

Beyond NAFI -Alternative fire data and 3D fire simulations

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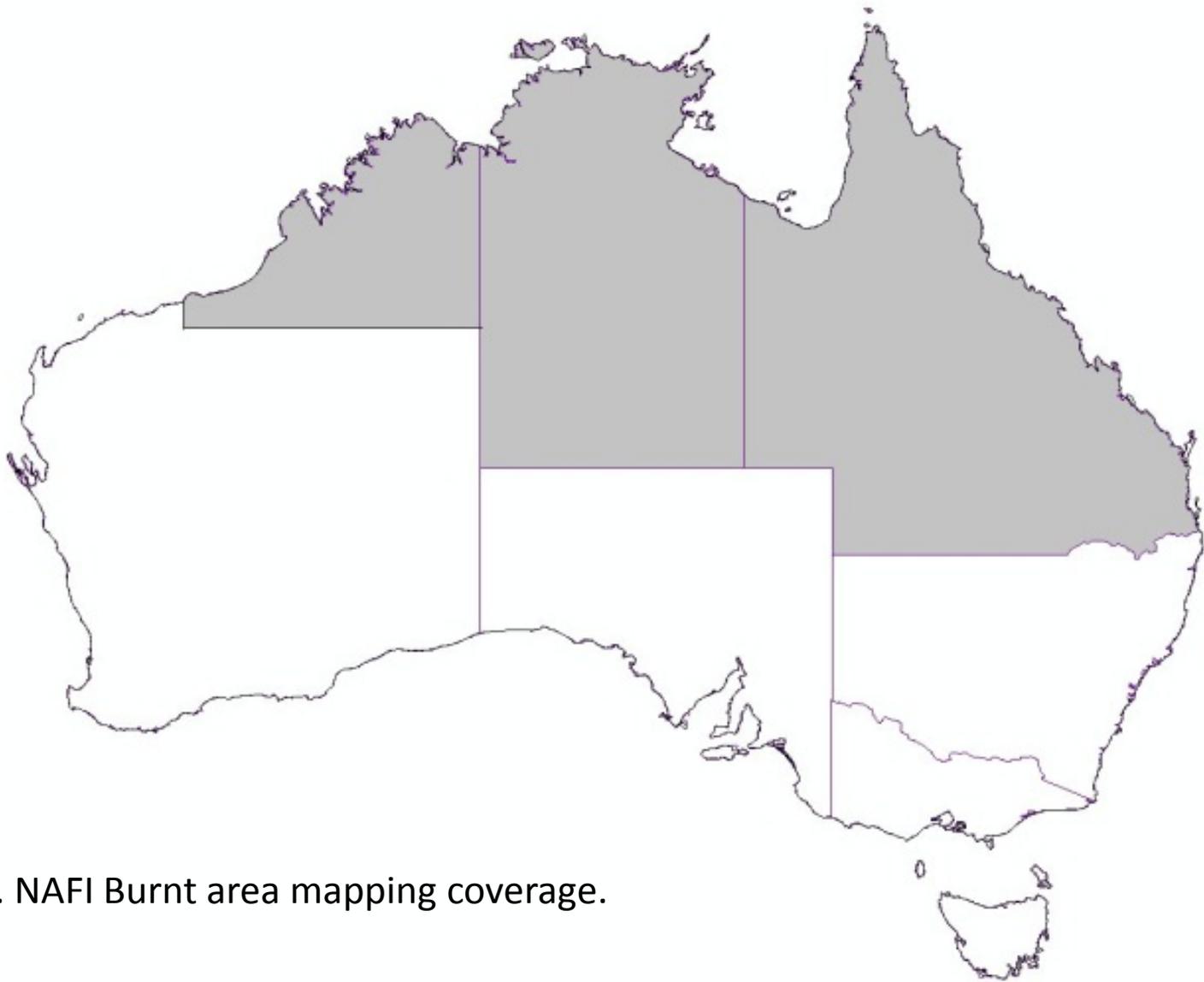
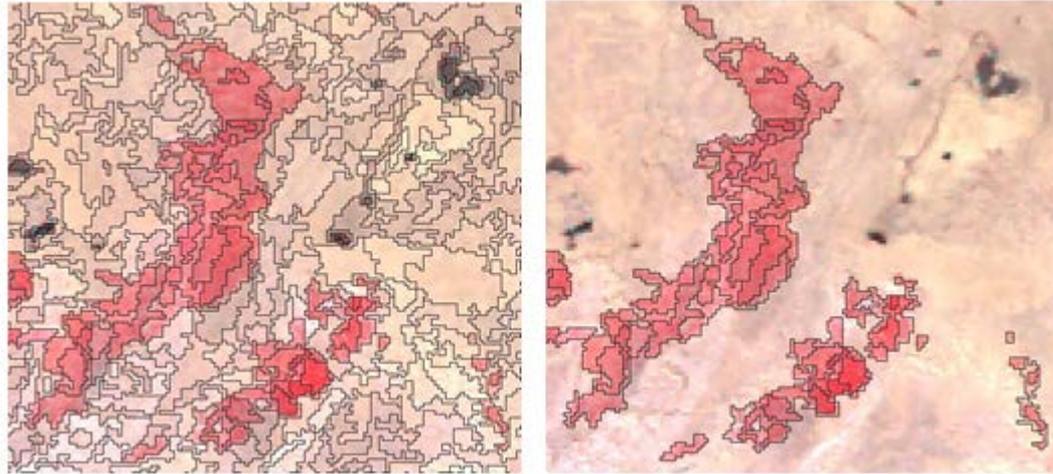


