

A large wildfire is burning in the background, with thick, dark smoke rising into the sky. The foreground is a lush green forest, partially in shadow. The text "B.C. Wildfire Service" is overlaid in the center.

B.C. Wildfire Service

Fire

- 10 year fire averages:
 - 1 847 fires
 - 115 464 ha
 - 39% Human caused, 61% lightning caused
- The fire season in BC is generally considered to be from April through October. However, in the dry southern parts of the province the season may stretch from March into November.



Fuel Types



Canadian FBP System Fuel Types



C-1



C-2



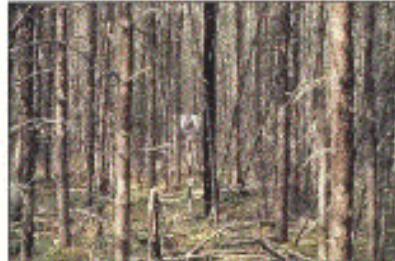
M-1



M-2



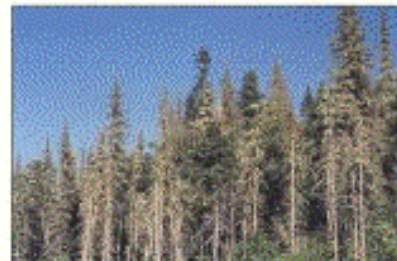
C-3



C-4



M-3



M-4



C-5



C-6



S-1



S-2



C-7



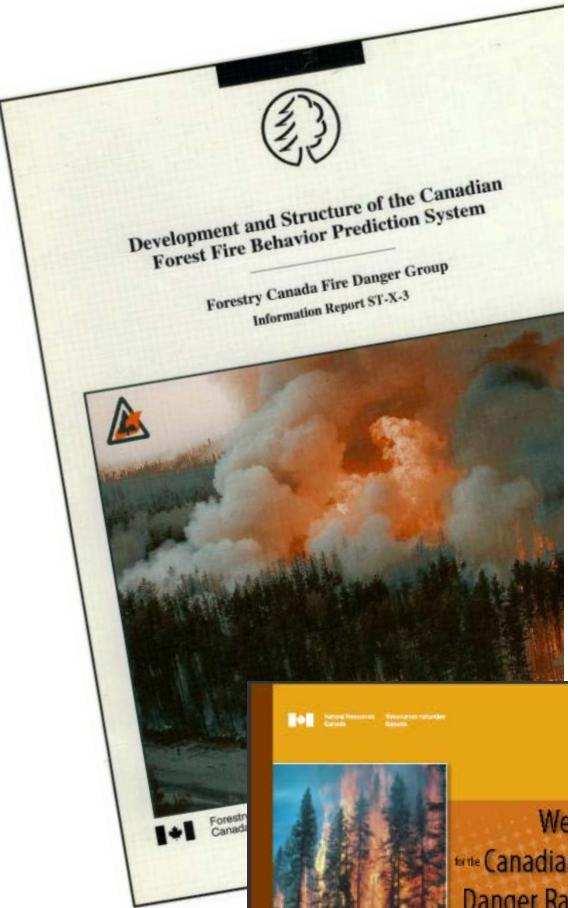
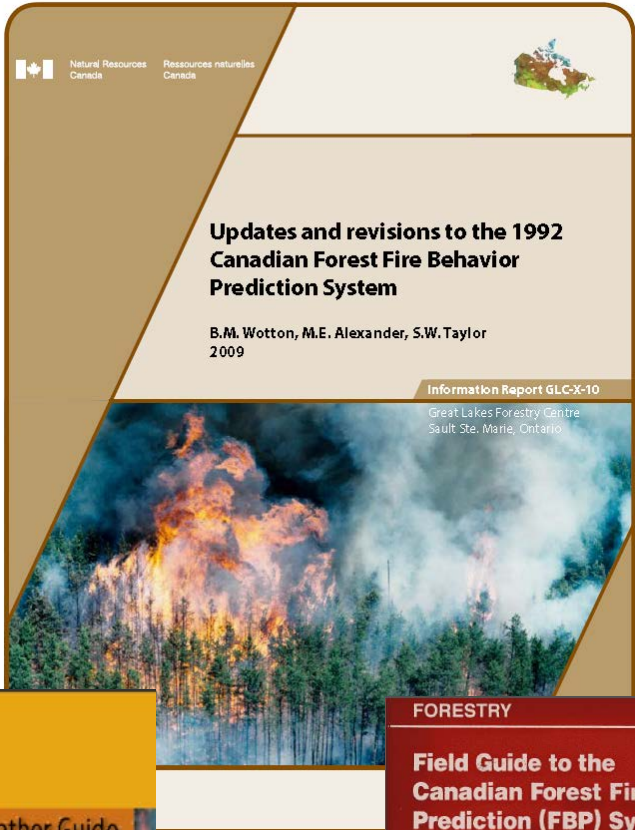
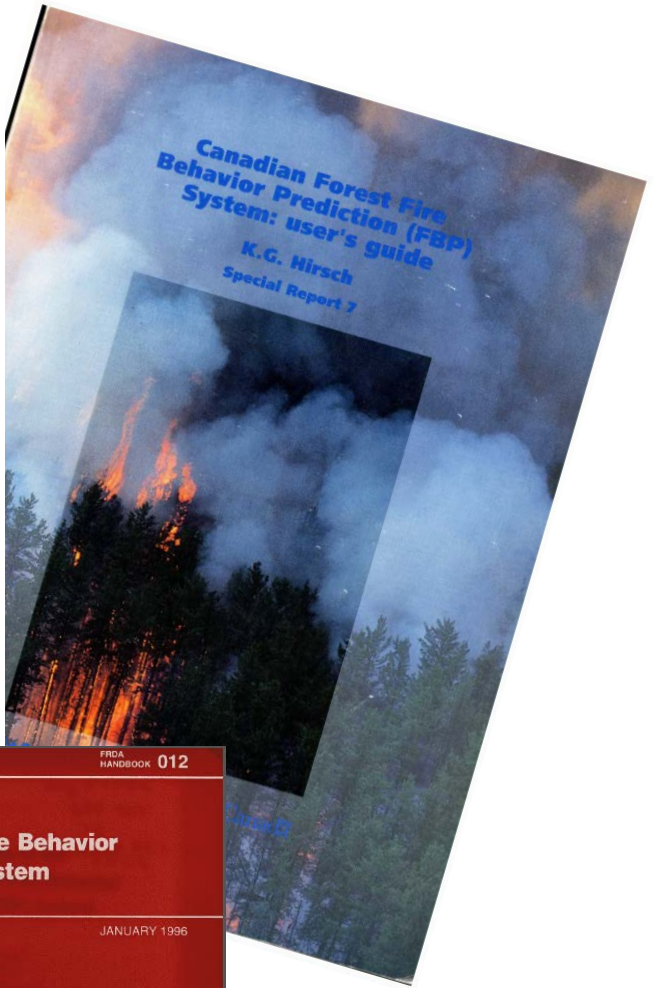
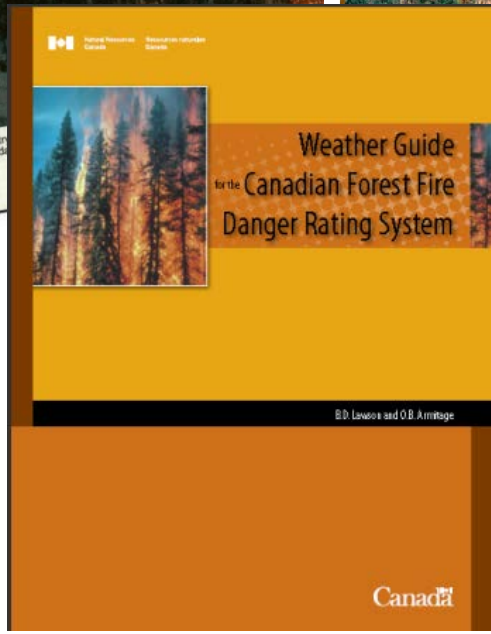
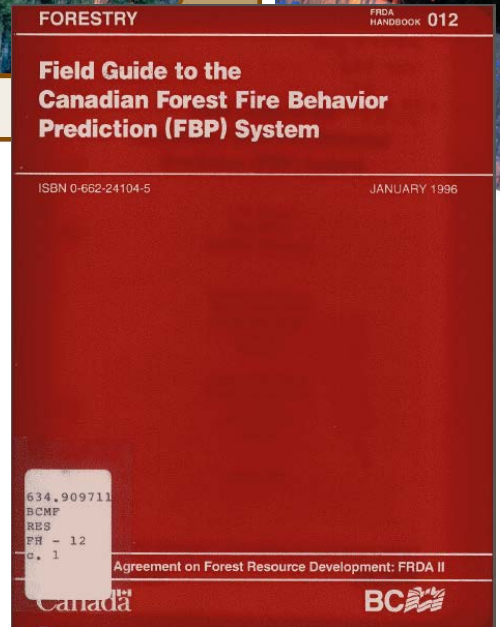
D-1



