



Use of Wildfire Photographs for Validating Fire Behaviour Models Or Using Wildfire Photos as a Primary Source of Fire Behaviour Data

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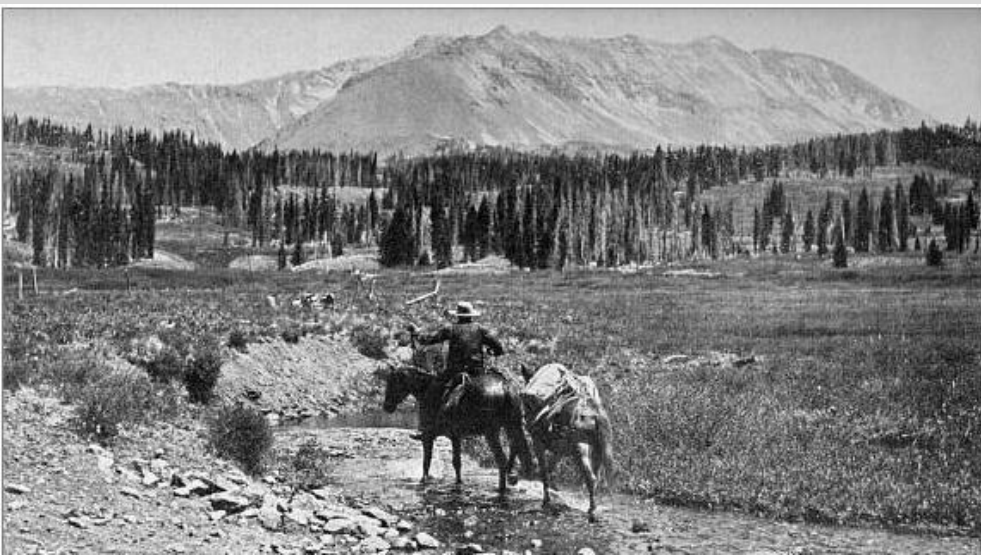
Nat. Resources Canada, Can. Forest Service

Rick Lanoville

NWT Forest Management Division (retired)



“It is not understood why forest fires should get away from the rangers, or rather why they do not find them and extinguish them more promptly. It seems reasonable that a ranger provided with a saddle horse and constantly on the move, as is his duty, should discover a fire before it gains much headway.”

