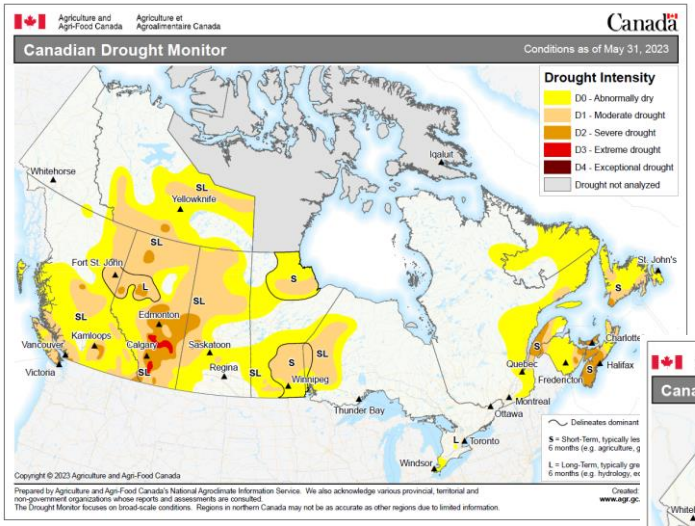
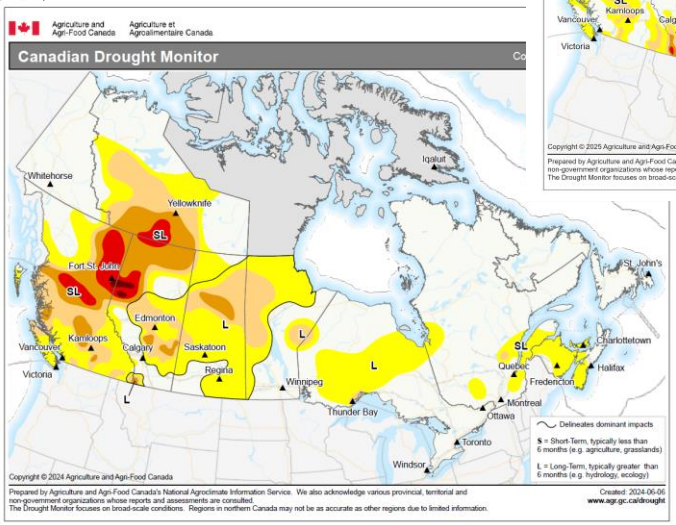

Natural Resources Canada
Ressources naturelles Canada
Fire Season Severity Anomaly Forecast
for the Institute for Catastrophic Loss Reduction
June 12, 2025
Richard Carr
Natural Resources Canada – Canadian Forest Service
Canada

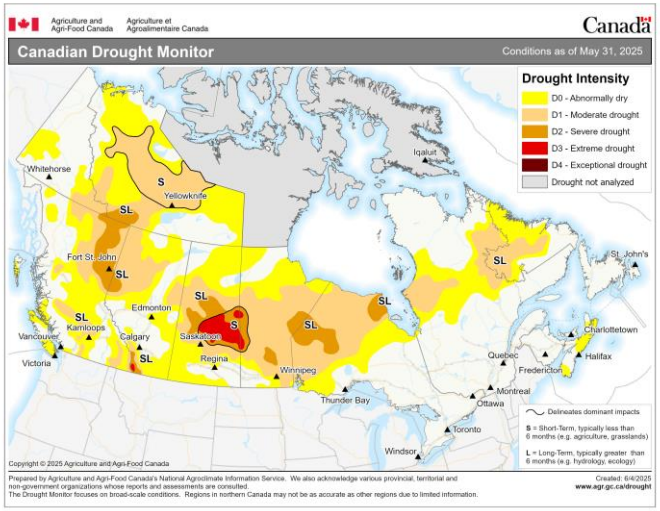
Agenda

- 2023-25 early season factors
- Climate model predictions
- 2025 CWFIS Fire Season Forecast (June 1)

Drought Progression: May 31, 2023-25

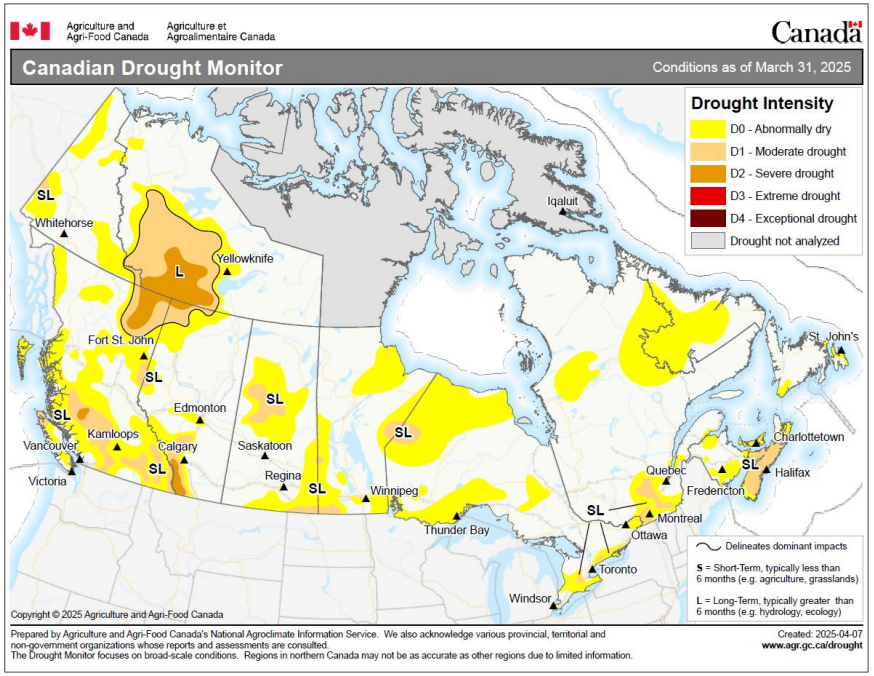


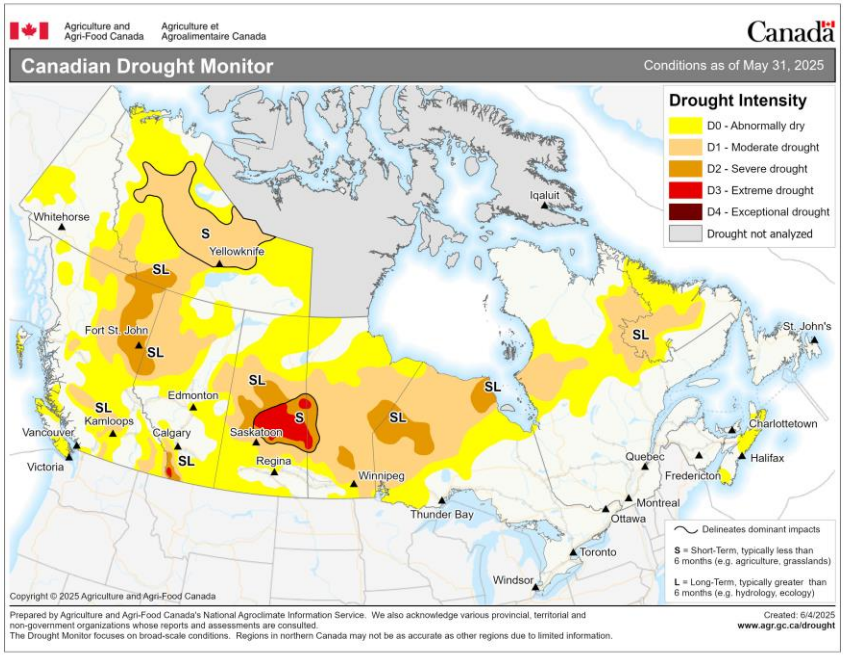




- **Drought *was* less intense than in spring 2023 and 2024**
  - **Intensification during 2023; reduction in mid to late 2024**

