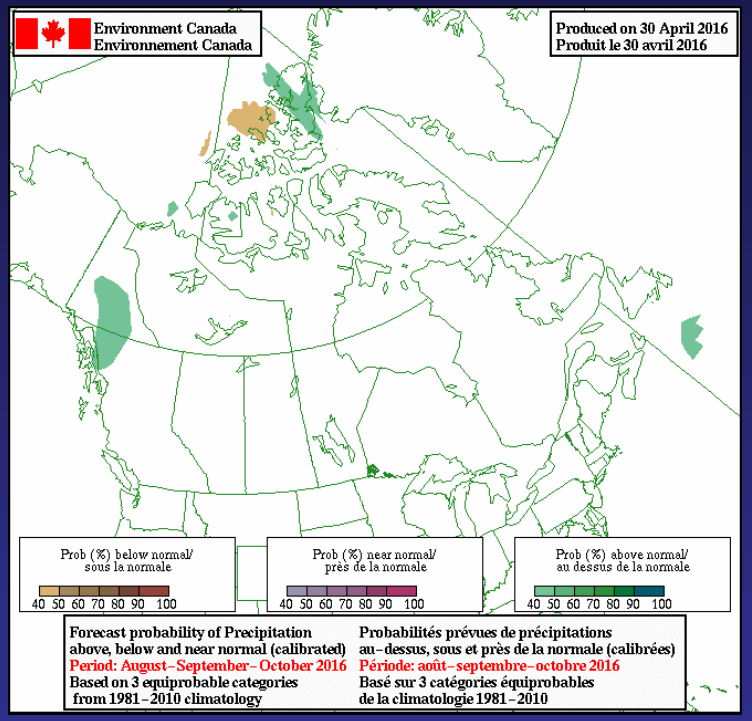
As summer develops, above-average conditions lessen though northern Saskatchewan and Manitoba, most of Eastern Canada remain high.

Southern Saskatchewan and NWT show above-average precipitation anomalies.

http://weather.gc.ca/saisons/prob_e.html

Seasonal Forecasts





August-September-October

Above-average temperatures will likely persist across Canada (mostly in the east) into the late summer.

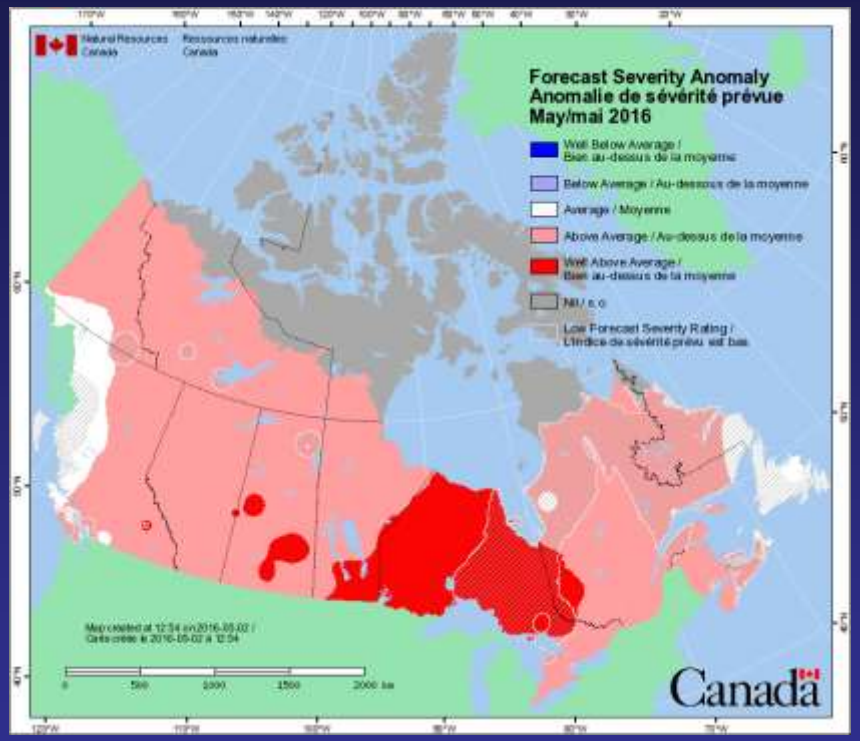
Above-average precipitation is likely only in the northern BC and Yukon.

http://weather.gc.ca/saisons/prob_e.html

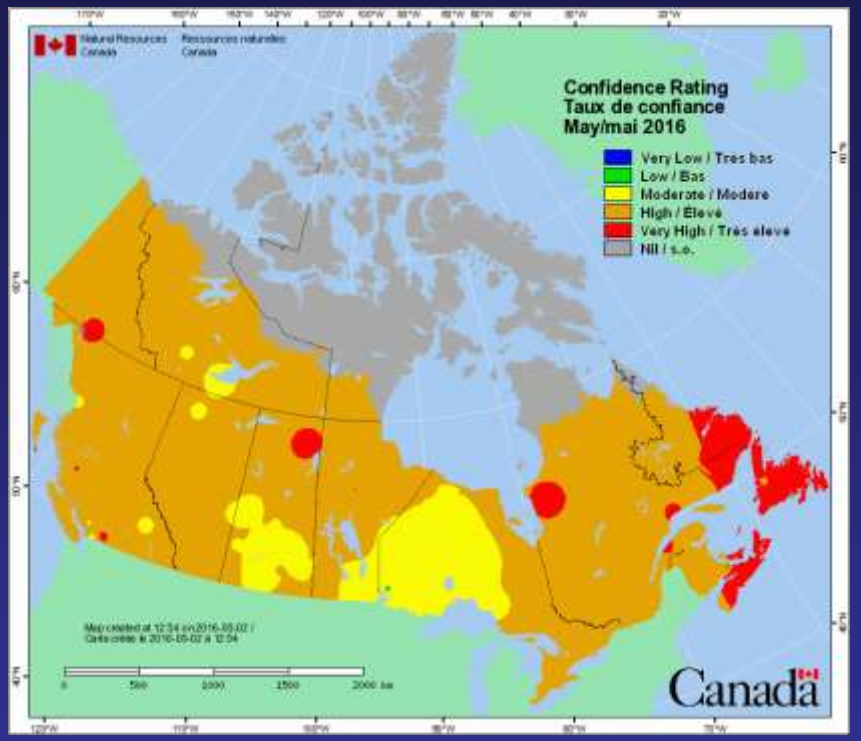
2016 Seasonal Prediction

Model Predictions

May 2016



Prediction
(predicted values normalized against average weather)

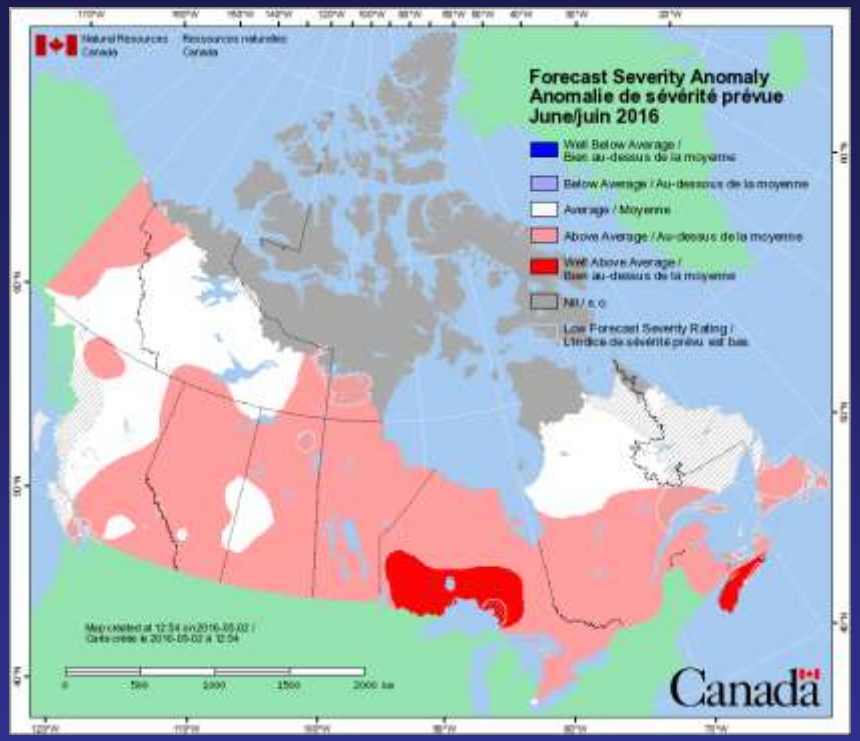


Confidence
(standard deviation normalized against average weather)