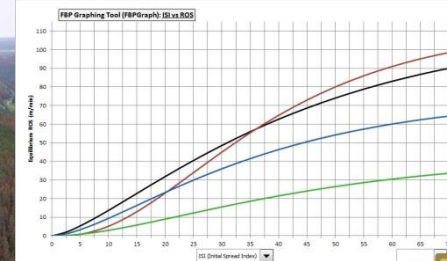


Washington, D.C. GLO memo, 1902



Wildfire Photos as Sources of Fire Behaviour Data

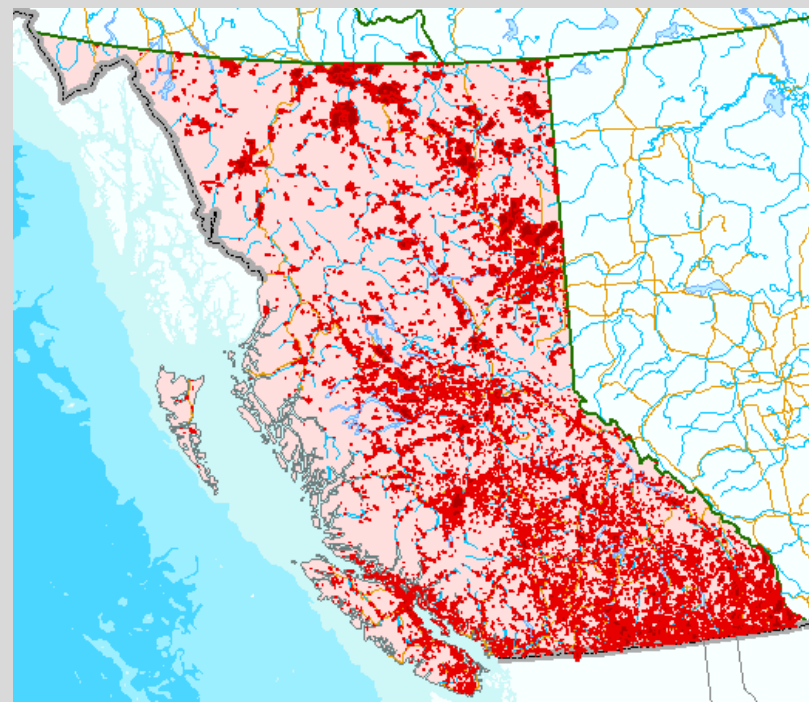
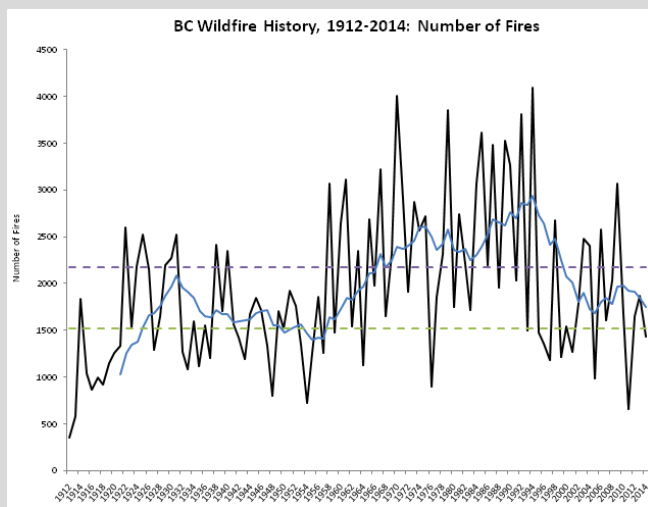
- Problem:
 - Fire behaviour prediction for safety, efficiency, land management objectives
 - Lack of new experimental burn data
 - FBP fuel types primarily for boreal veg. communities
 - Many BC veg. communities are different
 - Experimental burning programs expensive, slow



Wildfire Photos as Sources of Fire Behaviour Data

➤ Objective:

- Take advantage of wildfires as a data source for fire behaviour modeling
 - Average of ~1,900 fires/yr
 - ~20-100 fires/yr > 50 ha





Wildfire Photos as Sources of Fire Behaviour Data

- Air Attack – right time, right place
 - Also fire detection flights
- Dataset of opportunity
 - Initial project successful due to pre-existence of dataset
 - Photos exist in the era of cheap digital cameras
 - Photos taken by AAOs ~1998-present









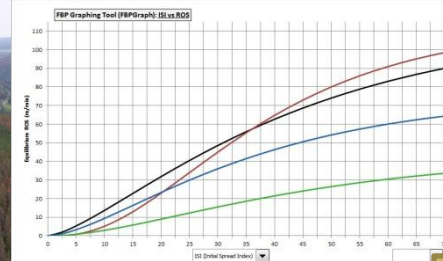


Photo interpretation process

- Simple, 'expert user' process to date
- Starts with acquisition of imagery
- Scan for possible candidate fires
 - Multiple photos showing fire progression
 - Landscape features visible for geo-referencing
 - Continuous fuel type and weather throughout
- BC experience: 1-2% of fires are potential candidates



Photo interpretation process

- Identify fire position points at different times
- Georeference images and fire points (Goog. Earth or other techniques)
- Identify estimated fire weather (nearest station, interpolated values, etc.)
- Measure ROS, note FT, confirm smoke column with wind, other chars.
- Analysis:
 - Chart ISI/ROS relationships or other fire behaviour characteristics
 - Use to validate FBP fuel types, or build new fuel type dataset



Provincial_Air_Tanker_Centre

images\$ (\\palazzo) (I:) > Provincial_Air_Tanker_Centre

Search Provincial_Air_Tanker_Centre

Organize Open New folder

★ Favorites

- Desktop
- Downloads
- Recent Places

Libraries

- Documents
- Music
- Pictures
- Videos

dperraki on MIZAR

Name	Date modified	Type
1998	06/10/2014 9:35 AM	File folder
1999	06/10/2014 9:35 AM	File folder
2000	06/10/2014 9:35 AM	File folder
2001	06/10/2014 9:36 AM	File folder
2002	06/10/2014 9:36 AM	File folder
2003	06/10/2014 9:39 AM	File folder
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2012	06/10/2014 9:55 AM	File folder
2013	06/10/2014 9:57 AM	File folder
2014	06/10/2014 9:59 AM	File folder
AAO Training	06/10/2014 10:03 AM	File folder
Barts Coverage Level Slides	06/10/2014 10:03 AM	File folder