Drought Progression: Spring 2025

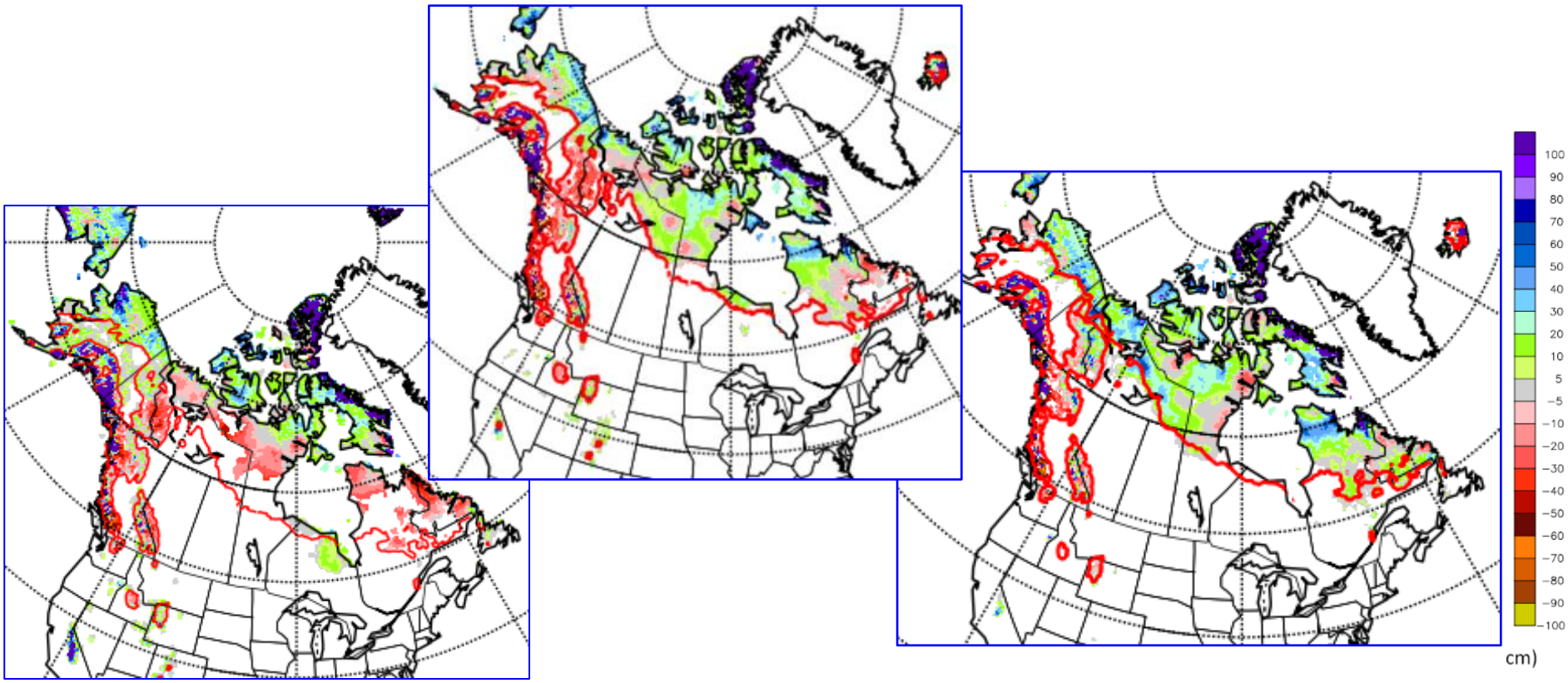




- **Not too dramatic at March 31, April 30**
- **Rapid intensification during May**
  - **Some reduction in southwestern NT, southern BC**

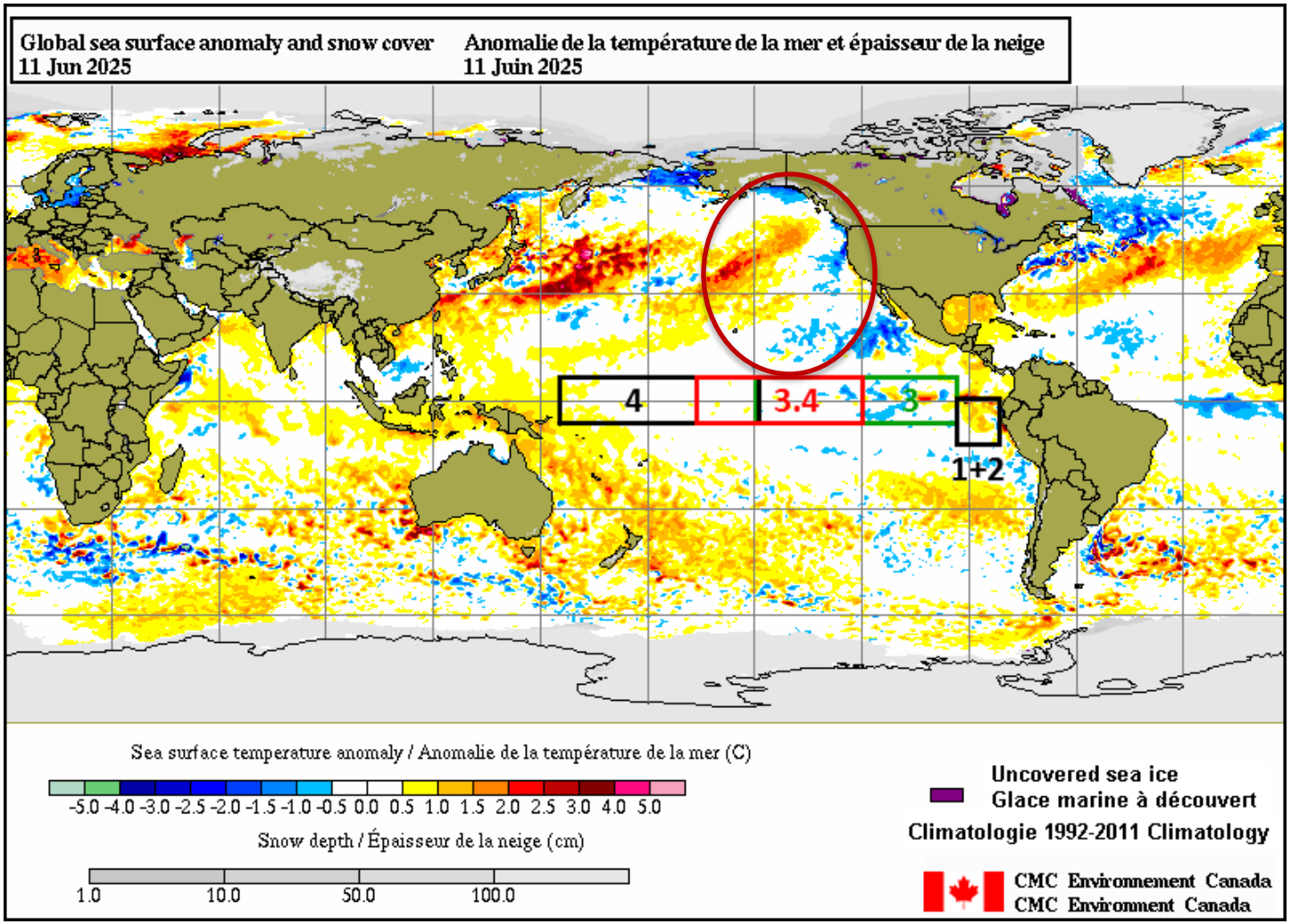
Snow Cover

- Snow melted quickly in southern BC in February-March
- Snow loss in other regions was normal during spring



May 10, 2023 *May 8, 2024* *May 14, 2025*

ENSO – Current SST



North Pacific SST (PDO) negative; closer to neutral than past few years

La Niña-ish condition faded … was winter 2024-25 ever a true La Niña? ENSO is neutral now.