Figure 1. NAFI Burnt area mapping coverage.

Mapping Process



- Segmentation (OBIA)
 - Remove pixel based classification anomalies (salt and pepper)
- Classification
 - Density slicing based on 2 image dates band 2 (NIR)
- Manual identification
 - Shape, Pattern, Context
 - Ancillary data
 - Hot-spots
 - **User input**

Mapping Process

- **Mapping temporal scale**

- Every 1-2 weeks
- Monthly mapping
- Yearly double check
- Ruled by cloud cover

- **Validation**

- Annual areal transect data
- For this chapter – LANDSAT based comparison



Field point based validation

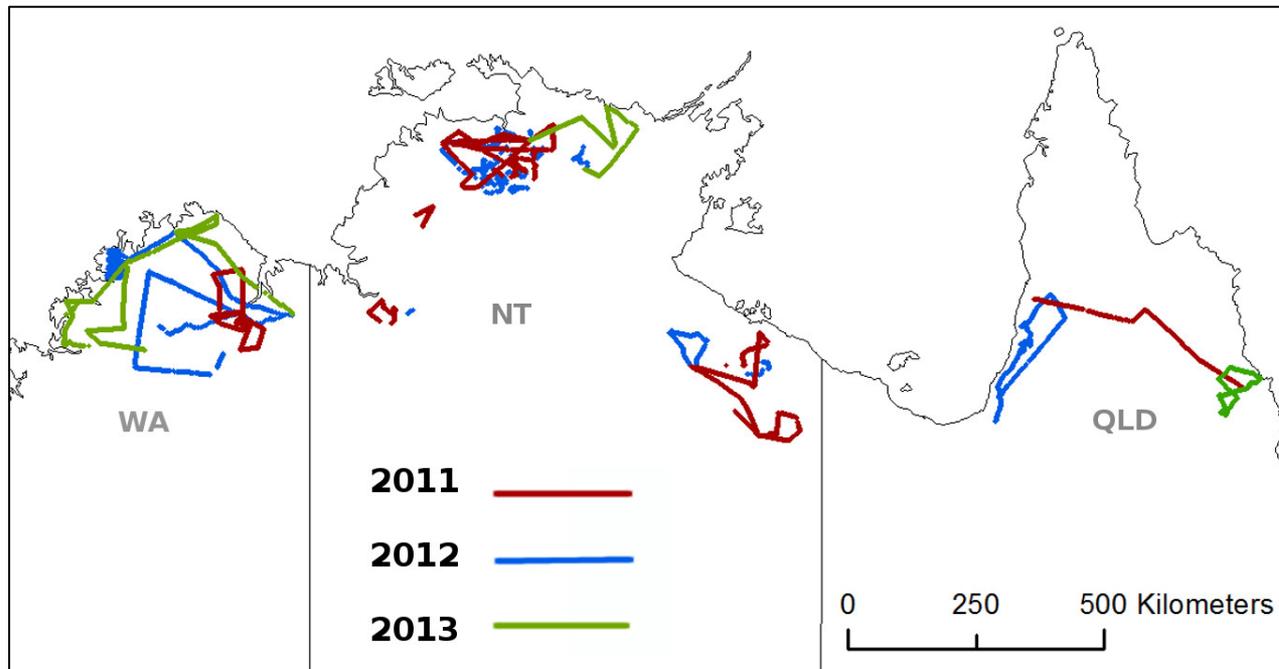


Figure 3. Map of north Australia illustrating the coverage by aerial and ground validation transects, 2011-13.

