

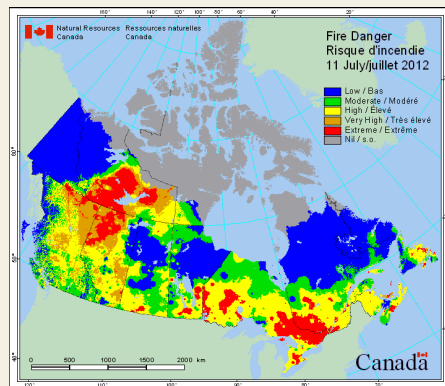


The Canadian Forest Fire Danger Rating System Next-Generation



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Natural Resources Canada
Canadian Forest Service





Next Generation - CFFDRS

Webinar: Ongoing activities in the development of a next generation of the Canadian Forest Fire Danger Rating System. Aug 15, 2014.

Presenter: *Mike Wotton, Canadian Forest Service and University of Toronto*

Mike Wotton visited Fairbanks in August 2014 to talk with managers and researchers about the further development and enhancement of the Canadian Forest Fire Danger Rating System (CFFDRS), which is the system used universally across Canada (and in other areas, including Alaska) by fire managers for daily operational estimation of fuel moisture, fire danger and potential fire behavior.

This visit is part of an ongoing focus on how to improve our use of CFFDRS in Alaska, which will include a [CFFDRS in Alaska Summit](#) October 28-30. Click the link for more information.

Watch Mike's [recorded webinar](#) on Vimeo.

Download PDFs of Mike's presentation slides:

- [Ongoing activities in the development of a next generation of the Canadian Forest Fire Danger Rating System](#)
- [CFFDRS and research applications](#)



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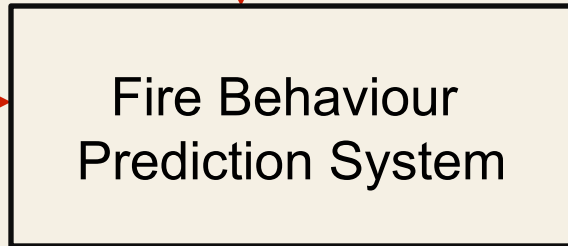
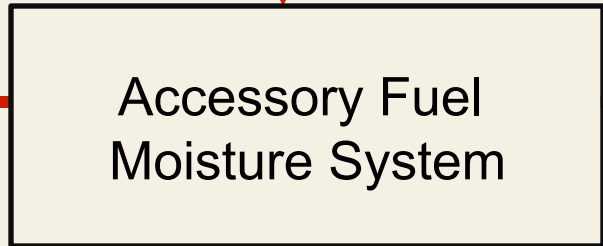
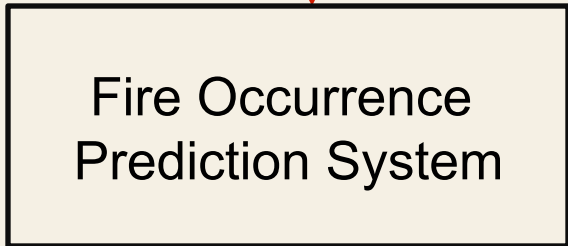
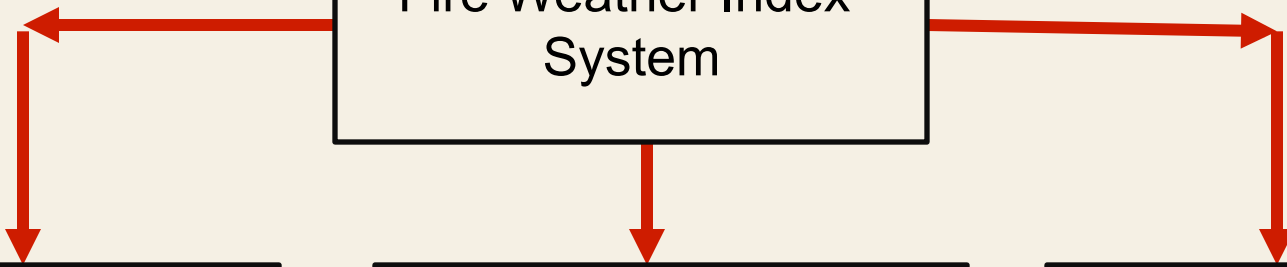
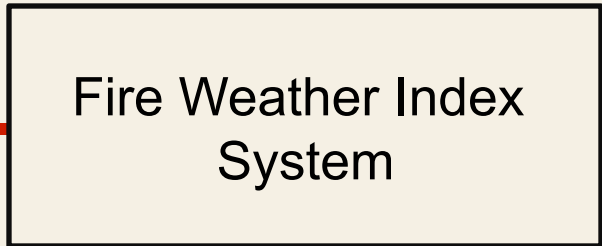


