

A satellite map of a region in North Australia, showing a large fire with multiple plumes of white and grey smoke rising from the ground. A yellow dashed line traces a path across the landscape, likely representing a fire boundary or a road. Labels on the map include 'COUNTRYDOWNS' at the top, 'WATERBANK' on the left, 'KILTO' in the center, 'ROEBUCK PLAINS' on the left, and 'GREAT NORTHERN HIGHWAY' on the right. The terrain is a mix of brown and green, indicating different vegetation types.

Landgate Update

North Australia Fire Managers Forum 2017

Landgate
Adrian

Landgate, Satellite Remote Sensing Services
adrian.allen@landgate.wa.gov.au

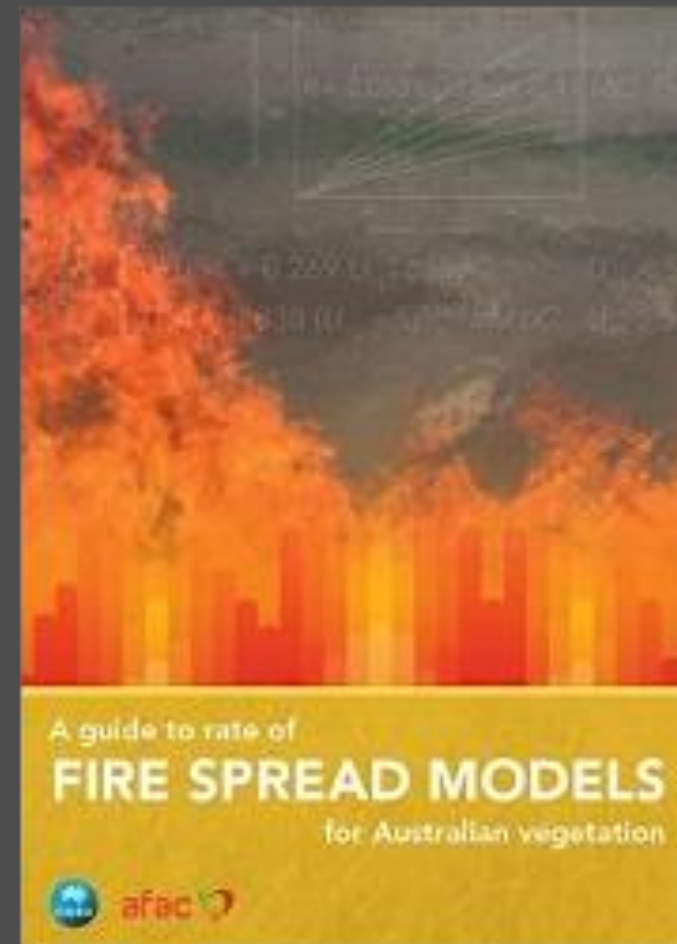
