2012 Seasonal Prediction for Canada

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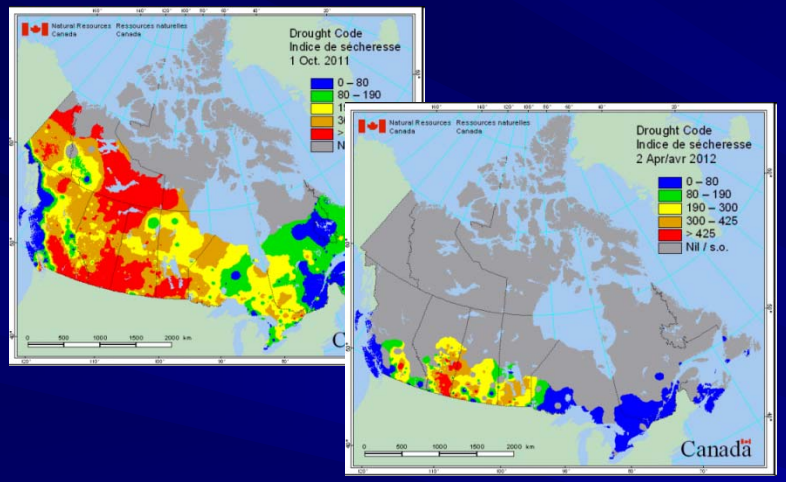
Methodology

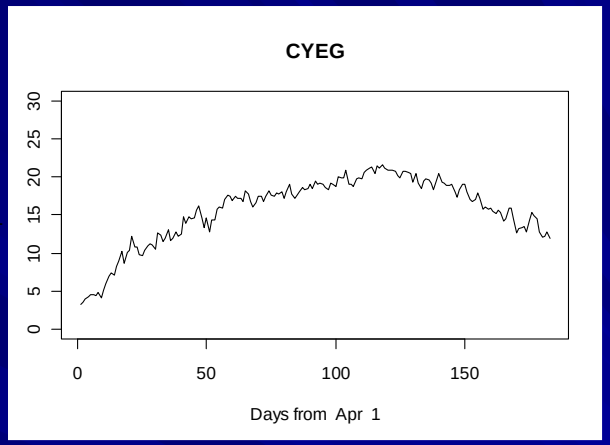
1. Calculate spring start-up conditions based on fall drought code (DC) values and over-winter precipitation amounts,
2. Calculate average daily weather for weather stations across country,
3. Incorporate Environment Canada's seasonal predictions,
4. Determine the fire severity based on the ratio of forecasted over average monthly severity rating (MSR).

Methodology

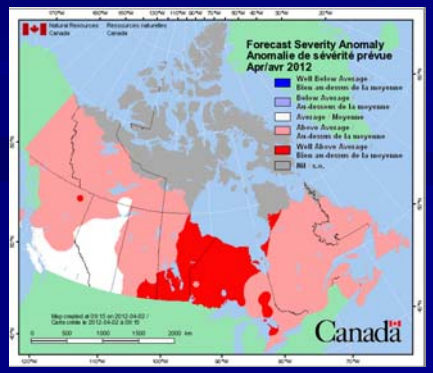
1. Fall conditions to Spring startup



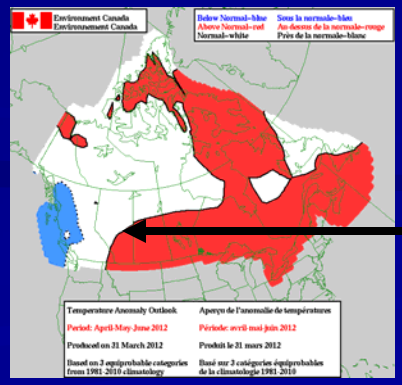
2. Calculate average daily weather

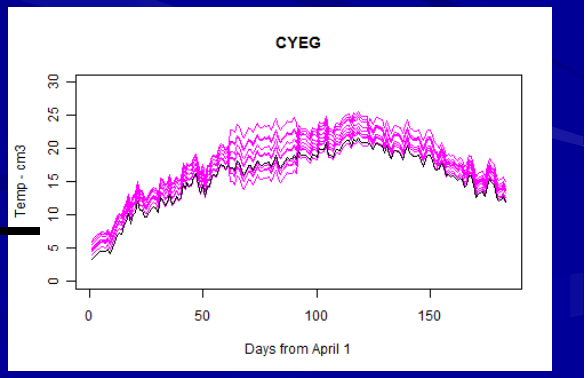


4. Calculate fire weather anomaly



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 four independent models:

1. climate ver. of the Global Environmental Multiscale model (GEM-CLIM),

2. 2nd gen. of the Atmospheric General Circulation Model (AGCM2),

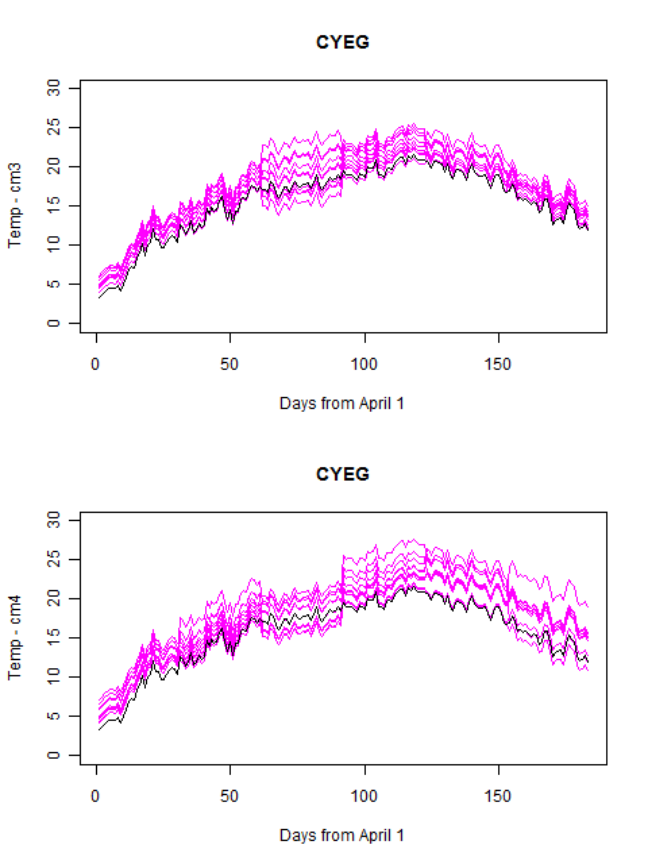
3. 3rd gen. of the Atmospheric General Circulation Model (AGCM3),

4. Spectral aux éléments finis (SEF).

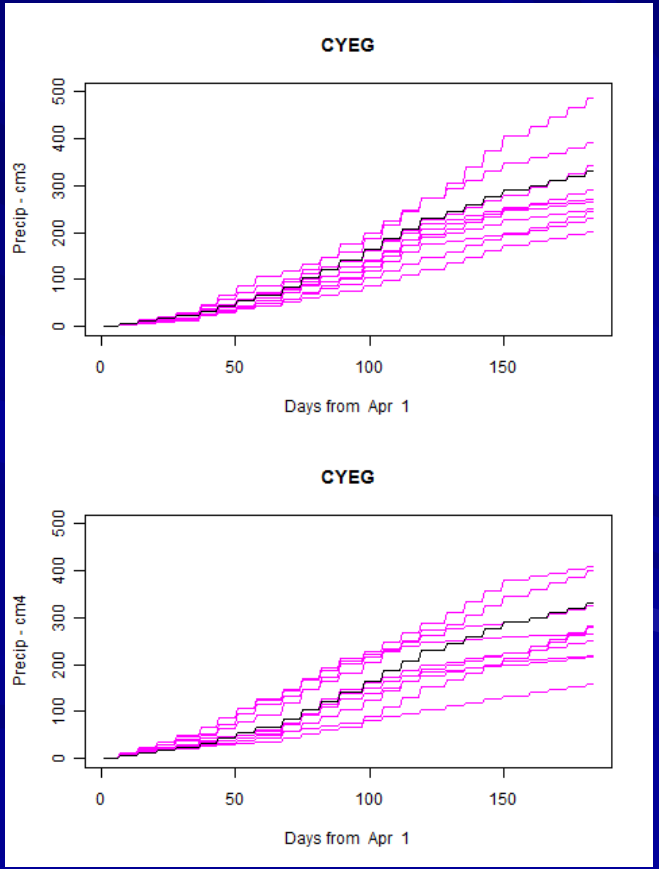
Forecasts are provided for the next four months.

