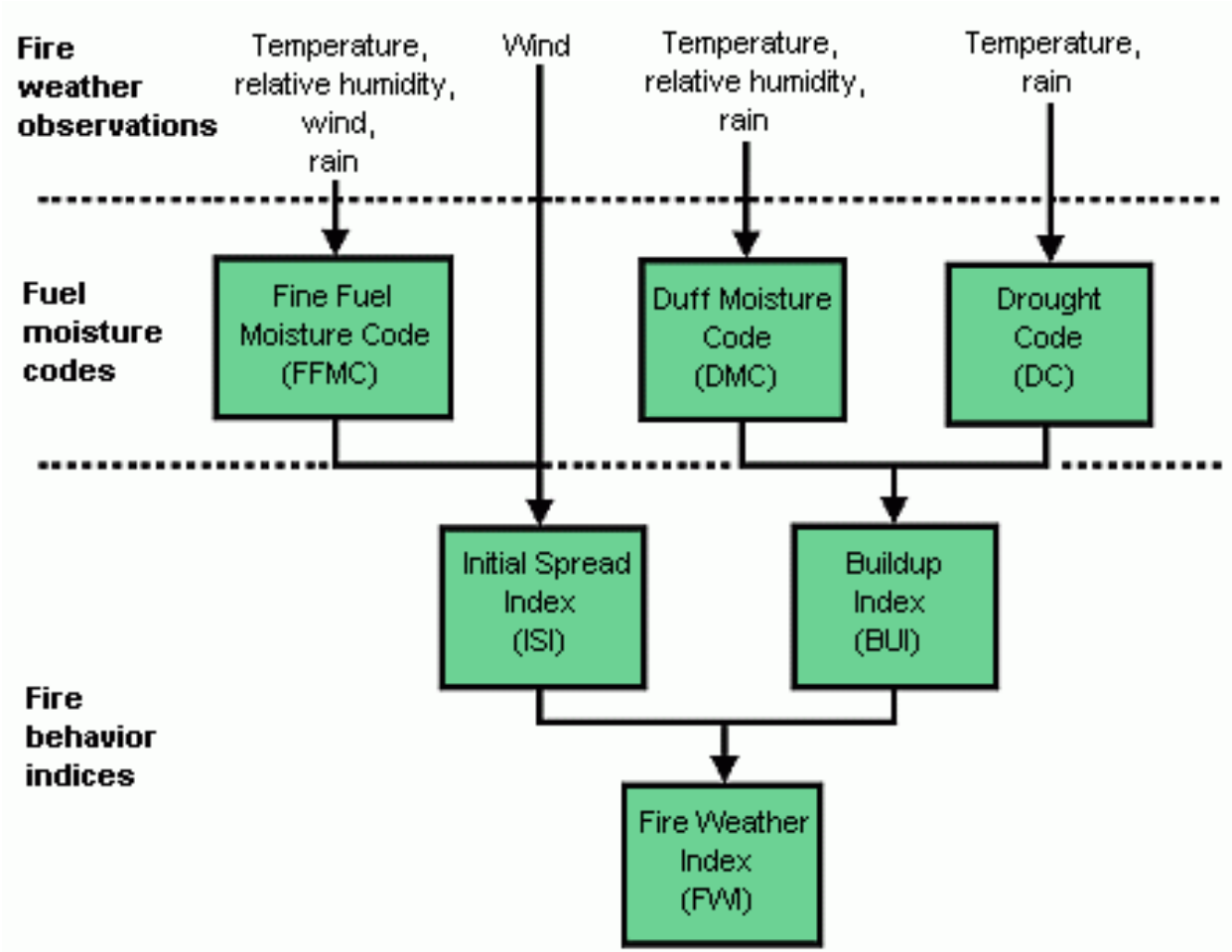
The Global Fire Early Warning System

3rd GWIS and GOFC-GOLD Fire IT Meeting
University of Maryland
Oct 1-2, 2018

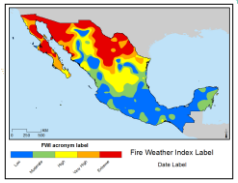
Outline

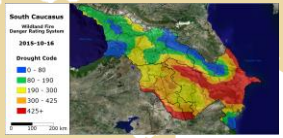
- Fire Weather Index
- Regional/National FWI Implementations
- FWI on the ground
- GFEWS
  - Purpose
  - Model
  - Examples
  - Calibration
  - Stack
  - Next Steps
  - Demo (if time)

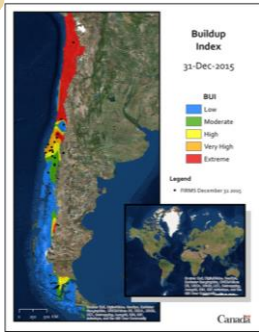
Fire Weather Index



Documented application of the FWI System in whole or in part.