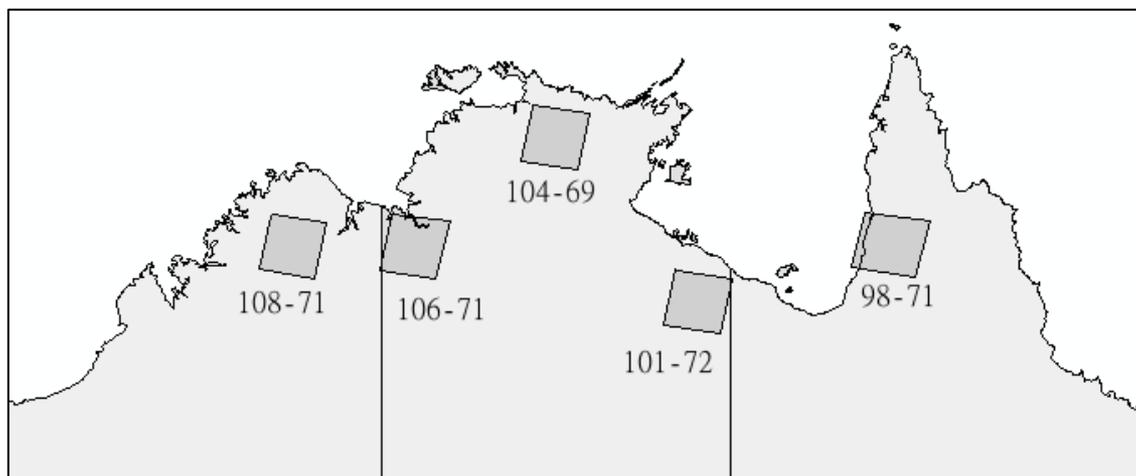
Overall accuracy

0.86

0.90

0.85

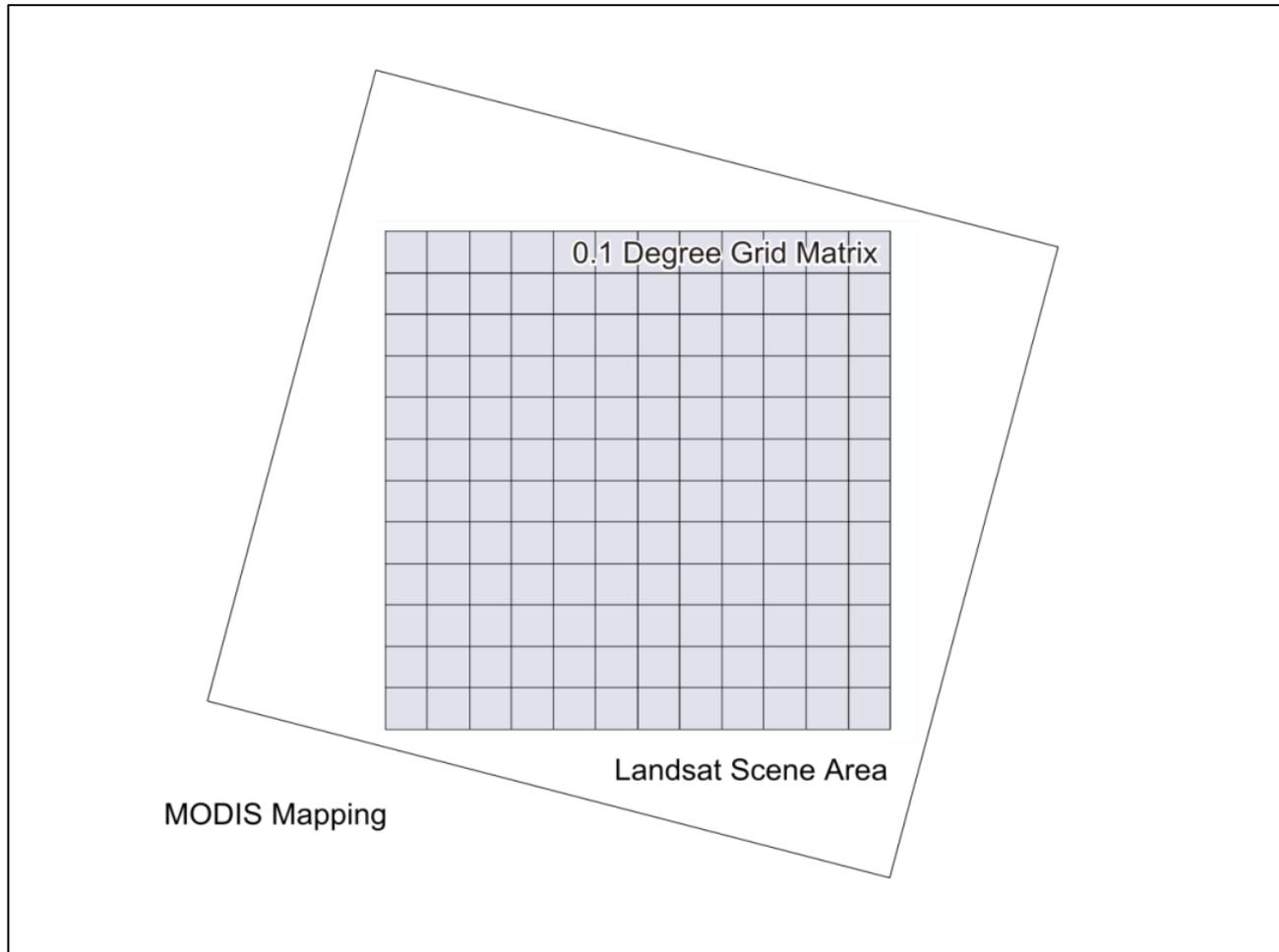
Landsat scenes

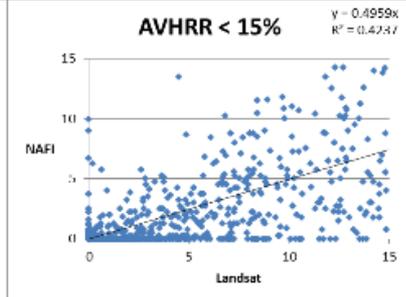
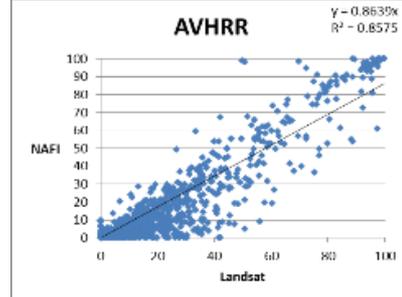
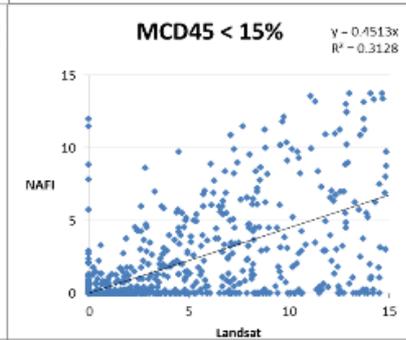
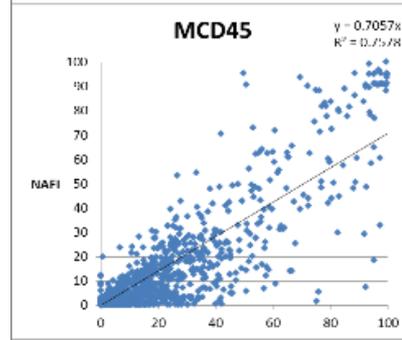
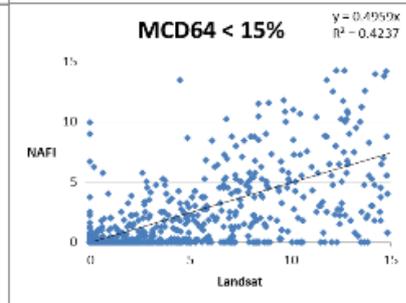
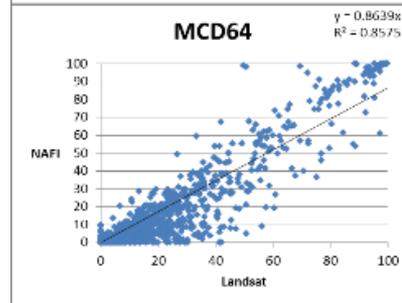
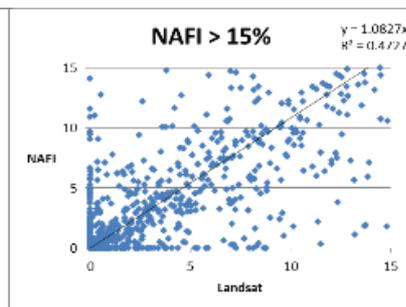
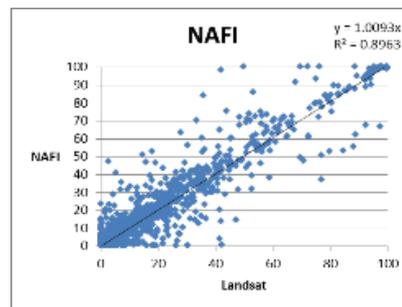


What auto-datasets?

Comparison data-sets	Sensor	Spatial resolution	Spatial Extent	Temporal Extent	Update Frequency	Latency	Map Method
NAFI	MODIS	250m	Kimberly, NT,QLD	2000-Present	Weekly	< Week	Manual