Fire Problems in ENSO Springs

	Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
Large area burned →	1995	1.0	0.7	0.5	0.3	0.1	0.0	-0.2	-0.5	-0.8	-1.0	-1.0	-1.0
Virginia Hills, AB →	1998	2.2	1.9	1.4	1.0	0.5	-0.1	-0.8	-1.1	-1.3	-1.4	-1.5	-1.6
	1999	-1.5	-1.3	-1.1	-1.0	-1.0	-1.0	-1.1	-1.1	-1.2	-1.3	-1.5	-1.7
	2000	-1.7	-1.4	-1.1	-0.8	-0.7	-0.6	-0.6	-0.5	-0.5	-0.6	-0.7	-0.7
Chisholm, AB →	2001	-0.7	-0.5	-0.4	-0.3	-0.3	-0.1	-0.1	-0.1	-0.2	-0.3	-0.3	-0.3
	2002	-0.1	0.0	0.1	0.2	0.4	0.7	0.8	0.9	1.0	1.2	1.3	1.1
Kelowna, BC →	2003	0.9	0.6	0.4	0.0	-0.3	-0.2	0.1	0.2	0.3	0.3	0.4	0.4
	2004	0.4	0.3	0.2	0.2	0.2	0.3	0.5	0.6	0.7	0.7	0.7	0.7
	2005	0.6	0.6	0.4	0.4	0.3	0.1	-0.1	-0.1	-0.1	-0.3	-0.6	-0.8
	2006	-0.8	-0.7	-0.5	-0.3	0.0	0.0	0.1	0.3	0.5	0.7	0.9	0.9
	2007	0.7	0.3	0.0	-0.2	-0.3	-0.4	-0.5	-0.8	-1.1	-1.4	-1.5	-1.6
	2008	-1.6	-1.4	-1.2	-0.9	-0.8	-0.5	-0.4	-0.3	-0.3	-0.4	-0.6	-0.7
	2009	-0.8	-0.7	-0.5	-0.2	0.1	0.4	0.5	0.5	0.7	1.0	1.3	1.6
	2010	1.5	1.3	0.9	0.4	-0.1	-0.6	-1.0	-1.4	-1.6	-1.7	-1.7	-1.6
Slave Lake, AB →	2011	-1.4	-1.1	-0.8	-0.6	-0.5	-0.4	-0.5	-0.7	-0.9	-1.1	-1.1	-1.0
	2012	-0.8	-0.6	-0.5	-0.4	-0.2	0.1	0.3	0.3	0.3	0.2	0.0	-0.2
→	2013	-0.4	-0.3	-0.2	-0.2	-0.3	-0.3	-0.4	-0.4	-0.3	-0.2	-0.2	-0.3
PDO positive phase →	2014	-0.4	-0.4	-0.2	0.1	0.3	0.2	0.1	0.0	0.2	0.4	0.6	0.7
→	2015	0.6	0.6	0.6	0.8	1.0	1.2	1.5	1.8	2.1	2.4	2.5	2.6
Fort McMurray, AB →	2016	2.5	2.2	1.7	1.0	0.5	0.0	-0.3	-0.6	-0.7	-0.7	-0.7	-0.6
Big years in BC →	2017	-0.3	-0.1	0.1	0.3	0.4	0.4	0.2	-0.1	-0.4	-0.7	-0.9	-1.0
→	2018	-0.9	-0.8	-0.6	-0.4	-0.1	0.1	0.1	0.2	0.4	0.7	0.9	0.8
	2019	0.7	0.7	0.7	0.7	0.5	0.5	0.3	0.1	0.2	0.3	0.5	0.5
	2020	0.5	0.5	0.4	0.2	-0.1	-0.3	-0.4	-0.6	-0.9	-1.2	-1.3	-1.2
Western half →	2021	-1.0	-0.9	-0.8	-0.7	-0.5	-0.4	-0.4	-0.5	-0.7	-0.8	-1.0	-1.0
	2022	-1.0	-0.9	-1.0	-1.1	-1.0	-0.9	-0.8	-0.9	-1.0	-1.0	-0.9	-0.8
Most of Canada! →	2023	-0.7	-0.4	-0.1	0.2	0.5	0.8	1.1	1.3	1.6	1.8	1.9	2.0
Busy summer →	2024	1.8	1.5	1.1	0.7	0.4	0.2	0.0	-0.1	-0.2	-0.3	-0.4	-0.5
	2025	-0.6	-0.4	-0.2	-0.1								

El Niño:

- Warm, windy, dry in western Canada

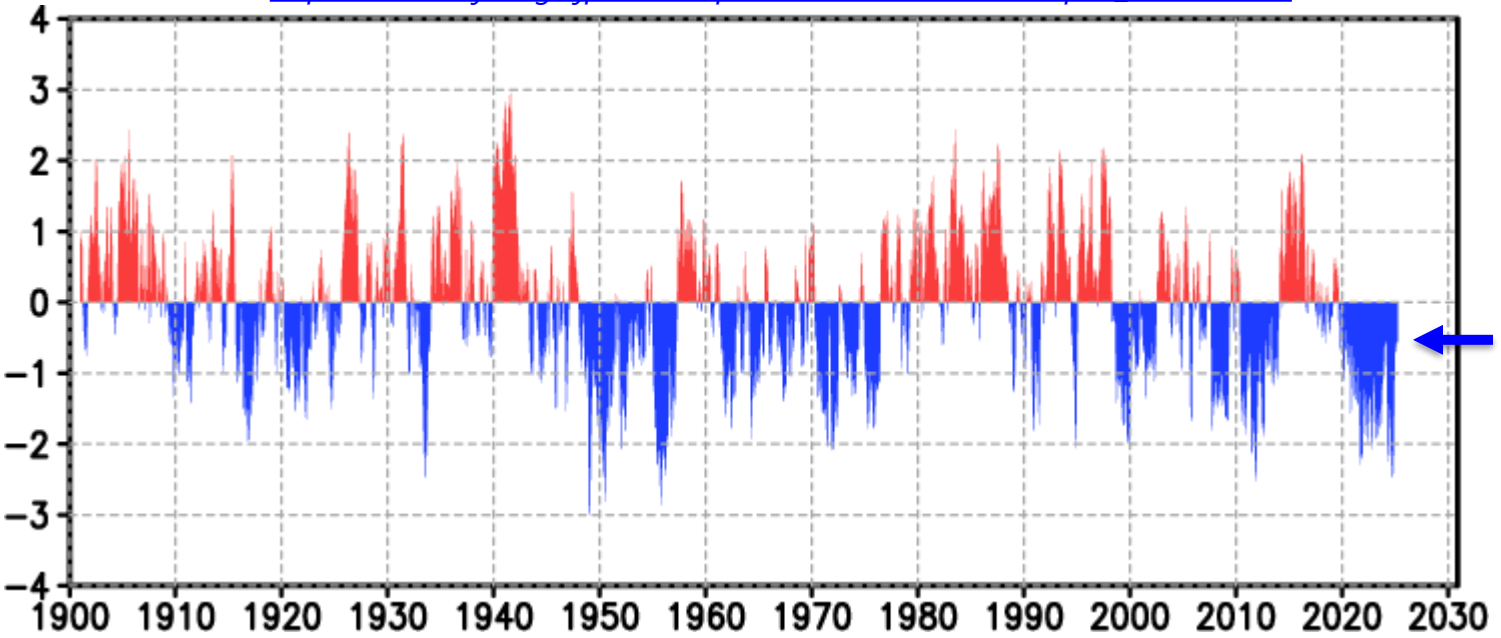
La Niña:

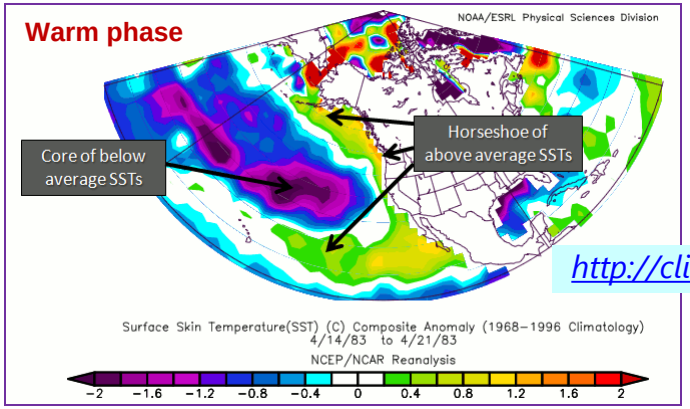
- Arctic surface highs bring dry air, strong wind around edges
- Temperature *may* be cool

Summer fire problems may depend on other influences

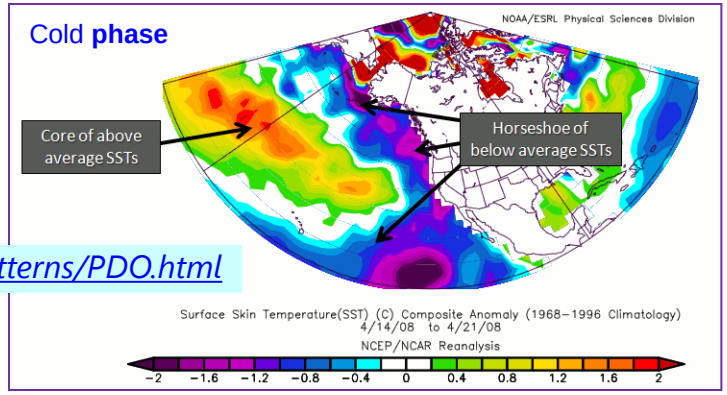
Pacific Decadal Oscillation (as of Apr 2025)