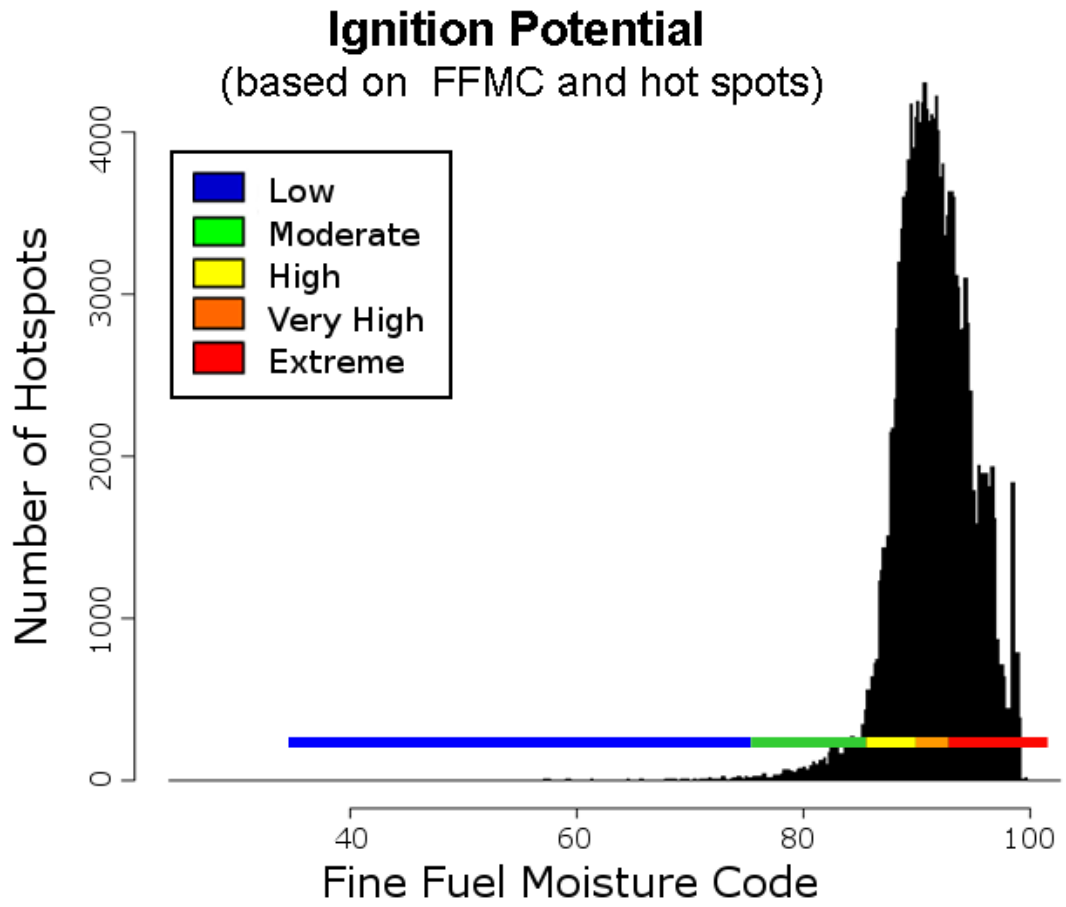


Recent Traning Regional System National System

Pre-suppression planning guide

Wildfire Threat Level	Resources on Standby	Alert Period	Dispatch Time
Low	crews, hand tools	mid-day	60-min
Moderate	crews, hand tools	all day	30 min
	pumps, water tanks	mid-day	60 min
High	crews, hand tools	all day	15 min
	pumps, water tanks	all day	30 min
	control line-building equipment	mid-day	60 min
Extreme	crews, hand tools	all day	15 min
	pumps, water tanks	all day	15 min
	control line-building equipment	all day	30 min
	aircraft, burnout equipment	mid-day	60 min