MCD45A1	MODIS	500m	Global	2000-Present	Monthly	3 Months	Auto
MCD64A1	MODIS	500m	Global	2000-Present	Monthly	3 Months	Auto
AVHRR DLI	AVHRR	1.1km	Australia	July 1989-Present	Yearly	1 Year	Semi-Auto

Landsat regression method





		NAFI	MCD64	MCD45	AVHRR
Early	R ²	0.82	0.72	0.63	0.63
	m	1	0.68	0.51	0.89
Late	R ²	0.92	0.93	0.83	0.81
	m	0.98	0.94	0.79	0.92

- Early dry season fires are difficult to accurately map even at the 250m MODIS scale. The ability for NAFI mapping to identify smaller and cooler early dry season burnt areas more readily than other available burnt area mapping products is important as they are often significant for operational planning purposes.
- The ability for land managers to provide input into the NAFI mapping process through providing ancillary data such as burn lines and or direct field based feedback on return visits to burnt areas builds participatory engagement in the product.

Limitations

- **Spatial – 250m**
 - **Solution: use free Landsat data**

- **Temporal: Weekly – Fortnightly**
 - **Solution: direct access free MODIS imagery**

Landsat data

Collection Resolution Map Layers Tools File Help

Downloadable

WRS-2 Path /Row: 105 69 Go

Lat/Long: -13.0 131.9 Go

Max Cloud: 100% [Left Arrow] [Up Arrow] [Down Arrow] [Right Arrow]

Scene Information:
ID: LC81050692014153LGN00
CC: 0% Date: 2014/6/2
Qlty: 9 Product: OLI_TIRS_L1T