Ensemble Forecasts

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

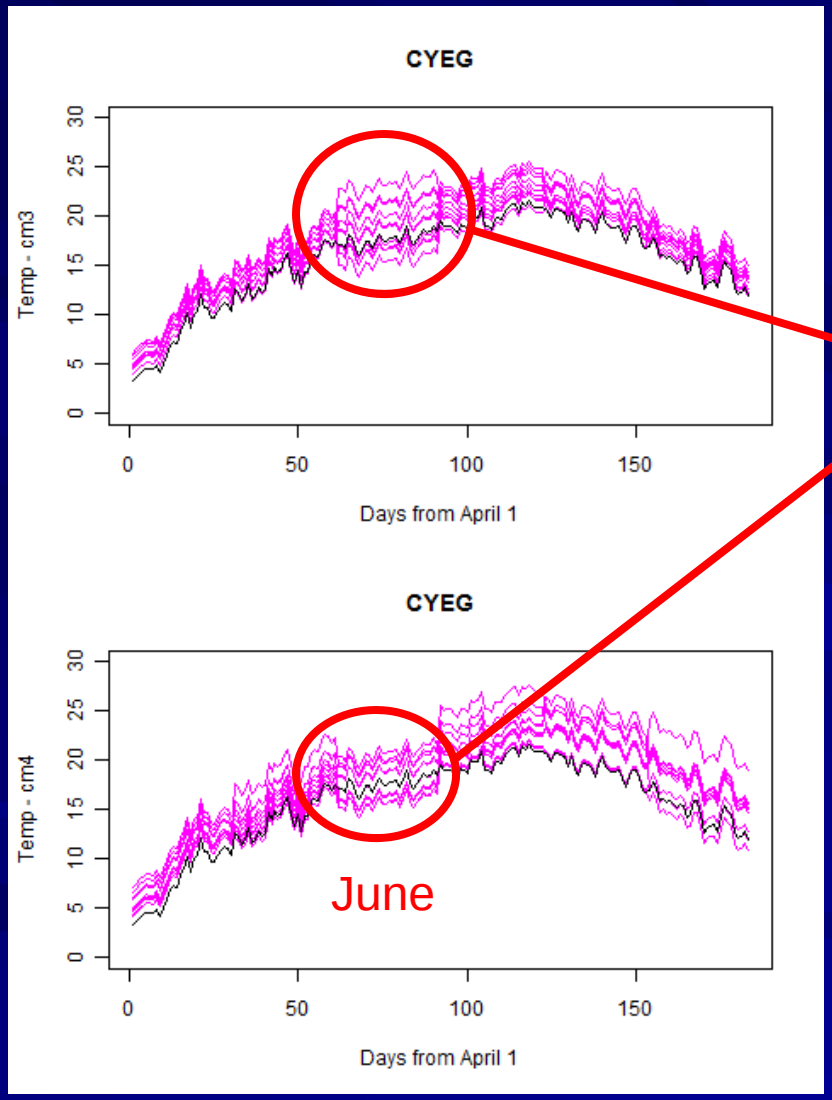


Temperature



Precipitation

Ensemble Forecasts

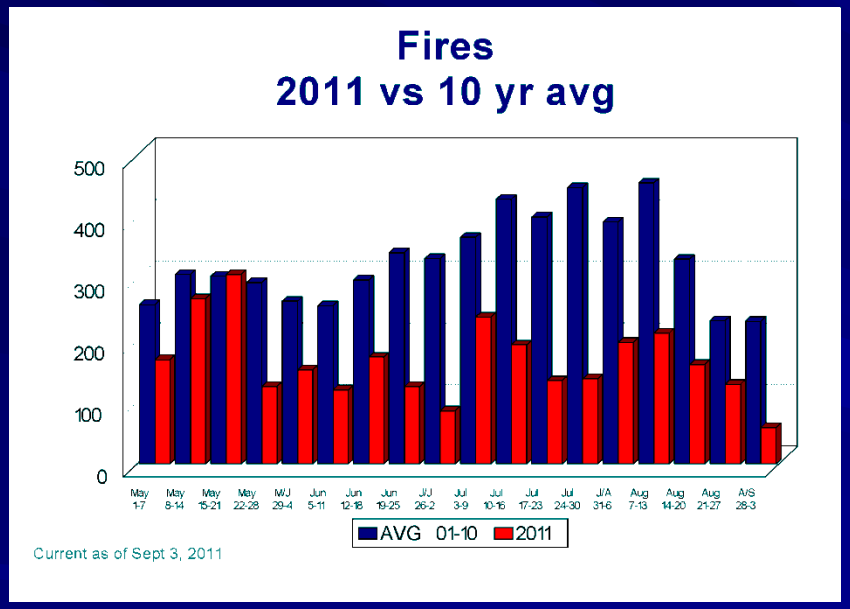


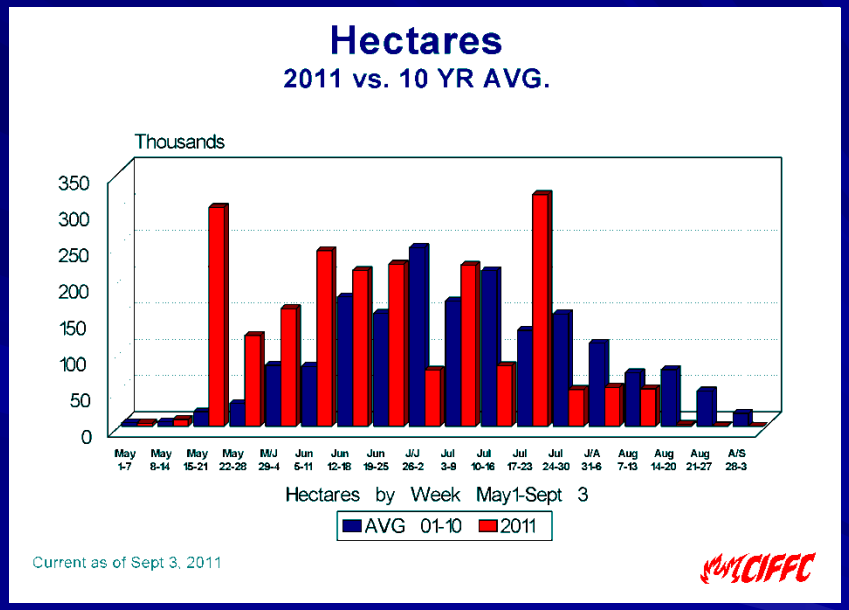
The ensemble approach provides a measure of confidence indicated by the spread of the ensemble members.

2011 Fire Season

2011 Prediction

The 2011 fire season was a relatively normal year with a below-average number of fires and an above-average area burned.





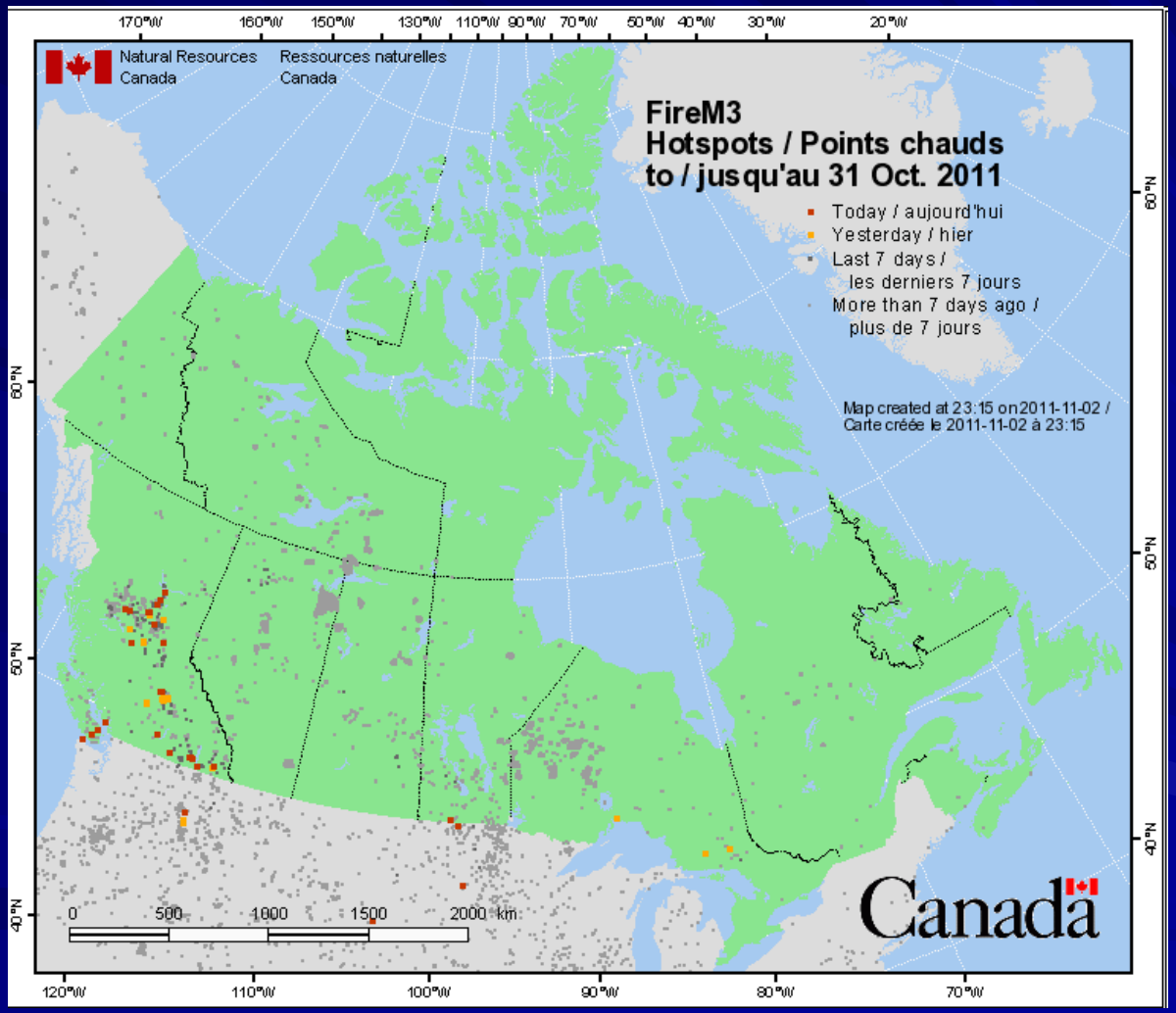
4,327 fires

(avg: 7,389)

2,563,290 ha

(avg 1,647,438 ha)

2011 Prediction



Most of the activity occurred in Alberta (May), and Ontario (July).

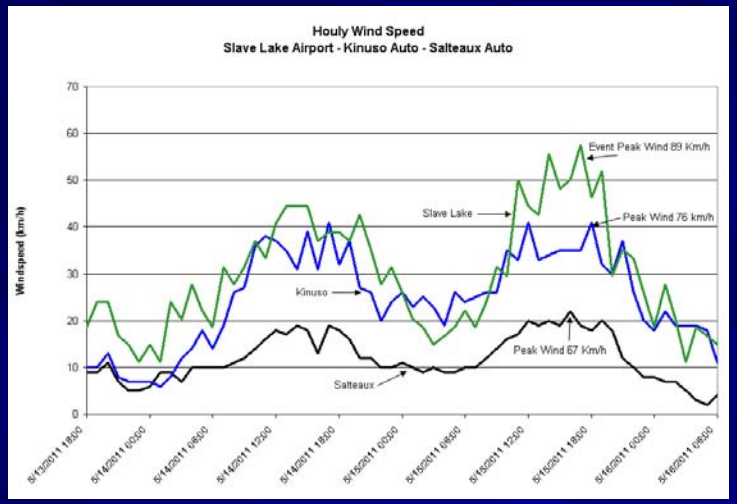
May 2011

On May 15, strong, dry winds gusting up to 70 km/h combined with a lack of precipitation created extreme conditions over most of the northern Alberta.

There were 68 new wildfire reported between Saturday and Sunday afternoon of that weekend (May 14-15).

These events lead to the Slave Lake and the Richardson Fires.

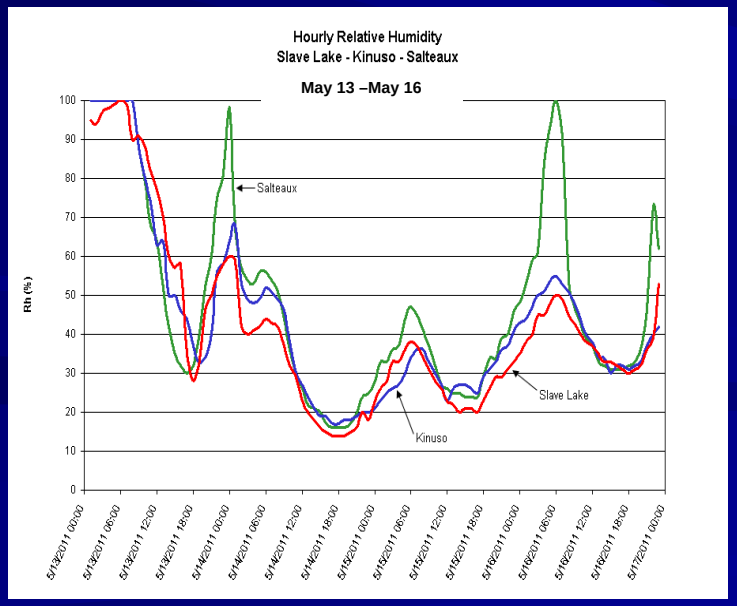
Slave Lake



Prior to the event, fire danger conditions at Slave Lake weren't exceptional, but a combination of