https://ds.data.jma.go.jp/tcc/tcc/products/elnino/decadal/pdo_month.html



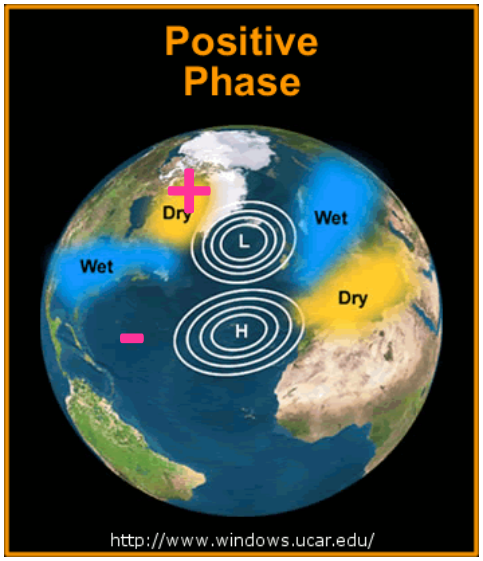


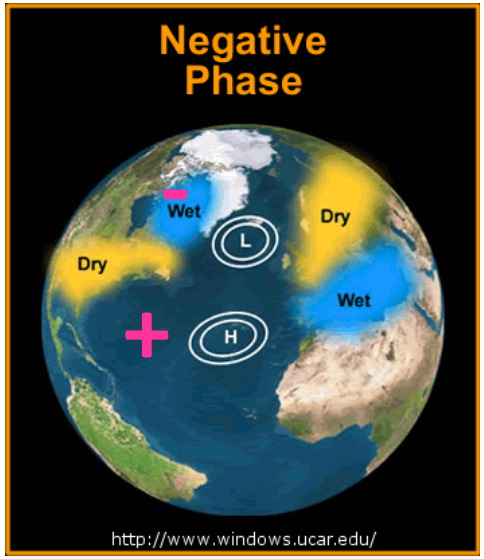
http://climate.ncsu.edu/climate/patterns/PDO.html

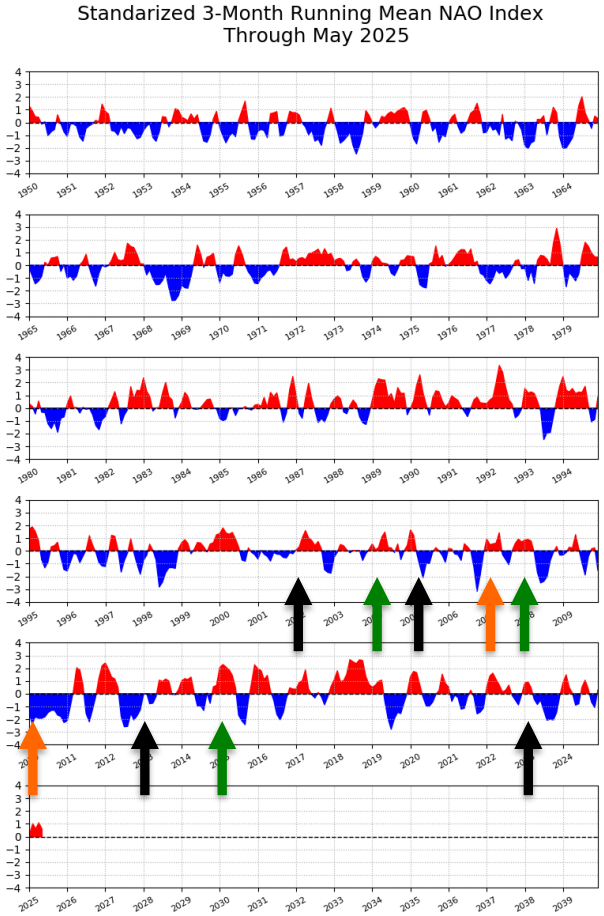


North Atlantic Oscillation (to May 2025)

https://www.ncei.noaa.gov/access/monitoring/nao







Quebec Area Burned (NFDB, ha*1000)

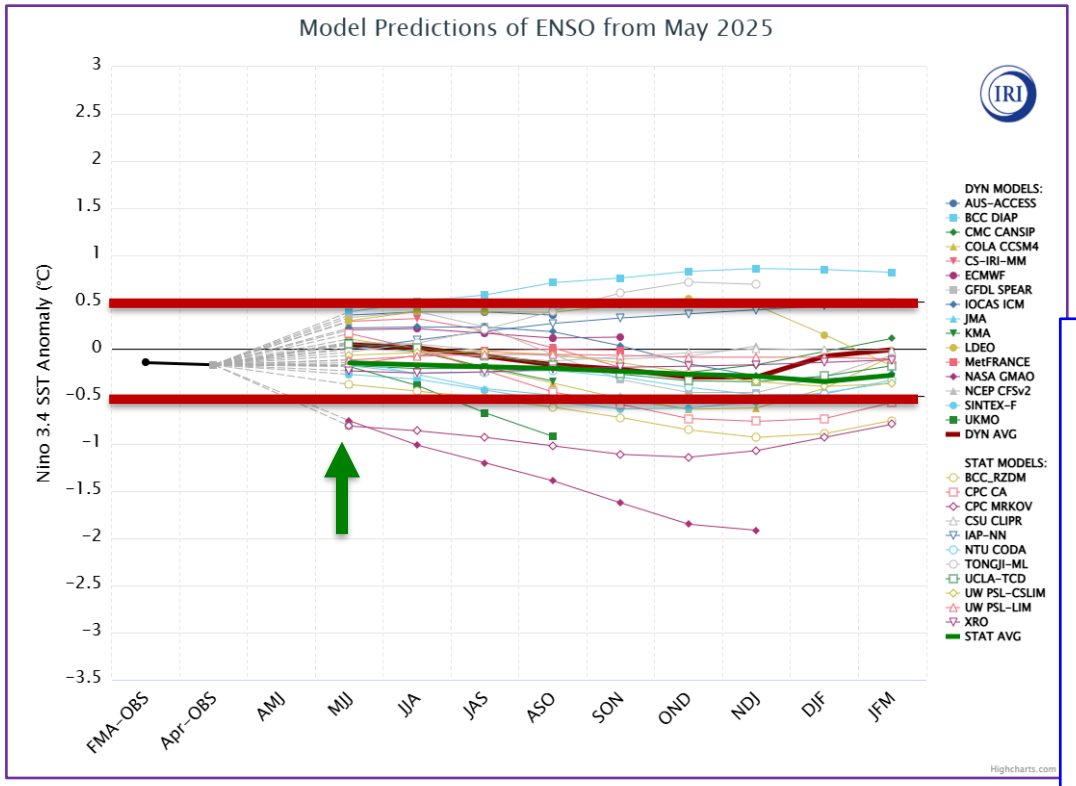
2023	5000*
2015	5
2013	1900
2010	315
2008	1
2007	343
2005	800
2004	3
2002	1000

Early years may not include area burned in northern (unmanaged) region

Climate Model Predictions

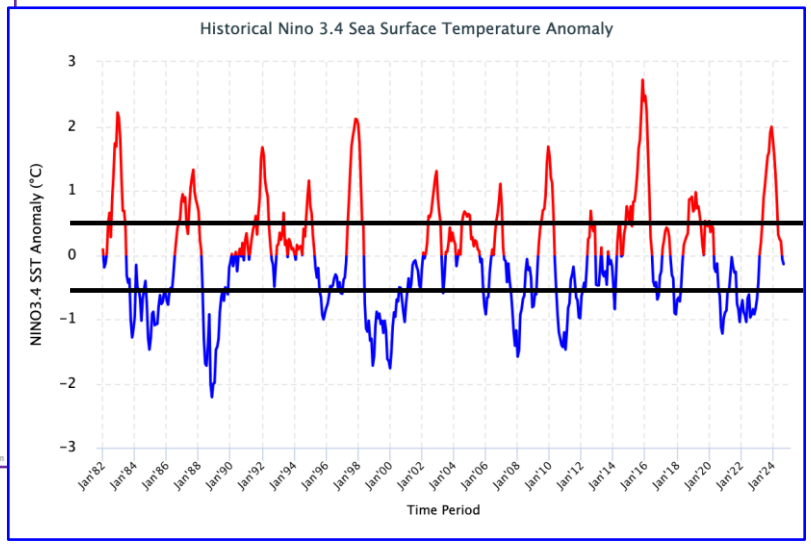
IRI ENSO Forecast

https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-sst_table
https://iri.columbia.edu/our-expertise/climate/forecasts/enso/2024-october-quick-look/?enso_tab=enso-sst_image