WHSE_NP (\\GISWHSE.ENV.GOV.BC.CA) (P:)

ARCHIVE (\\spatialfiles2.bcgov) (S:)

System (T:)

Organisation of imagery
Can be an issue

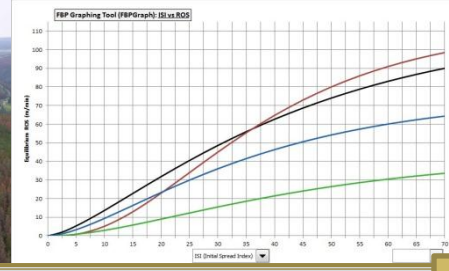
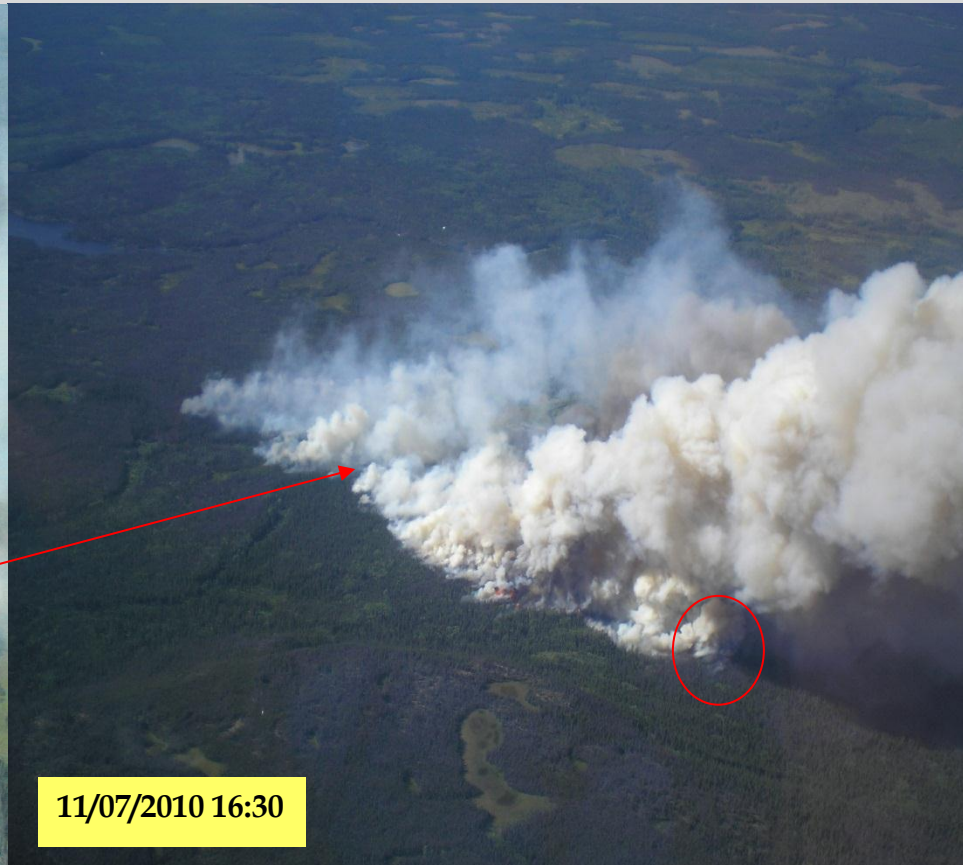