Local Calibration of the FFMC



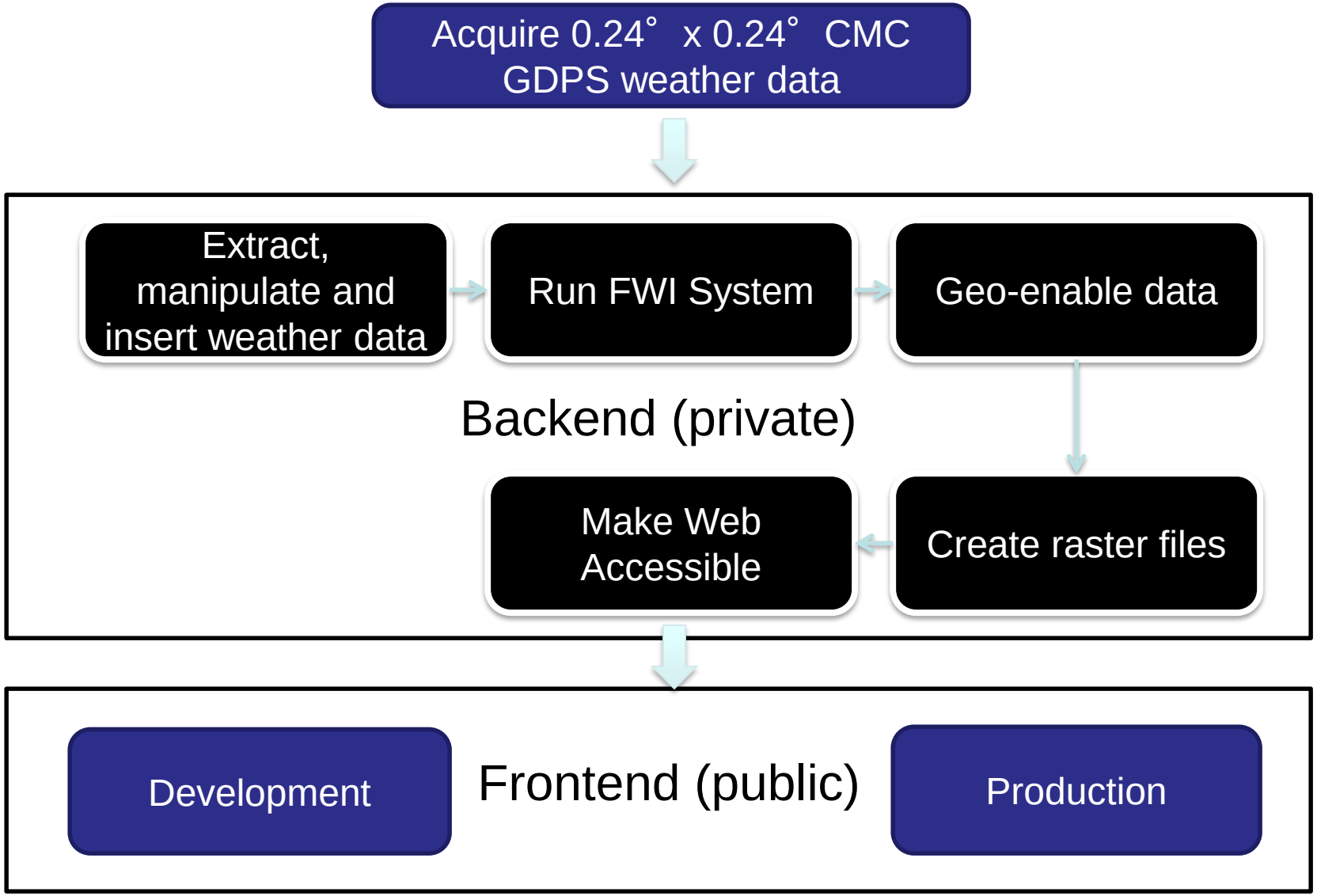
Some General Rules in the Boreal Forest

- When DMC > 20: lightning ignition hazard
- When FFMC > 86: high possibility of fire
- When FFMC < 74: low possibility
- DC > 500: Extensive mop-up required
- FWI is used for warnings and advisories for the public