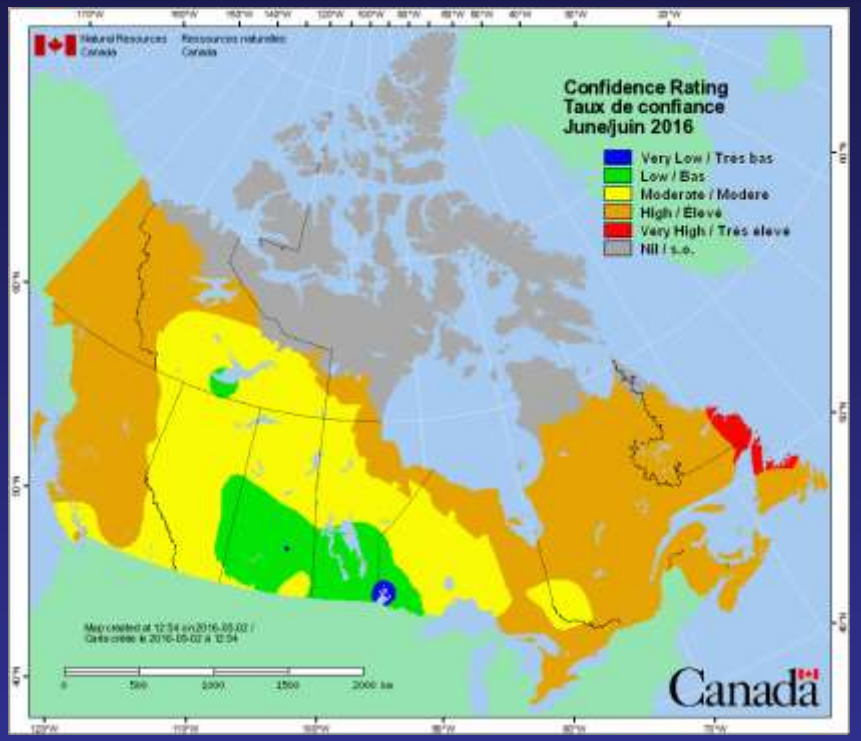
Above-average conditions cover most Canada, with well-above average in Ontario in May.

Confidence is highest in the west and Quebec.

June 2016



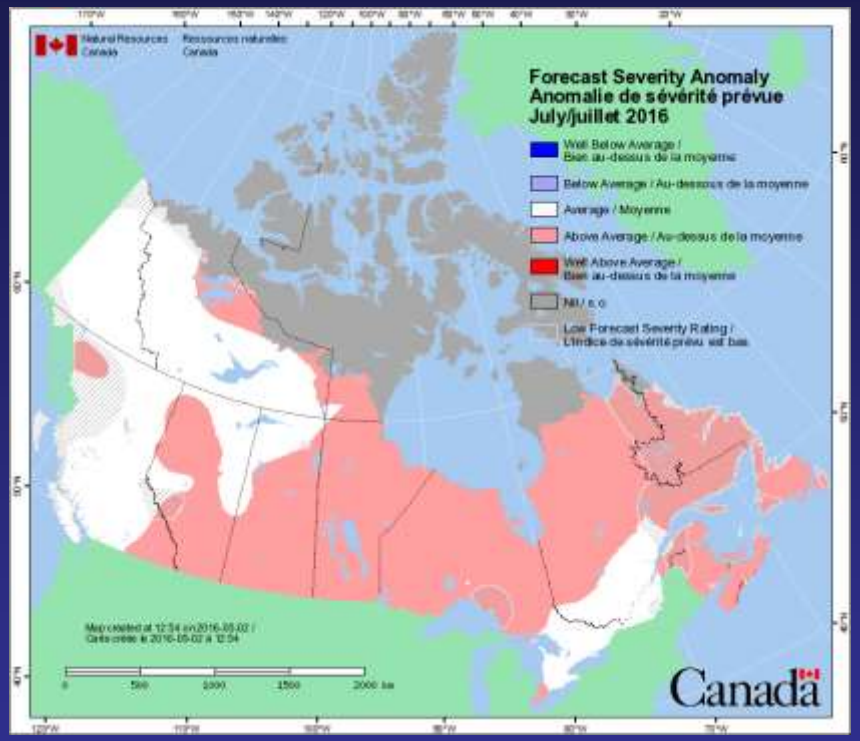
Prediction
(predicted values normalized against average weather)



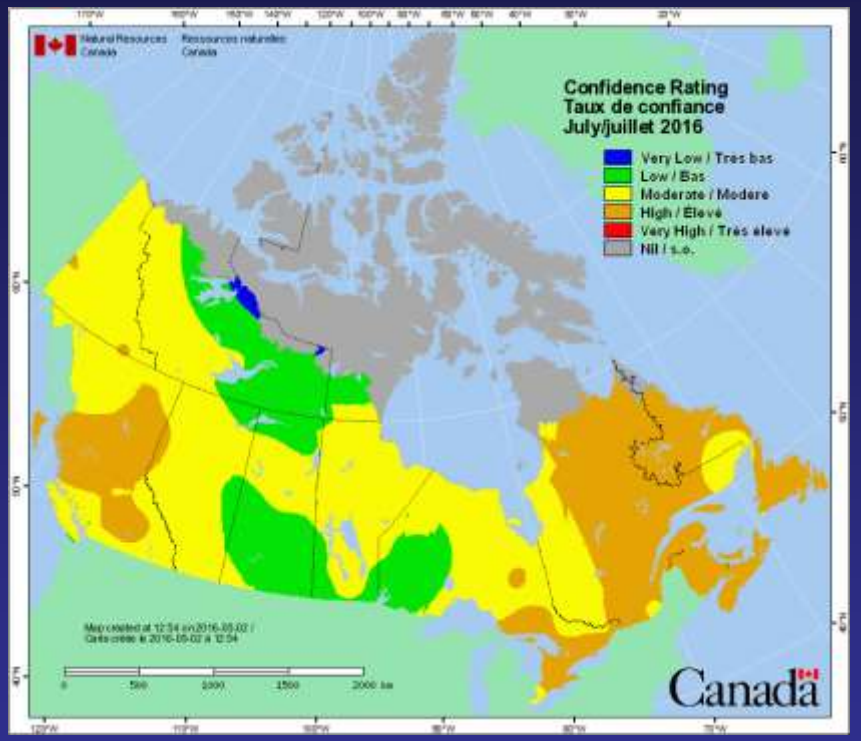
Confidence
(standard deviation normalized against average weather)

Above-average condition cover much of the boreal forest across Canada though the extent is much reduced.