S-3



O-1

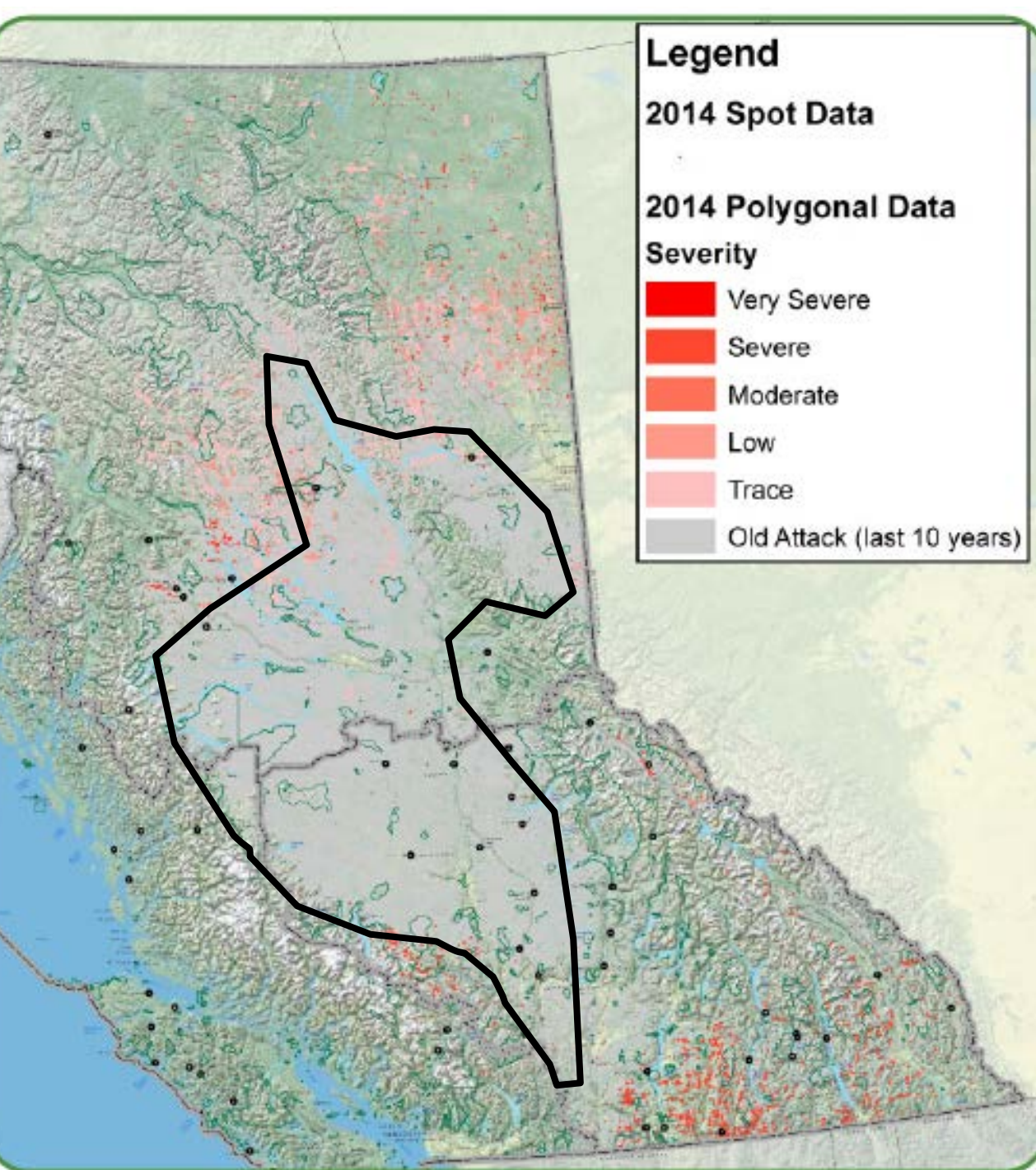


Fuel Types

- Due to the wide variety of climates and terrain in the province, most FBP fuel types are represented in BC.
- A number of fuels, especially the hemlock, fir, cedar mixes along the coast and in the interior wet belt, are not well represented by the FBP fuel types, so a best fit based on close examination of the fuel complex structure is required.
- To represent the spruce-balsam stands in the central and northern interior the C-3 fuel type has been modified by reducing the crown base height and increasing the crown fuel load. Tables are available. Field validation continues.

Fuel Types

- The C7 (Ponderosa Pine/Douglas Fir) fuel type has been revised to include an adjustable grass curing component.
 - the accuracy of projections made before grass, which is the primary fire carrier in this type, has fully cured.
- Large tracts in the central interior are heavily infested with Mountain Pine Beetle. Studies are proceeding to determine the impact of different stages of the mortality process on fire behaviour.



Mountain pine beetle infestations recorded in British Columbia in 2014

“Shows the leading edge of the Infestation”

Fire Research Paper dealing with rate of spread in MPB Forest (1-5 years post attack)

Fire Ecology Volume 10, Issue 2, 2014
doi: 10.4996/fireecology.1002010

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RESEARCH ARTICLE

MODELING WILDFIRE SPREAD IN MOUNTAIN PINE BEETLE-AFFECTED FOREST STANDS, BRITISH COLUMBIA, CANADA

Daniel D.B. Perrakis^{1*}, Rick A. Lanoville², Stephen W. Taylor³, and Dana Hicks¹

¹Ministry of Forests, Lands, and Natural Resource Operations, Wildfire Management Branch,
2957 Jutland Road, Second Floor, Victoria, British Columbia, Canada V8T 5J9

²Department of Resources, Wildlife, and Economic Development,
Forest Management Division (Retired), Government of Northwest Territories,
PO Box 7, Fort Smith, Northwest Territories, Canada X0E 0P0

³Canadian Forest Service, Pacific Forestry Centre,
506 West Burnside Road, Victoria, British Columbia, Canada V8Z 1M5

*Corresponding author: Tel.: +1-250-356-0082; e-mail: Daniel.Perrakis@gov.bc.ca

ABSTRACT

The mountain pine beetle (*Dendroctonus ponderosae* Hopkins; MPB) has killed lodgepole pines (*Pinus contorta* Dougl. ex Loud.) across 20 million hectares of central British Columbia, Canada, since the late 1990s, challenging land managers as well as fire management personnel. Although recent studies have used models to simulate how MPB might affect fire spread, very little fire behaviour has been documented in MPB-affected stands. We documented rate of spread (ROS) in experimental fires and wildfires in recent MPB-killed stands in British Columbia using interpretations of oblique photographs, airborne measurements of wildfire spread, and experimental burns. Fire spread observations were used to develop ROS models following the empirical approach of the Canadian Forest Fire Danger Rating System (CFFDRS). Sixteen fire runs were examined that occurred in mature MPB-affected