Photo-series examples



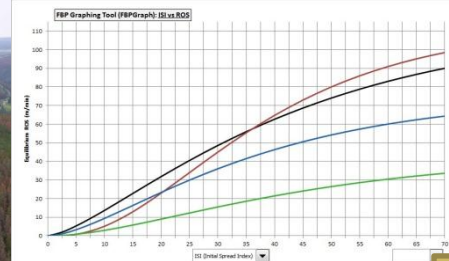


Photo-series examples



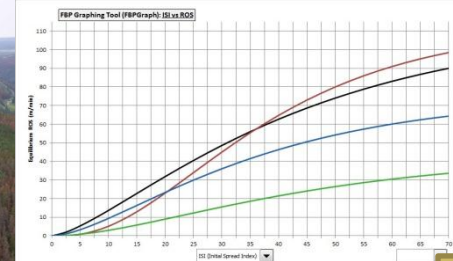
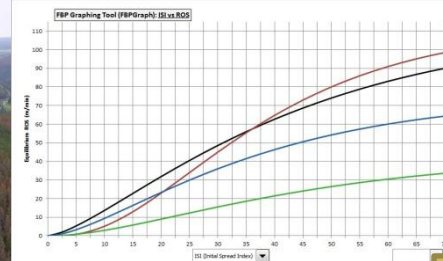


Photo-series examples





20:44



BC AAO Photo Analysis Project: 2000-2012

- Contracted out to experienced FBS (Rick Lanoville)
- Initial focus was fires in red-attack MPB
- Later examined all fuel/stand types
- ~40 fires analyzed: ROS, fire type
- Fuel types mixed:
 - C-3R (MPB), C-2, C-7, C-3, S-1, plus oddballs

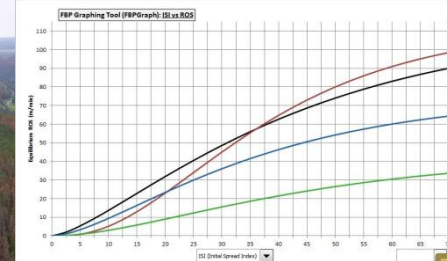
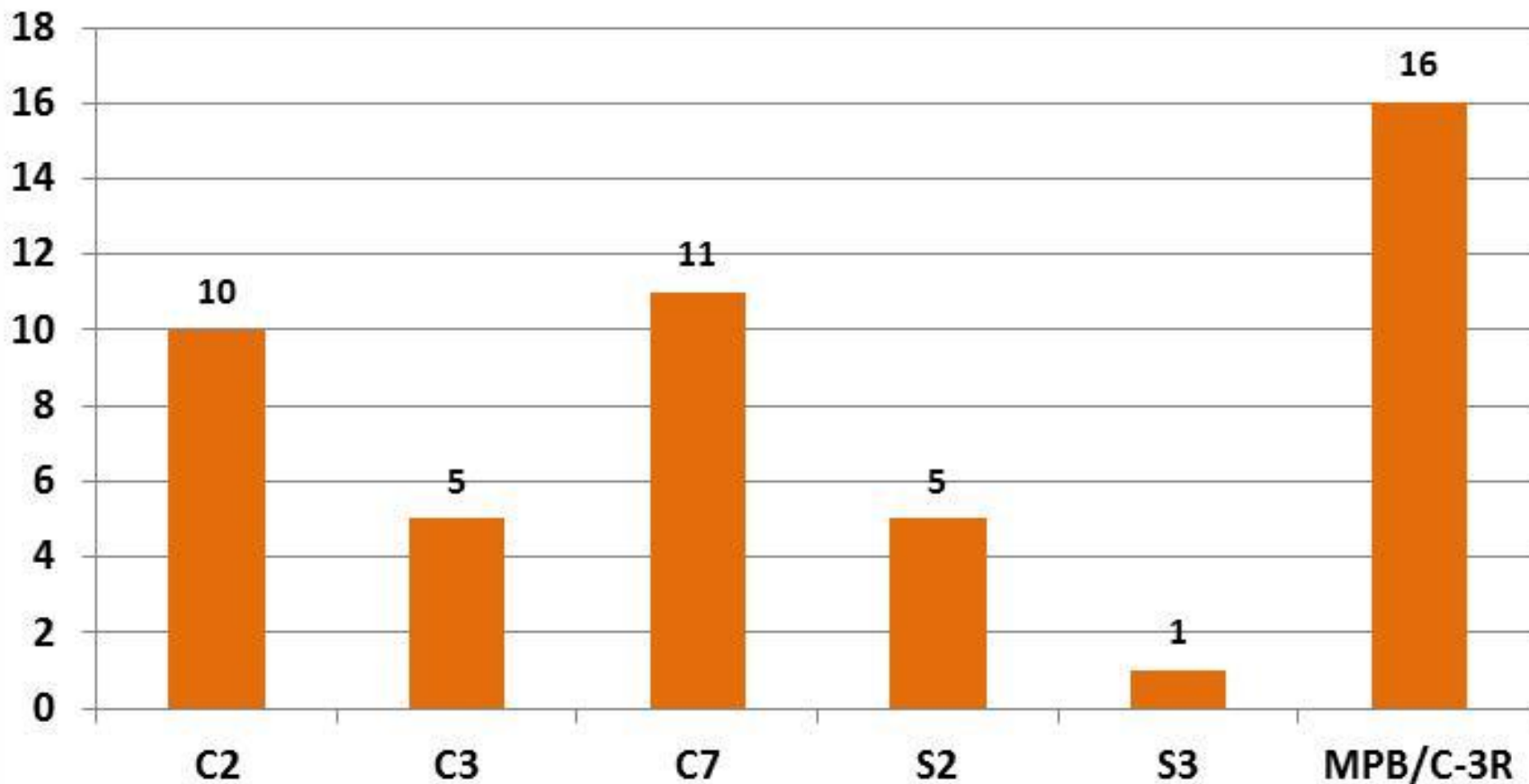
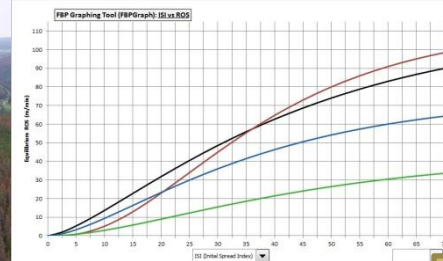