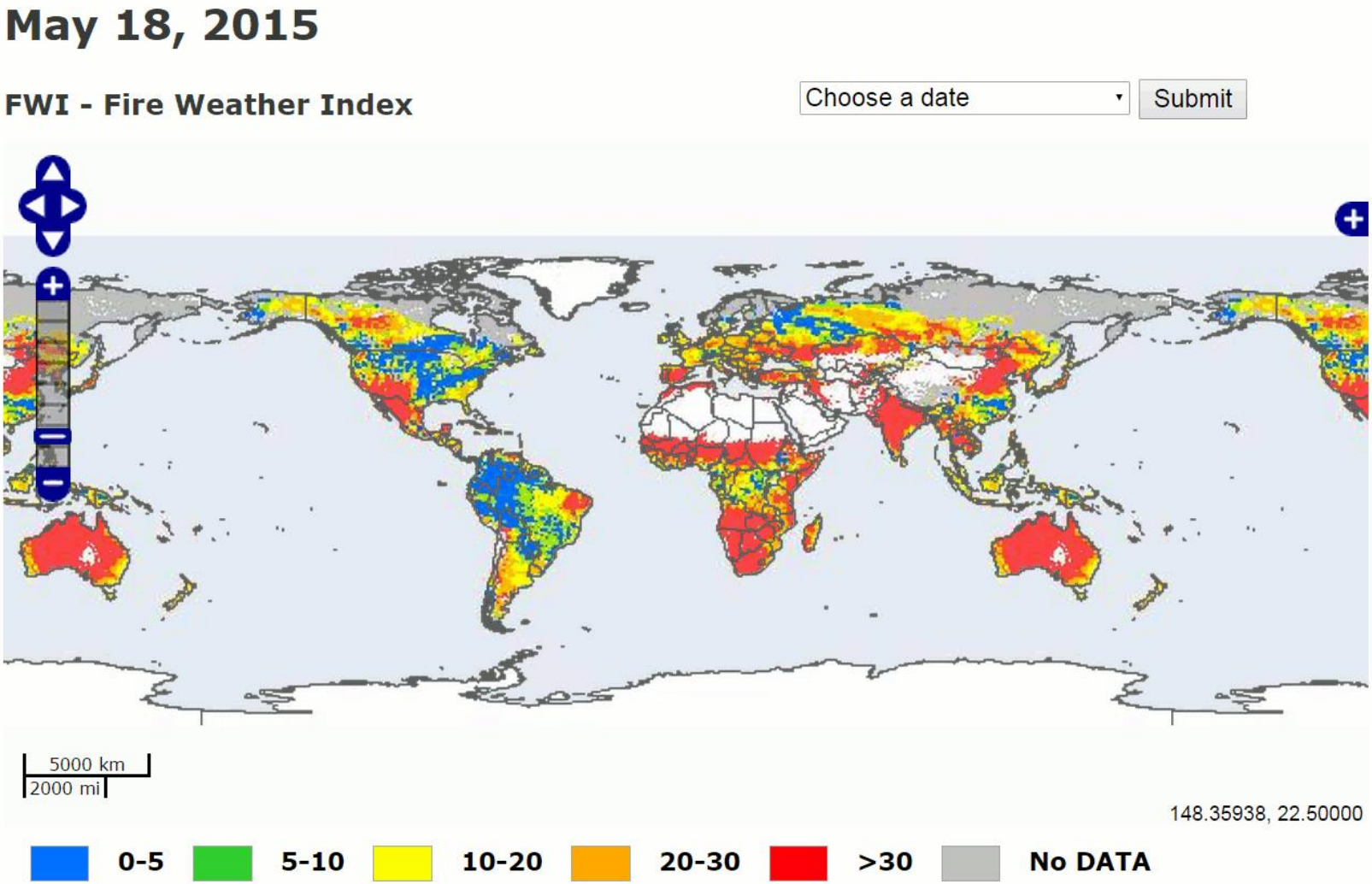
The Purpose of the GFEWS

- Millions of hectares burn each year
- Human safety, global economies affected
- Longer term prediction of fire danger
- Support international fire management co-operation
- Coarse-resolution Fire Danger for countries without a system
- Free and open access to fire intelligence