- high winds (50 kmh gusting to 90)
- low humidities (as low as 12-13%)

lead to the explosive situation



Richardson Fire

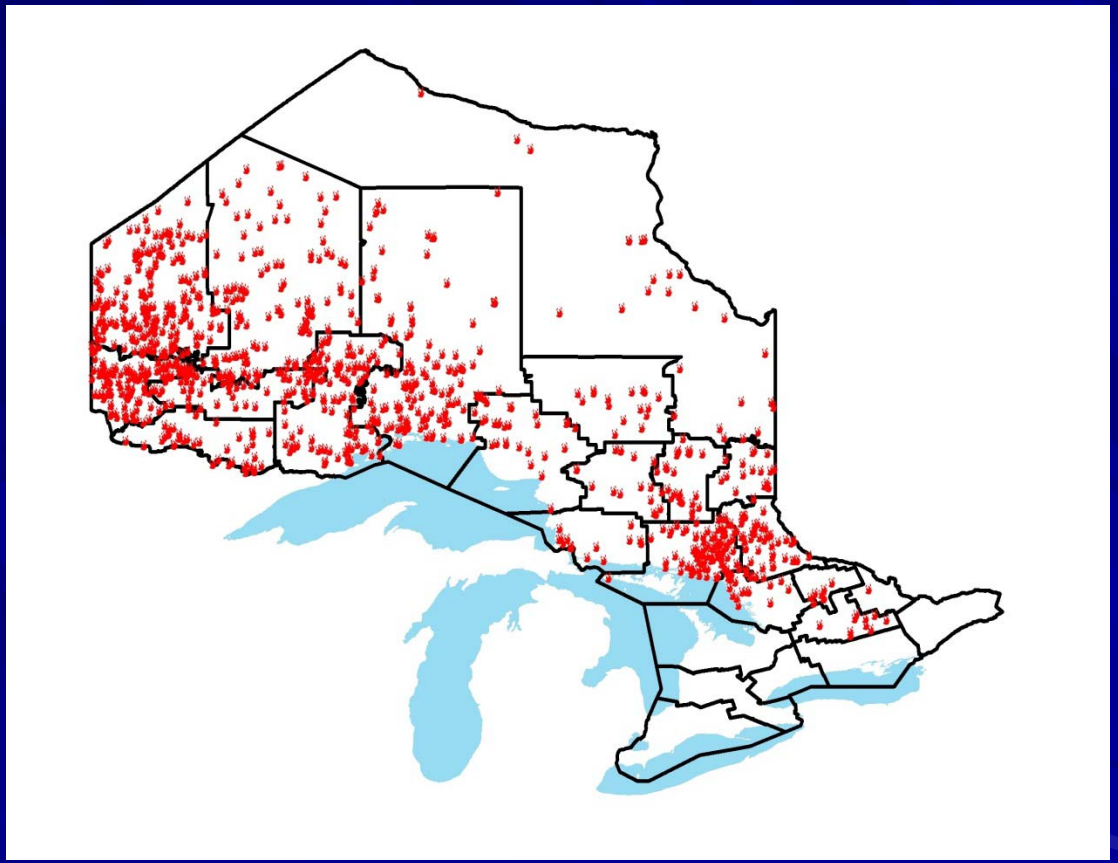
Also on May 15, the Richardson fire started north of Ft. McMurray.

This fire did an 80 km run in 48 hours.

This fire ultimately burned to over 500 000 ha (5 000 km^2) in size

July 2011

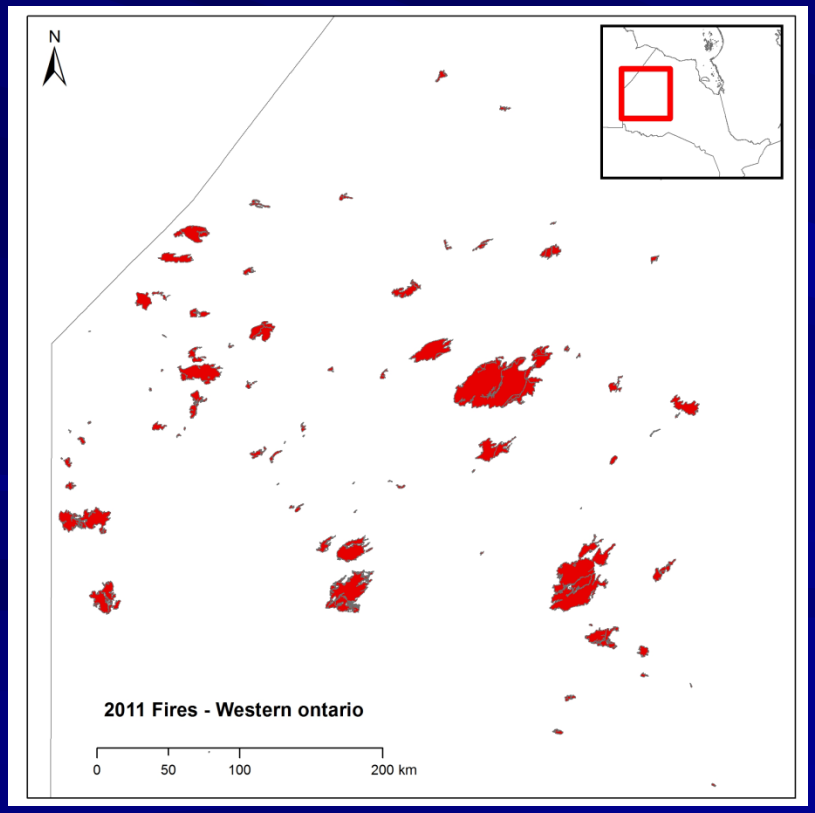
Ontario saw an extreme fire season in 2011 with the most area burned in over 50 years.

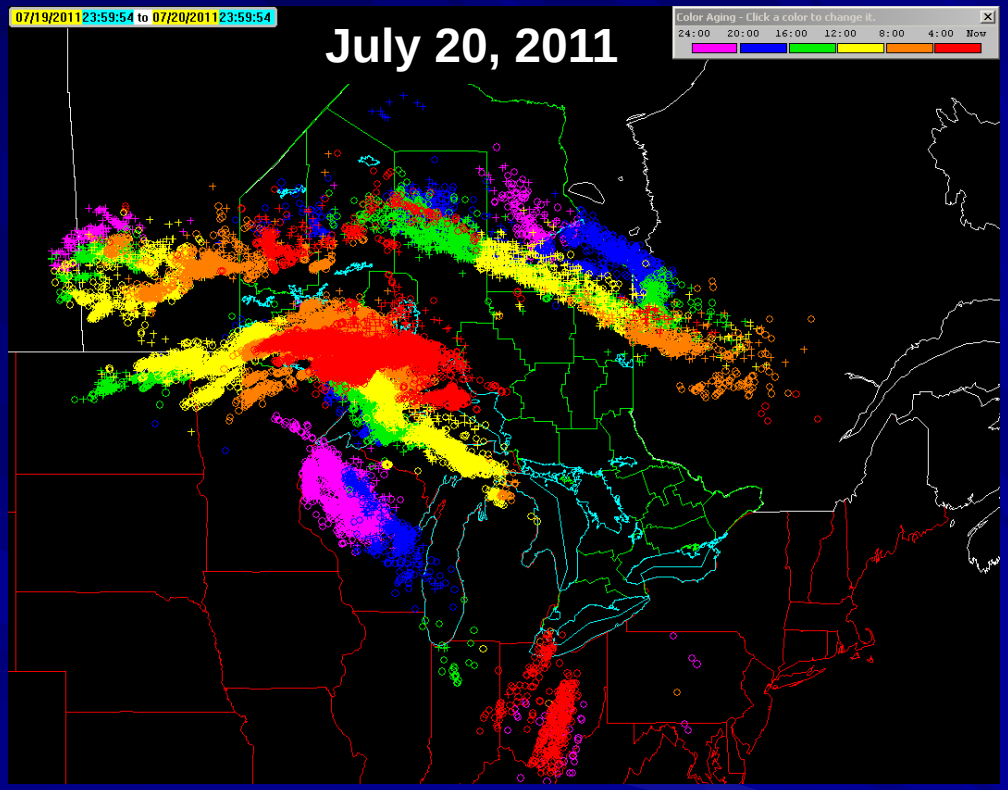


In 2011, 1,275 fires burned 633,058 ha.

The ten year average is 1,109 fire burning 76,837 ha.

Western Ontario



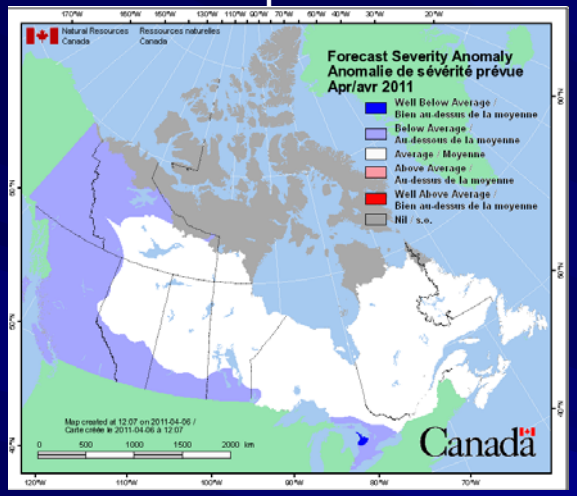


Most fires were triggered by lightning events as storms tracked north and south of the province.

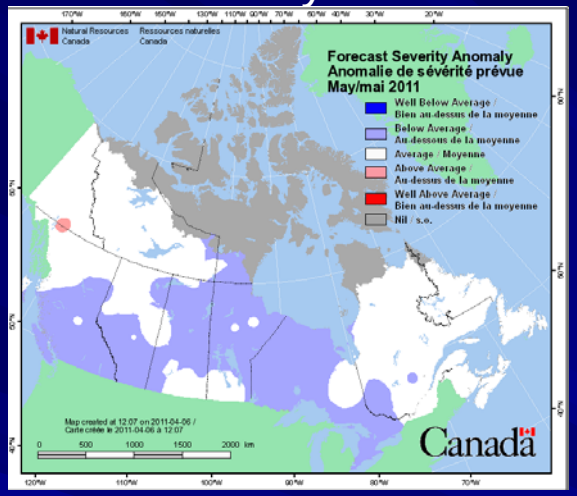
In July, 650 fires burned 558 000 ha.

April 2011 Prediction

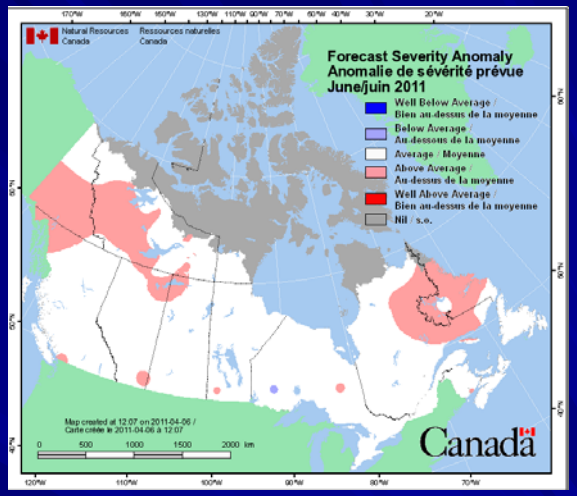
April



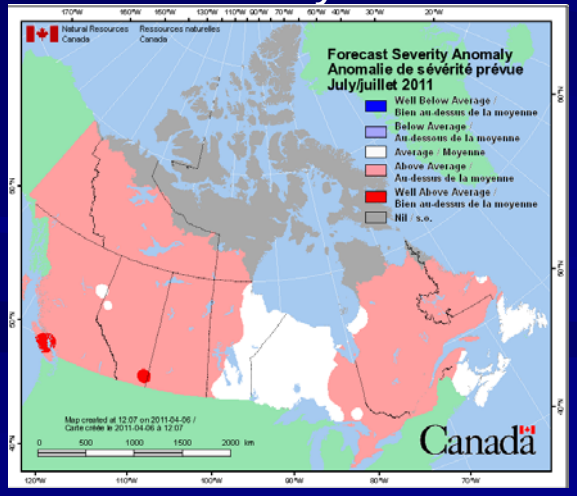
May



June



July



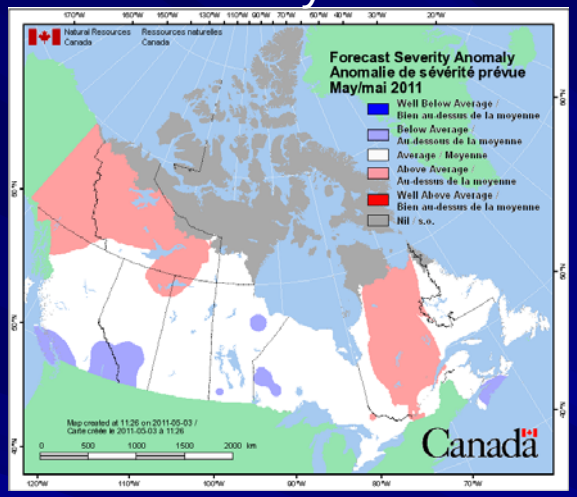
The April forecast predicted below-average conditions in Ontario and the western provinces for May, while the country gradually moved to above-average conditions for July.