Partner in Copernicus Australia

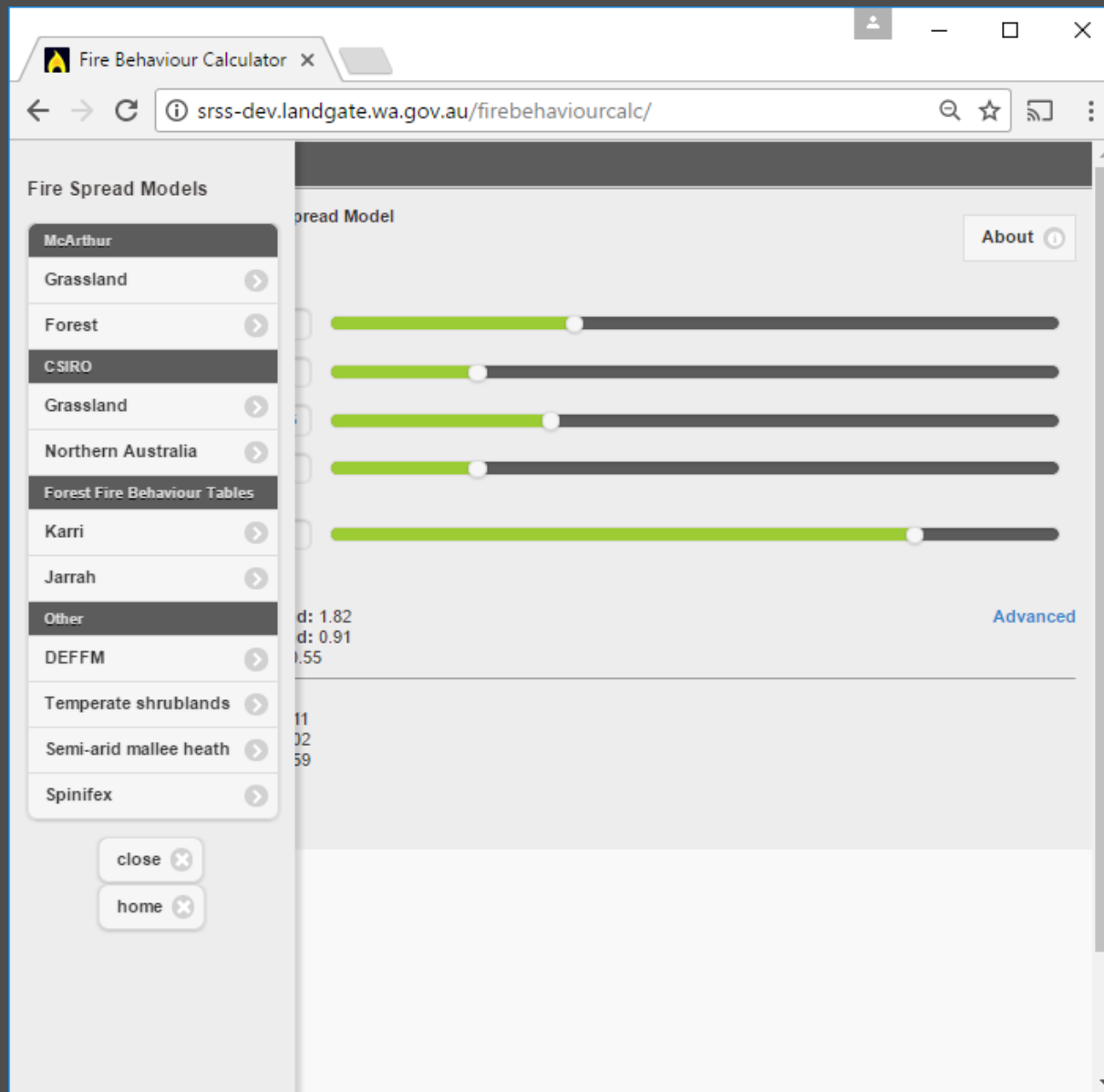
- Australian Copernicus Data Hub
(Landgate, Geoscience Australia, CSIRO, QDSITIA, NSW OEH)
- See <http://www.copernicus.gov.au/>
- Rapid access to the Sentinel satellite series.



Fire Behaviour Calculator [View](#)

- Phone / tablet / website / desktop
- Recent fire spread models
- Managed code base
- Interoperable
- **New project for 2017 / 2018:**
Integrating MetEye data





The screenshot shows a web browser window titled "Fire Behaviour Calculator" with the URL `srss-dev.landgate.wa.gov.au/firebehaviourcalc/`. The interface is divided into a left sidebar and a main content area.