Photo analysis (Lanoville 2013)

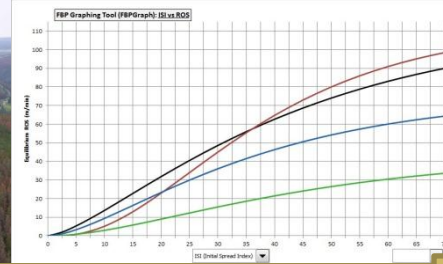
Number of Fire Runs by Fuel Type





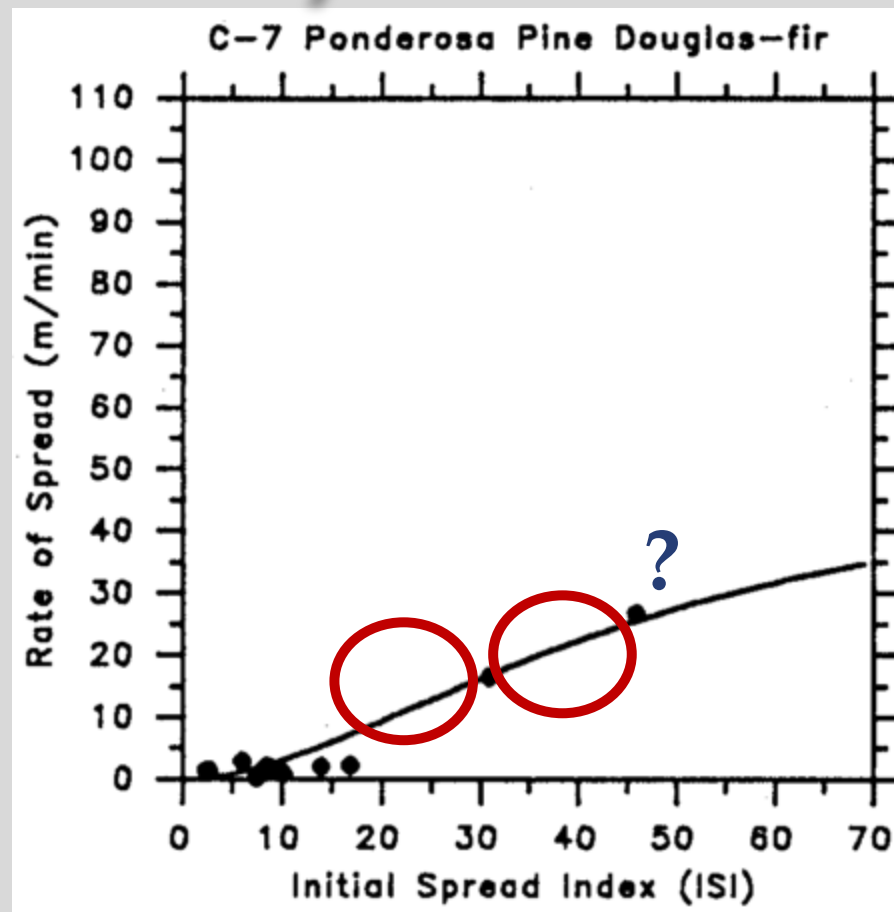
Examples of Photo-interp. FB Data: C-3R

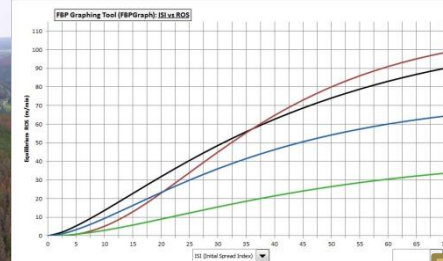
- MPB-affected lodgepole pine
 - (yellow-red-early grey phase, 0-5 years post-attack)
- Key fuel type in BC, ~2003 -2010
