



Wildfire Smoke Forecasting Systems

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June 5, 2018

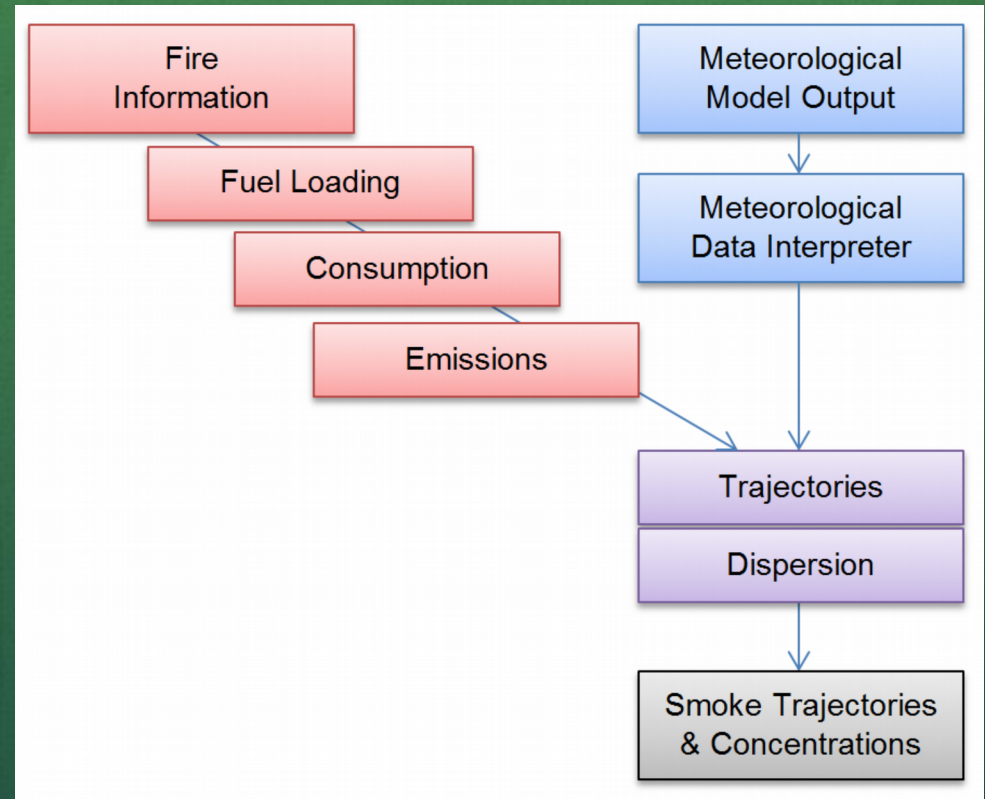
Smoke Forecasts

- Ground level forecast of particulate matter 2.5 microns and smaller (PM2.5)
- Useful for predicting relative risk levels and areas of effect
- Accuracy depends on fire detection and weather forecasts
- Does not include air quality components



Modeling System

- Satellite detection of hotspots
 - GOES (NOAA)
 - MODIS (NASA)
- Fire information added to hotspots (CWFIS)
 - Fuel type
 - Moisture codes
 - Drought code
 - Slope & aspect
- Meteorological forecasts
 - WRF (UBC)
 - RDPS (EC)





BlueSky Canada (BSC)