Jun 2014 Go

Prev Scene Next Scene

Landsat 8 OLI Scene List

<http://glovis.usgs.gov/>

MODIS

- <http://modis.org.au/modis/modis-toa/>



MODIS

- <http://modis.org.au/modis/modis-toa/>
- **Need to institutionalise pre-processing and serving of this MODIS data.**

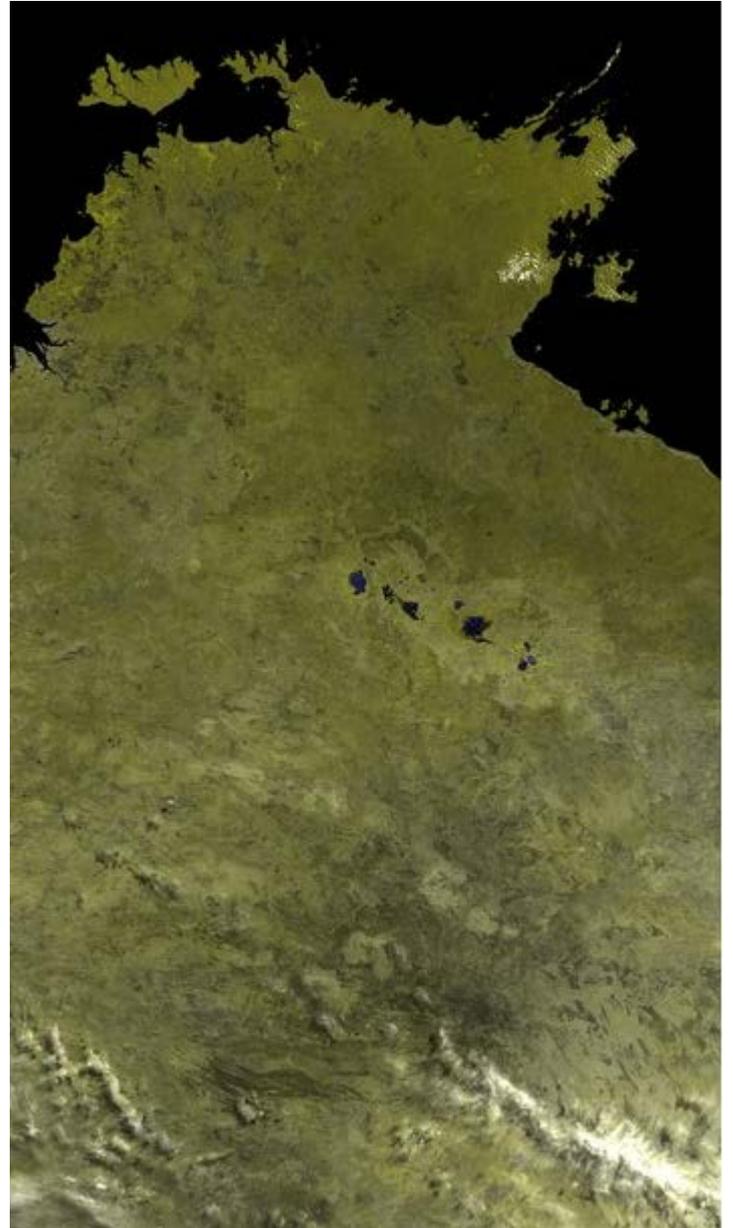
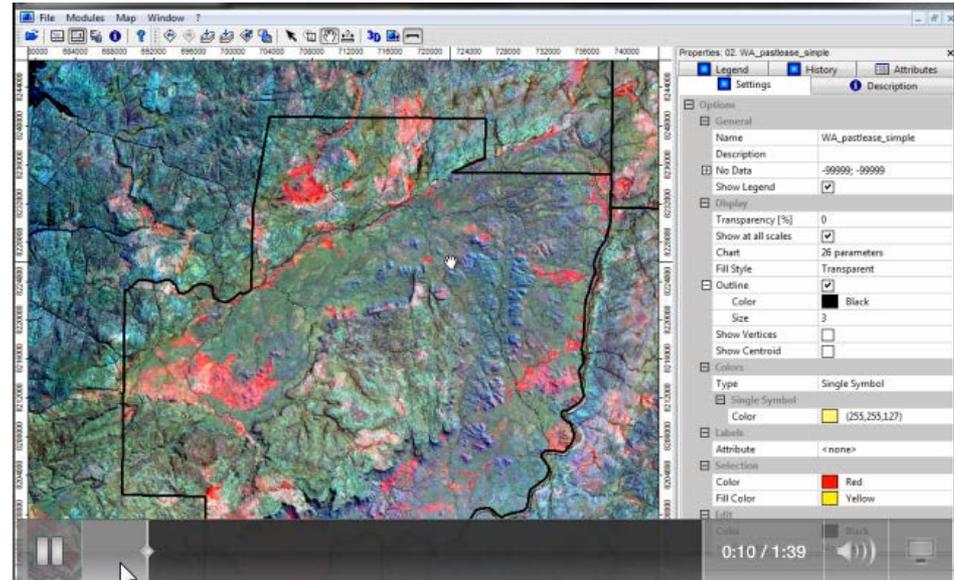