July 2016



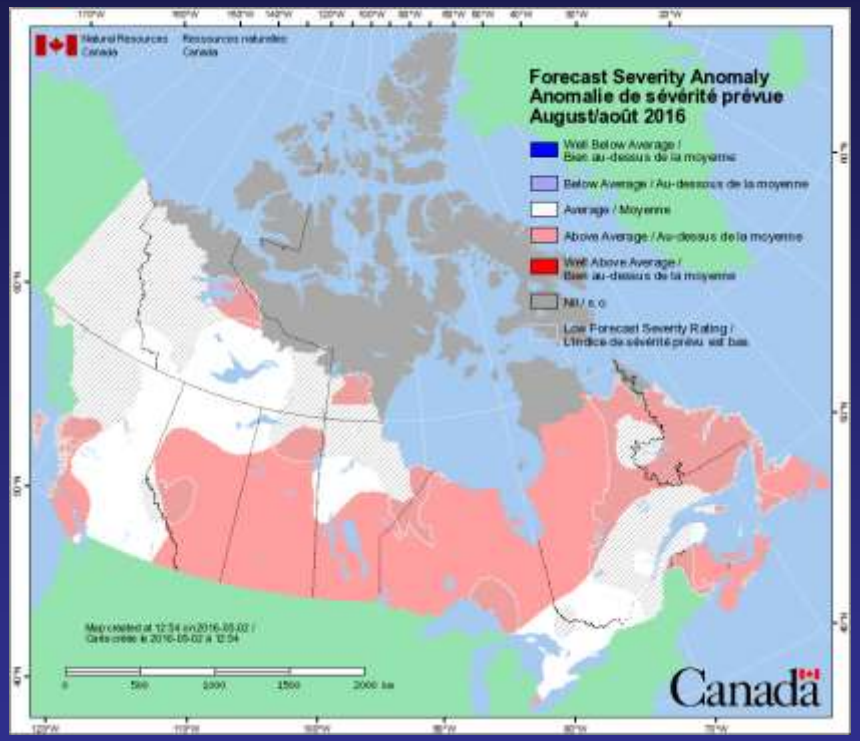
Prediction
(predicted values normalized against average weather)



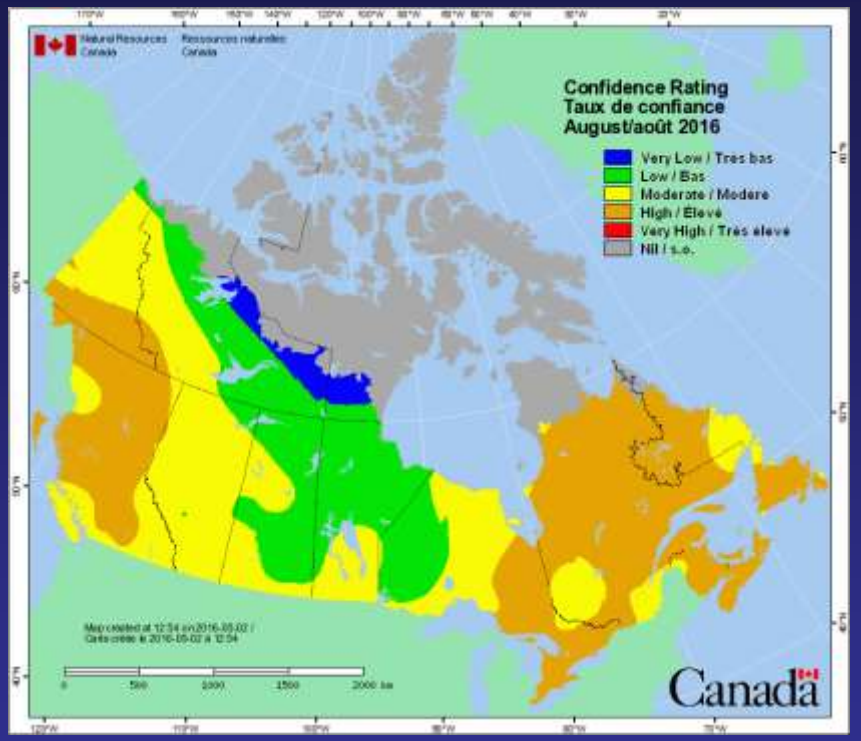
Confidence
(standard deviation normalized against average weather)

As summer develops, fire danger conditions begin to settle though above-average conditions are still present from Alberta through to Atlantic Canada.

August 2016



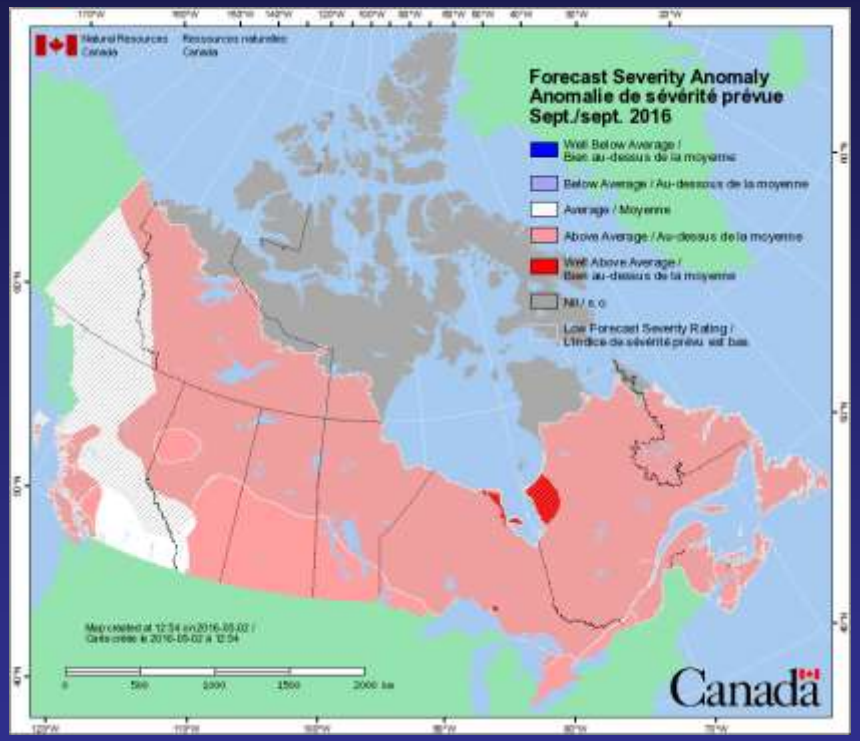
Prediction
(predicted values normalized against average weather)



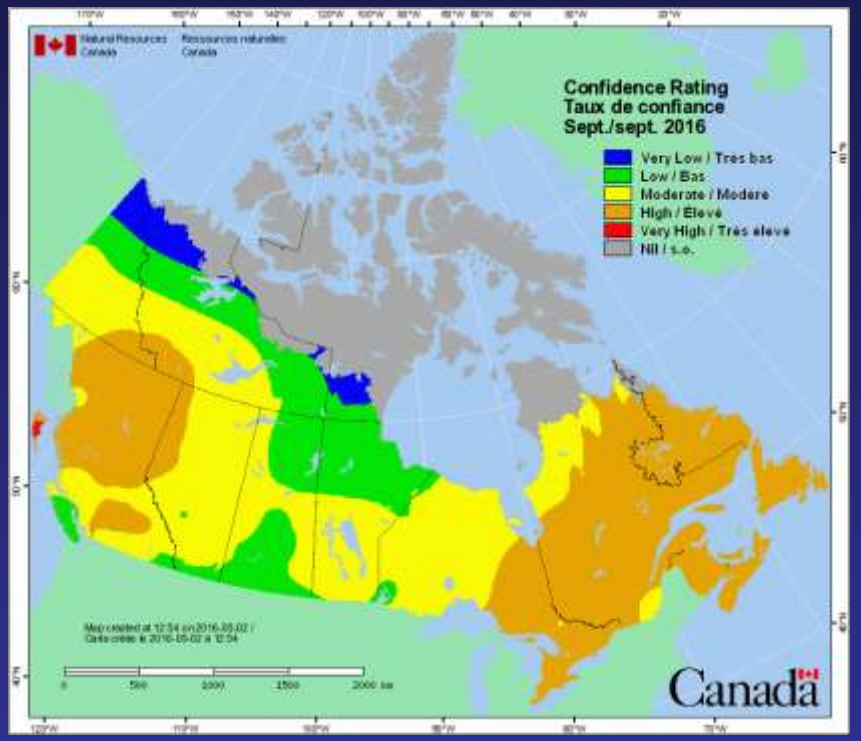
Confidence
(standard deviation normalized against average weather)

The Prairies and Ontario continue to see above-average conditions while much of the rest of the country winds down.