The forecasts for May and June were relatively consistent with the forecasts produced in March.

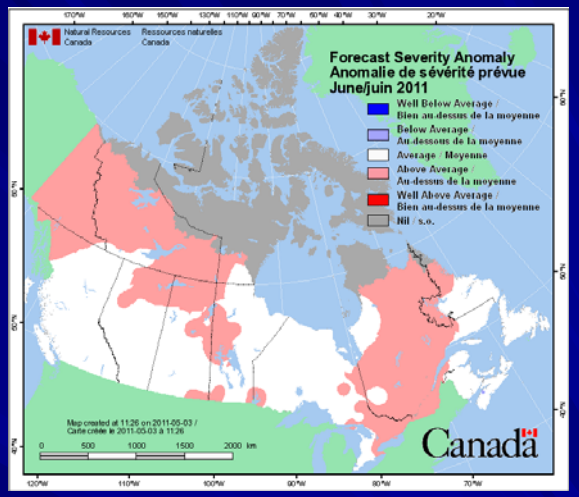
May 2011 Prediction

The May forecast predicted above-average conditions for the North and much of Quebec for May to while reducing the July conditions for the mid-latitudes.

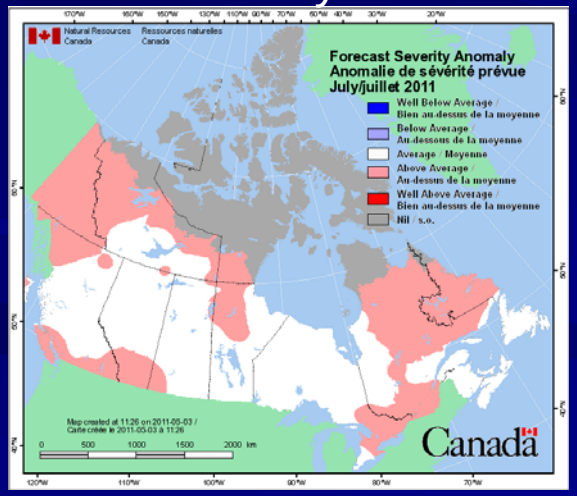
May



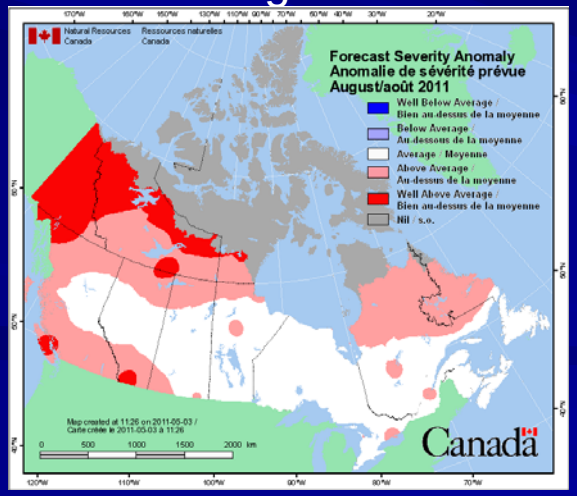
June



July



August



The Richardson fire started on May 14 and burned over 500 000 ha.

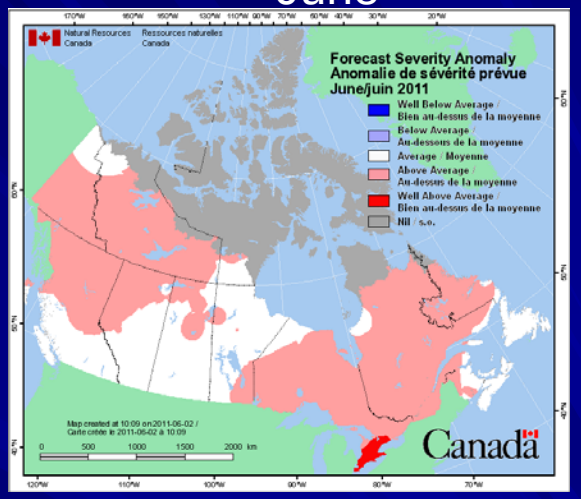
Northernwestern Saskatchewan and southern NWT saw significant fire activity.

June 2011 Prediction

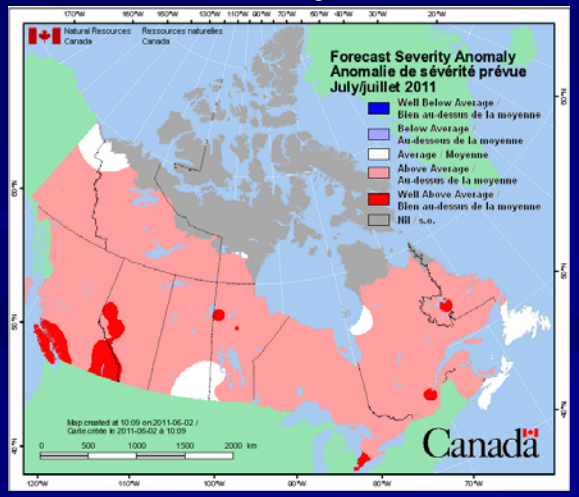
Contrary to the forecasts, most Canadian provinces saw their fire seasons end in June.

The exception being Ontario, which had a fire outbreak in June and July.

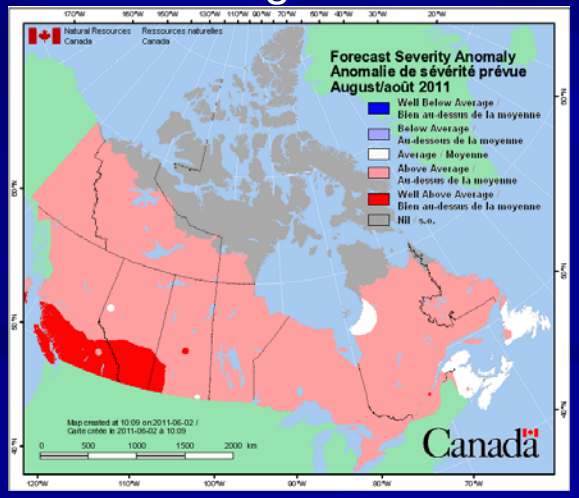
June



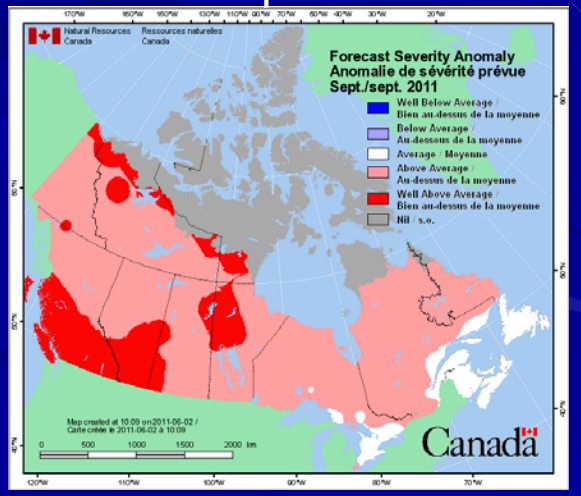
July



August



September



Summary

2011 was a relatively “normal” year with below-average number of fires and an above-average area burned (20% due to a single fire).

Model predictions pointed to Northern Alberta as being above-average but failed to detect the situation in western Ontario. (seasonal predictions are aimed at predicting general conditions and not specific weather events).

Perhaps in its struggle to find areas of above and below average conditions, the model succeeded in predicting a “normal” fire season.

2012 Seasonal Prediction

Starting Conditions

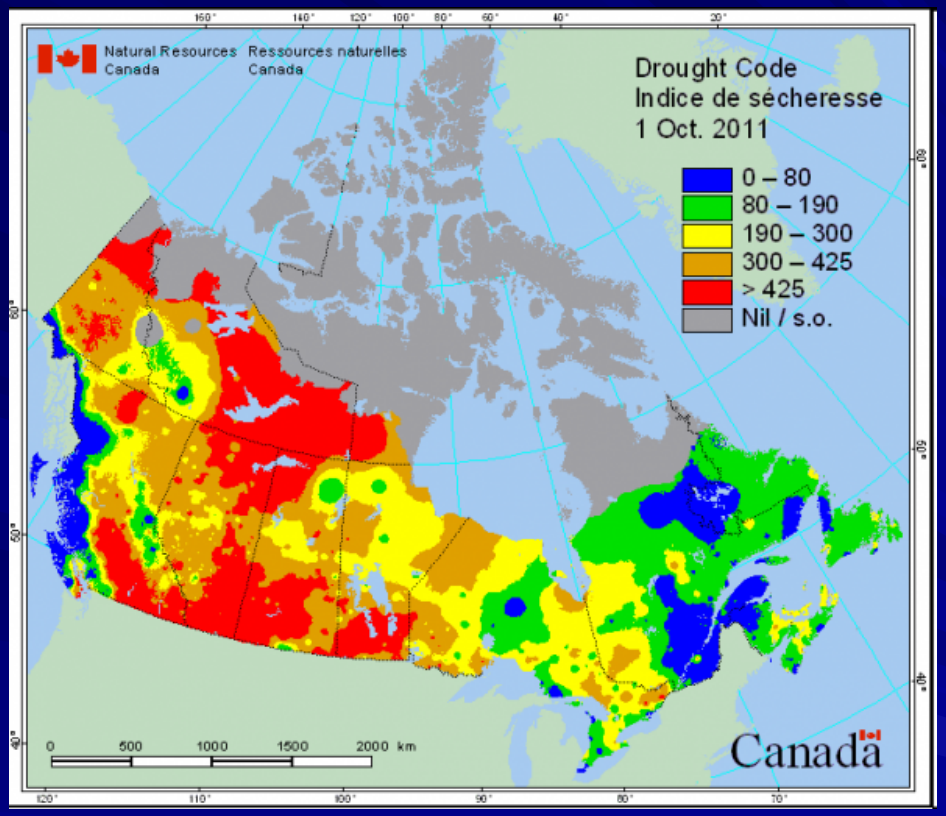
Spring Start-up Conditions

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) (similar to the 1000 hour moisture code).

All other moisture codes in the FWI system are reset.