May, 2025

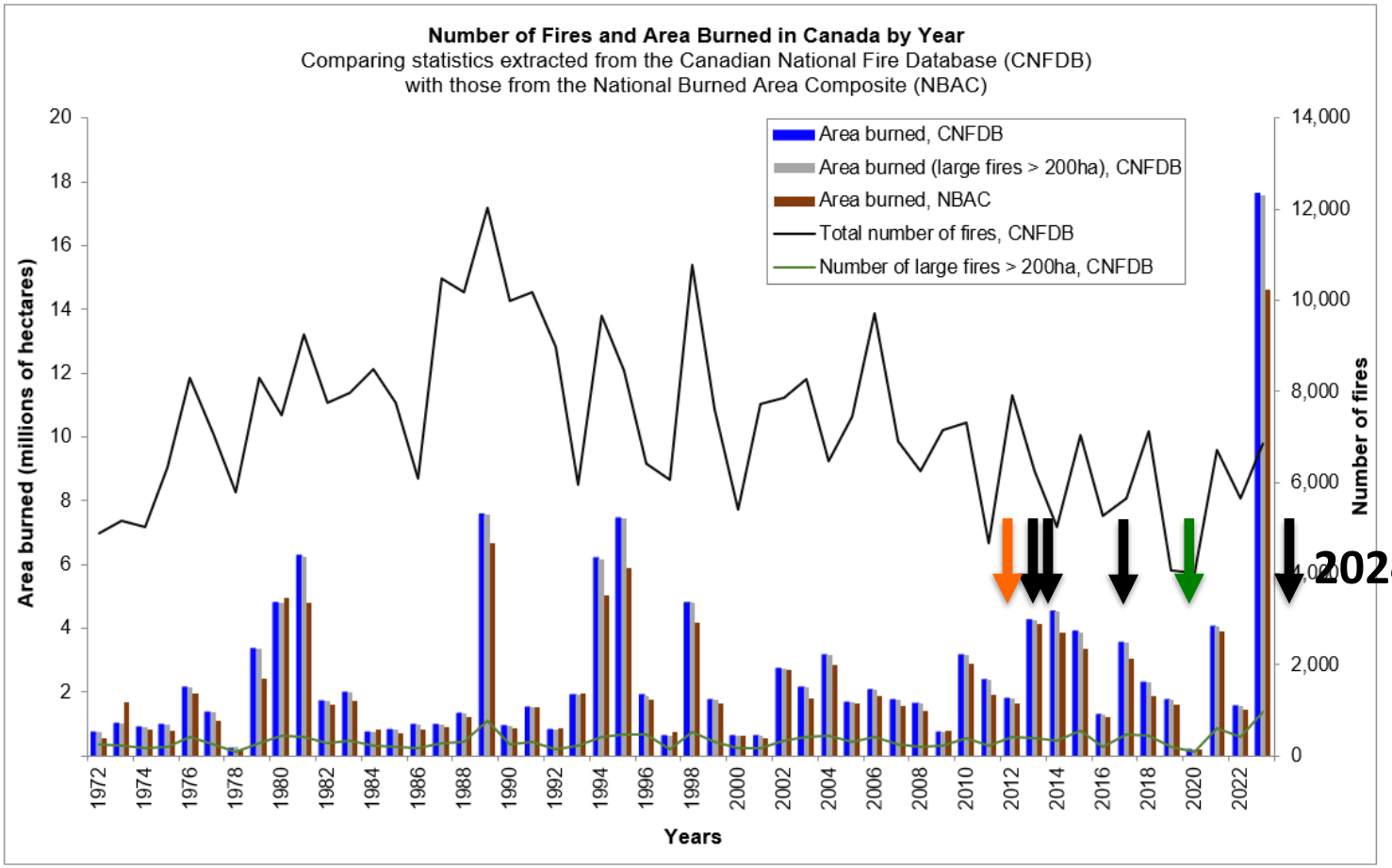
Neutral conditions likely continuing to winter 2025-26



Time series to October 2024

Neutral ENSO: Recent Analog Years

- **Arrows to area burned: 2012 (orange), 2013—2014, 2017 (black), 2020 (green), 2024 (black)**



CanSIPS

- **Ensemble has increased from 2x10 to 2x20 members**
- **Models developed by Canadian Centre for Climate Modeling and Analysis**
  - **CanCM4i (CanESM5)**
  - **GEM5.2-NEMO: Global Environmental Multiscale – Nucleus for European Modeling of the Ocean**
- **NRCan uses temperature and precipitation data, plus fuel moisture initialization from CWFIS**
- **Skill of climate forecasts often best in coastal areas, poorer in lee of mountain ranges**

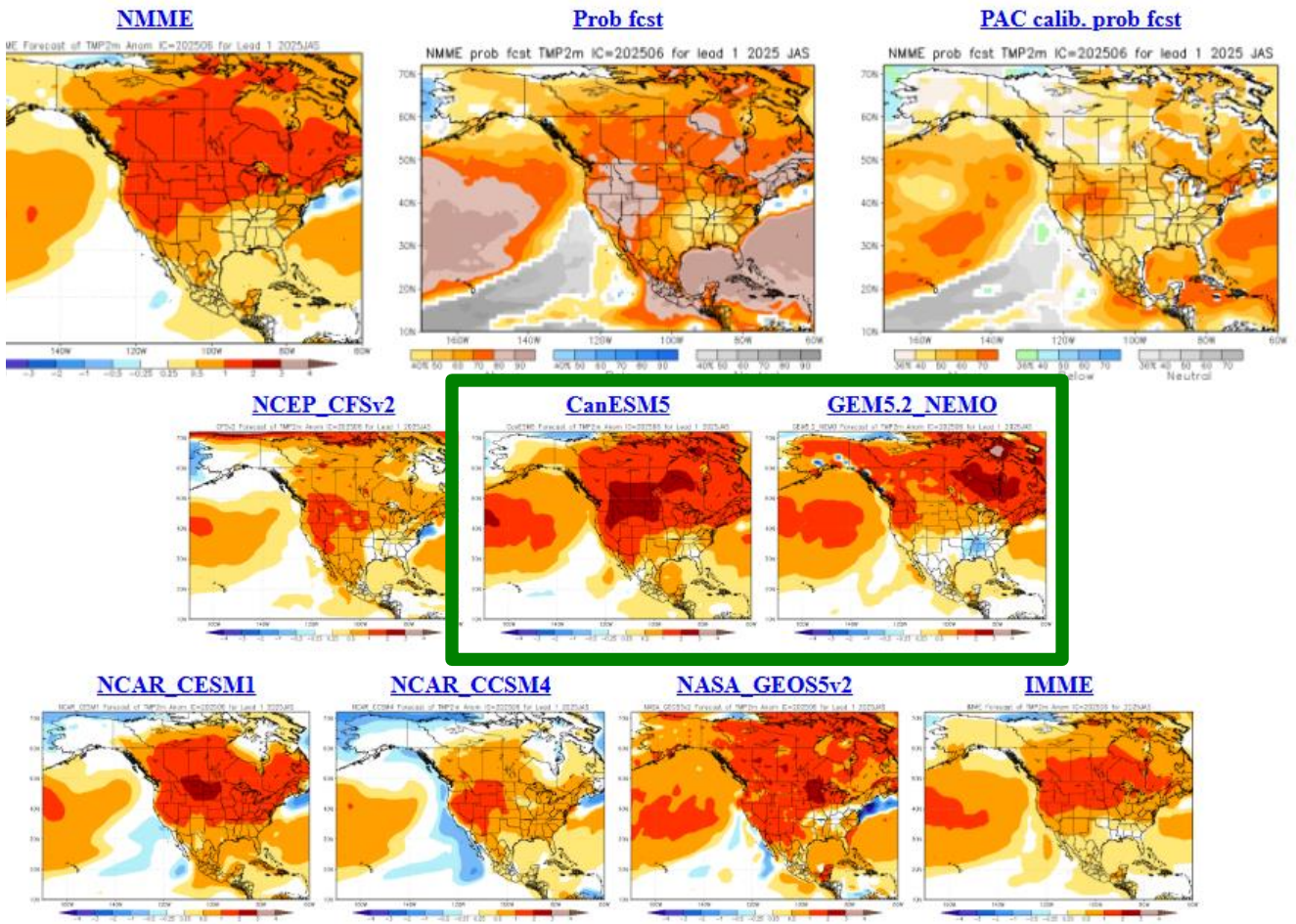
North American Multi-model Ensemble

NMME – April run

JJA Temp

Looks warm …

Subtract a bit of drama to get truer picture!