September 2016



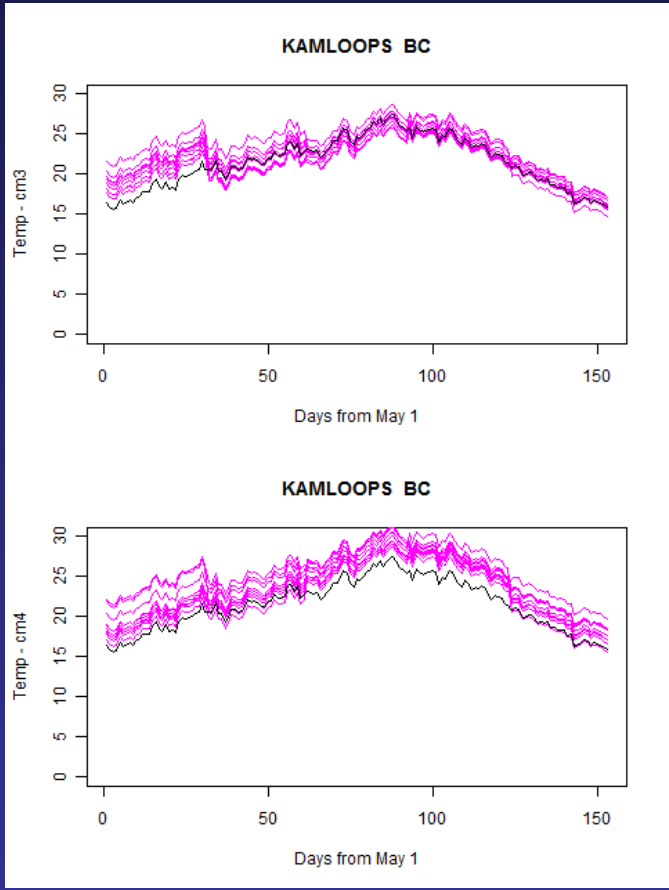
Prediction
(predicted values normalized against average weather)

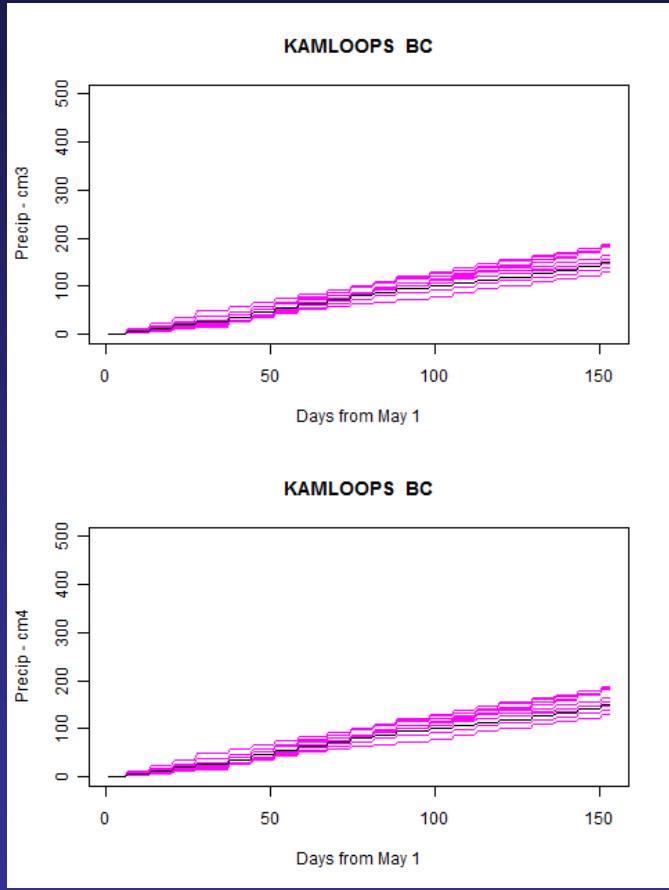


Confidence
(standard deviation normalized against average weather)

As fall takes hold, much of Canada may experience an extended fire season (with the exception of BC and the Yukon).