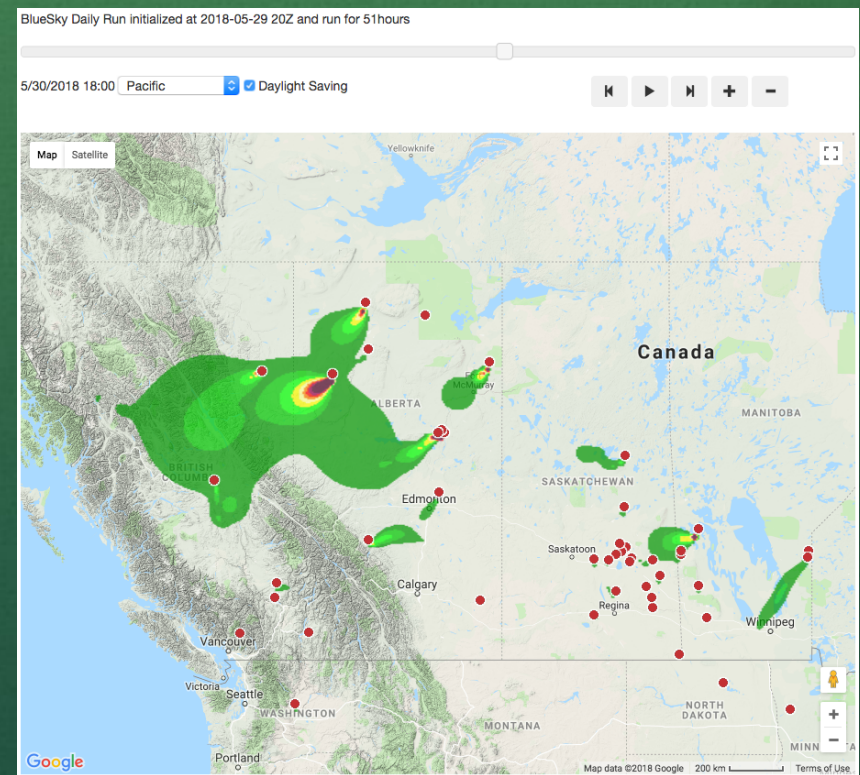
Partnership between the Canadian Safety & Security Program (CSSP), multiple provincial agencies, and the University of British Columbia

Wildfire Smoke Forecasting Systems

June 5, 2018

BlueSky Canada (BSC)

- Canada-wide forecasts four times a day
- Interactive web forecast viewer
- Also consume forecasts via:
 - KMZ download
 - GeoServer WMS
 - Raw NetCDF
- www.firesmoke.ca



BlueSky Playground

- Ad hoc smoke modeling tool
 - Prescribed burns
 - Pile burns
 - Wildfires
-
- www.firesmoke.ca/playground

Canadian Playground Home | My Emissions | My Dispersions | Feedback | Help Logged in as blueop | Log Out

Home » My Emissions » demo1806 (Wildfire)

Models have executed successfully!

Emissions **Notes**

Inputs

Latitude: .233460666237
Longitude: -122.76855468;

Target Size: 1000 ha

Click here to query the [CWFS Fuels Database](#) and determine the fuel parameters for this location (will open in a new tab/window).

Fuels: C2 - Boreal spruce

Fire Fuel Moisture Code 89.0902
Slope 1.039 %

Duff Moisture Code 80.9986
Aspect 209.792 deg

Drought Code 252.6618
Windspeed 8.6069 km/hr

Wind Direction 234.5007 deg

Fire Weather Index 20.47

Fire Behavior Prediction

Rate of Spread	7.09	m/min
Surface Fuel Consumption	3.22	kg/m ²
Total Fuel Consumption	3.83	kg/m ²
Head Fire Intensity	8146.62	kW/m

Emissions

PM _{2.5}	204.31	tonnes
PM ₁₀	241.08	tonnes
CO	2409	tonnes
CO ₂	25998	tonnes
NO _x	28.43	tonnes
GHGs	31330	tonnes CO _{2e}

Fire Timing Info

Discard Changes Apply Create Dispersion

Government of Canada / Gouvernement du Canada

Search Canada.ca

Jobs ▾ Immigration ▾ Travel ▾ Business ▾ Benefits ▾ Health ▾ Taxes ▾ More services ▾

Home → Environment and natural resources → Weather information → Analyses and Modelling → Modelling → [National Wildfire Smoke Model](#)

[Access city](#) | [Weather Topics](#)

Canada's Wildfire Smoke Prediction System (FireWork)

Daily smoke forecast maps from early April to late October

Smoke from wildfires in forests and grasslands can be a major source of air pollution for Canadians. The fine particles in the smoke can be a serious risk to health, particularly for children, seniors and those with heart or lung disease. Because smoke may be carried thousands of kilometres downwind, distant locations can be affected almost as severely as areas close to the fire. To help Canadians be better prepared, wildfire smoke forecast maps are available through the Government of Canada's FireWork system. FireWork is an air quality prediction system that indicates how smoke from wildfires is expected to move across North America over the next 48 hours.