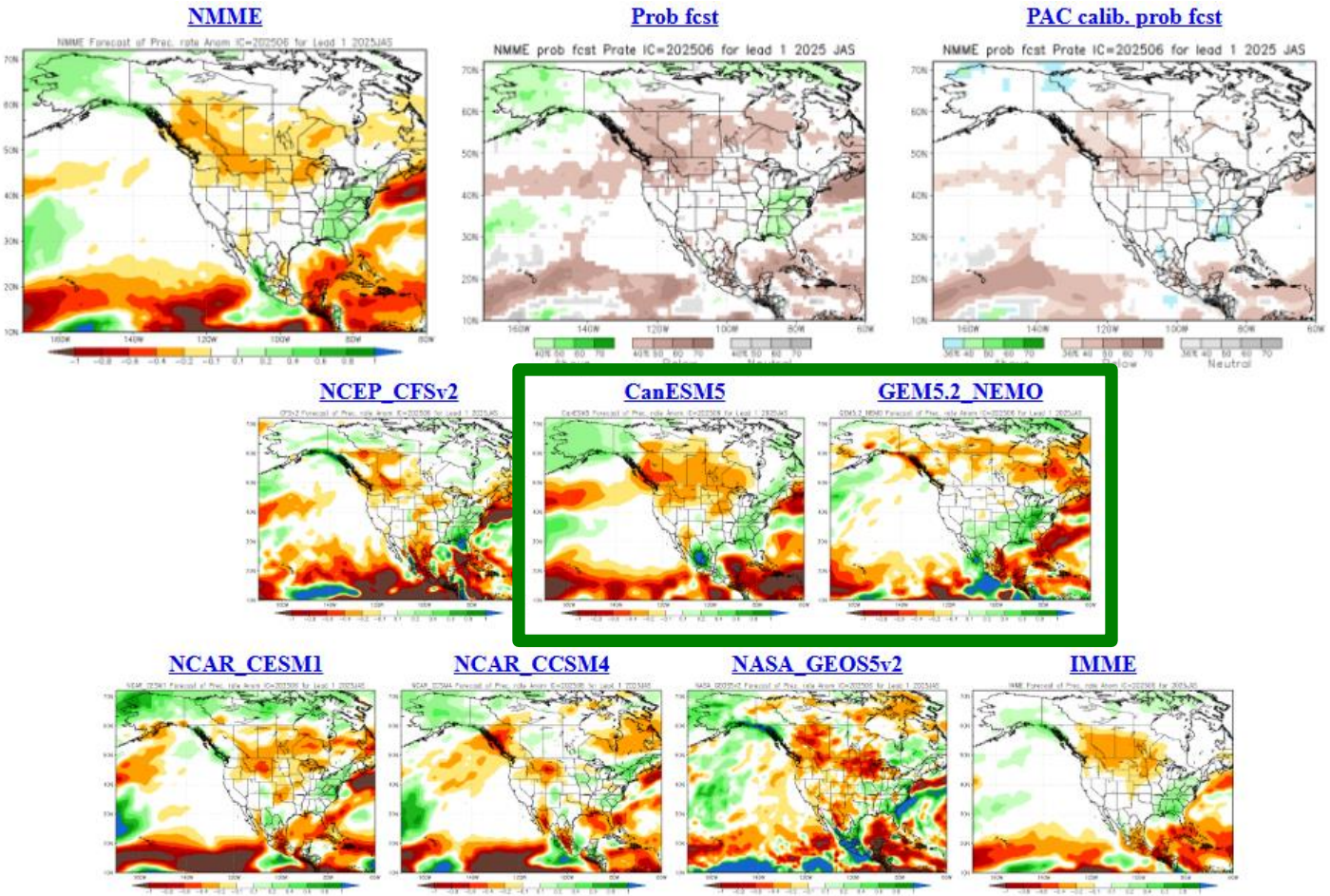


North American Multi-model Ensemble

NMME – April run

JJA Precip

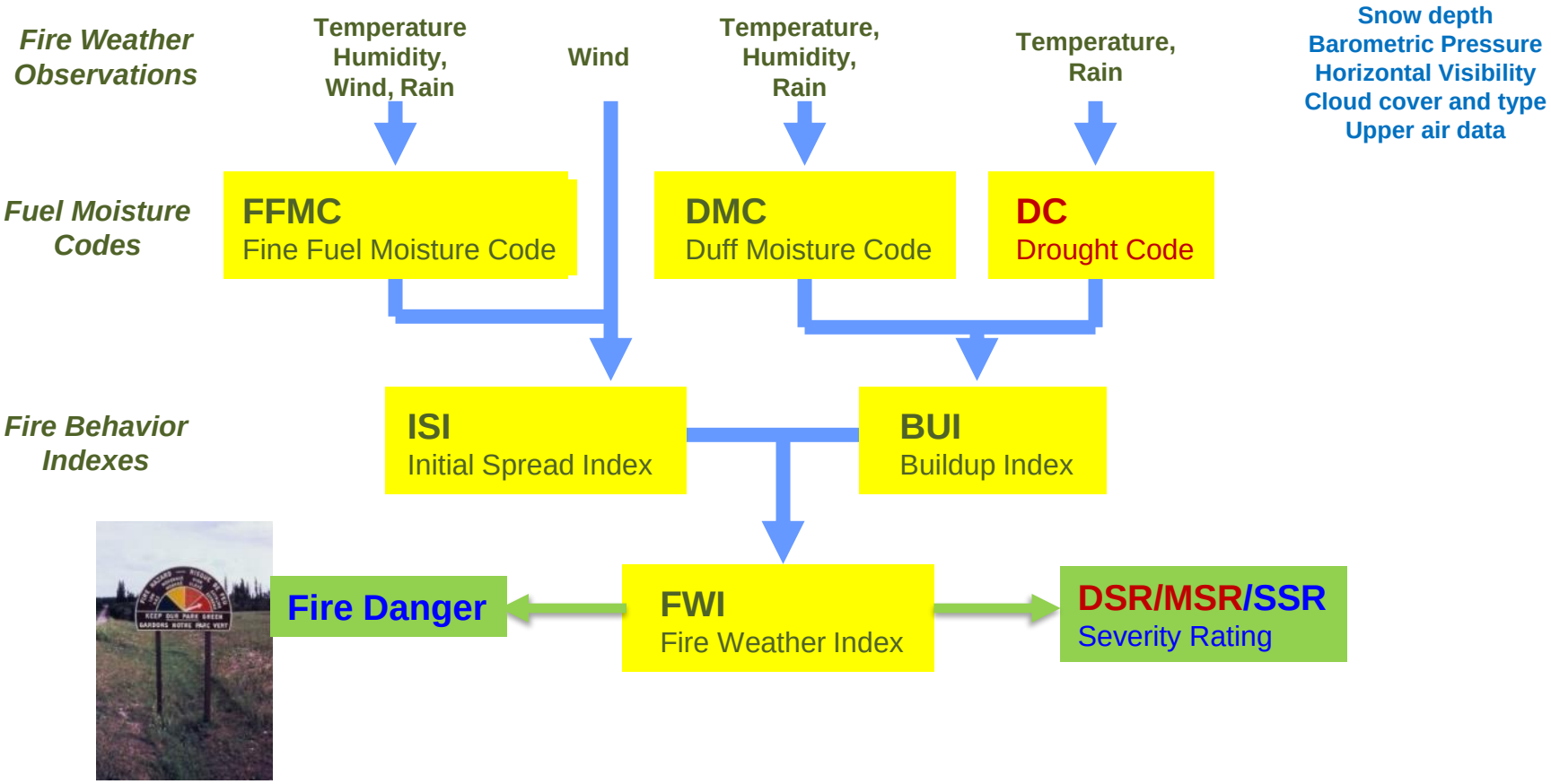
Many dry regions?