Daily Model

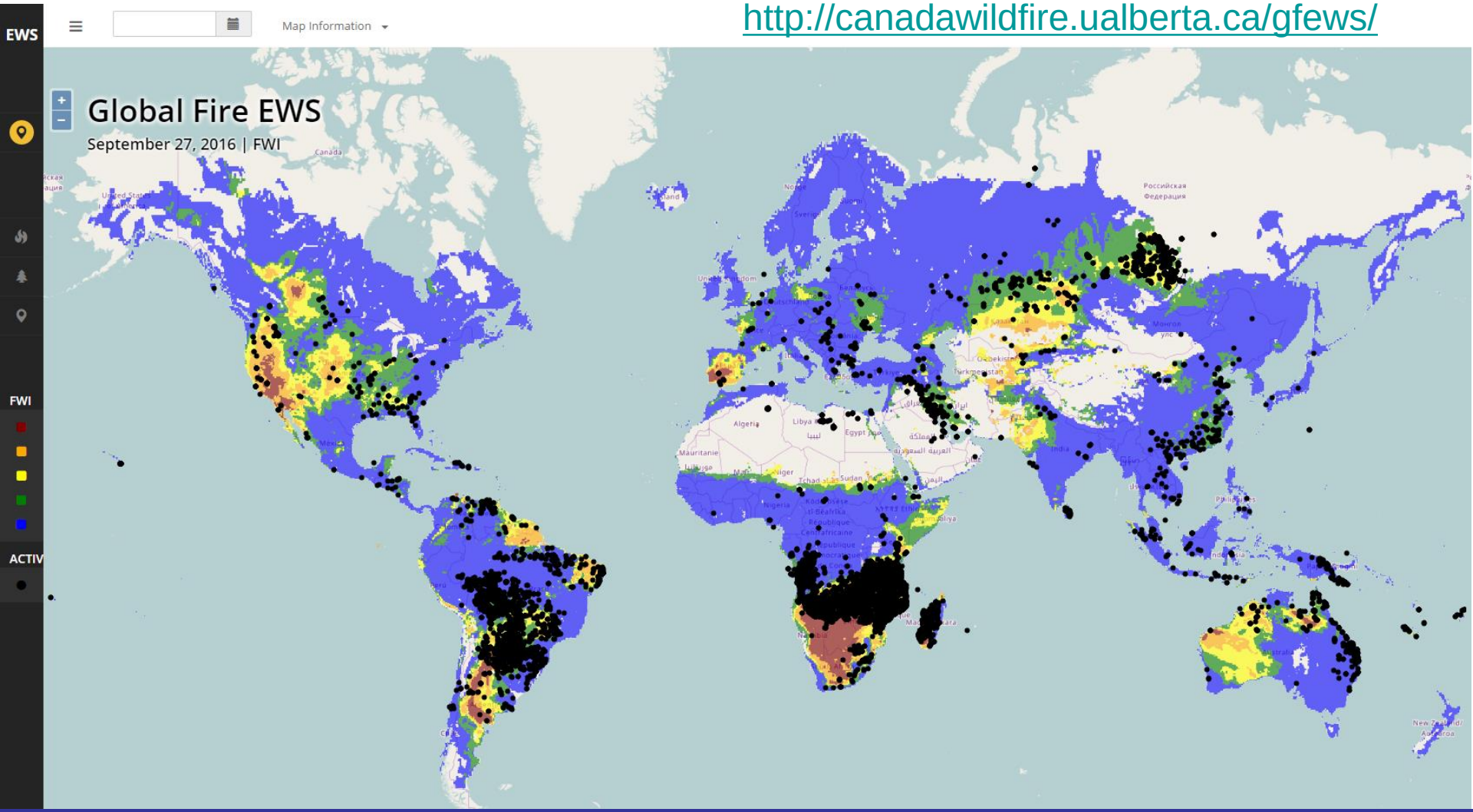

Acquire 0.24° x 0.24° CMC GDPS weather data
Extract, manipulate and insert weather data
Run FWI System
Geo-enable data
Backend (private)
Make Web Accessible
Create raster files
Development
Frontend (public)
Production

The old

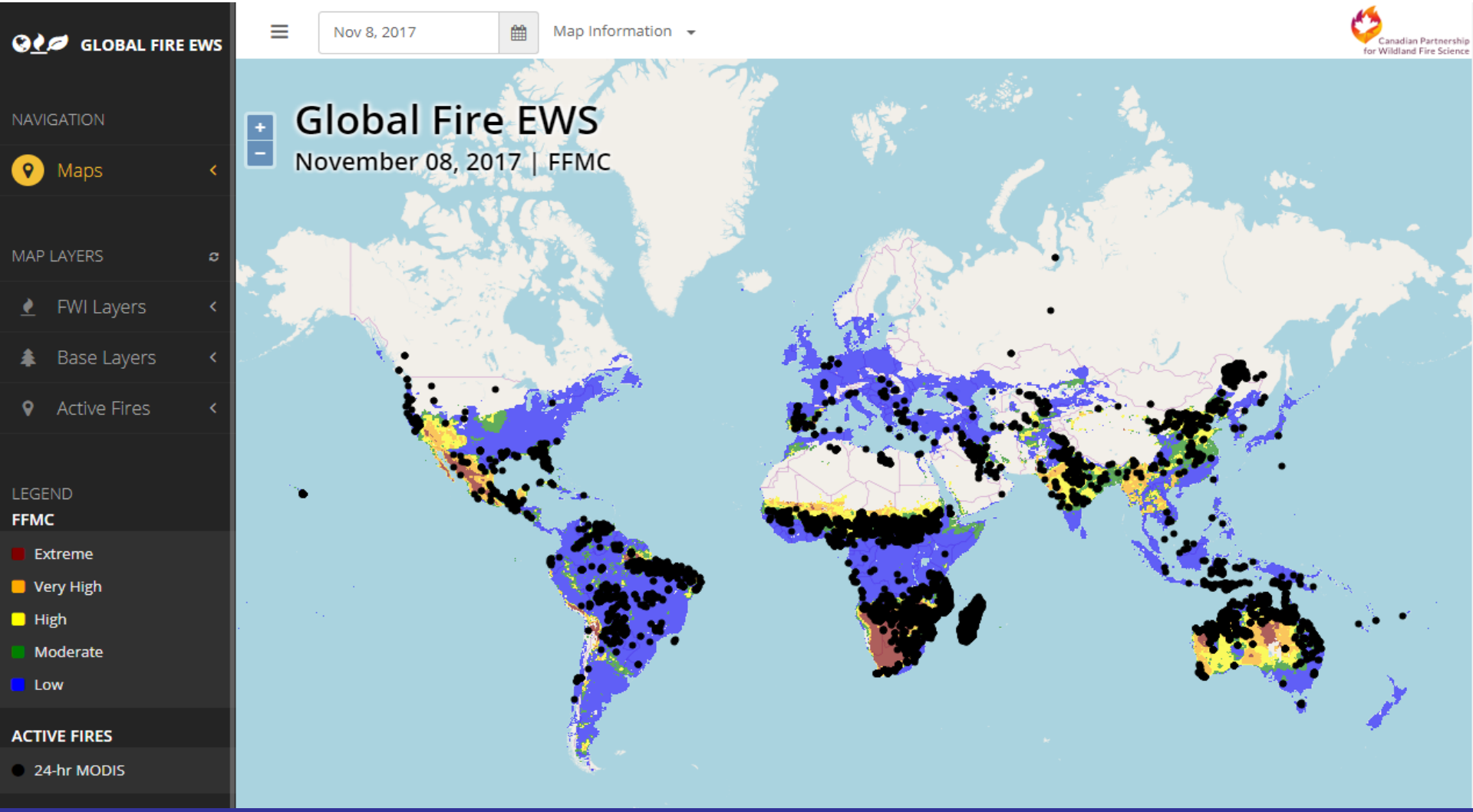

May 18, 2015
FWI - Fire Weather Index
Choose a date
Submit
5000 km
2000 mi
148.35938, 22.50000
0-5
5-10
10-20
20-30
>30
No DATA