RESUMEN

El escarabajo de pinos de montaña (*Dendroctonus ponderosae* Hopkins; MPB) ha provocado la muerte del pino contorta (*Pinus contorta* Dougl. ex Loud.) en 20 millones de ha en la Columbia Británica del Canadá desde fines de los 1990s, generando un desafío tanto para los gestores del territorio como para el personal de gestión del fuego. Aunque estudios recientes han usado modelos para simular como el MPB podría afectar la propagación del fuego, el comportamiento del fuego en rodales afectados por MPB ha sido escasamente documentado. Nuestro trabajo documenta la velocidad de propagación (ROS) en fuegos experimentales e incendios en rodales muertos recientemente por acción del BMP en la Columbia Británica, usando interpretaciones de fotografías oblicuas, mediciones de desplazamiento del fuego por acción del viento, y quemas experimentales. También utilizamos observaciones de velocidades de propagación del fuego, para desarrollar modelos de propagación siguiendo la aproximación empírica del Sistema Canadiense de Evaluación de Peligro de Incendios forestales (CFFDRS). Fueron examinadas dieciséis corridas de incendios ocurridas en rodales maduros, afectados

“a linear average of 2.7 times higher ROS in best fit models than expected for unaffected pine.”

Publish by:

Fire Ecology

Volume 10, Issue 2

2014

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L.A.C.E.S and the MPB Forest

- L. - Lookouts - You need lookouts to monitor fire behaviour to ensure you are aware of the transition of surface fire to crown fire. Remember this can occur in a matter of seconds and these seconds can count in terms of your safety
- A. - Anchor Points - You must start all action from a non flammable point. It is good to use this anchor point as a safety zones as well
- C. - Communication - Talking as a group, briefings, radio communication all form part of this. Marking no work zones and safety zones and escape route are also from of communications.
- E. - Escape Routes - Yes routes, you should have more than one. Remember you are in a forest of weakened trees, escape routes can be cut off by falling trees. Marked? Scouted? Timed?
- S. - Safety Zones - Make sure you have a big enough safety zone, remember you are dealing with higher fire intensity than the Red Book is showing you. Remember the surrounding forest could fall or blow down with the weaken root structure. (old rule of thumb 10 times the size, in diameter, of the surrounding forest or 4 times the maximum flame height.*) A new rule of thumb may be better at 15 or 20 times the forest height? If you don't have an area, build it!!!!

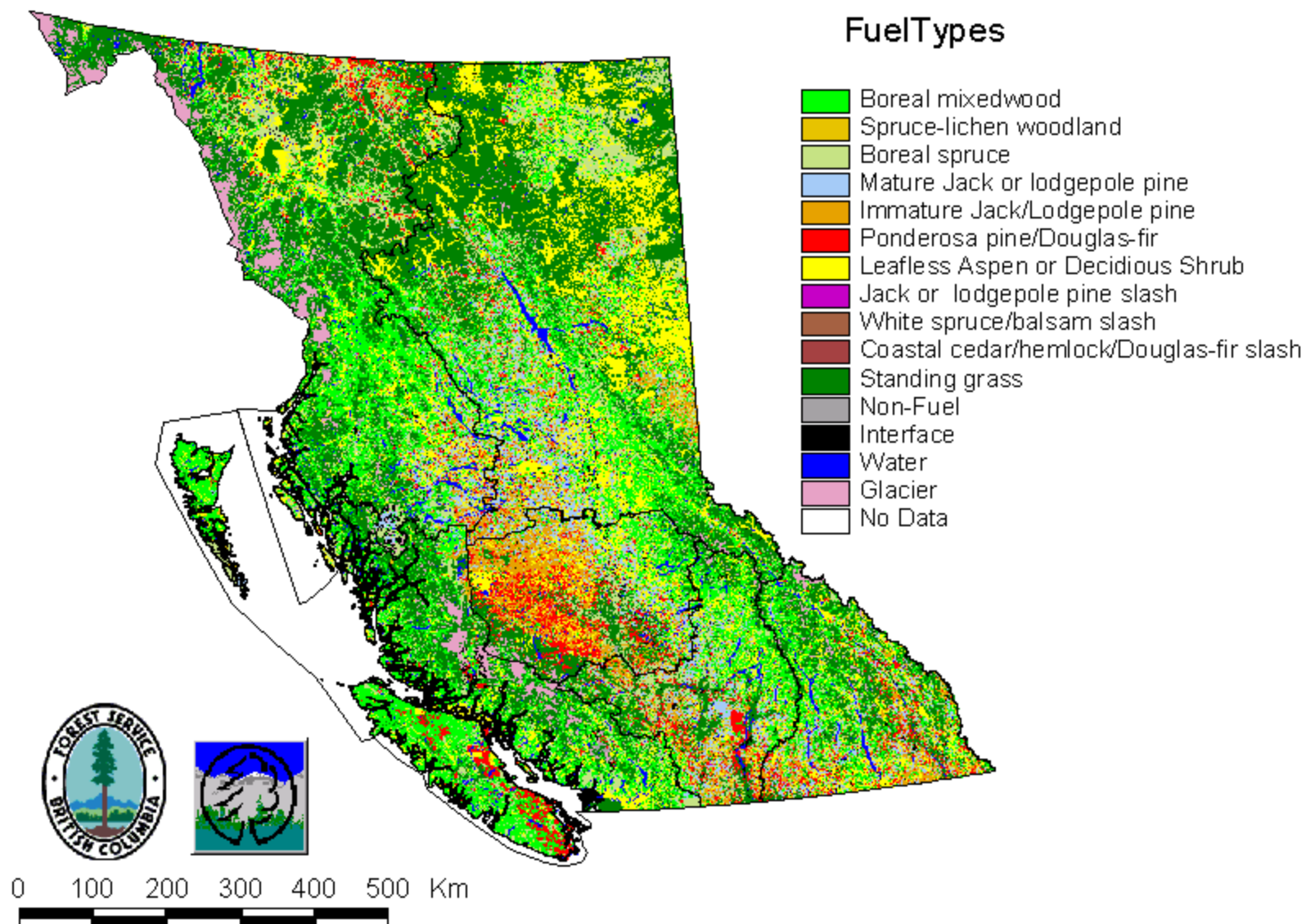
* average flame height of crown fires in conifer forests is generally 2 to 2.5 times the stand height