Current CFFDRS

Ignition
Risk

Weather

Topography
Fuels



CFFDRS

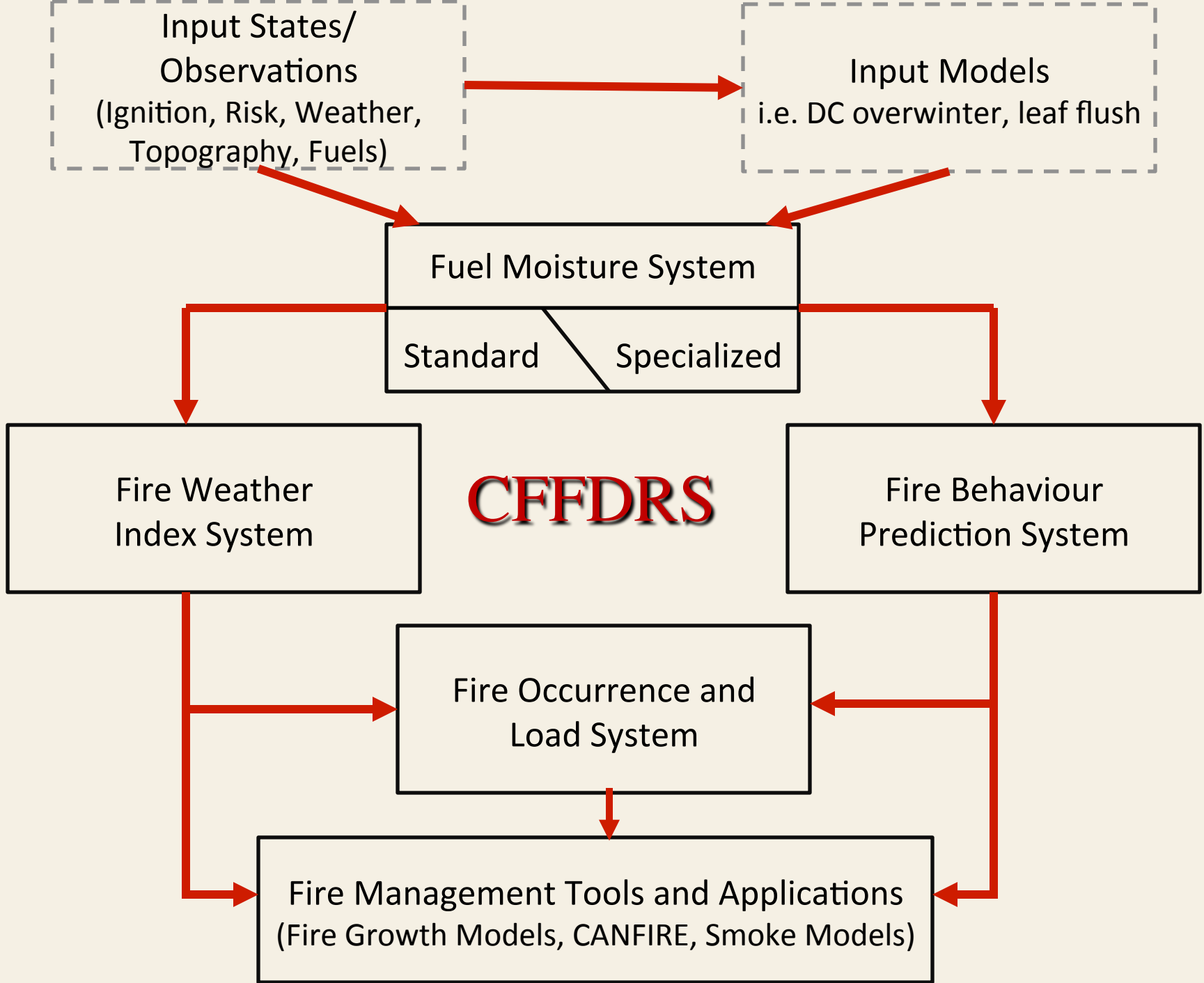




Development Philosophy

- Not a complete overhaul; improvement of known issues by integrating new fire science and technological advancements
- Based on field studies that capture key processes
- Introduce greater flexibility
- Maintain simplicity; limited physical parameters, readily available inputs, easy to use and understand





Input States/
Observations
(Ignition, Risk, Weather,
Topography, Fuels)



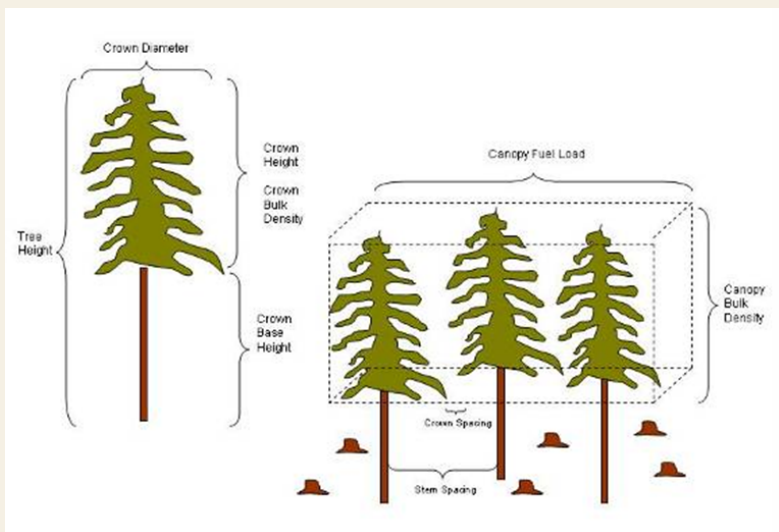
Input Models
i.e. DC overwinter, leaf flush