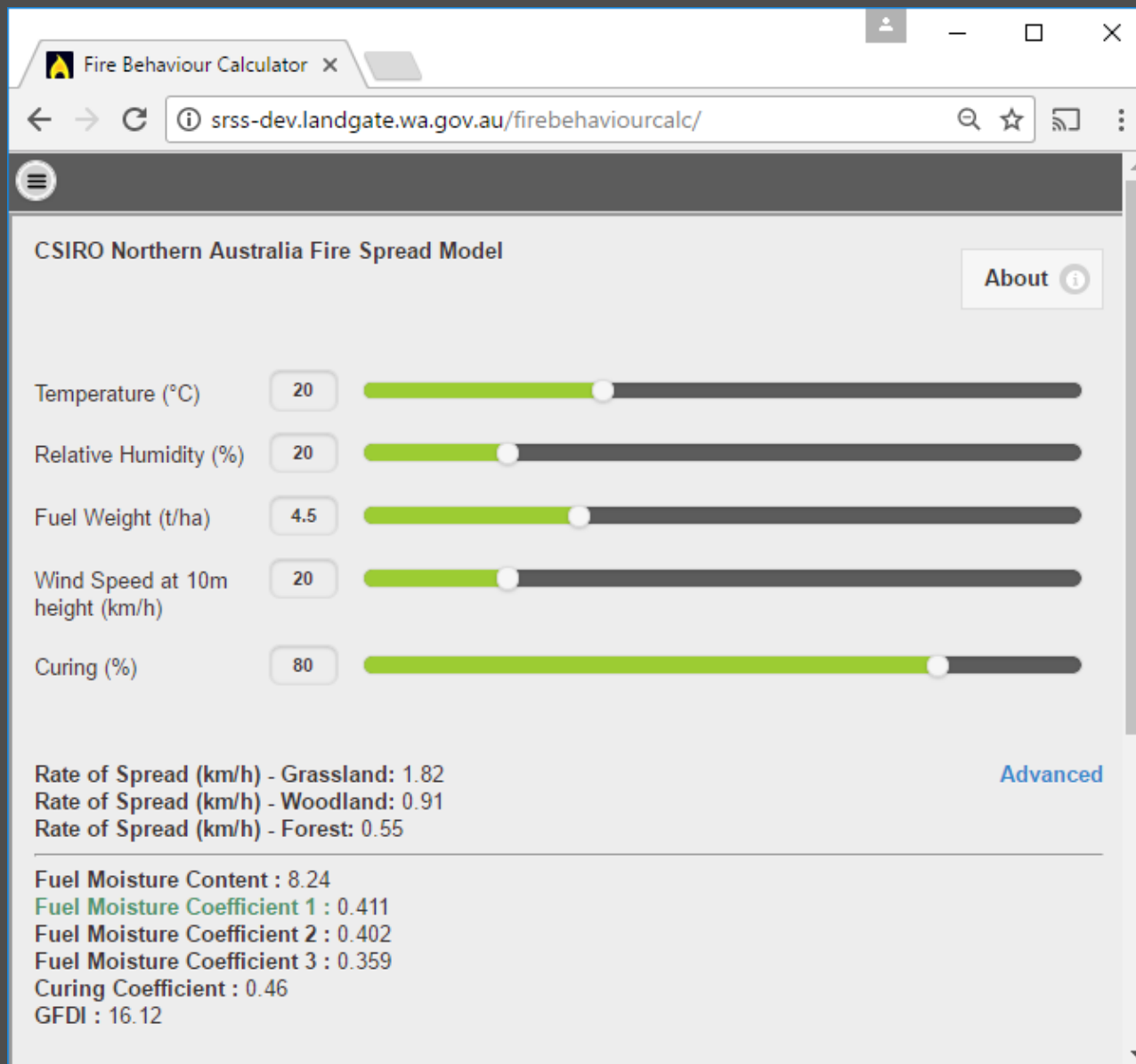
Fire Spread Models Sidebar:

- McArthur
- Grassland
- Forest
- CSIRO
- Grassland
- Northern Australia
- Forest Fire Behaviour Tables
 - Karri
 - Jarrah
 - Other
- DEFFM
- Temperate shrublands
- Semi-arid mallee heath
- Spinifex

Buttons at the bottom of the sidebar: "close" and "home".

Main Content Area:

- Section: "Fire Spread Model" with an "About" button.
- Five horizontal sliders with green segments and white knobs, representing adjustable parameters.
- Text labels: "d: 1.82", "d: 0.91", "1.55".
- Link: "Advanced".



The screenshot shows a web browser window with the title "Fire Behaviour Calculator". The address bar shows the URL "srss-dev.landgate.wa.gov.au/firebehaviourcalc/". The main content area is titled "CSIRO Northern Australia Fire Spread Model" and includes an "About" button. Below the title are five sliders for input parameters: Temperature (°C) at 20, Relative Humidity (%) at 20, Fuel Weight (t/ha) at 4.5, Wind Speed at 10m height (km/h) at 20, and Curing (%) at 80. Below the sliders, the calculated results are displayed: Rate of Spread (km/h) for Grassland (1.82), Woodland (0.91), and Forest (0.55). A blue "Advanced" link is visible to the right of these results. At the bottom, a list of fuel moisture and curing coefficients is shown: Fuel Moisture Content (8.24), Fuel Moisture Coefficient 1 (0.411), Fuel Moisture Coefficient 2 (0.402), Fuel Moisture Coefficient 3 (0.359), Curing Coefficient (0.46), and GFDI (16.12).