Calibrated Fire Weather Index

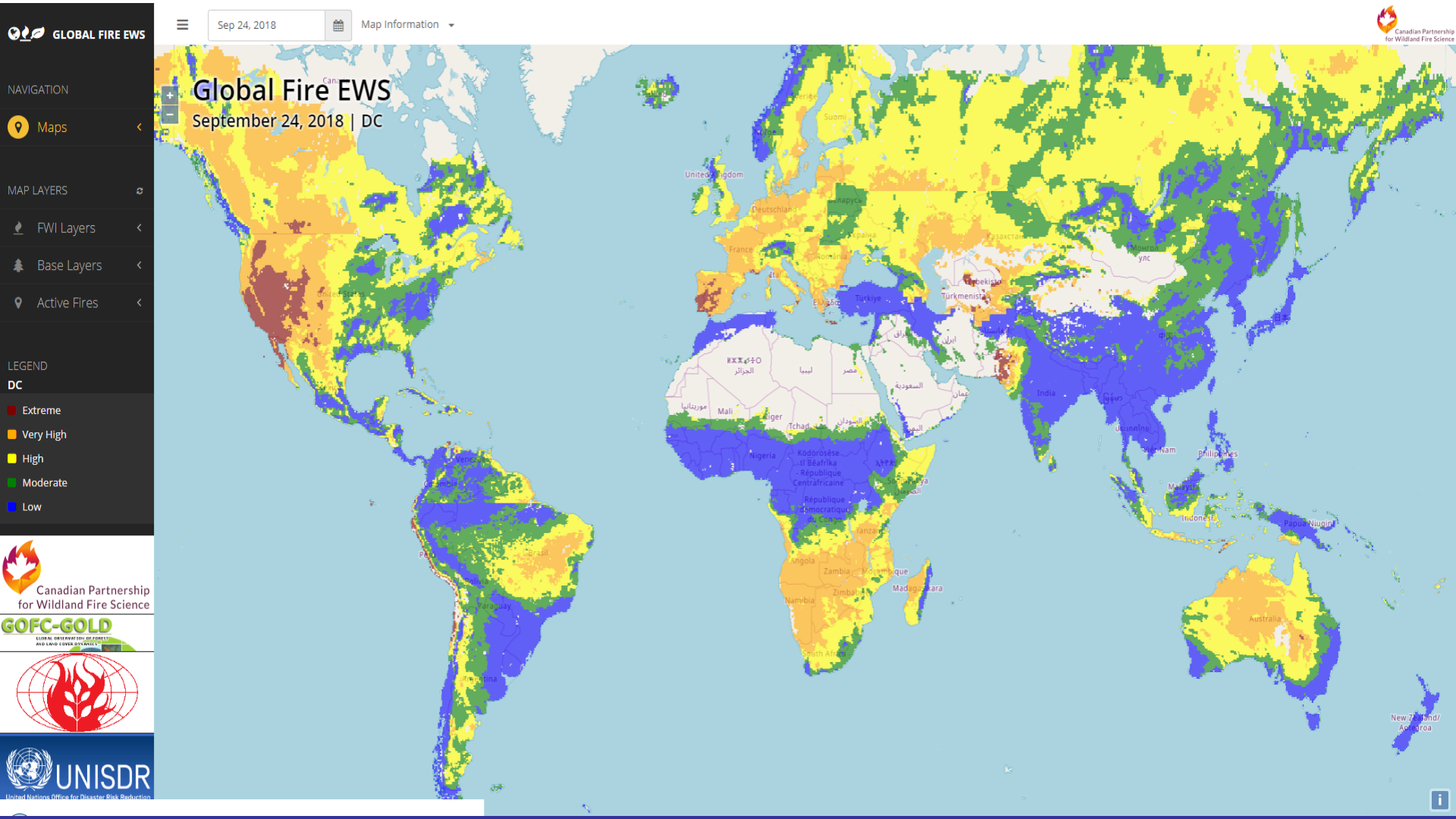
http://canadawildfire.ualberta.ca/gfews/



Calibrated FFMC



Calibrated DC



System Calibration

Considerations:

- FWI parameter scale range
- Fire season length
- Fire season controlling factor (temperature or rain)
- Developed 3 classification scenarios (A, B, C)