C-3

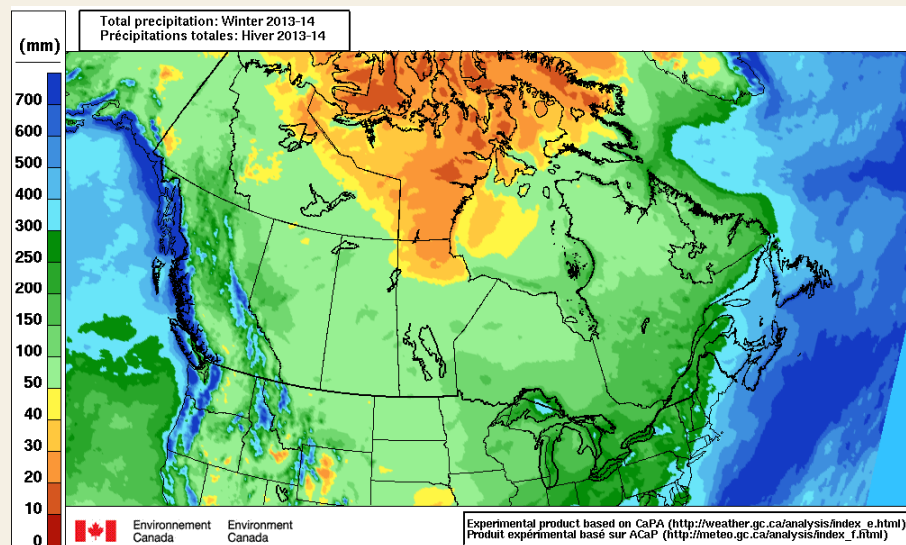
Mature Jack or Lodgepole Pine



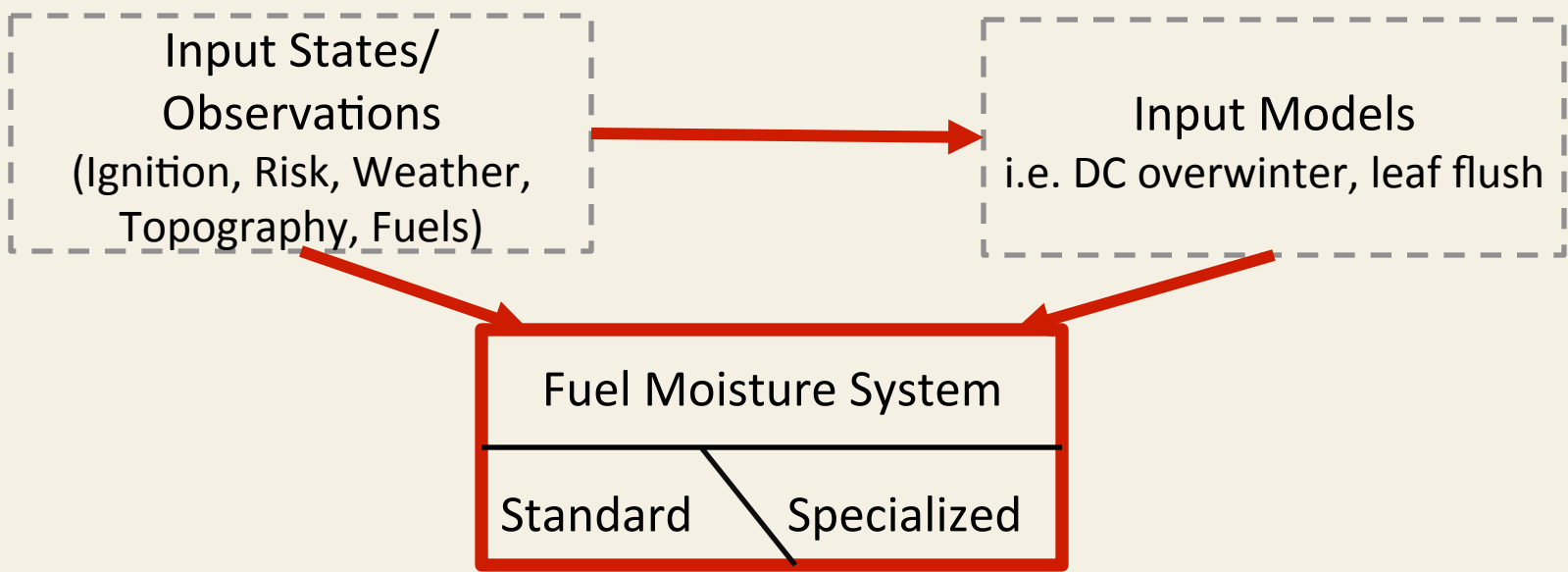
CFFDRS



New fuels categories and characterization



DC overwinter model