Fire Behaviour Calculator

srss-dev.landgate.wa.gov.au/firebehaviourcalc/

CSIRO Northern Australia Fire Spread Model

About

Temperature (°C) 20

Relative Humidity (%) 20

Fuel Weight (t/ha) 4.5

Wind Speed at 10m height (km/h) 20

Curing (%) 80

Rate of Spread (km/h) - Grassland: 1.82
Rate of Spread (km/h) - Woodland: 0.91
Rate of Spread (km/h) - Forest: 0.55

Advanced

Fuel Moisture Content : 8.24
Fuel Moisture Coefficient 1 : 0.411
Fuel Moisture Coefficient 2 : 0.402
Fuel Moisture Coefficient 3 : 0.359
Curing Coefficient : 0.46
GFDI : 16.12

CSIRO Northern Australia Fire Spread Model

About ⓘ

Model Description

CSIRO Northern Australia Fire Spread Model (Cheney and Sullivan, 2008)

This model is suitable for tropical grassland fuel types, woodlands and open forests with a dominant grassy fuel understorey. It was taken from Cruz M. G., Gould J. S. Alexander M. E., Sullivan A. L. McCaw W. L., Mathews S. (2015) *A Guide to Rate of Fire Spread Models for Australian Vegetation*. (CSIRO) Land and Water Flagship, Canberra, ACT, and AFAC Melbourne, Vic, 125pp. (Page 42)

The Curing coefficient ϕC [Eqn. 3.9]:

$$\phi C = \frac{1.12}{1 + 59.2 * \exp(-0.124(C - 50))}$$

The fuel moisture content MC [Eqn. 3.8]:

$$MC = 9.58 - 0.250T + 0.138RH$$

The fuel moisture coefficient ϕM [Eqn. 3.7]:

$$\phi M = \begin{cases} \exp(-0.108MC) & , MC < 12\% \\ 0.684 - 0.0342MC & , MC \geq 12\%, U_{10} < 10kmh^{-1} \\ 0.547 - 0.0228MC & , MC \geq 12\%, U_{10} \geq 10kmh^{-1} \end{cases}$$

Rate of spread for open grassland [Eqn. 3.5]

$$R_g = \begin{cases} (0.054 + 0.269U_{10})\phi M\phi C & , U_{10} \leq 5kmh^{-1} \\ (1.4 + 0.838(U_{10} - 5)^{0.844})\phi M\phi C & , U_{10} > 5kmh^{-1} \end{cases}$$

Rate of spread for woodland [Table 3.7]

$$R_w = R_g \times 0.5$$

Rate of spread for open forest [Table 3.7]

$$R_f = R_g \times 0.3$$

CSIRO Northern Australia

Temperature (°C)

Relative Humidity (%)

Fuel Weight (t/ha)

Wind Speed at 10m
height (km/h)

Curing (%)