Kamloops 2016



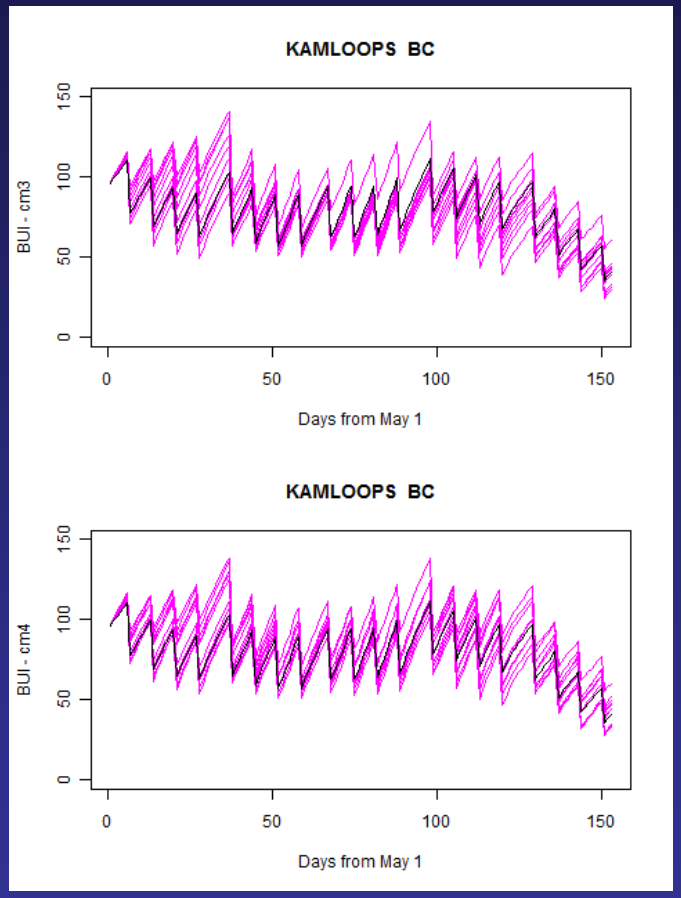


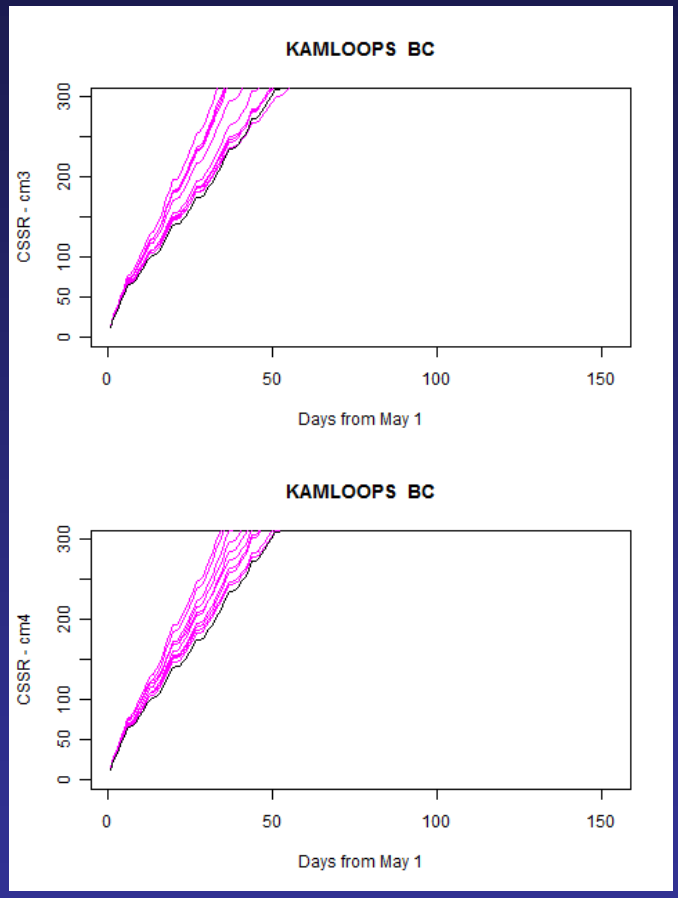
Temperature

Precipitation

While Kamloops starts out with well above-average temperatures, precipitation is expected to be above-average later in the summer.

Kamloops 2016



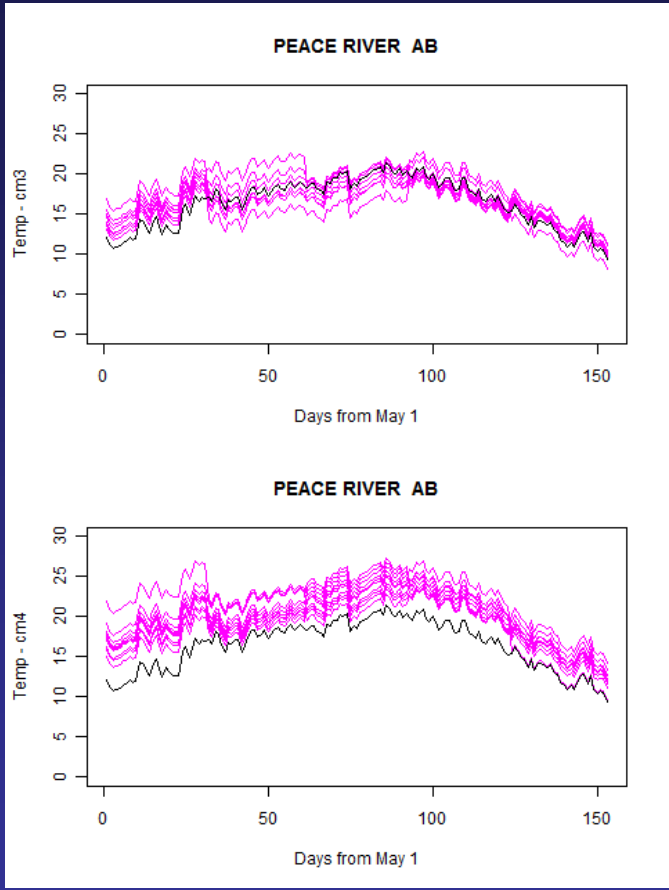


BUI

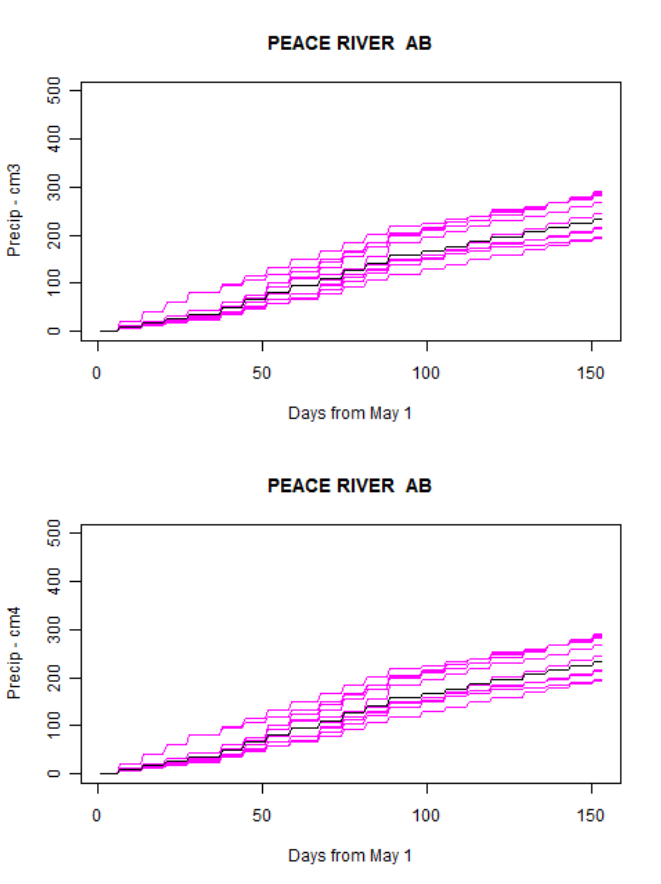
CSSR

Kamloops may see an elevated BUI conditions in May but this drops to average values for the remainder of the season.