- 16 photo series originally identified (trimmed to 11 after fuel type checking)
- Used as key data for proposed C-3R fuel type
 - Most data (11 data points out of 16 total in dataset) from photo interp.



Examples of Photo-interp. FB Data: C-7 Re-analysis

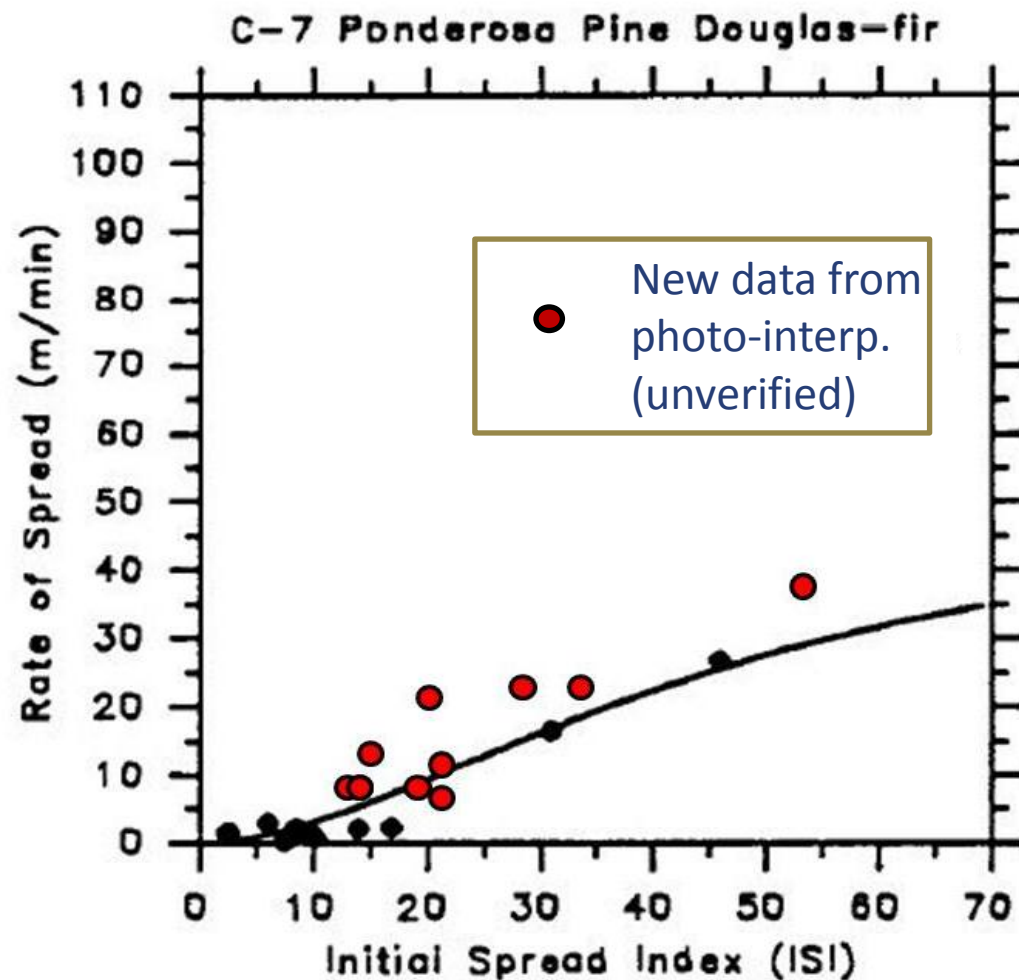
- Ponderosa pine/Douglas-fir
- Poorly understood, weakly validated fuel type – could use additional data