Final Thoughts

- Use ANCHOR points in any suppression activity
- Monitor the fire environment
 - Utilize the information that your hourly wx readings are giving you
 - Take hourly weather reading
 - Be aware of surrounding fuel types (receptive fuel beds for spotting)
 - Watch for any topography features (may see even quick short fire runs with topography interactions)
 - Areas with understory will be the most active in terms of fire behaviour
- No two areas will be the same from a fuel perspective, you will be working in areas where the fuel has fell down, is falling down, or could fall down. Assess the stands before working in any area.
- Remember LACES!!!!
- ... And one more time ... ANCHOR POINTS!!!!!!



British Columbia Forest Protection



Weather

- Weather patterns locally are strongly affected by the mountain ranges. The wettest areas will be on the westward slopes and the driest to the east.
- During outflows, coastal areas can experience similar conditions along with high winds, when a high pressure system lies over the interior and a low sits off the coast.
- Additional mountain influences are covered in the **Topography** section.

Weather

- Though most weather systems move eastward from the Pacific Ocean, the southern part of the province is also subject to tropical moisture feeds that move north from the US. These increase the potential for high based lightning in the affected areas.
- Additionally the area east of the Rocky Mountains is affected by drying flows from Alberta and the NWT.
- Local weather patterns and anomalies should be discussed with the fire weather forecaster upon arrival at the fire center.

Weather

- Fire weather forecasters are dedicated to each fire center during the fire season.
- Fire weather data is collected hourly from an automated network of 290+ fire weather stations.
- Daily values are also provided from 50+ MSC weather stations to fill gaps in the hourly network.
- Fire specific forecast can be requested from the forecasters
- Onsite feedback and hourly weather is very appreciated by the forecasters