Peace River 2016



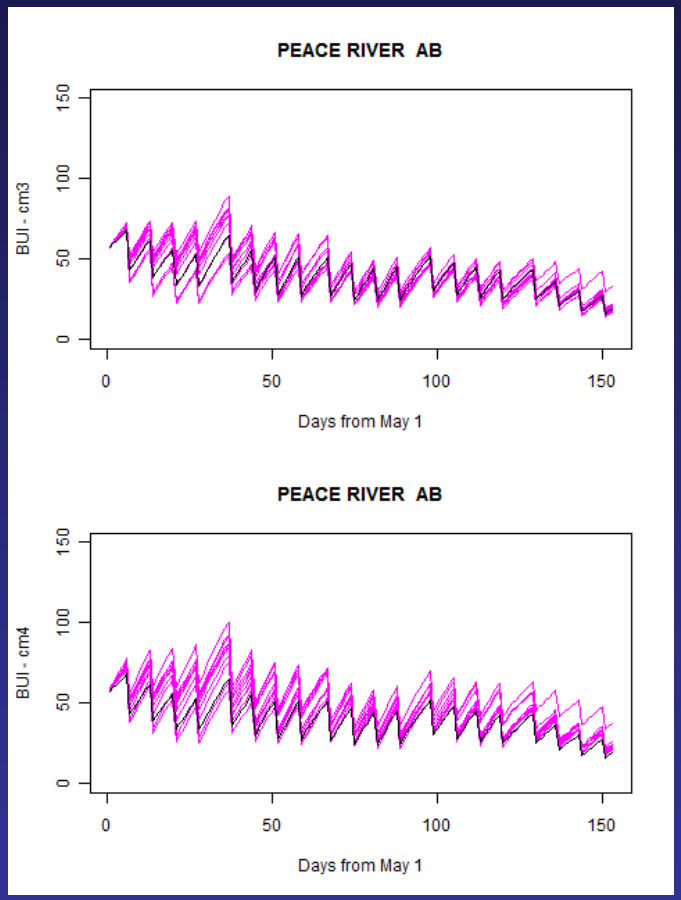
Temperature

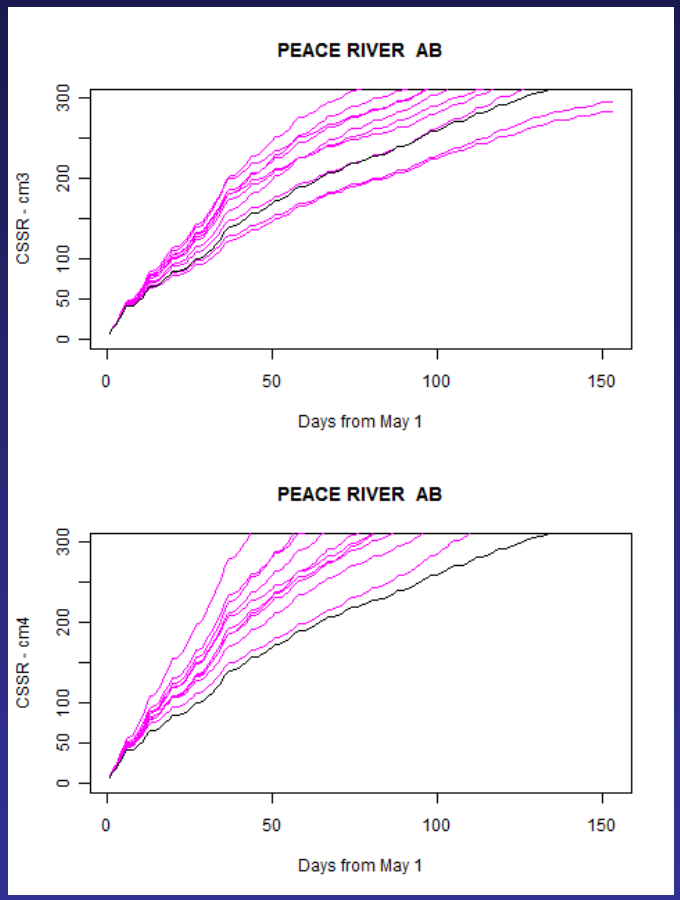


Precipitation

For Peace River and other northern Prairie stations, above average temperatures carry through into June with average precipitation.

Peace River 2016



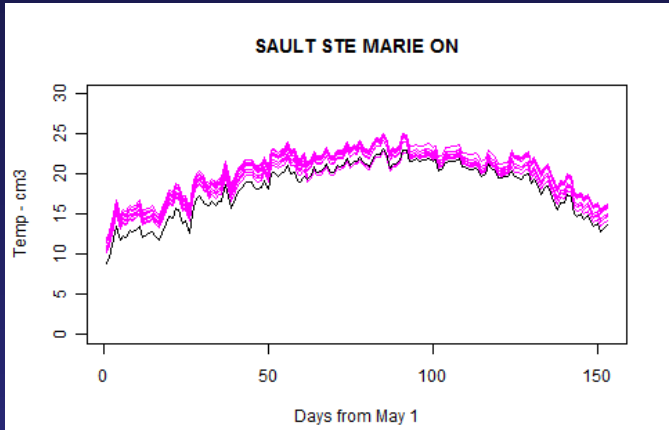


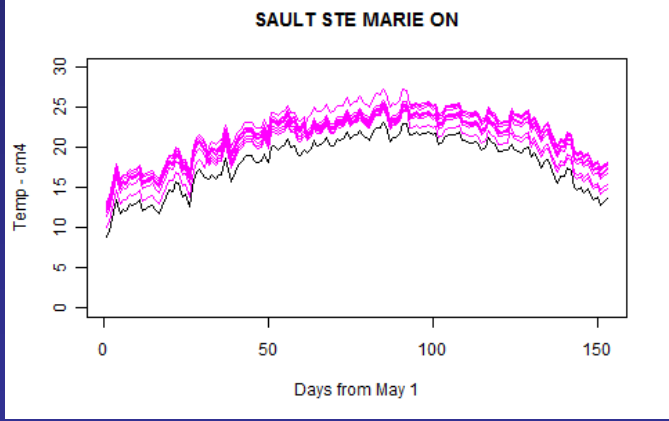
BUI

CSSR

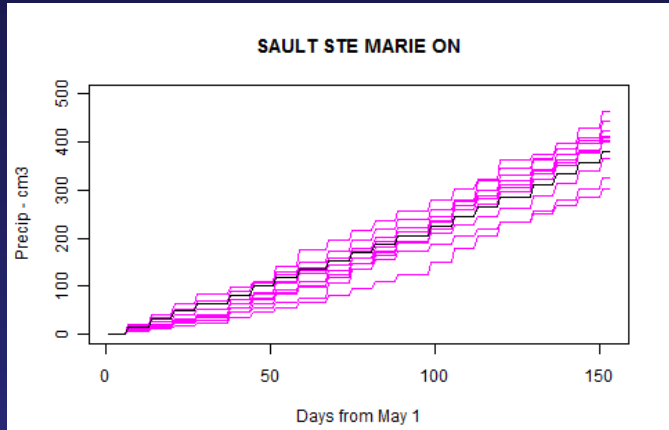
Elevated BUI conditions in May begin to fall in June. This could still carry on high CSSR conditions into July and August.