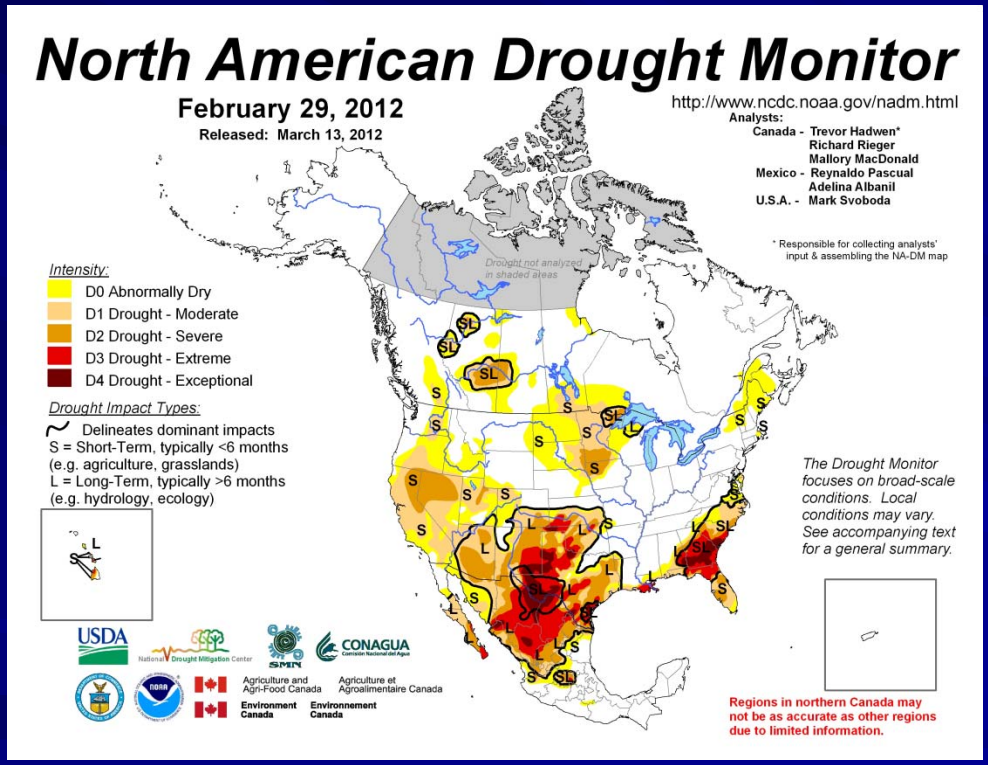
Fall Conditions



Oct 1, 2011

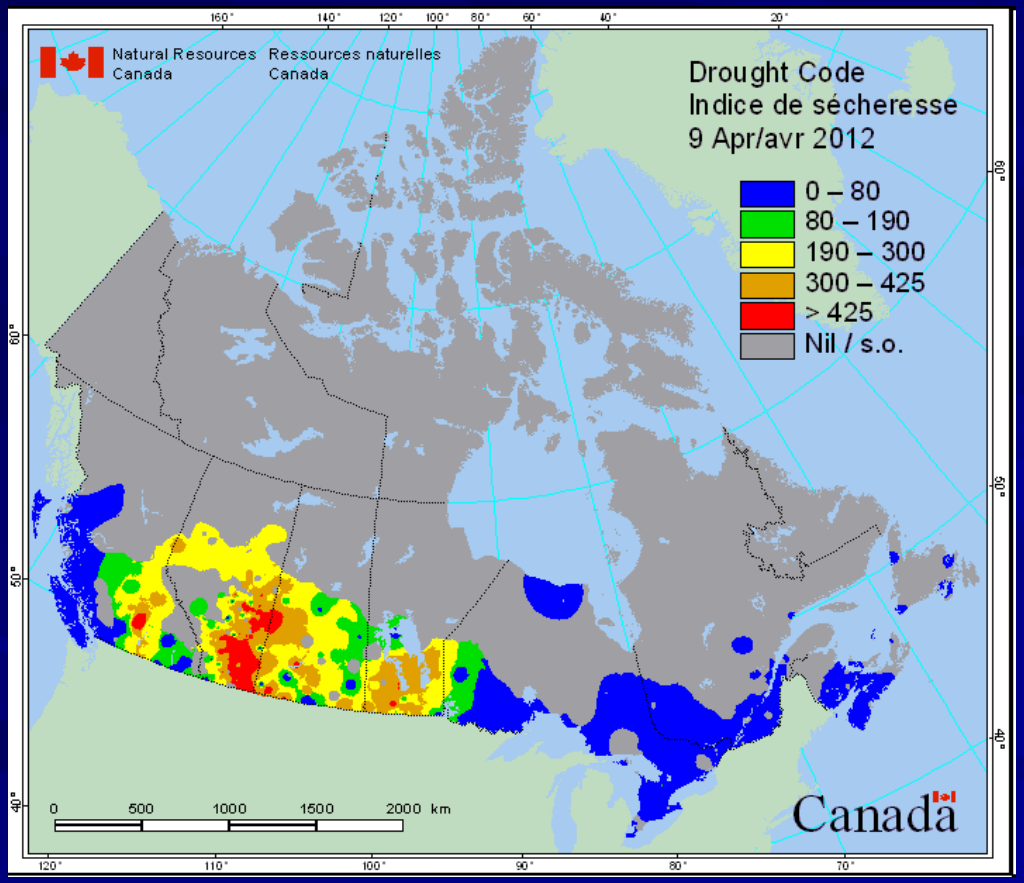
Fall DC values show extreme (dry) conditions throughout much of Western Canada and the Territories.

Spring Start-up Conditions



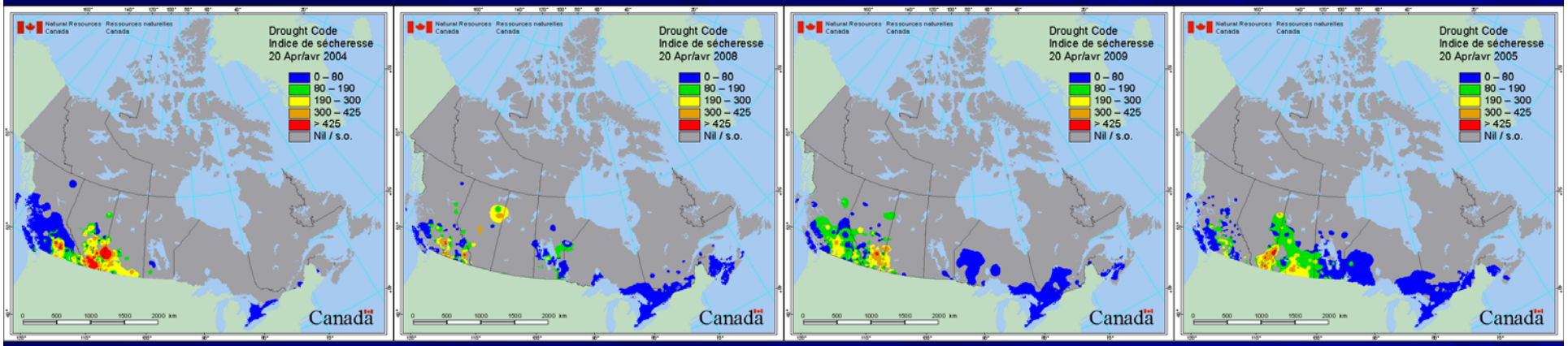
North American Drought Monitor indicates a relatively normal pattern with parts of Alberta described as in severe drought

Spring Start-up Conditions



High DC values are showing through in the prairie provinces with higher than average conditions in western Ontario.