Region	FFMC	DMC	DC	ISI	BUI	FWI
BONA	A (or B)	A (or B)	C	A	A (or B)	A
AUST	C	C	C	C	C	C
BOAS	A (or B)	B (or A)	C	A	B (or A)	A
CEAM	B (or C)	C	C	B	C	B (or C)
CEAS	C (or B)	C[1]	C	C	C	C (or B)
EQAS	A or B	B (or C?)	C	A	C	A
EURO	B (or A)	C (or B)	C	B	B (or C)	B (or A)
MIDE	C	C	C	C	C	C
NHAF	C	C	C	C	C	C
SEAS	C	C	C	C	C	C
Mekong	[2]	C	C	C	C	[2]
SHSA	B (or A)	C (or B)	B (or C)	B	B (or C)	B (or C)
SHAF	C (or B)	C	C	C	C	C (or B)
TENA	C	C	C (or B)	C	C	C (or B)

Giglio et al. 2006

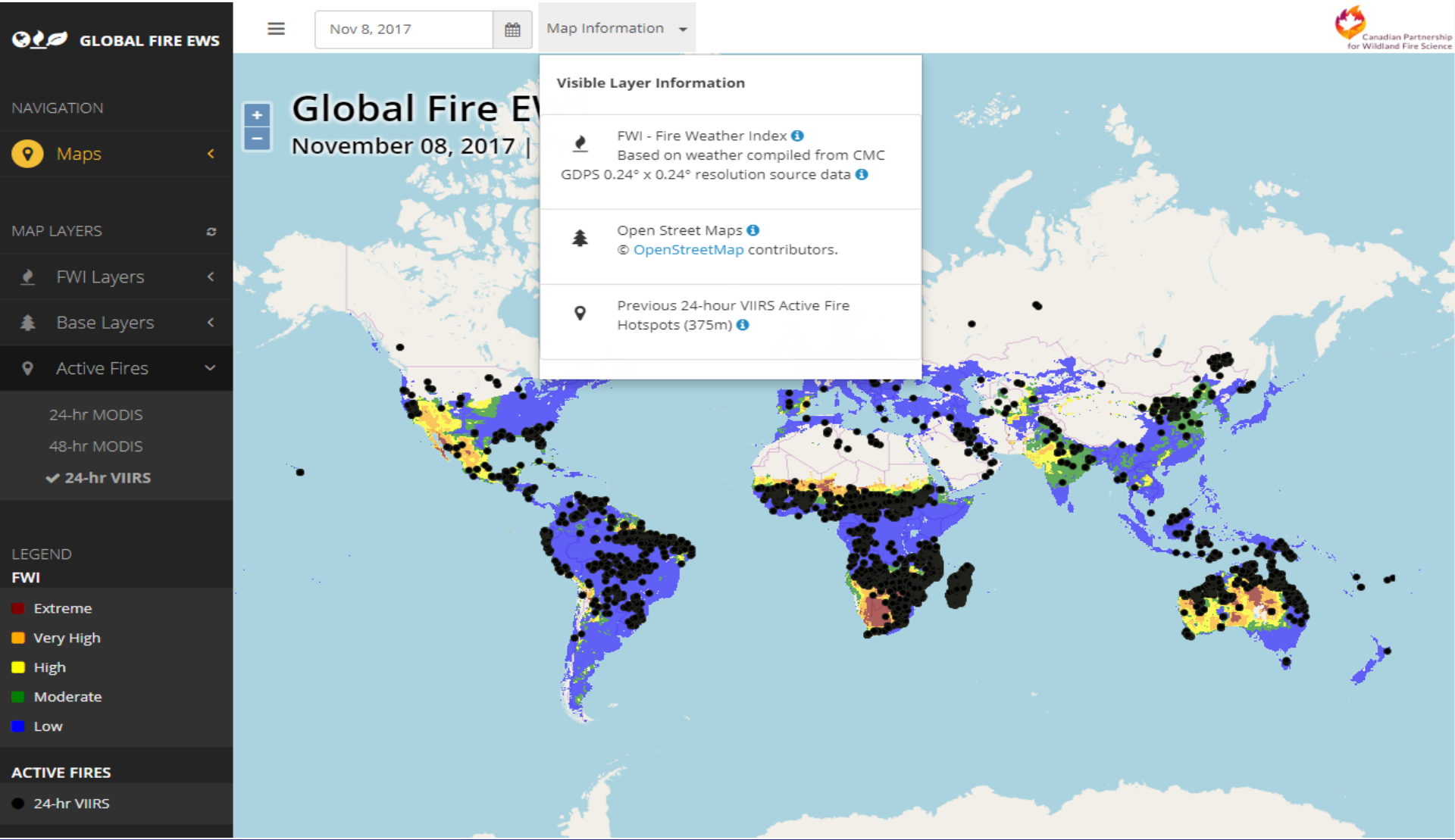
System Calibration

BONA	Boreal North America
TENA	Temperate North America
CEAM	Central America
NHSA	Northern Hemisphere South America
SHSA	Southern Hemisphere South America
EURO	Europe
MIDE	Middle East
NHAF	Northern Hemisphere Africa
SHAF	Southern Hemisphere Africa
BOAS	Boreal Asia
CEAS	Central Asia
SEAS	Southeast Asia
EQAS	Equatorial Asia
AUST	Australia and New Zealand