- [Evening forecast](#): a computer-generated smoke animation that indicates how wildfire smoke is expected to spread hour by hour, for the next 48 hours (starting at 00:00 UTC[†] and updated at 05:30 UTC). One-hour steps in the animation can be viewed separately.
- [Morning forecast](#): a computer-generated smoke animation that indicates how wildfire smoke is expected to spread hour by hour, for the next 48 hours (starting at 12:00 UTC[†] and updated at 17:00 UTC). One-hour steps in the animation can be viewed separately.
- [Wildfire smoke and Air Quality](#): Effects of wildfire smoke on your health, actions you can take to protect yourself, and more about the FireWork prediction system.

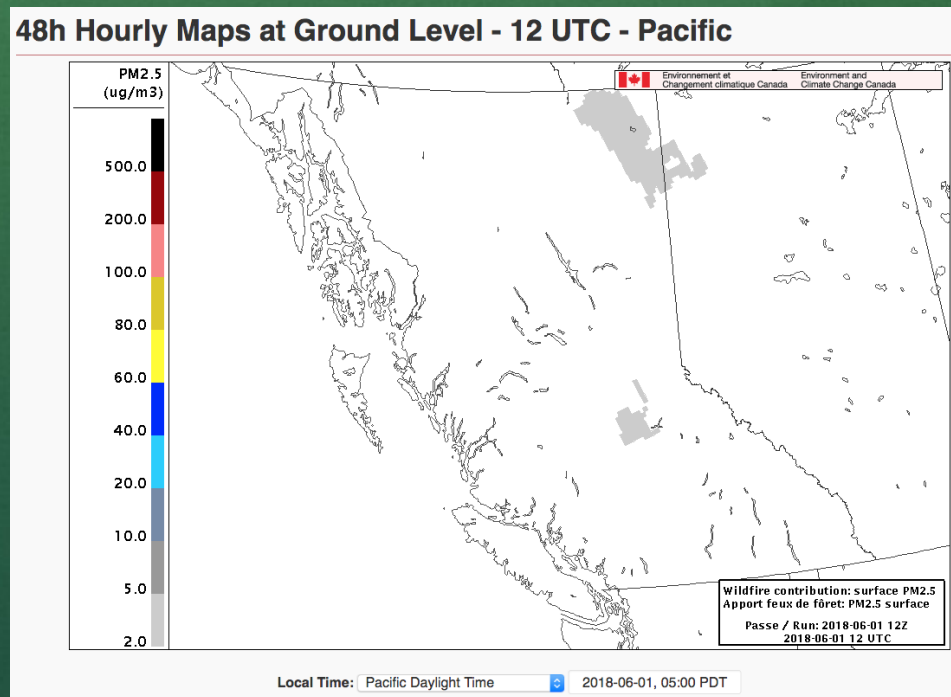
As fire and smoke conditions can change quickly, always check with your local health and emergency officials for the latest developments.

FireWork

Environment Canada

FireWork

- Canada-wide forecasts twice a day
- Forecast WMS
- Incident forecasting service
- www.weather.gc.ca/firework





AirFire

AirFire Research Team
U.S. Forest Service (USFS)

AirFire

- Air Resource Advisors
- Smoke forecasts (BlueSky framework)
 - Point & regional
 - Trajectories
- Air quality tools
- Playground – smoke simulations
- airfire.org (team site, smoke forecasts)
- firesmoke.us (tools portal)

WILDLAND FIRE AIR QUALITY TOOLS PORTAL

TOOL ACCESS | ABOUT THIS SITE | HELP | CONTACT

Wildland Fire Air Quality Tools

WFDSS Integrated Tools v0.9 (Beta Test)

STATUS: IMPORTANT UPDATE 2/6/13:
THIS PAGE IS BEING REDESIGNED AND REIMPLEMENTED FOR THE 2013 WESTERN WILDFIRE SEASON.
SOME FEATURES AND LINKS MAY BE BROKEN IN THE MEANTIME.
WE APOLOGIZE FOR THE INCONVENIENCE.