Rate of Spread (km/h) - C

Rate of Spread (km/h) - V

Rate of Spread (km/h) - F

Fuel Moisture Content : 16.12

Fuel Moisture Coefficient

Fuel Moisture Coefficient

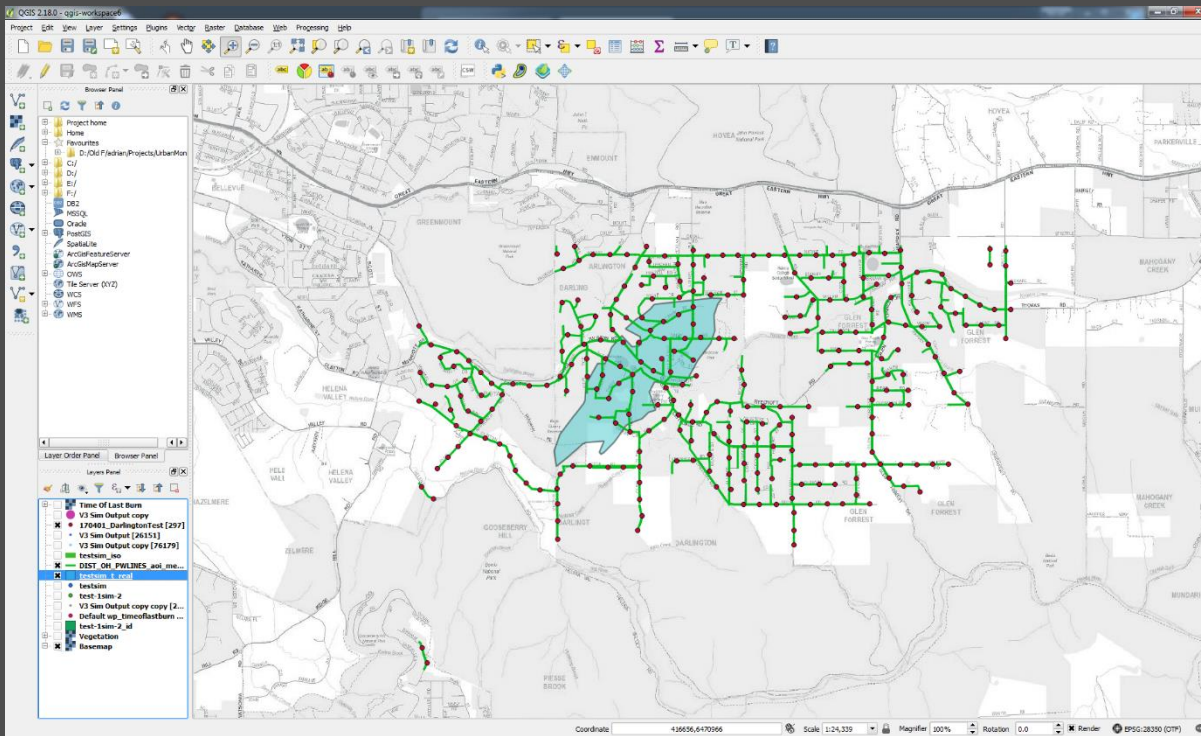
Fuel Moisture Coefficient

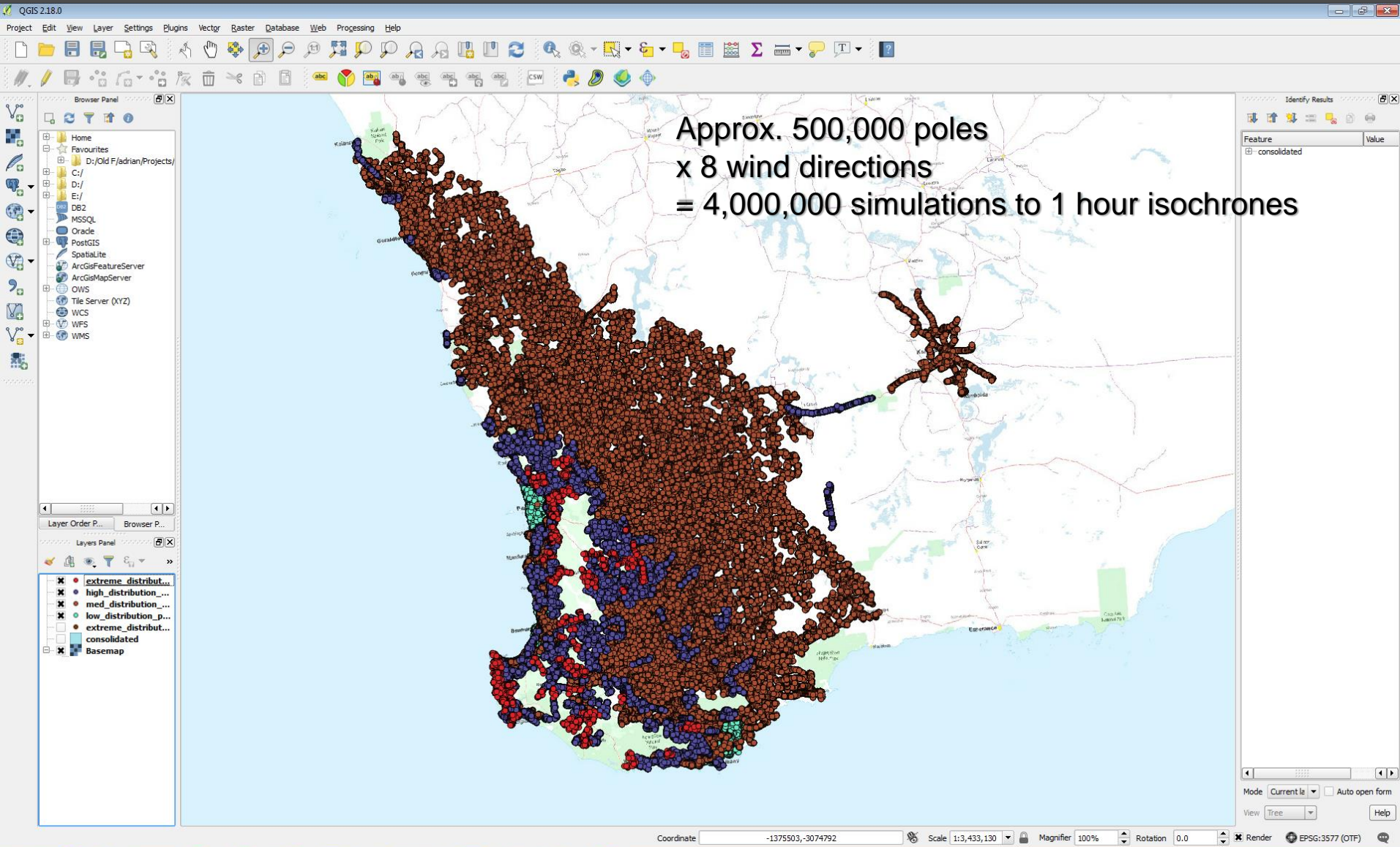
Curing Coefficient : 0.46

GFDI : 16.12

Bushfire Consequence Analysis Project with DFES, for Western Power

Develop a new fire risk map for the power network based on fire start consequences.





Proposed fuel loads surrogates for urban areas

For areas mapped as grass, define a methodology to determine tonnage according to number of buildings in 1 ha raster cell

- 0-2 buildings p/ha (R2) = 4.5 t/ha (natural)
- 3-5 buildings p/ha (R5) = 1.5 t/ha (grazed)
- 6-15 buildings p/ha (R15) = 0.5 t/ha (eaten out)
- 15+ buildings p/ha (>R15) = 0.0 t/ha