Image Visualisation

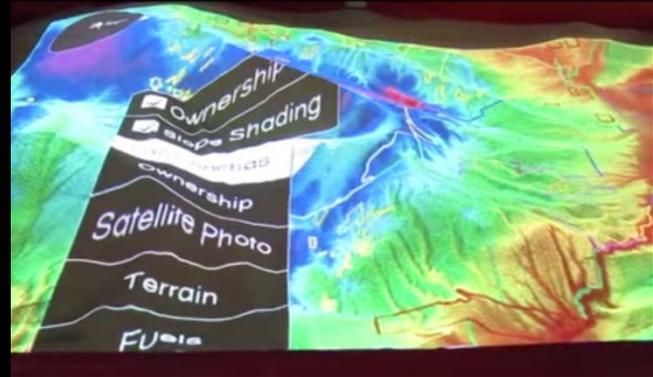
- Software
 - *SAGA GIS*
 - Free Open Source Software



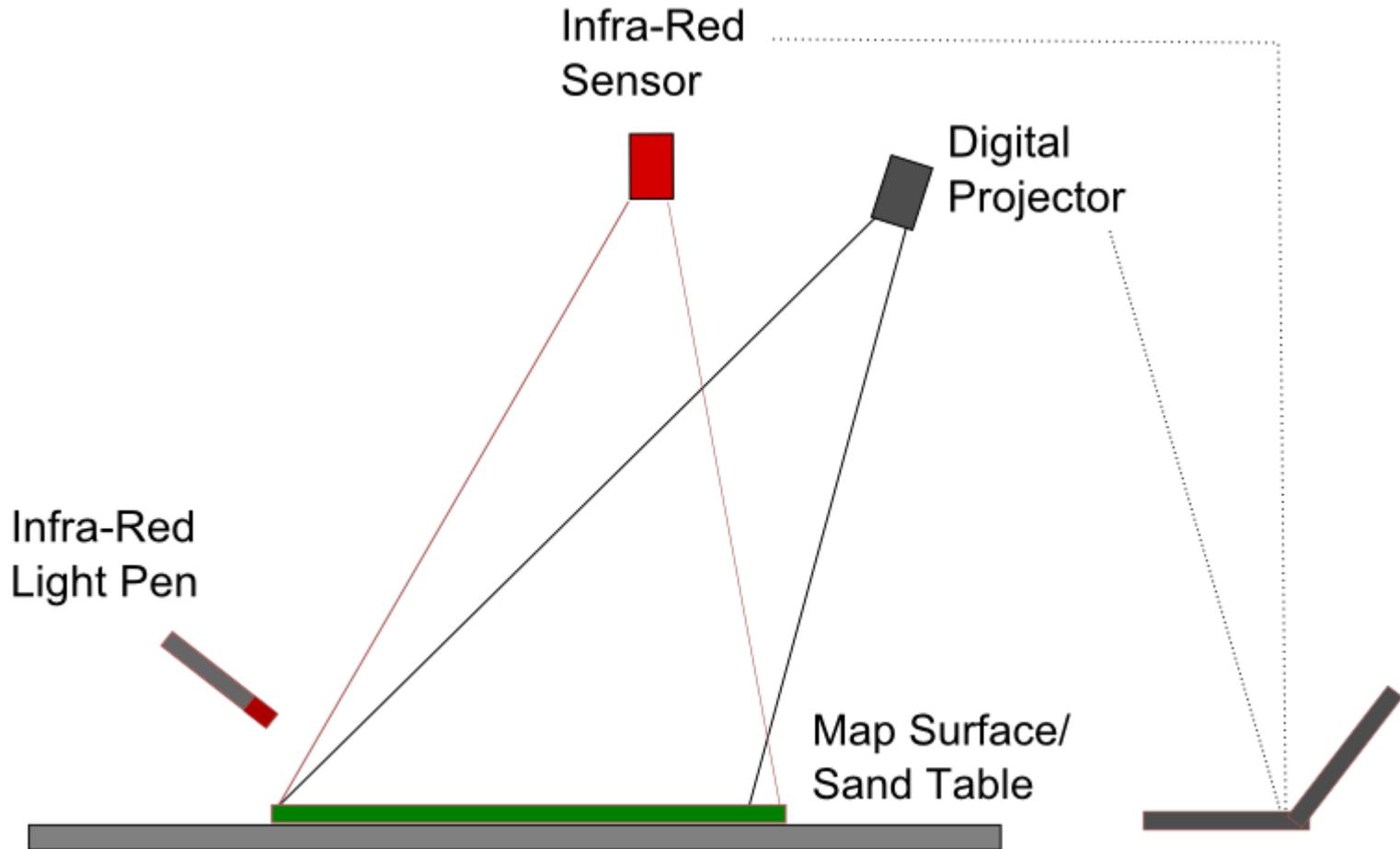
- Training material development
<http://www.screencast.com/users/RohanIndo/playlists/SAGA%20FIRE>
- Software development collaboration with SAGA development team