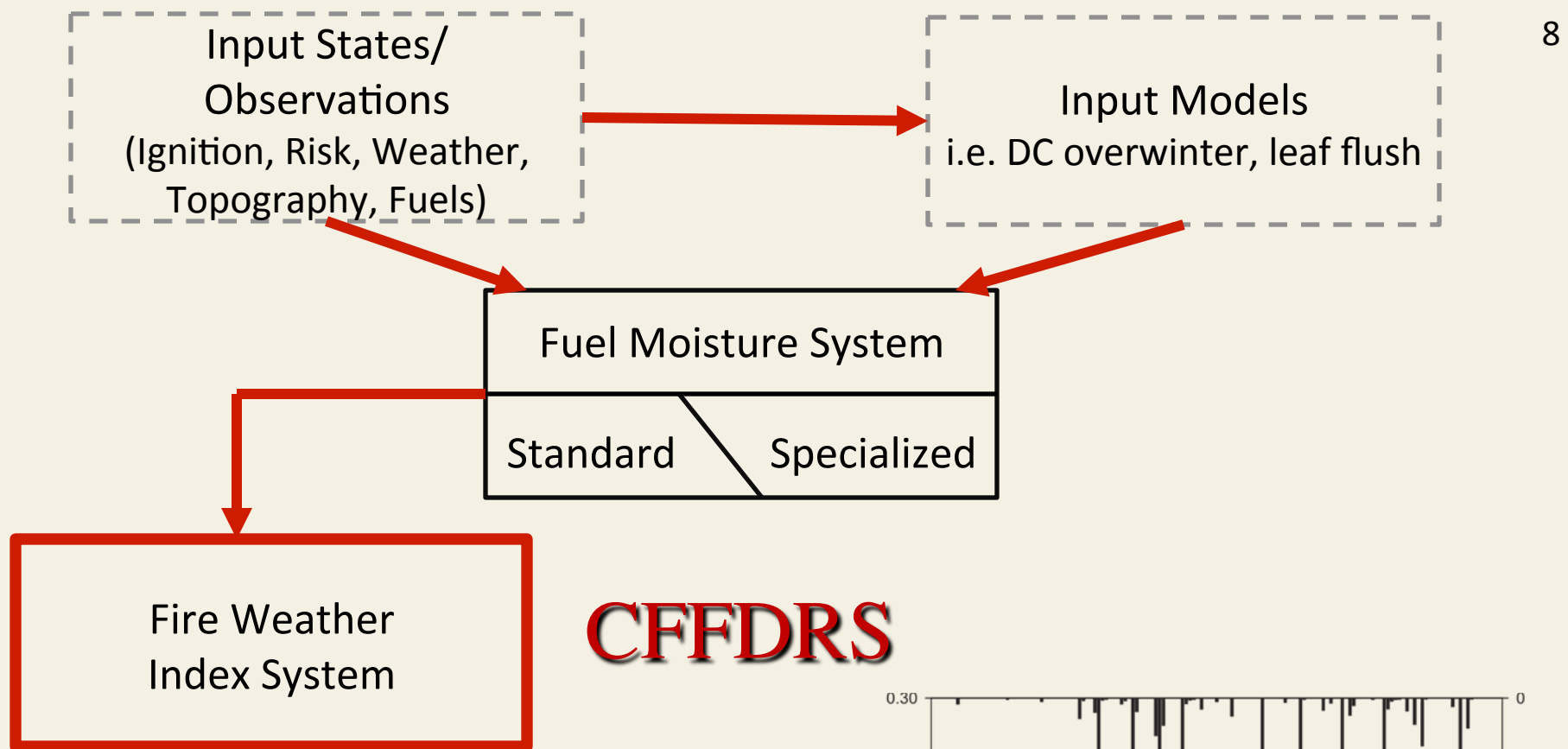
CFFDRS



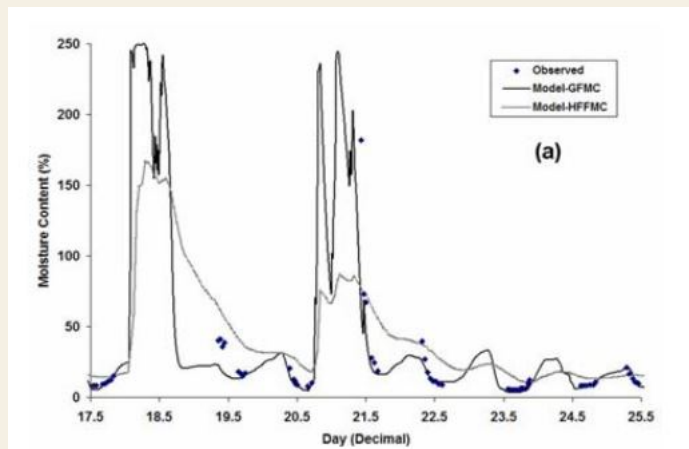
Pine forest standard moisture codes



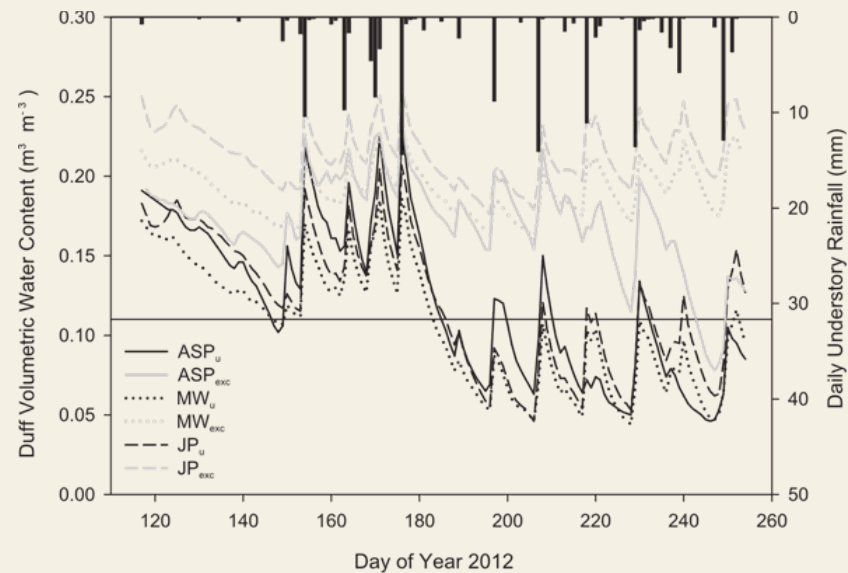
Peat Moisture Code: Waddington et al. 2012 CJFR