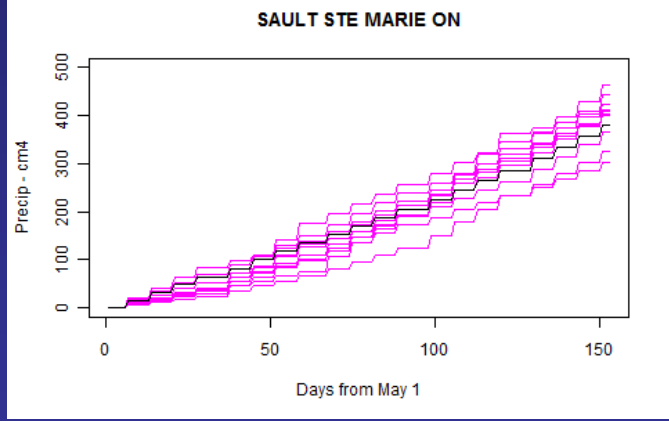
Sault Ste. Marie 2016





Temperature

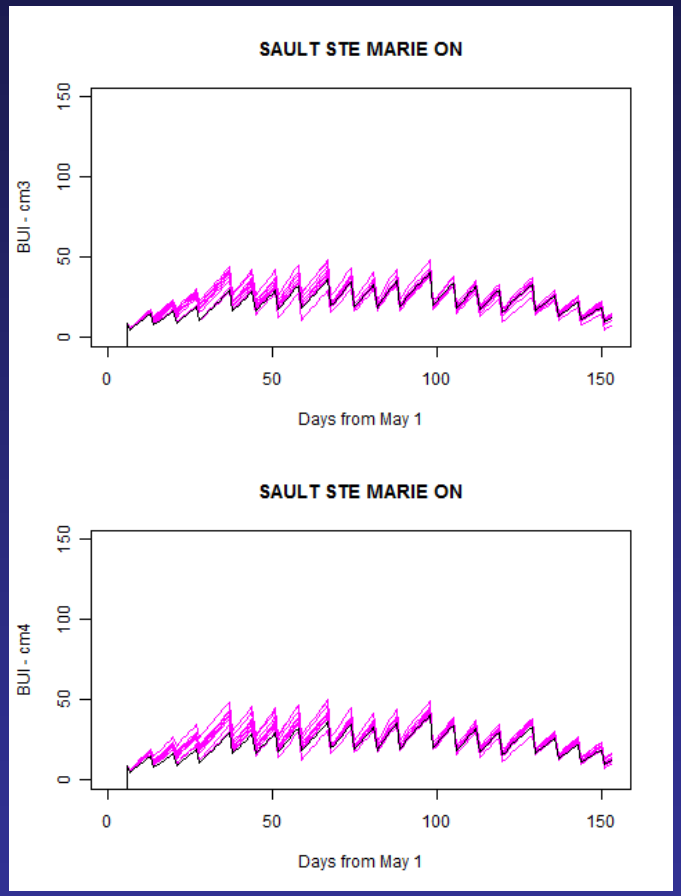


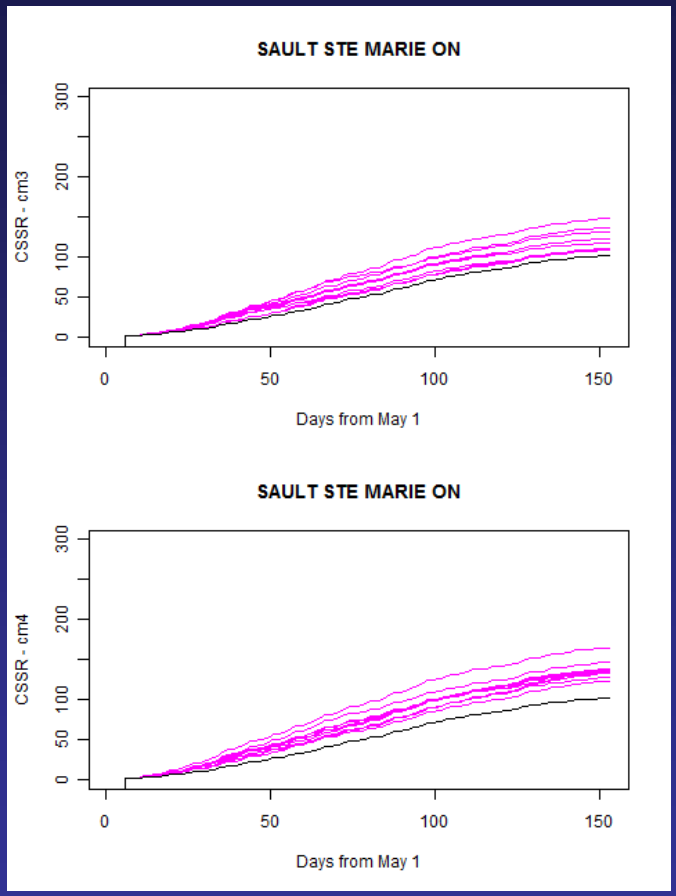


Precipitation

Above-average temperatures for most of the summer with increasing precipitation mid-summer.

Sault Ste. Marie 2016



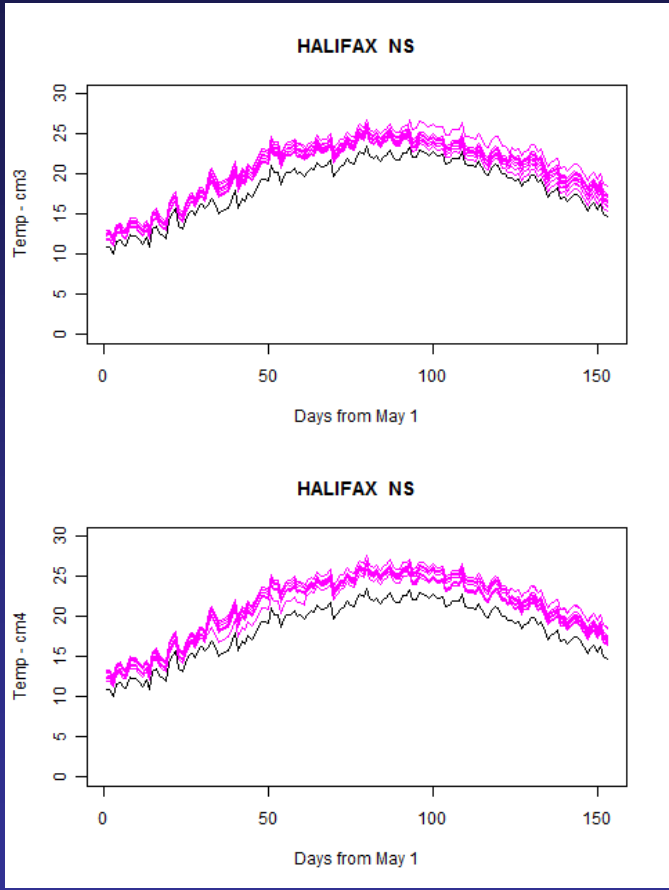


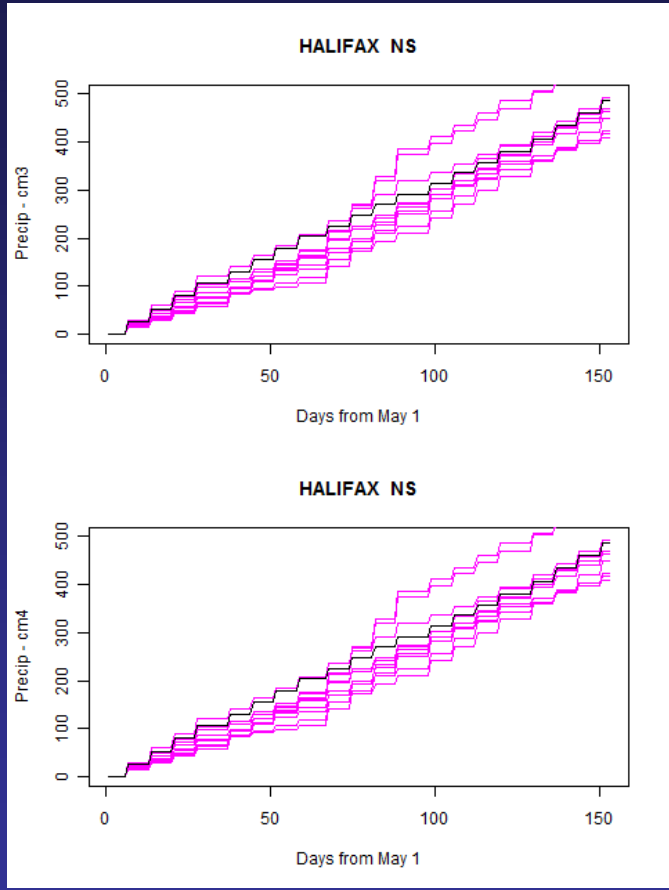
BUI

CSSR

The BUI pattern in eastern Canada is typically less dramatic but still above average into July.