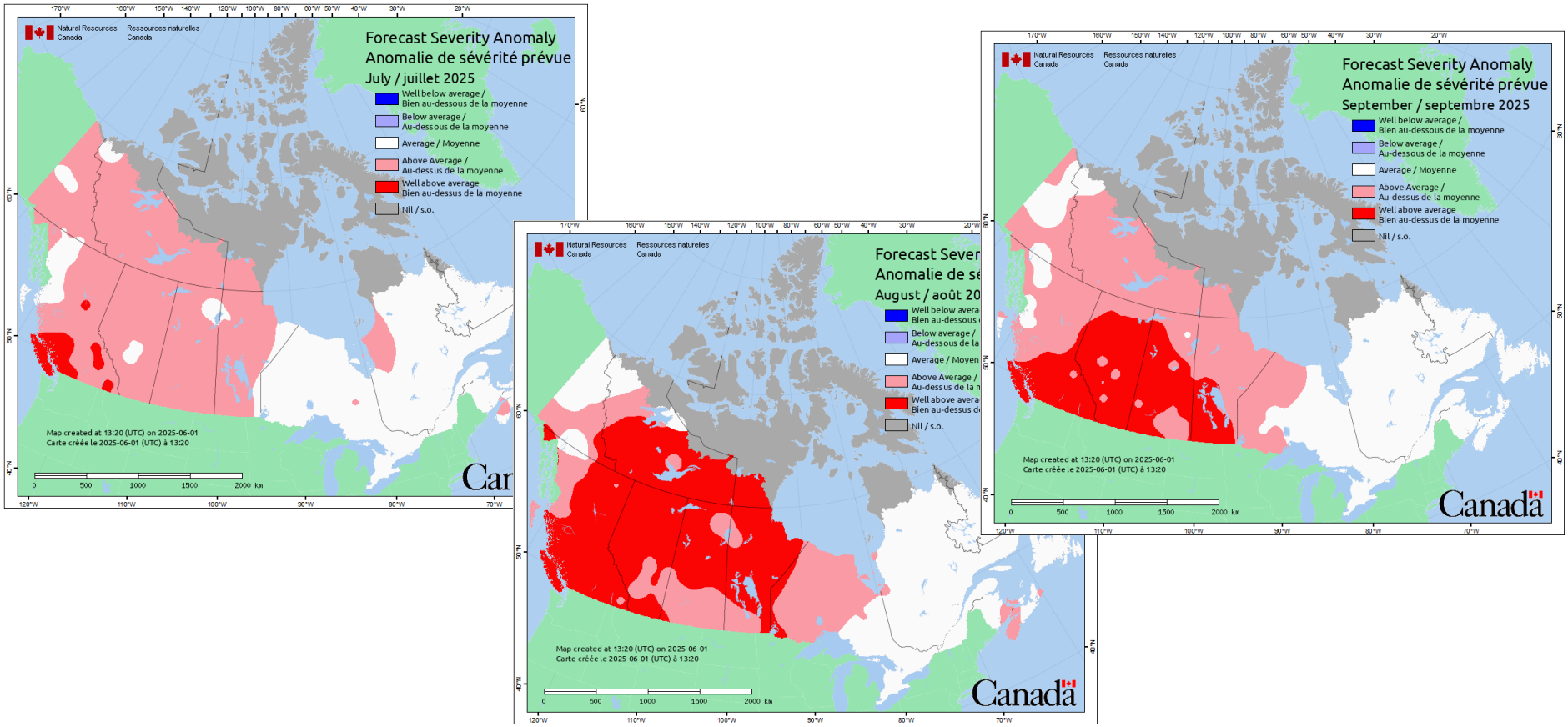
2025 NRCan-CFS Seasonal Prediction

Canadian Forest Fire Weather Index (FWI) System

Seasonal forecasts use the severity rating anomaly



NRCan-CFS Prediction: *June run, for July -- Sept*

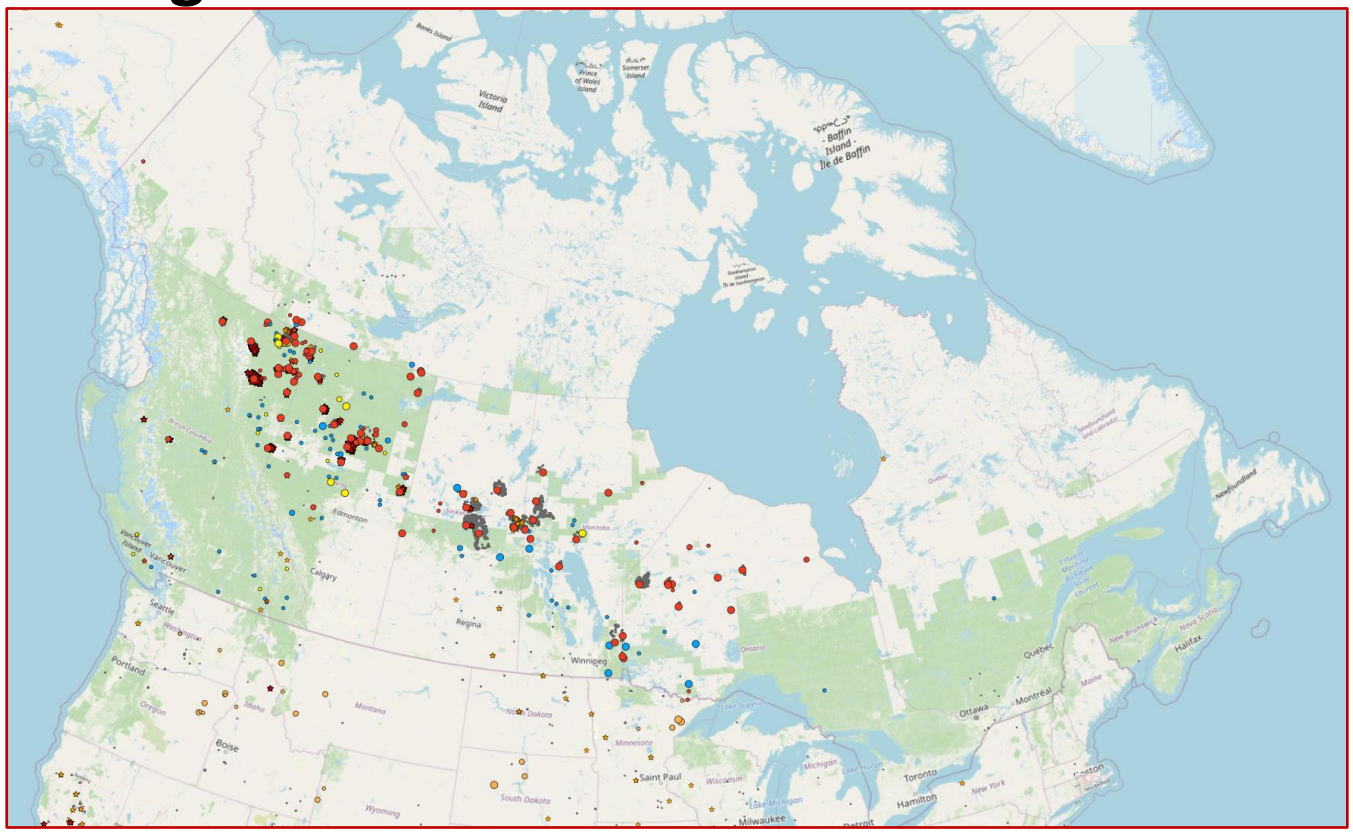


Anomaly

Predicted values normalized against average weather

CWFIS Current Season Snapshot

- **CWFIS: Canadian Wildland Fire Information System: *https://cwfis.cfs.nrcan.gc.ca***
- **Large fires BC to western Ontario**

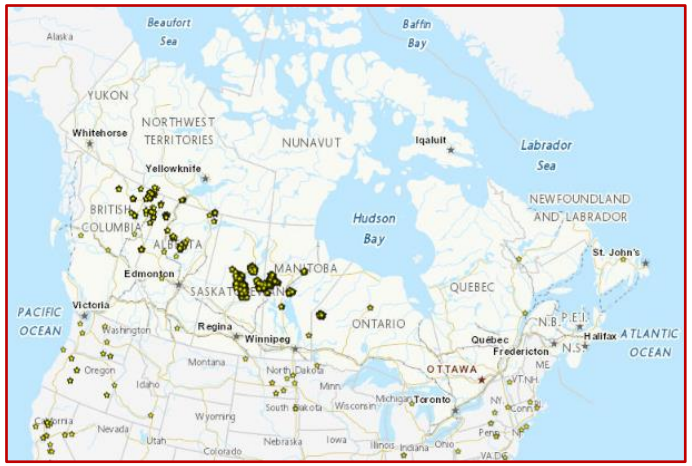


Largest complexes are 25LF-SHOE, central SK: ~650,000 ha

Flin Flon MB / Creighton SK: ~500,000 ha

Windy spring?

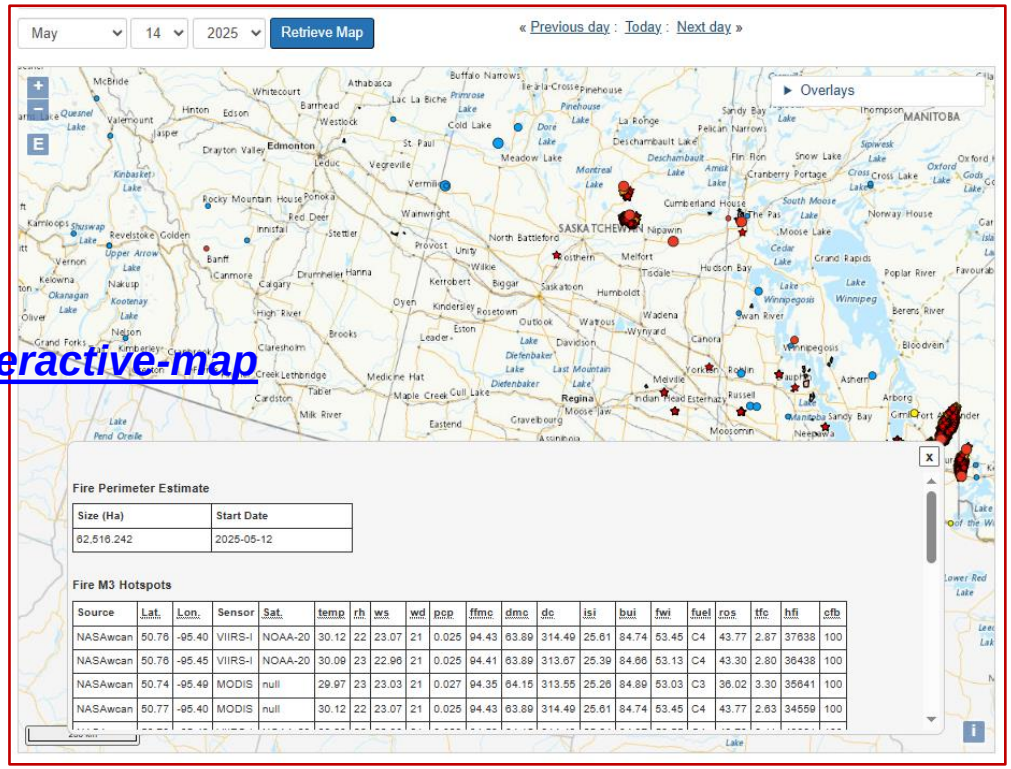
- Many periods of rapid growth
- No wind comparisons with normals, but in discussion
- Current burned area passed annual average by ~June 7
- Area burned at about 3.5 million ha as of June 11
- CIFFC National Preparedness Level at 5 since May 29, Level 3 since May 15
  - 1 2 3 4 5
  - Crews from USA, Australia