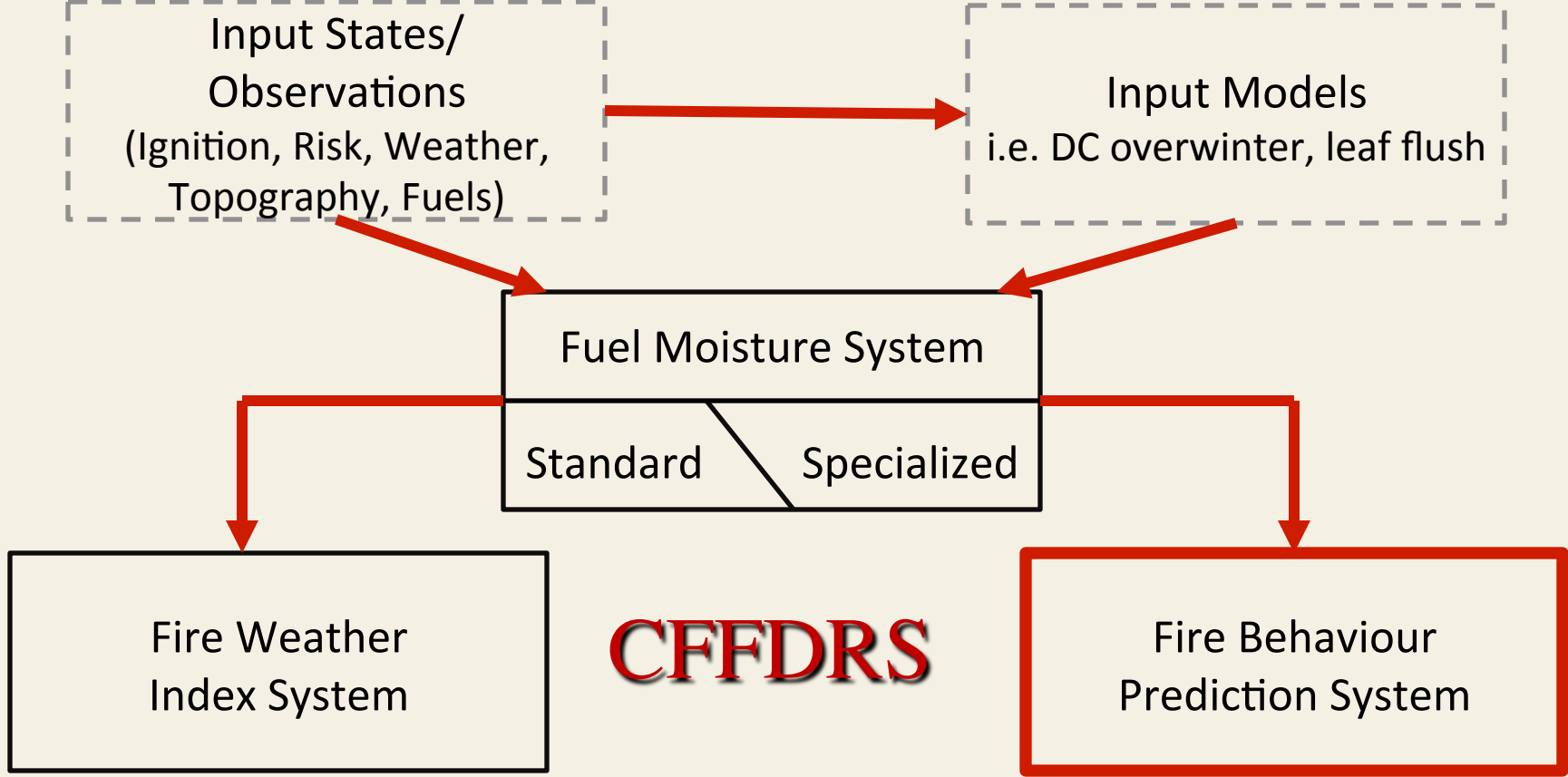
CFFDRS



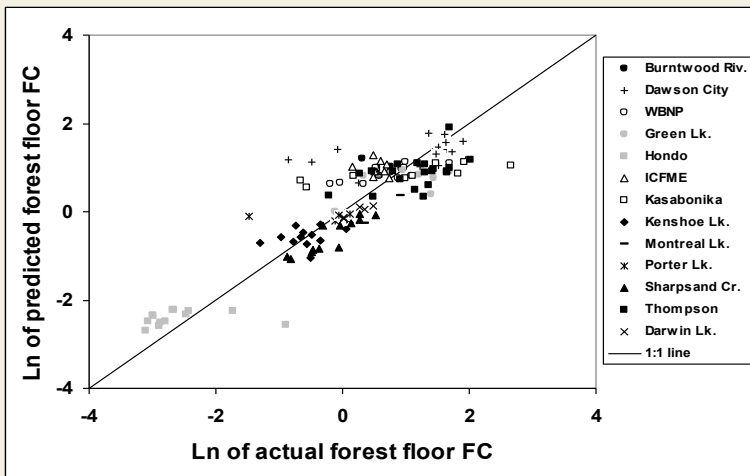
Grass Moisture Model: Wotton 2009



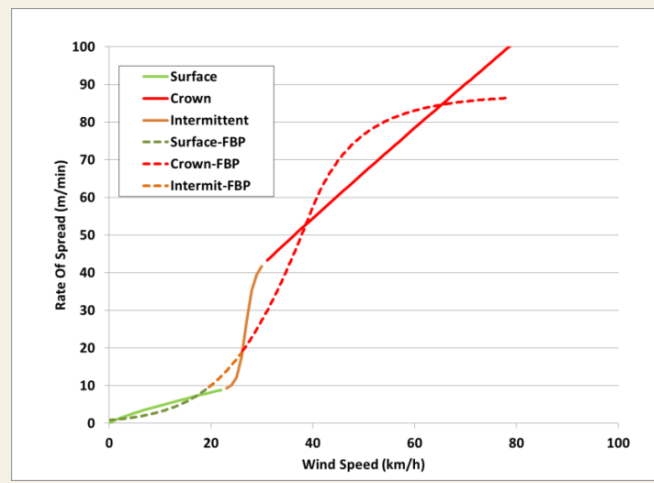
Evapotranspiration and DMC: Thompson et al. submitted CJFR



CFFDRS



Fuel load specific consumption models



Dual equilibrium spread models

Input States/
Observations
(Ignition, Risk, Weather,
Topography, Fuels)