Spring Start-up Conditions

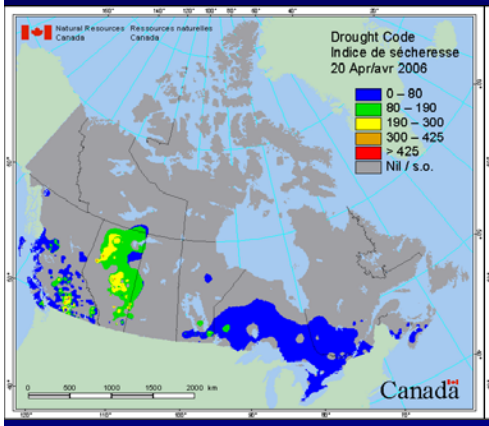


2004

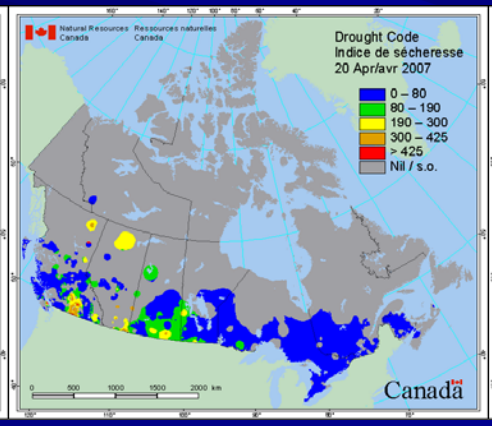
2005

2006

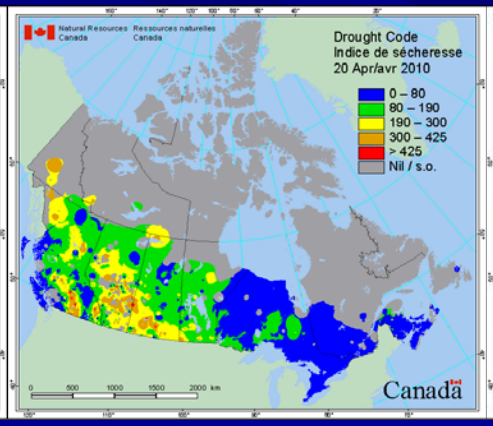
2007



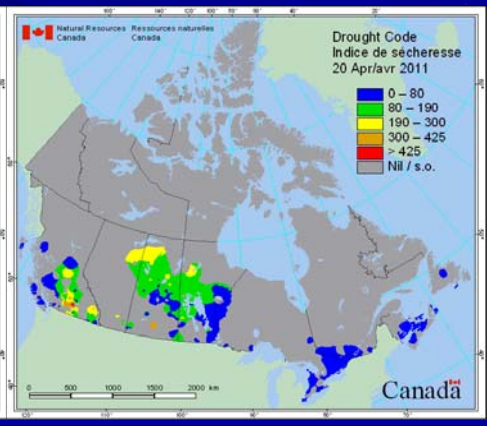
2008



2009



2010

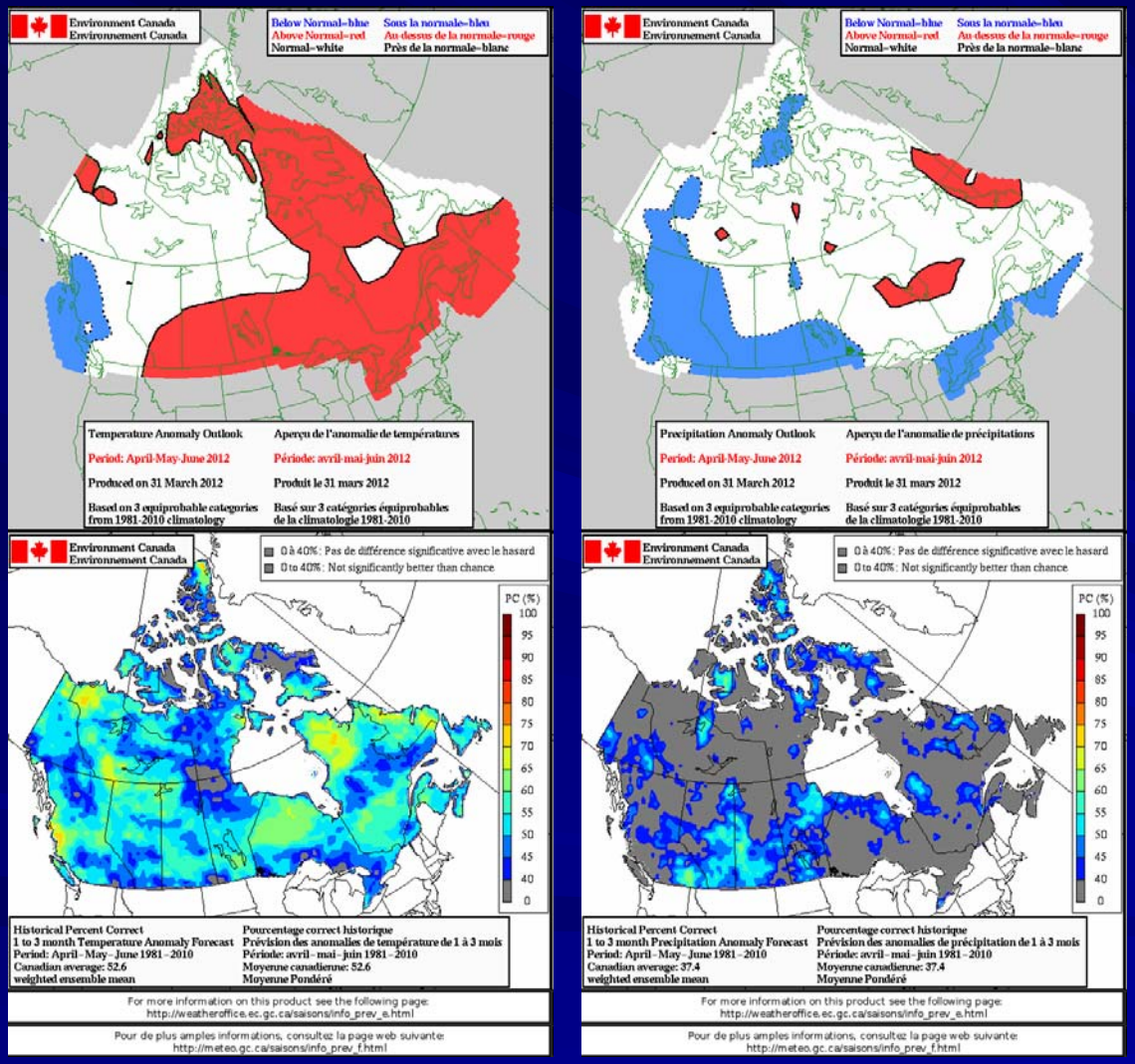


2011

2012 Seasonal Prediction

CMC Forecasts

Seasonal Forecasts



April-May-June

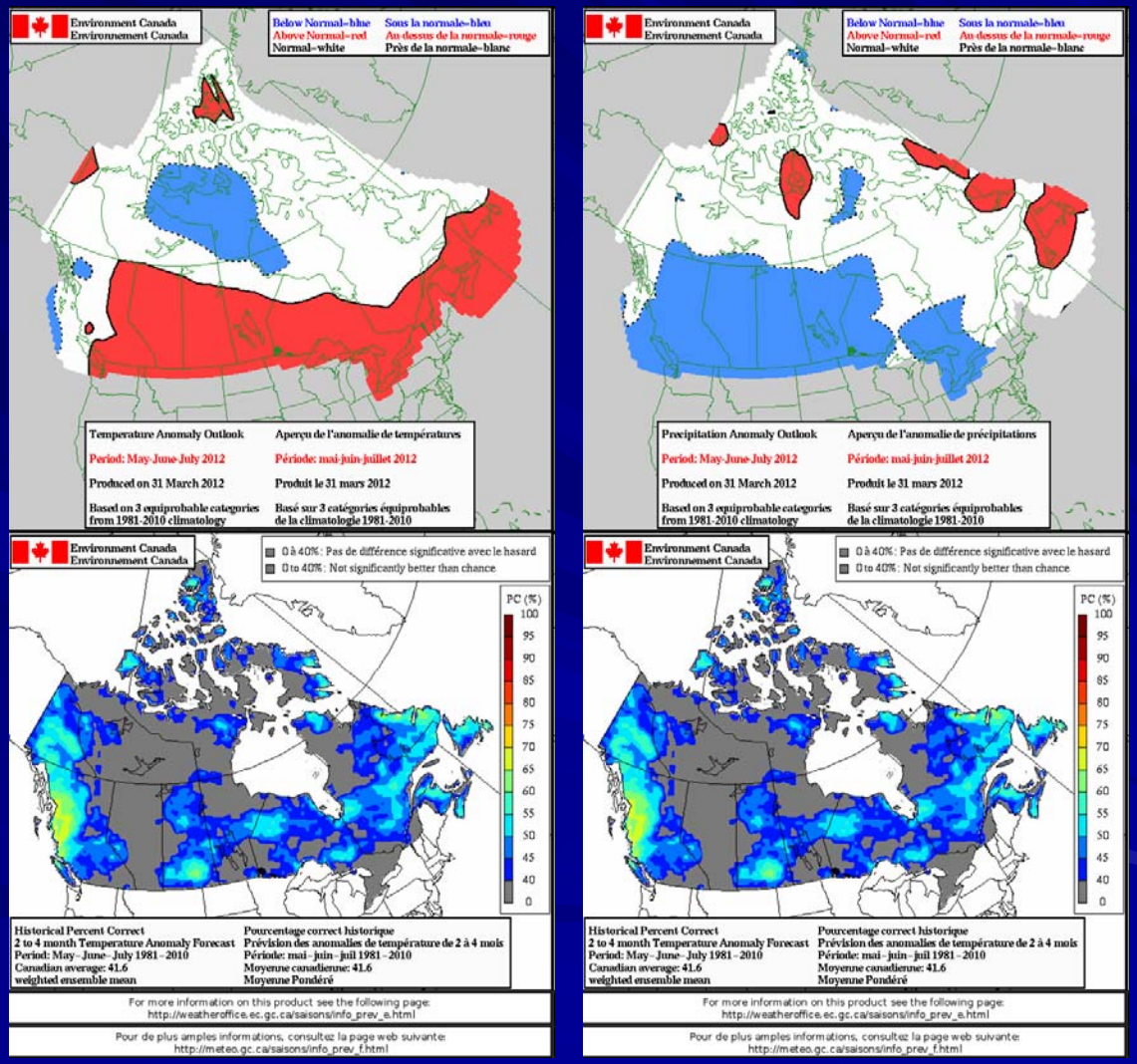
Spring temperature anomalies are high for much of Canada (except for BC and the northwest).

Precipitation anomalies are low for western Canada and southern Ontario.

Seasonal Forecasts

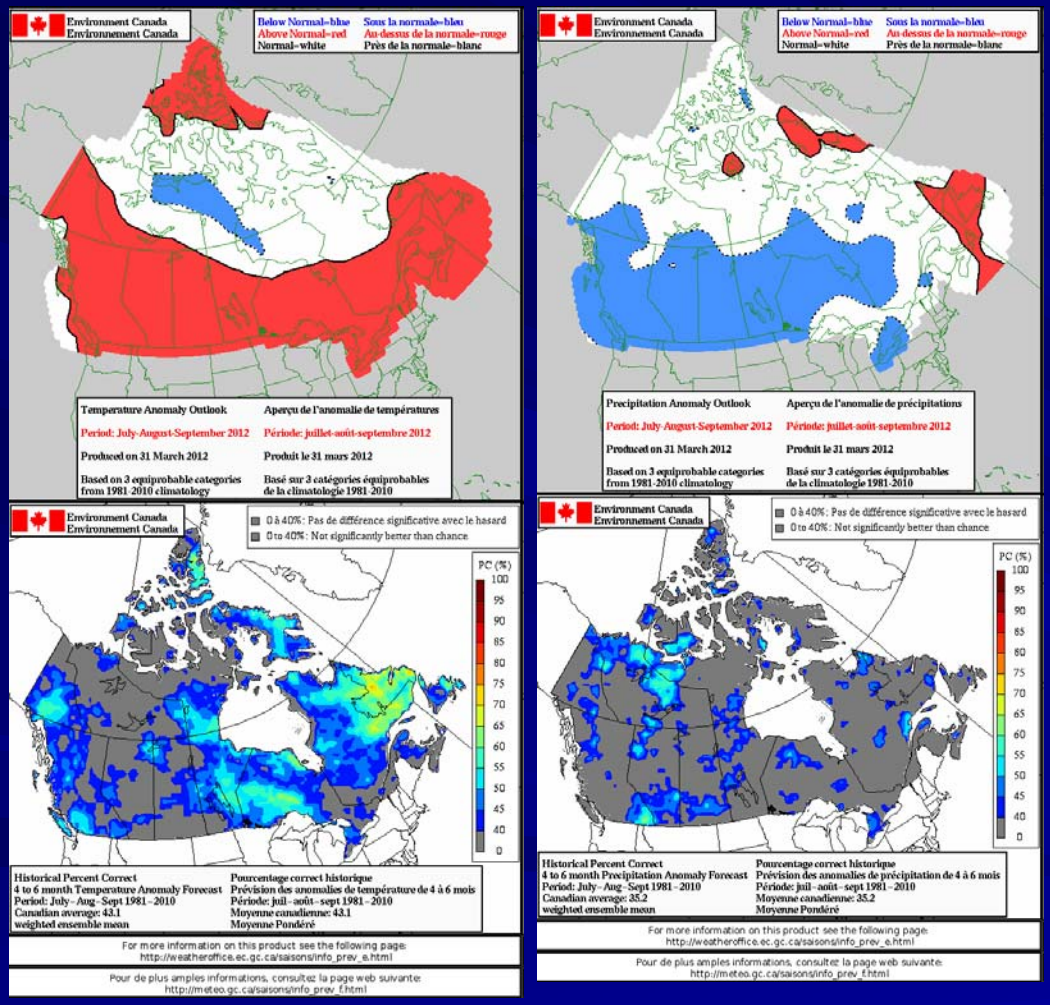
Early summer sees above-normal temperatures in the lower latitudes.

Below-normal precipitation is predicted for much the same region (except for the Atlantic).



May-June-July

Seasonal Forecasts



July-August-September

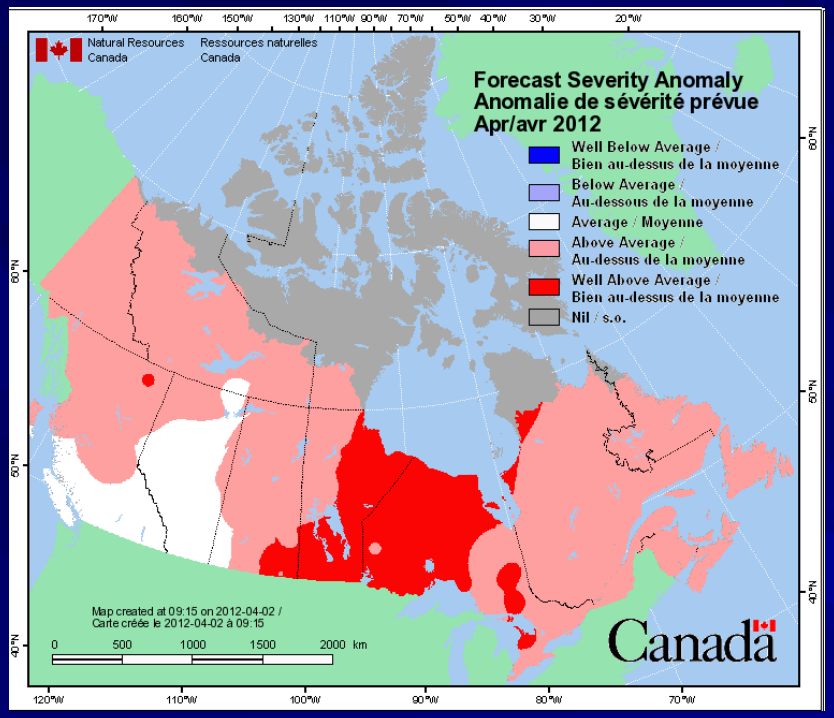
Nearly all of Canada within the treeline is predicted to have above-average temperatures.