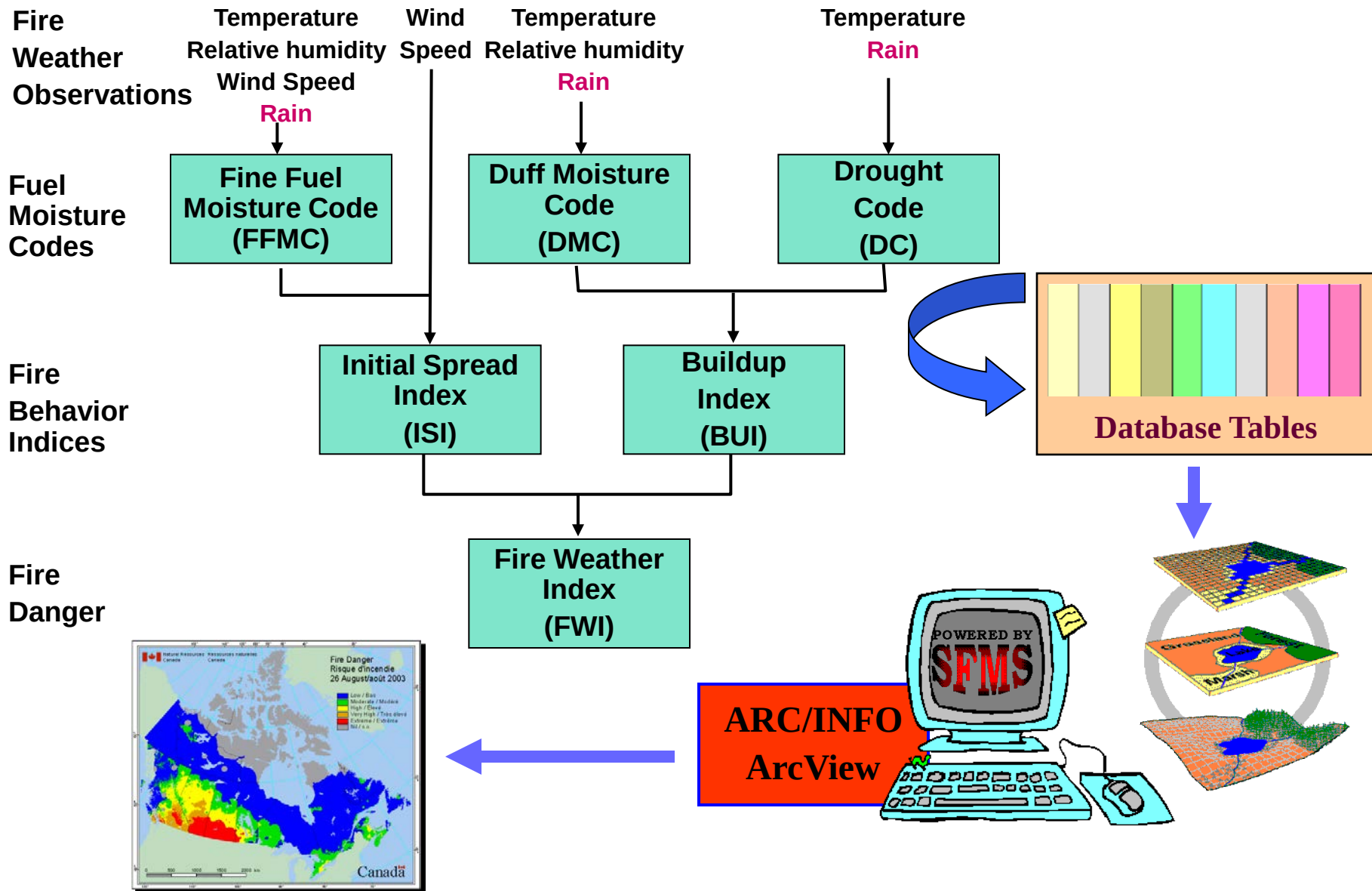
Weather

- The weather data and calculated codes and indices are posted on the website.
- Quick Deploy weather stations are available if there is not a representative network station.
- Belt weather kits are also available for feed back from the fireline. Most BC staff carry a kit with them.

Forecast Regions, Fire Weather Zones & Danger Index Regions



Canadian Forest Fire Weather Index System



Fire Weather Site

Fire Weather Home - Microsoft Internet Explorer provided by Protection Branch - Dec 6, 2002

Back Forward Stop Refresh Home Search Favorites Media History Print

Address <http://142.36.185.24/scripts/menu/BC/ShowPage...> Go

File Edit View Favorites Tools Help Links Google Emp-portal PB Int FWx Wx Polling Fire Sciences EC Wx EC Seasonal

OFTS Fire Weather I-Maps System

Home>Fire Weather>Fire Weather Home

Fire Weather Home

Welcome to the Fire Weather website!

Notes & What's New

- September 30** A new interface for [SFMS](#) is now interface. The maps are identical in both interface.
- August 8** Added an online [Resource Offer](#) list
- July 4** The weather station map tool has returned. Maps & Images / Static Maps / Weather Station
- June 24** The ability to sort by weather zone has been added. Data (one day), Hourly Weather Data (one hour), Weather Indices, Weather History and Hourly Precipitation
- June 2** To reduce confusion, interactive maps now have a default background color
- May 20** Have you tried graphing weather data yet?
- May 12** If you'd like to change your default background color, click on the "Change Background Color" link in the "Weather Data" section.

Home
Fire Occurrence Prediction
Graphs
Maps & Images
Reports
Text Forecasts
Weather Data
Data Entry
Maintenance & Utilities
Help