Re-Analysis of C-7 (in progress)

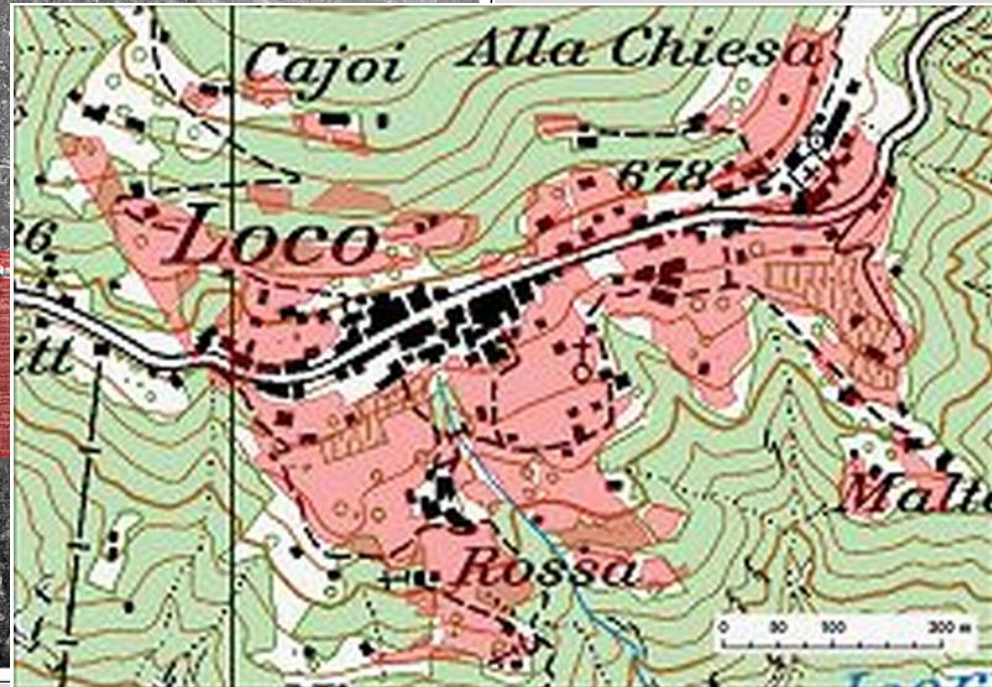
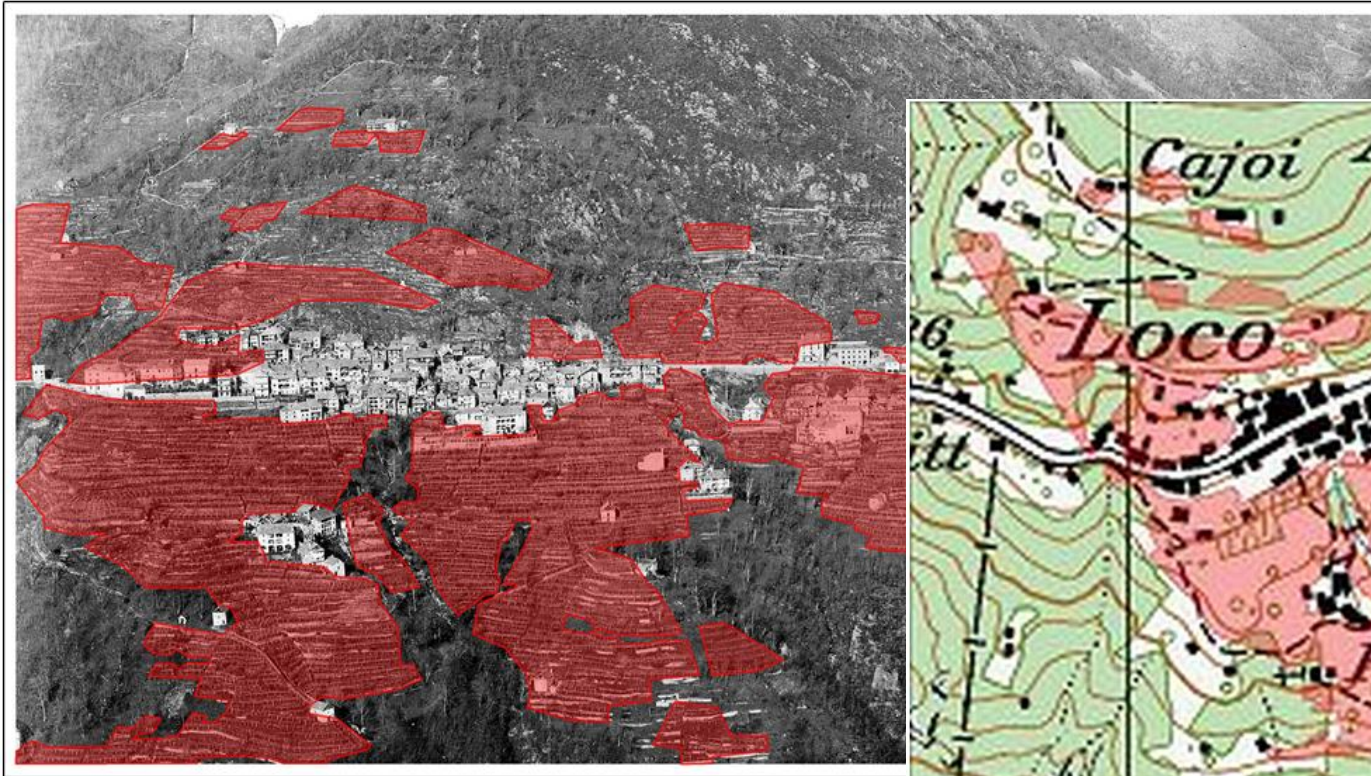
- Verification of new data still required
- Combine with C-7B (curing) factor (J. Beck), US data
- New ROS model may result