3D Interactive fire simulations

- Inspired by Sim Table
 - www.simtable.com
- Combined
 - Surface interactivity
 - Agent based models (Fire spread)
 - A sandpit
- Training support tool.



3D Interactive fire simulations

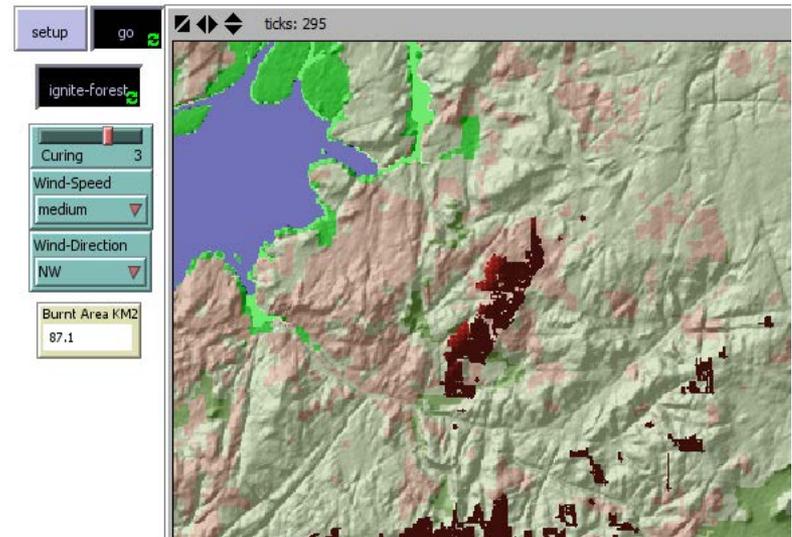


Simulation of fire spread

- **NOT** a model of fire spread
 - Not trying to predict fire path rather mimic fire behaviour in relation to biophysical variables.

Work in progress.

- Fuel load (Veg + TSLB)
- Slope
- Wind Speed direction
- Curing



DEMO



Simulation of fire spread

- **Training Tool**
 - **Looking to incorporate**
 - **Measure of burning intensity**
 - **Cost of chopper**
 - **Burning efficiency**
 - **?**

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