Input Models
i.e. DC overwinter, leaf flush

Fuel Moisture System

Standard

Specialized

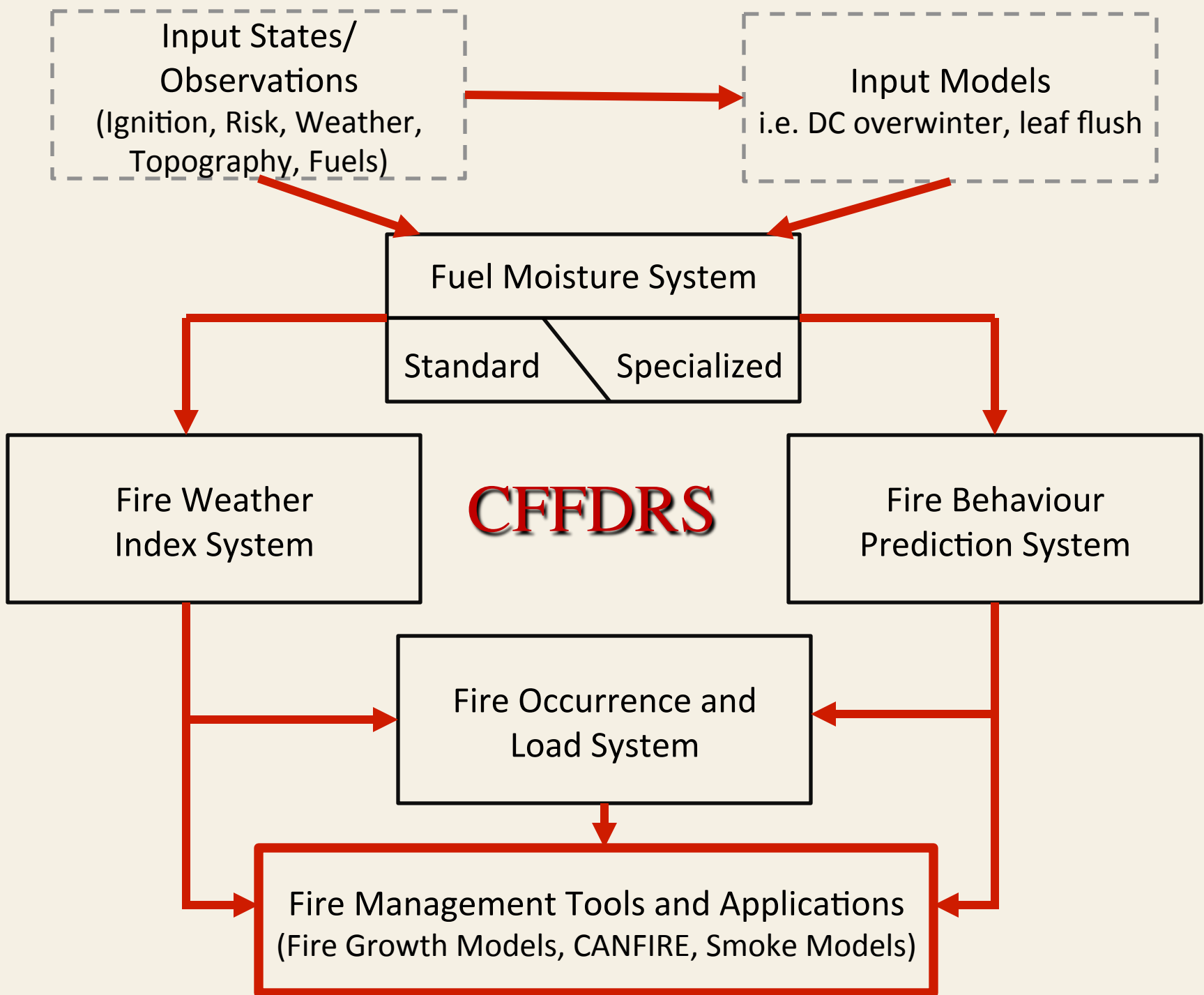
Fire Weather
Index System

CFFDRS

Fire Behaviour
Prediction System

Fire Occurrence and
Load System





REDapp Fire Behaviour Calculator



REDapp.org

The REDapp Community



Home of REDapp - The Universal Fire Behaviour Calculator

REDapp is a fire management decision support tool developed with financial support from the Canadian Interagency Forest Fire Centre (CIFFC), and in-kind support from fire management agencies across Canada. The founding members of the REDapp development team represent the Government of Alberta, Government of the Northwest Territories, Heartland Software Solutions Inc., and Natural Resources Canada.

As of Feb 2014:

- The Status of REDapp is: Community Beta 1.9 - This means that REDapp is only available to REDapp Community members and is still experimental.
 - We are expecting a major release in Q1 or Q2 of 2014
- The Status of the Community is closed (Invite only)
 - We expect to open the community to the public when the first official release of REDapp occurs

- Single step calculator for fire behaviour based on CFFDRS
- Input or download weather, FWI Calculator, FBP Calculator, Spotting Calculator, Mapping Tool, and Statistics

REDapp

Date and Time: Date: May 24, 2014, Time Zone: EDT: Eastern Daylight Time (-5:00), Ignition Location: Latitude: 46.57777, Longitude: -84.08115, **FIND CURRENT LOCATION**

Weather: FWI Calculator | FBP Calculator | Spotting Calculator | Map | Statistics

Current Conditions

Province: Ontario, City: Sault Ste. Marie, Time of Observation: 11:00, 24 October 2014, Temperature: 7.5 °C, Relative Humidity: 98 %, Wind Speed: 4.0 km/h, Wind Direction: 90 °, **TRANSFER TO FWI**

Ensemble Forecast