STEP 1

Set your fire location:

Latitude: 47.50 °N
Longitude: -115.00 °E
Default location used.

Click on map or type location.

STEP 2

Select Your Tool:

- ▶ Smoke Guidance Point Forecast
- ▶ Smoke Guidance Regional Maps
- ▶ Diurnal Surface Wind Pattern Analysis
- ▶ Climatological Ventilation Index Point Statistics
- ▶ Current Air Quality Conditions Map
- ▶ Fire Information & Smoke Trajectories
- ▶ Customized Fuels, Consumption, & Smoke Modeling

See below for tool description, attributes, and other details.

Filter by:

ATTRIBUTE

- [any]
- Instant Access
- Easy to Use
- Localized
- Text-based
- Graphical
- Interactive

FORECAST PERIOD

- [any]
- Uses Climatological Data
- Shows Current Conditions
- 1 Day + Forecast
- 3 Day + Forecast
- 7 Day + Forecast

Tool List

Current filter applied: none (viewing all products)

Smoke Guidance Point Forecast

localized text summary of atmospheric conditions affecting smoke
produced by: National FCAMMS

National FCAMMS Smoke Dispersion Forecast Guidance	
GFS Forecast Initialization Time: 06/07/2009 02:00	
Forecast duration (UTC)	06/07 12:00:00 - 06/09 12:00:00
Mixing height (m)	200 - 2000 - 2000
Mixing height wind speed (m/s)	3 - 4 - 1
Mixing height wind direction	180 - 200 - 120
Vertical resolution (m)	1515 - 1450 - 900
Release Level	3 - 2 - 2
Release Method	2 - 2 - 2
Release Rate	2 - 2 - 2
PM2.5 release (ug/m³)	999 - 999 - 999

Predicted conditions at your location affecting fire and smoke.

- Mixing Height
- Transport Winds
- Ventilations Index
- Haines Index
- National Scope
- 7 day Point Location Forecast
- Uses National Weather Service NAM and GFS weather predictions

GFS (7-day) forecast [View Point Forecast](#)

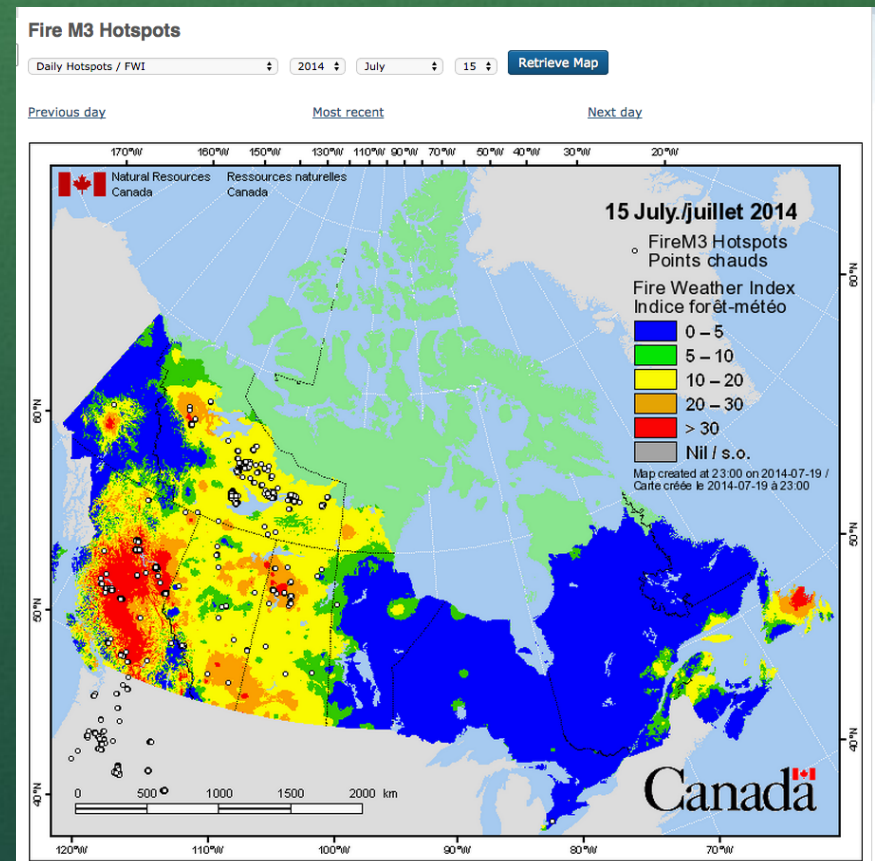
[learn more](#)