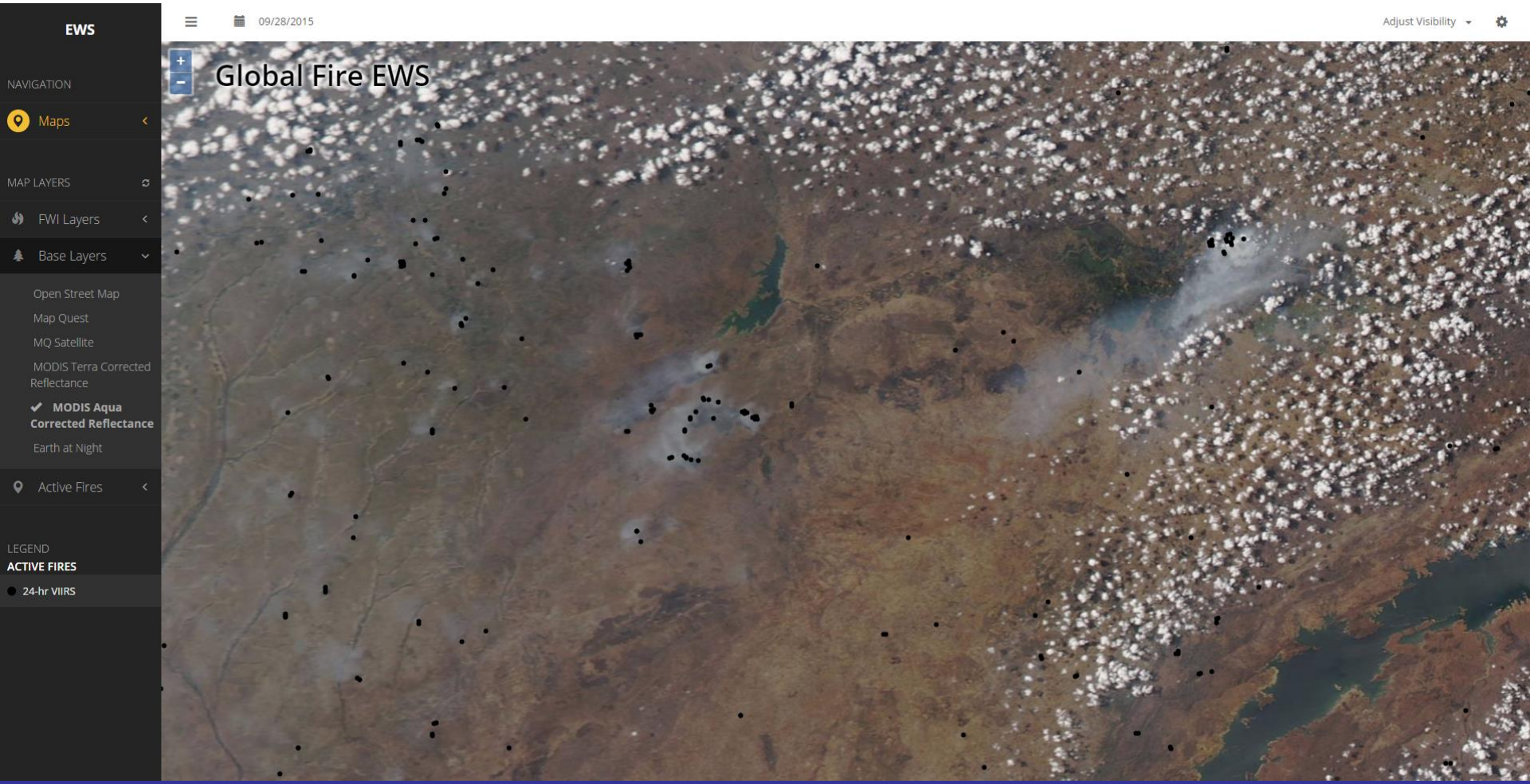
System Features

- Attributions & information on visible layers
- MODIS & VIIRS hotspots
- Multiple base layers
- Regionally Calibrated
- Simple to add new existing layers

Attributions and map info



Hotspots & baselayers



Hotspots & baselayers

The Stack (backend)

The Stack (frontend)

Next Steps

- Multiple forecast models/Ensemble model
- Enhanced global daily actuals
- Fuel / Fire Behaviour modelling
- Enhanced Interactivity
- Additional Baselayers (land cover/textural)
- Additional Overlays (smoke forecasts etc.)
- Collaboration or integration with GWIS and/or other global systems

Demo?

Map: http://canadawildfire.ualberta.ca/gfews/

Website: http://gfmc.online/gwfews/index-12.html


UNIVERSITY OF
ALBERTA


UNIVERSITY OF
MARYLAND


Canadian Partnership
for Wildland Fire Science


Canada
Natural Resources Canada
Canadian Forest Service


DRI
Desert Research Institute


Environment and
Climate Change Canada


NOAA
National Oceanic and
Atmospheric Administration
U.S. Department of Commerce
Satellite and Information Service

Canada

Alan S. Cantin
William (Bill) J. de Groot