Province: Ontario, City: Sault Ste Marie, Weather Model: GEM (selected), NCEP, Custom, Ensemble Output: 00Z (selected), 12Z, 50th Percentile (selected), 75th Percentile, 95th Confidence Interval, Forecast Day: 1, Display Time in UTC, **EXPORT FORECAST**, **TRANSFER TO STATS**

Date and Time	Temp	RH	Precip	WS	WD
0:00					
6:00					
12:00					
18:00					

TRANSFER TO FWI, **ASSUMPTIONS**, **SETTINGS**, **RESET**, **BUGS AND TECH SUPPORT**

REDapp

Date and Time: Date: May 24, 2014, Time Zone: EDT: Eastern Daylight Time (-5:00), Ignition Location: Latitude: 46.57777, Longitude: -84.08115, **FIND CURRENT LOCATION**

Weather: FWI Calculator | FBP Calculator | Spotting Calculator | Map | Statistics

Map view showing Sault Ste. Marie, Lake Superior, Lake Huron, Lake George, and surrounding areas. A red fire icon is visible near Sault Ste. Marie. **Map** | **Satellite**

Display

- Current Location
- Ignition
- Fire Perimeter
- Weather Stations

EXPORT, **ZOOM TO IGNITION**, **ASSUMPTIONS**, **SETTINGS**, **RESET**, **BUGS AND TECH SUPPORT**



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REDapp User Community

- Establishment of User Community through forums, user directory listing, user input on application changes (Voting)

Home The Project REDapp Team Get REDapp Contact Forums Library Voting Login

REDapp.org

The REDapp Community

First Steps Add content Invite someone! User Directory Recent content

Logout

First Steps...

Welcome to the REDapp community. Here is a handy list of things you can do here, we encourage you to do them all :)

- [Get a copy of REDapp.](#)
- [Go to the homepage and see whats new.](#)
- [Read and post in the Forums](#) Post here to ask for help with REDapp or to report a bug in REDapp.
- [Visit the REDapp Library](#) - read release notes or other project documents.
- [Use the Contact page](#) to report a typo or give us feedback about the website.