Daily
Hourly



Wind driven. Vince Fire, north end of Horseranch Range June 2002, NW Fire Centre



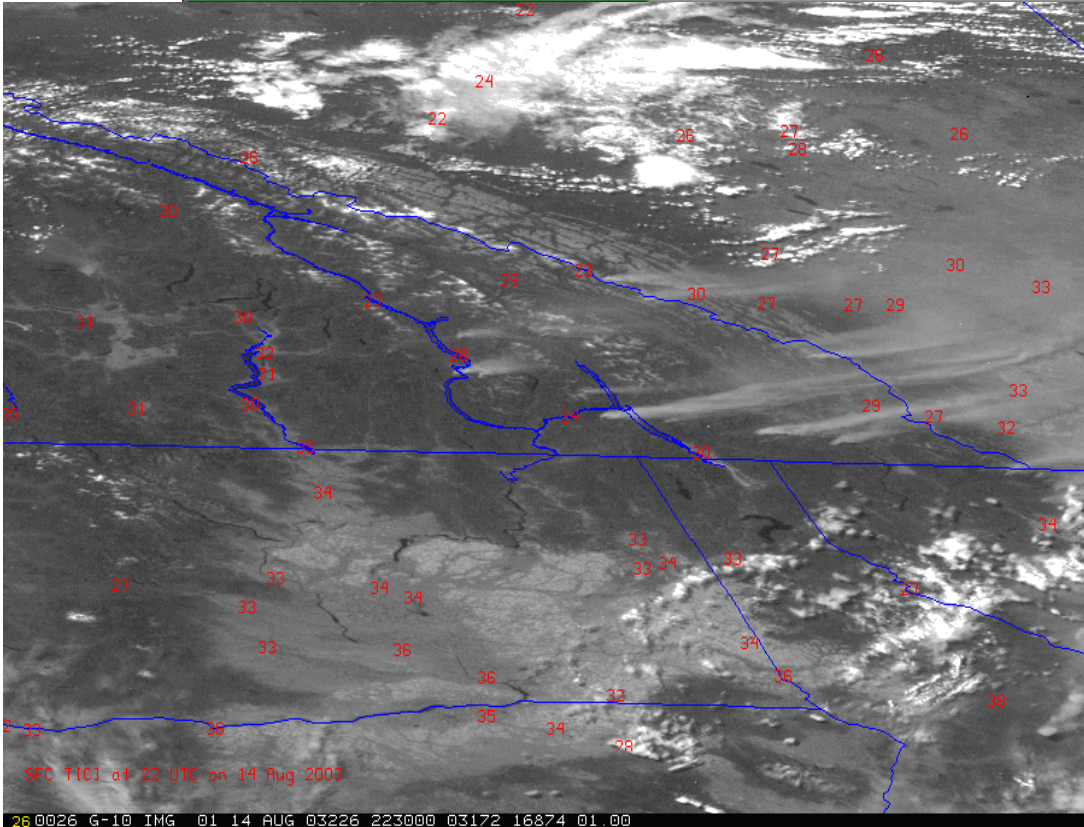
Charts & Images Available

Fire Weather Home

Welcome to the Fire Weather website!

Home	Charts & Images	Current Satellite Images
Fire Occurrence Prediction	Spatial Fire Mgmt (SFMS)	Infrared
Graphs	Static Maps	Visible
Maps & Images	Lightning & Wx (I-Maps)	Visible (South East)
Reports		Satellite Animation
Text Forecasts		Infrared
Weather Data		Visible
		500 mb
		Large Forecast Charts
		Small Forecast Charts
		Analysis
		Surface
		Surface Prog

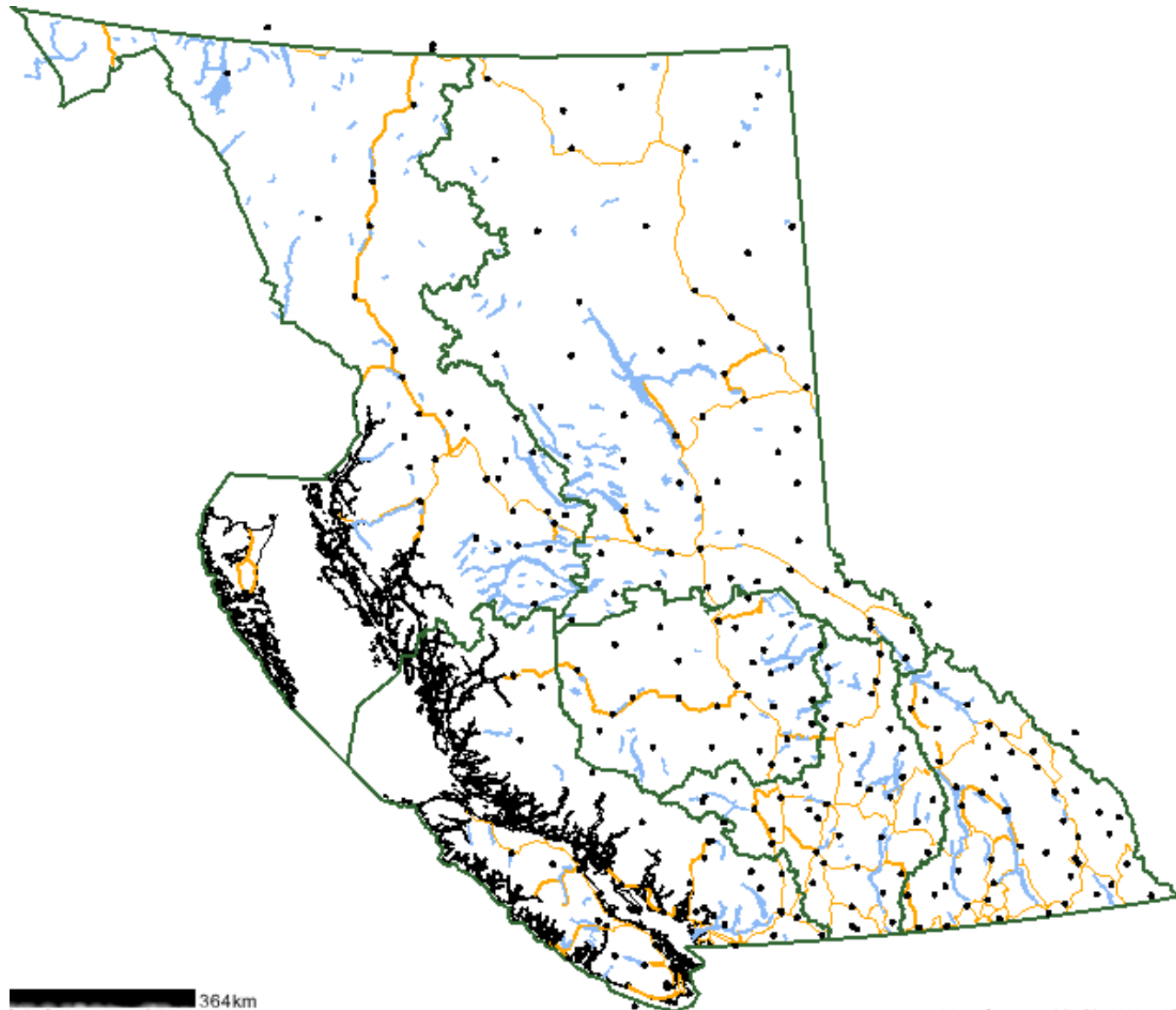
[ke to change your default](#)