Nearly the same prediction for below-average precipitation (except for Atlantic Canada)

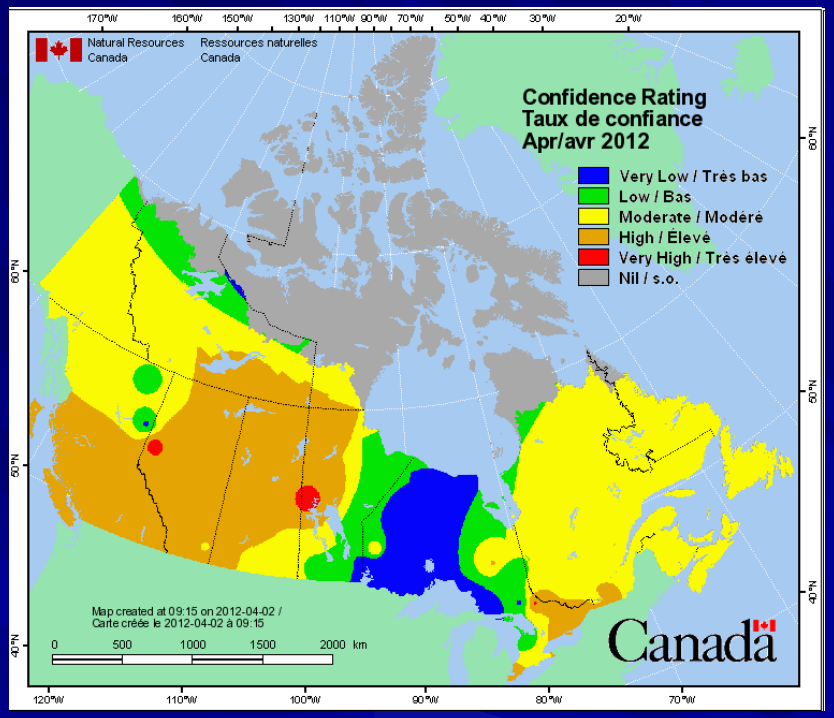
2012 Seasonal Prediction

Model Predictions

April 2012



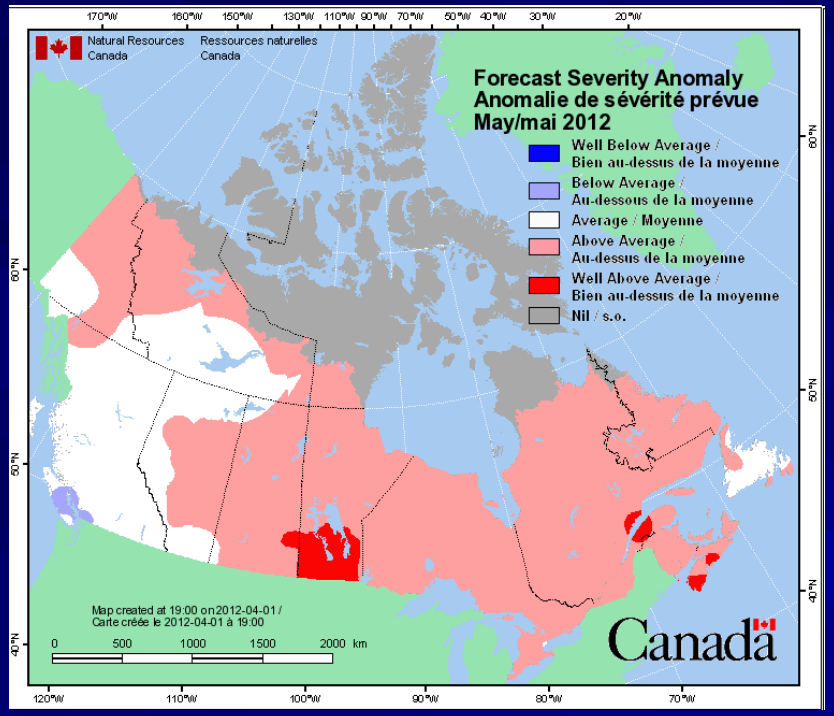
Prediction
(predicted values normalized against average weather)



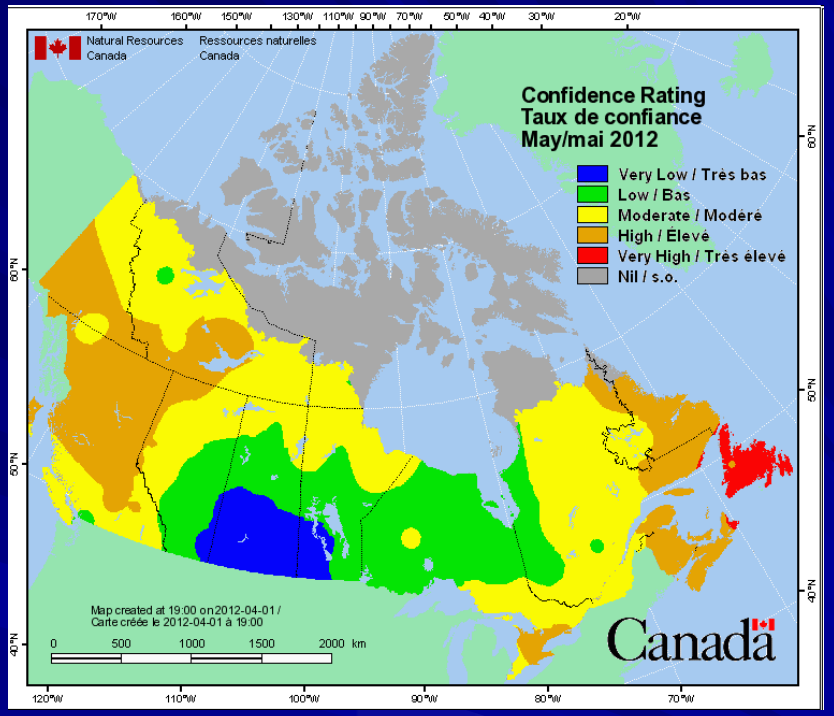
Confidence
(standard deviation normalized against average weather)

Manitoba and Western Ontario may see well-above-average fire severity in April (though confidence is low).

May 2012



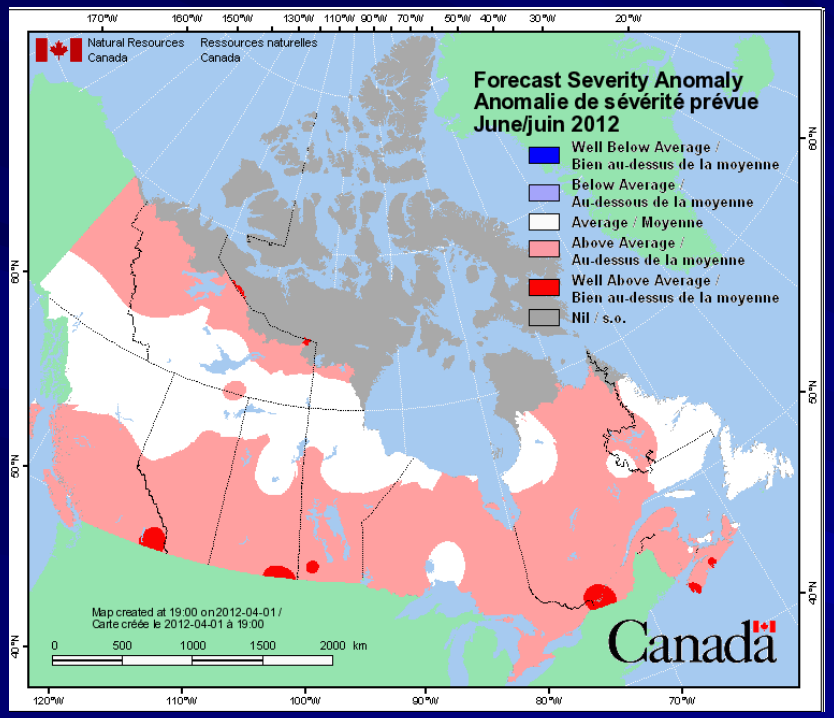
Prediction
(predicted values normalized against average weather)



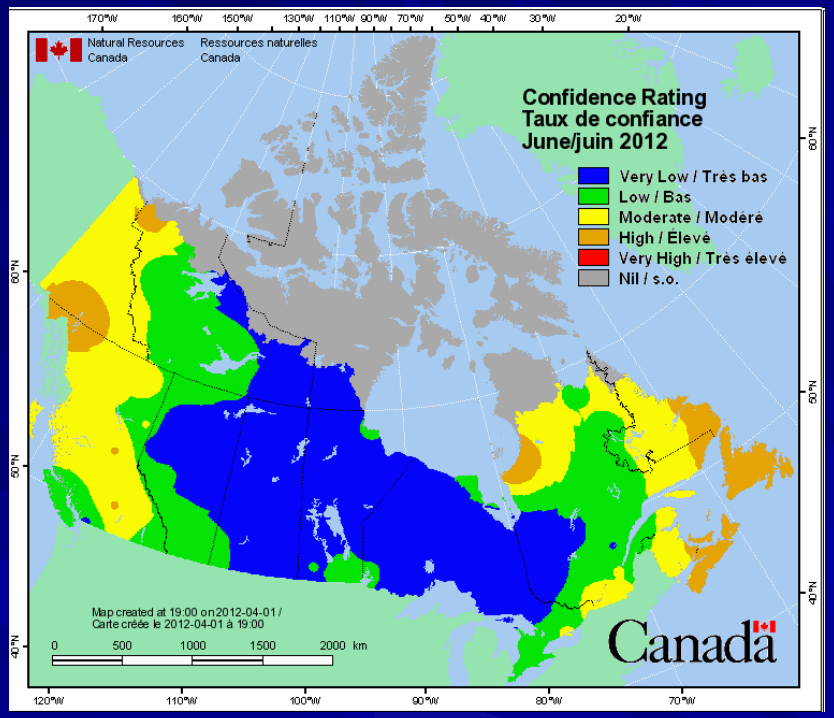
Confidence
(standard deviation normalized against average weather)

May could simply see above-average conditions while BC and southern NWT will be closer to normal.

June 2012



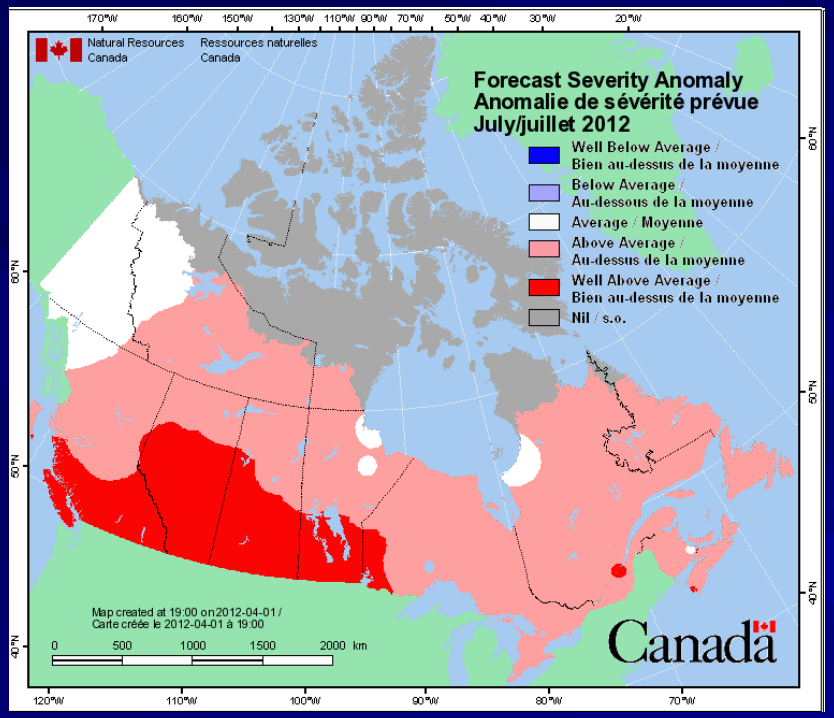
Prediction
(predicted values normalized against average weather)



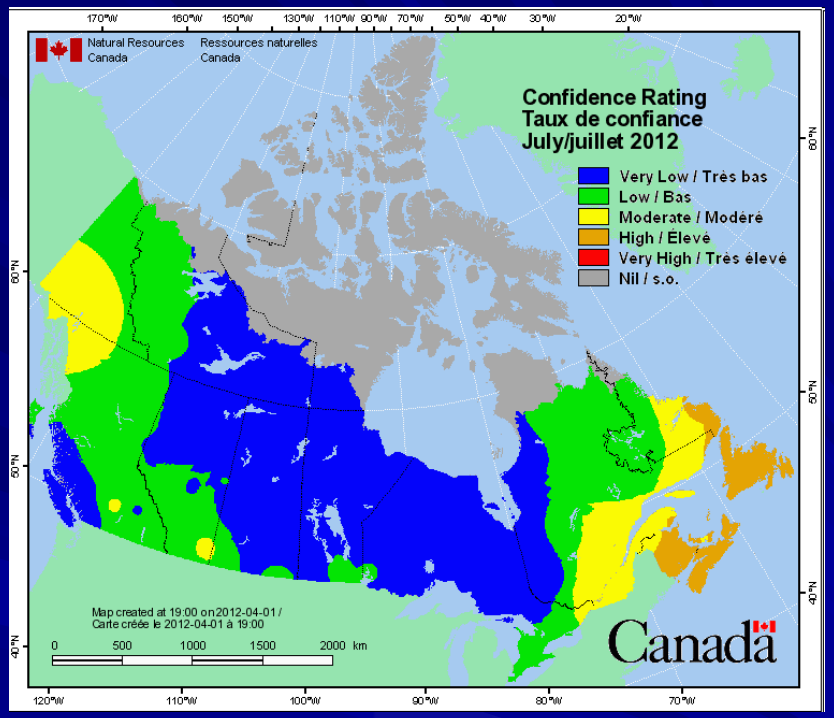
Confidence
(standard deviation normalized against average weather)

June sees a split along the 60º latitude with above-average conditions north and south.