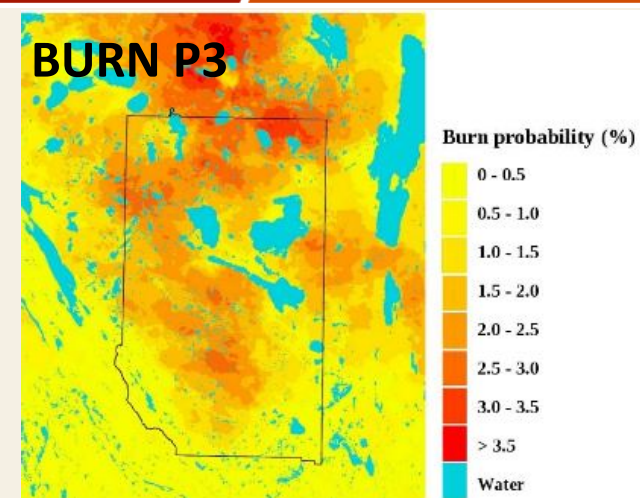
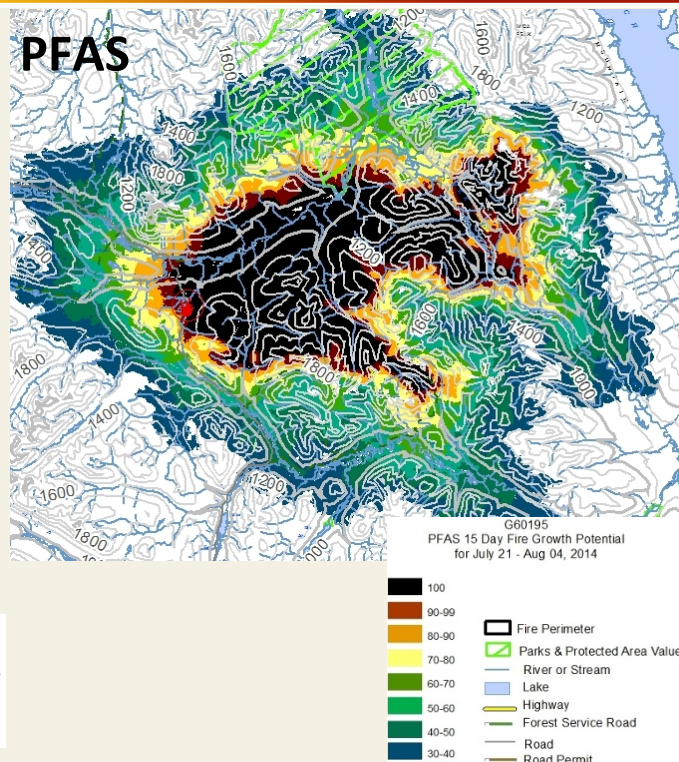
- [Invite others](#) - Use this to help your mates get into REDapp.
- [manage your account, invitations and watched posts.](#)



CFFDRS Fire Growth Models



- Final fire perimeter
- Forward spread distance
- 30 min fire progressions



- All models are based on FWI and FBP inputs
- Consistent inputs and formats
- All spatially explicit





CFFDRS Fire Growth Models

Prometheus

- Deterministic fire growth simulation
- Modular, allows easy incorporation into other models
- Real-time fire growth (days) for operational use
- Similar to Farsite (see Opperman et al. 2006 for comparison)
- Maintained by Alberta ESRD
- Contact: Neal McLoughlin

PFAS (Long Range Model)

- Probabilistic model using historical data to model the probability of fire spread in a given period of time
- Also includes probability of natural extinction
- Used operationally (weeks-months) to prioritize fires on landscape, and/or for modified response
- Similar output to FSPRO, but different modelling approach
- Maintained by CFS in Edmonton
- Contact: Kerry Anderson

Burn P3

- Stochastic fire ignition with deterministic fire spread
- Burn probability for all pixels on the landscape; also includes fire intensity
- Landscape scale long-term planning tool
- Might work well with RAVAR for risk assessment
- Maintained by CFS in Edmonton
- Contact: Marc Parisien



Fire Effects and Smoke Models

CANFIRE – Canadian Fire Effects Model

- Bill deGroot – CFS Sault Ste. Marie

<http://www.glfc.forestry.ca/canfire-feucan/>

Smoke Modelling

- Blue Sky – Kerry Anderson – CFS Edmonton
- Canadian Meteorological Centre Smoke Forecasting System – Didier Davignon - Environment Canada

<http://www.sk.lung.ca/index.php/protect-your-lungs-mainmenu/air-quality/smokenews>



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Concluding Remarks

- Work in progress
- Small group of researchers, limited budget, large task..... CFS is glad to partner on research opportunities particularly experimental burning projects
- For more details please refer to Mike Wotton's webinar
<https://www.frames.gov/partner-sites/afsc/events/previous-events/previous-webinars/wotton/>
- mike.wotton@utoronto.ca