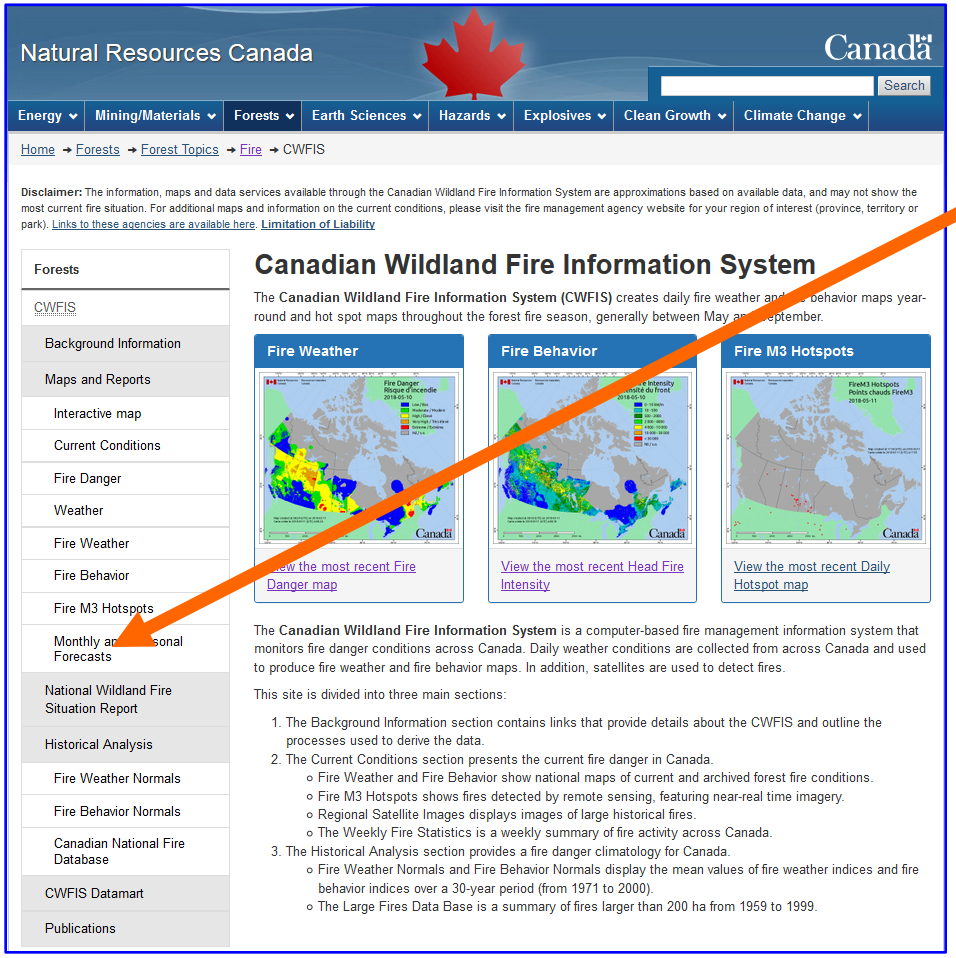
CWFIS Interactive Map Information

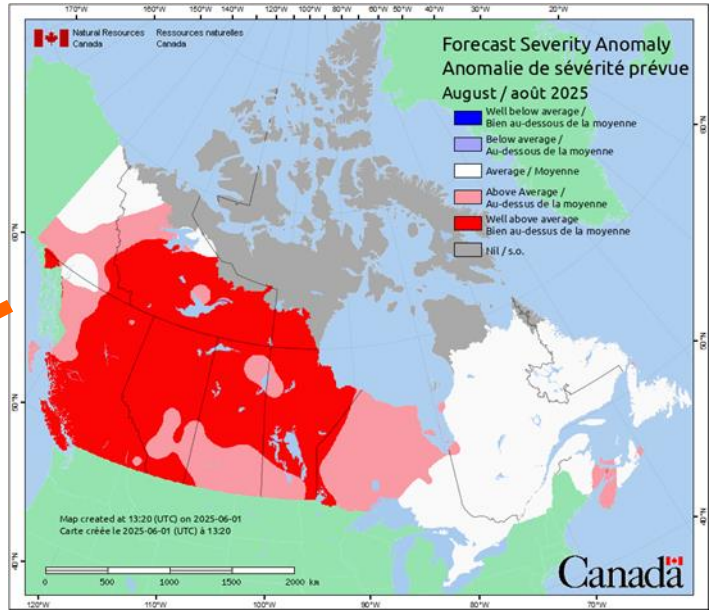
- Dates can be chosen from the drop-down menu
- On the CWFIS interactive map, click features to open an information box

https://cwfis.cfs.nrcan.gc.ca/interactive-map



Canadian Wildland Fire Information System (CWFIS)





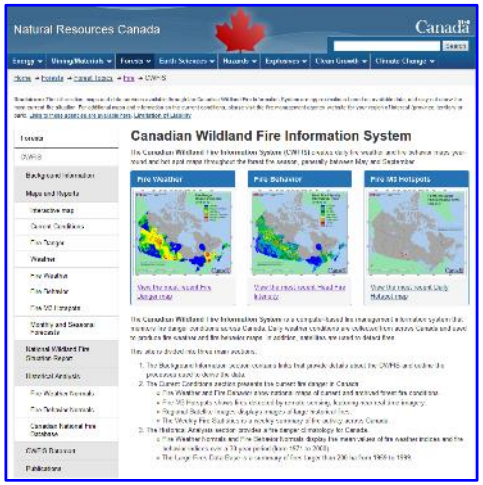
Note: updated CWFIS web site rollout 2025-26

Conclusions and Reminders

- Warm summer (may be common with warming climate)
- Potentially dry, especially southern BC to central Canada
- Neutral ENSO: higher activity in west?
- Serious fires can occur in any year
- Fire activity depends on ignitions; our forecast only predicts where potential exists
- This year's forecast runs have been produced using cleaned code on Azure (thank you, Robert Jagodzinski!)
- In 2026 a new method will be introduced (Piyush Jain)

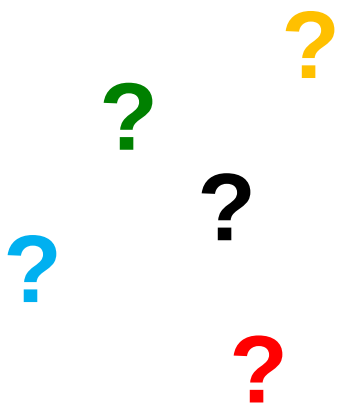
Remember to check updates …

- **Seasonal forecast: first working day each month on CWFIS: March-September**
- **Daily conditions: provincial and/or CWFIS web sites**



Wildland Fire Yukon
Northwest Territories
Newfoundland Labrador
SOPFEU
Société de protection des forêts contre le feu
Prince Edward Island CANADA
Saskatchewan
British Columbia
Alberta Wildfire
Manitoba
New Nouveau Brunswick CANADA
Government of Ontario
Nova Scotia Canada

Questions?



Contact:

Richard Carr
Fire Research Analyst
Natural Resources Canada – Canadian Forest Service

Richard.Carr@NRCan-RNCan.gc.ca

5320 122 Street NW
Edmonton, AB, Canada
T6H 3S5
825-510-1265