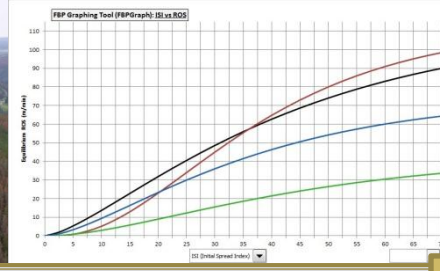




Future Directions

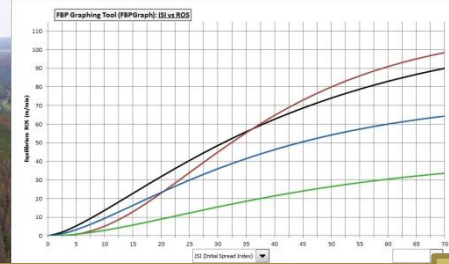
- UVic partnership: use of image analysis and visualisation tools for fireline position ID





Future Directions

- Continued analysis of promising photo-fires (2013-present)
- Pilot study for national scan of available photos (with S. Taylor, CIFFC proposal)
- Other tools to improve on concept (new remote sensing technologies; IR, high res. satellites, etc.)



**Thanks to BC Prov. Air Tanker Ctr
Superintendents who created
dataset:**

Leigh Barratt

Jeff Berry

Mike Benson (current)

Questions?