July 2012



Prediction
(predicted values normalized against average weather)



Confidence
(standard deviation normalized against average weather)

July sees a significant increase in fire weather conditions in western Canada. Low confidence in predictions for central Canada.

CanSIPS

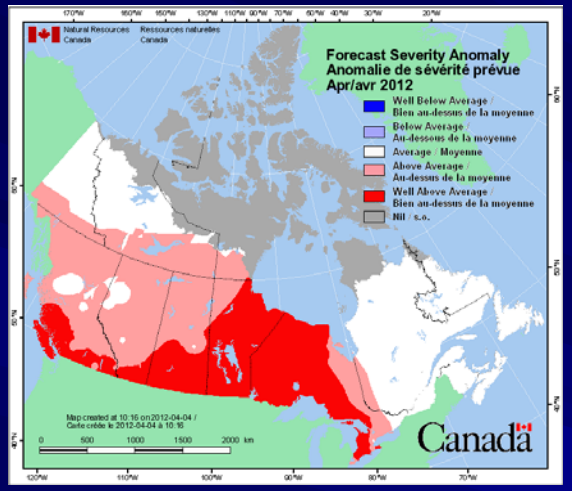
Currently, the Canadian Meteorological Centre (CMC) is replacing their seasonal forecasting scheme with CanSIPS: Canadian Seasonal to Inter-annual Prediction System.

CanSIPS uses two new models: the third and fourth generation General Circulation Models CM3 and CM4. These have couple atmospheric ocean processes and promise to provide better long-range forecasts.

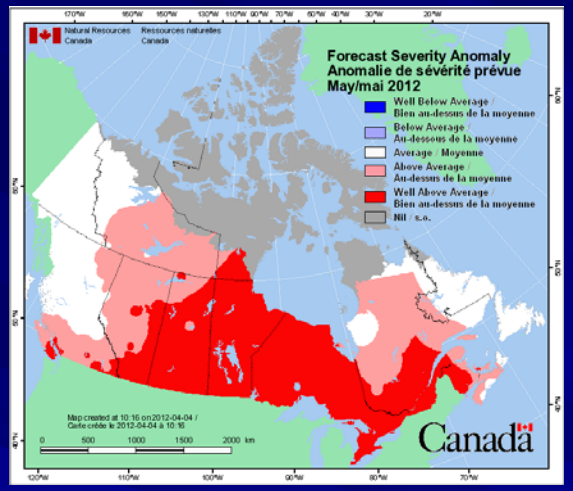
CanSIPS will provide monthly forecasts for the next 12 months.

New CMC 2012 Prediction

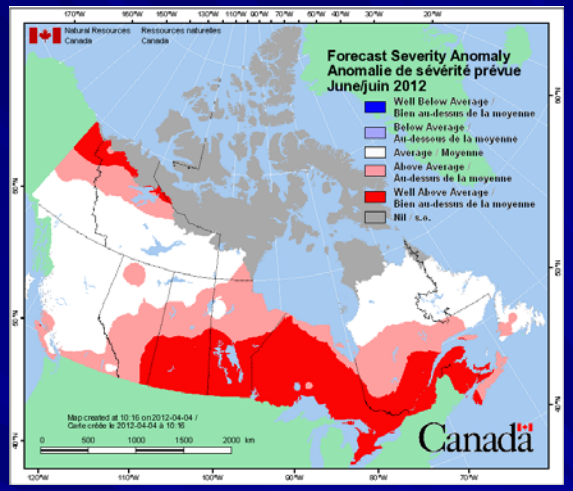
April



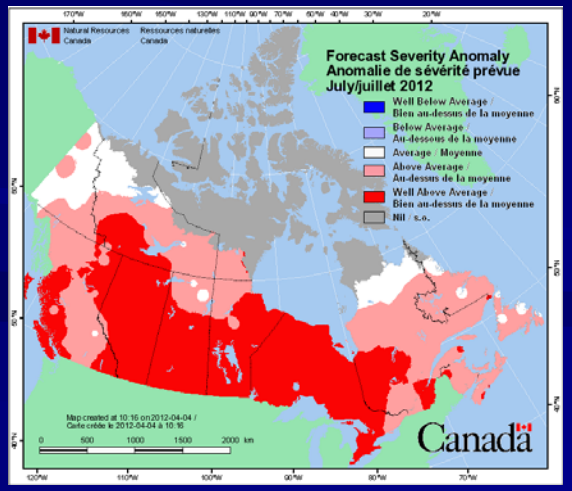
May



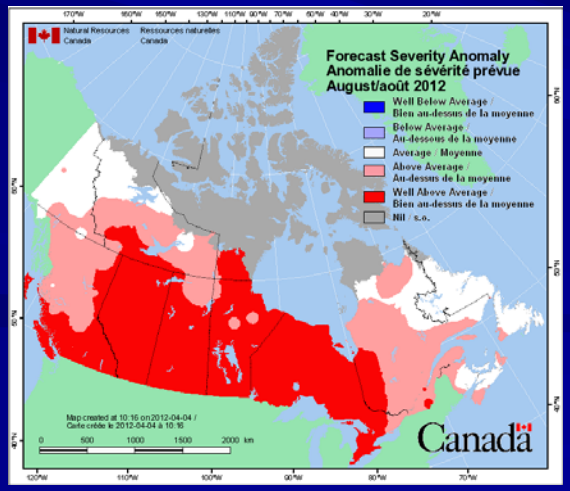
June



July



August



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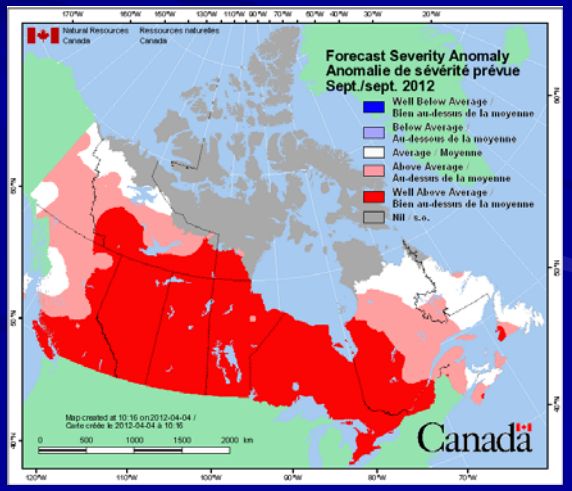
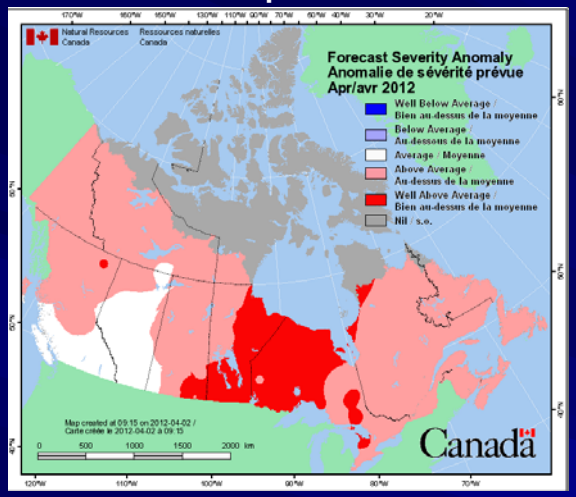


Old CMC 2012 Prediction

April



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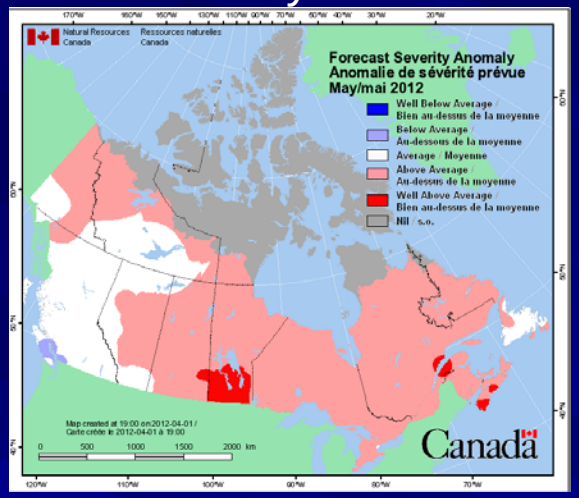
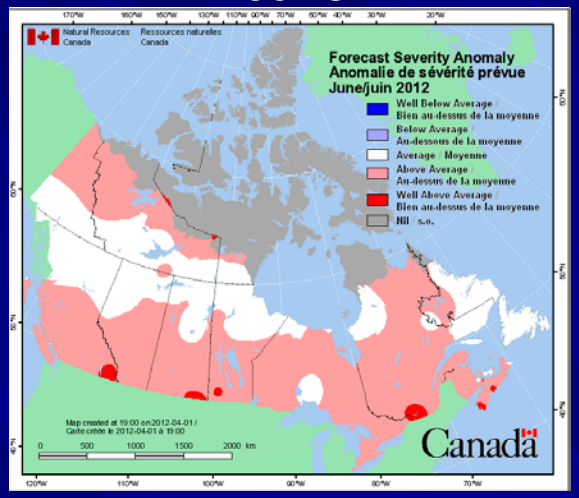


June



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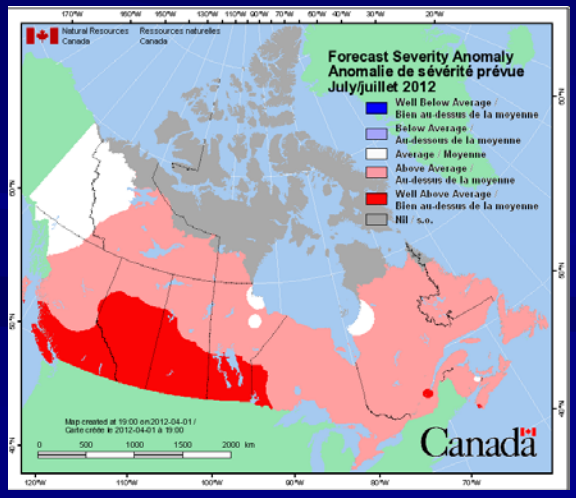

Summary

Indications are that Canada could experience a dramatic fire season.

- *Dry conditions prevailed last fall throughout much of western Canada,*
- *An unusually warm winter has lead to an early start up this spring,*
- *Temperatures across Canada are expected to be above average, while precipitation is expected to be below-average.*

While seasonal predictions are at best an indication of how the season may develop, it would be prudent to be prepared.

The End