SFC T/C1 at 22 UTC on 14 Aug 2003

26 0026 G-10 IMG 01 14 AUG 03226 223000 03172 16874 01.00

Weather Station Distribution Protection & MSC Sites



Links to Weather Station Map and List of Station Coordinates

OFTS **Fire Weather** **Systems** **Efficiency**

Home>Fire Weather>Weather Stations

Home	
Fire Occurrence Prediction ▶	Weather Stations
Graphs ▶	
Maps & Images ▶	Charts & Images ▶
Reports ▶	Static Maps ▶
Text Forecasts ▶	Precip Map
Weather Data ▶	Spatial Fire Mgmt (SFMS)
Data Entry ▶	
Maintenance & Utilities ▶	
Help ▶	

Protection Wx Stations
Multi-Agency Wx Stn (name)
Multi-Agency Wx Stn (code)
Weather Zones

OFTS **Fire Weather** **Systems**

Home>Fire Weather>Weather Stations

Home	
Fire Occurrence Prediction ▶	Weather Stations
Graphs ▶	
Maps & Images ▶	
Reports ▶	BUI History Graph
Text Forecasts ▶	DC History Graph
Weather Data ▶	Danger Class
Data Entry ▶	Danger Ranger
Maintenance & Utilities ▶	Extreme Danger Summary
Help ▶	Hourly Precipitation Summary
	Station Startup Indices
	Wx History
	Wx Search
	Wx Station Coordinates

Topography



- Mountain dominated
- Variable throughout BC
- Significant impact on weather and fire behaviour

Topography

Effects to consider:

- Subsidence heating and drying in lee of mountains.
- Channeling of winds along mountain ranges.
- Funneling of winds through narrow valleys and gaps with resultant velocity increases.
- Turbulence around gaps and terrain breaks.
- Rapid heating of steep southerly slopes.
- Upslope winds from daytime heating.
- Significant downslope flows can develop at night.
- Strong downslope flows below glaciers at any time.

Topography

Effects to consider:

- Overnight thermal belt development part way up the valley sides keeps temperatures and relative humidity's near daytime levels.
- Wind sheer at the top of the inversion can lead to sudden increases in fire intensity and rates of spread as the inversion breaks and the upper winds are mixed down.

Fire weather forecasters at the fire centers can provide estimates of breakthrough temperature and time at specified elevations. Local observation is crucial for validation.

Topography

Effects to consider:

- Temperature and RH change with elevation as a result of adiabatic cooling.
- Upper slopes will have a cooler, more humid burning environment than lower slopes. As a fire progresses, spot forecasts must be requested for the appropriate elevation.
- To reflect the cumulative effect on fuel moisture, the codes from the parent station should be rerun using adjusted startup values provided by the forecaster.

Fire Behaviour Forecasts and Advisories

- Fire Behaviour Forecasts are issued daily. The timing may vary based on organizational requirements. The standard national format can be used.
- The Operational Safe Work Standard #5 outlines the requirements for Wind Advisories, Fire Behaviour Advisories and Extreme Fire Behaviour Warnings, which are issued by the specialist in addition to the forecast if the outlined conditions are met.
- Fire Centers also issue these products on a wide area basis.
- Crews on your fire must be made aware that your forecasts, advisories and warnings supercede anything broadcast they hear from the fire centre on your incident.

Wildfire Service Organization

The Wildfire Service organization is structured as follows:

- Headquarters office located in Victoria
- Provincial Wildfire Coordination Centre.
- 6 regional Fire Centers:
 - Coastal, located in Parksville
 - Kamloops, located at the Kamloops airport
 - Cariboo, located at the Williams Lake airport
 - Southeast, located at the Castlegar airport
 - Prince George, located in Prince George
 - Northwest, located in Smithers

Wildfire Service Organization

- Each fire center is divided into Fire Management Zones run by a Zone Protection Officer. There are 35 zones in the province.
 - 3 person initial attack crews and 20 person unit crews (sustained action) are based seasonally around the zones.
- The provincial Rapattack base is located in Salmon Arm. Crews and helicopters will be repositioned to secondary bases as required.
- A Parattack team and jump ship are based at the Fort St John airport.
- The Provincial Airtanker Centre is located at the Kamloops airport. This office coordinates the positioning of air resources around the province.

Wildfire Service Organization

- Fire equipment depots are located in Chilliwack and Prince George.
- ICS
The Incident Command System has been implemented to manage fire events in BC.
- The Fire Behaviour Specialist reports, as a technical specialist, to the Plans Section Chief.

Access to WMB Information

- BC Wildfire Service public website:
<http://bcwildfire.ca/index.htm>
- Protection internal website:
https://gww.nrs.gov.bc.ca/flnr/wmb?pl=mb-flnr-wildfire_man
- Fire weather and CFFDRS information is accessible from the internal website.
- Necessary systems access will be granted on arrival.