ATTRIBUTES

- INSTANT ACCESS
- EASY TO USE
- LOCALIZED
- text
- ATMOSPHERIC CONDITIONS

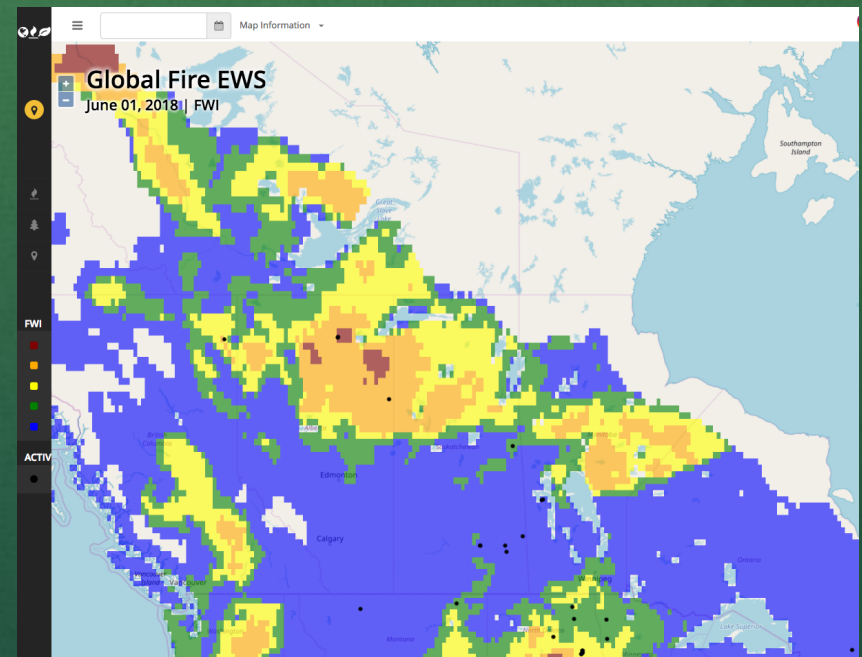
Canadian Wildland Fire Information System (CWFIS)

- Daily maps
 - Fire weather & fire behavior (year-round)
 - Hot spot maps (during forest fire season)
- Datamart
 - National Fire Database (polygon & point data)
 - Hot spots & ground reports (daily download)
- cwfis.cfs.nrcan.gc.ca



Global Fire Early Warning System

- 1-10 day fire weather index (FWI) forecast
- Displays FWI with hotspots
- Collaboration between University of Alberta, NRCan, CMC
- canadawildfire.ualberta.ca



NOAA Hazard Mapping System (HMS)

- Analysis
 - Interactive GIS tool
 - Maps & Google Earth files
- Satellite imagery
 - GOES & active fires (NOAA)
 - MODIS (NASA)
- www.ospo.noaa.gov/Products/land/hms.html



Recap

Organization	aka	URL
BlueSky Canada	BSC	www.firesmoke.ca
EC Firework	FireWork	www.weather.gc.ca/firework
USFS AirFire Lab	AirFire	www.airfire.org
Canadian Wildland Fire Information System	CWFIS	cwfis.cfs.nrcan.gc.ca
Global Fire Early Warning System	EWS	canadawildfire.ualberta.ca
NOAA Hazard Mapping System	HMS	www.ospo.noaa.gov/Products/land/hms.html

Contact

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**Canadian Safety
and Security Program**



Natural Resources
Canada

Ressources naturelles
Canada



Government
of Alberta

Alberta



MINISTRY OF NATURAL RESOURCES



Environment
Canada Environnement
Canada