Halifax 2016



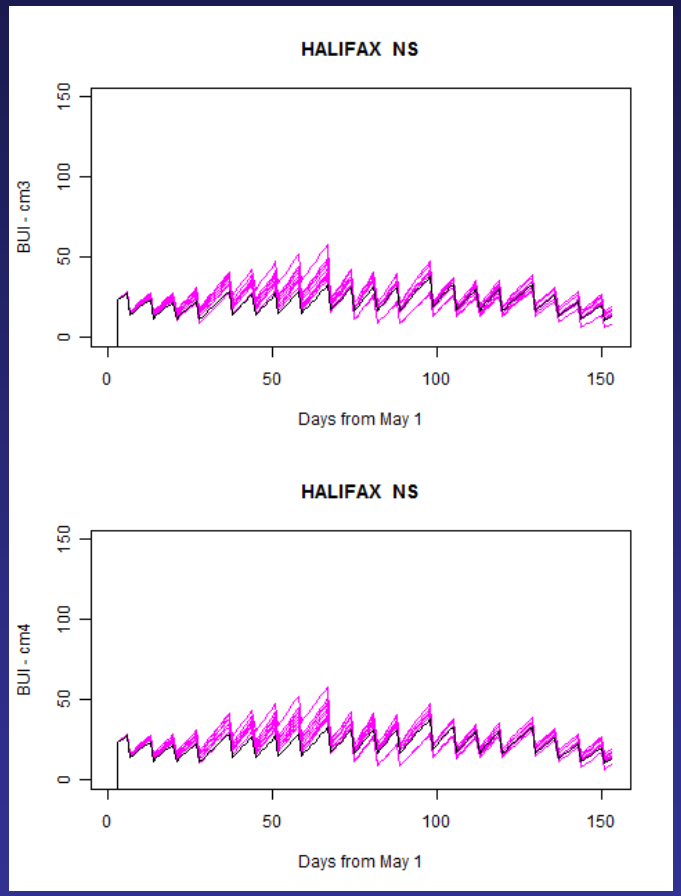


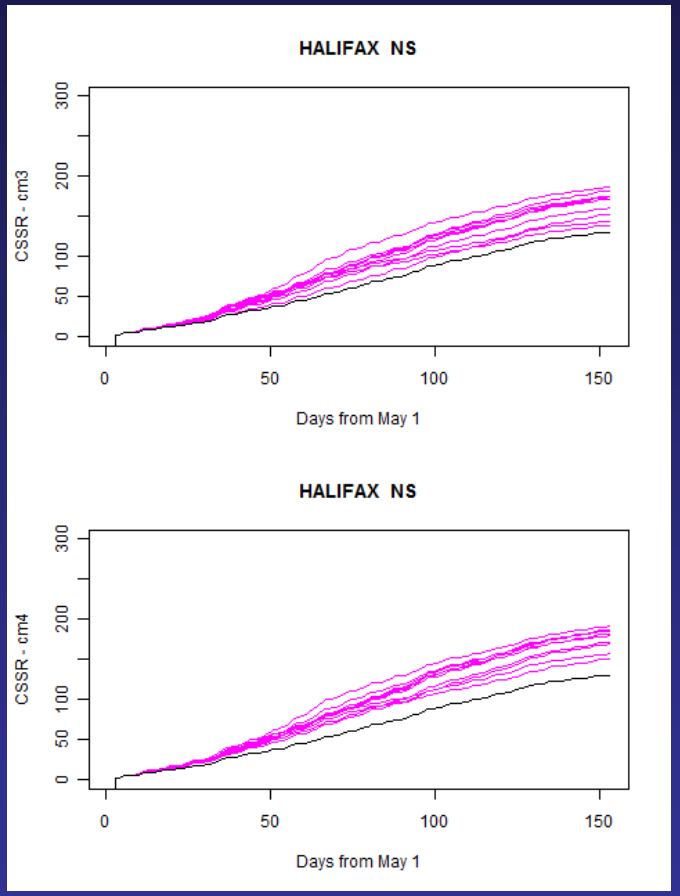
Temperature

Precipitation

Halifax is showing above-average temperatures and below-average precipitation for most of the summer

Halifax 2016





BUI

CSSR

Halifax typically experiences a spring fire season, which may extend into June, but this drops to average values for the remainder of the season.

2016 Prediction

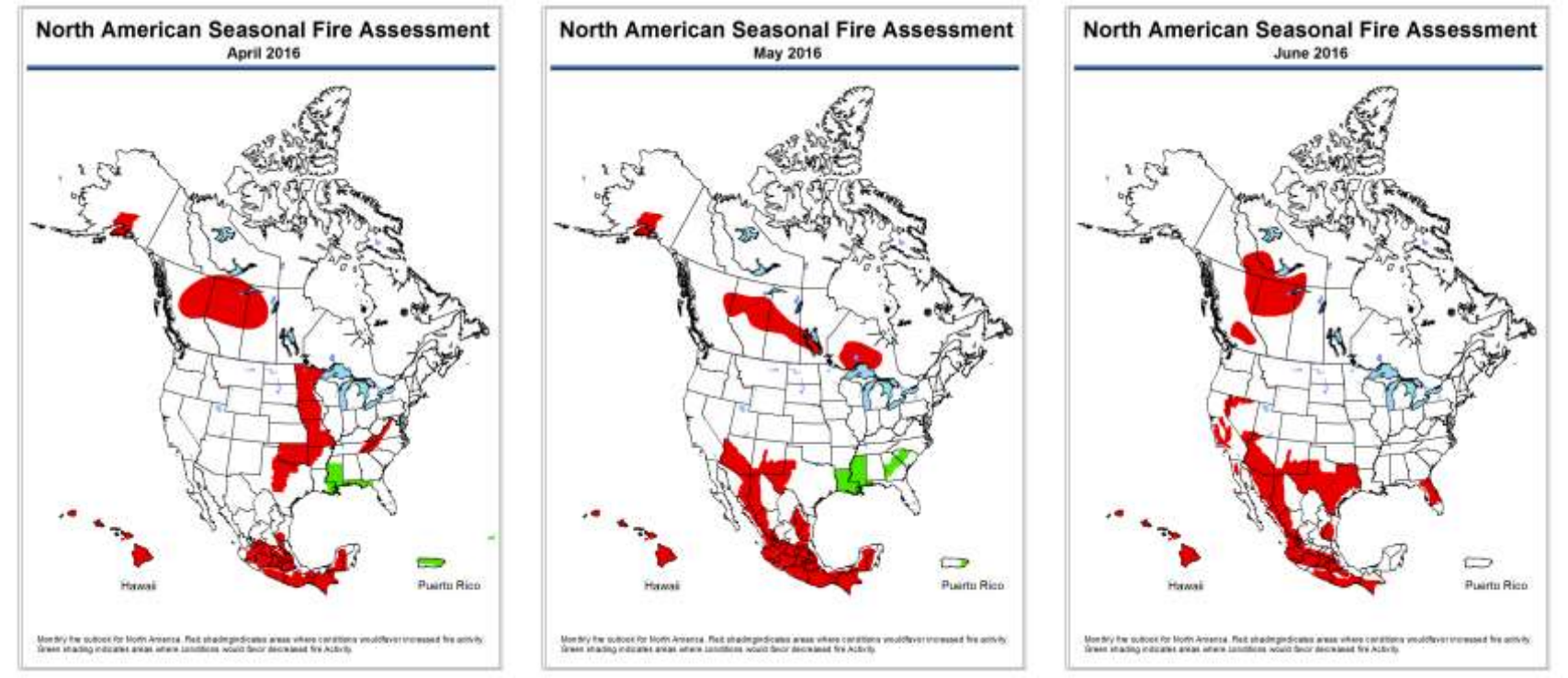
In summary, it appears that western Canada is seeing an early start to the fire season. This is leading to extreme conditions in BC, Alberta, Saskatchewan and NWT.

Ontario will likely see above-average conditions in May and June.

Atlantic Canada may see and extended spring fire season.

Conditions across Canada should moderate over summer, which could reduce fire danger.

North American Seasonal Assessment



The forecast (released last month) included the northern Prairies and southern NWT as areas of concern in the North American Seasonal Assessment.

http://www.predictiveservices.nifc.gov/outlooks/NA_Outlook.pdf

Questions?

Contact

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Edmonton, AB

(780) 435-7320

Kerry.Anderson@Canada.ca