Firewatch Update

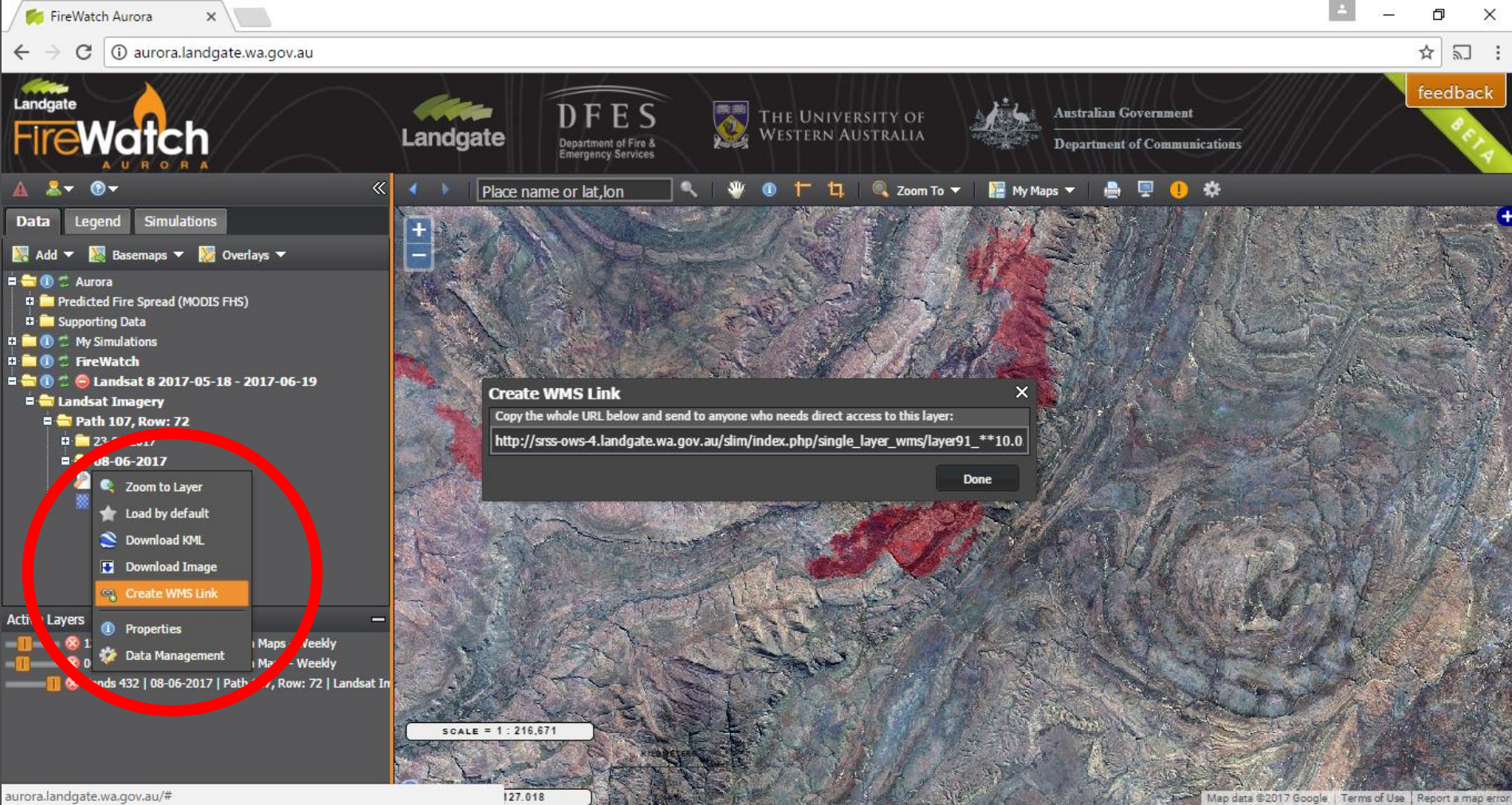
- Partnering with Geoscience Australia to provide a National fire hotspot mapping system.
- Landsat imagery
Will be providing new band combinations and a better enhancement.
- Grassland curing product, with DFES, DPaW and BoM.
- ***New Project 2017/2018 – begin to enable access to Sentinel 2 data through Firewatch and Aurora***

Aurora Update

- DFES has developed a TRK
- Download and WMS access to all imagery (Landsat, MODIS, AVHRR, VIIRS, Himawari-8)
- Dry Eucalypt Forest Fire Model (DEFFM)
- Moving to a 100m national output grid - from 200m
- Head fire summary report viewable from each simulation
- Printing size now range from A4 to A0
- Draw and save polygon and line tool

Landgate Update - Firewatch / Aurora

NAFM 2017



The screenshot displays the FireWatch Aurora web application interface. The browser address bar shows `aurora.landgate.wa.gov.au`. The page header includes logos for Landgate, DFES (Department of Fire & Emergency Services), The University of Western Australia, and the Australian Government. A 'feedback' button and a 'BETA' banner are also visible.

The main interface features a map with a red fire simulation. A 'Create WMS Link' dialog box is open, displaying the following text:

Create WMS Link

Copy the whole URL below and send to anyone who needs direct access to this layer:

`http://srss-ows-4.landgate.wa.gov.au/slim/index.php/single_layer_wms/layer91_**10.0`

Done

The left sidebar contains a 'Data' panel with a tree view of layers. A red circle highlights the 'Create WMS Link' option in the context menu for the selected layer. The 'Active Layers' panel at the bottom shows the current layer stack.

Landgate Update - Firewatch / Aurora

NAFM 2017



QGIS 2.10.1-Pisa - test landsat

Project Edit View Layer Settings Plugins Vector Raster Database Web Processing Help

Layer order

- layer91_201706080130_LS8_OLI_LGN_1070
- 1 to 250k Map (Australia)

Control rendering order

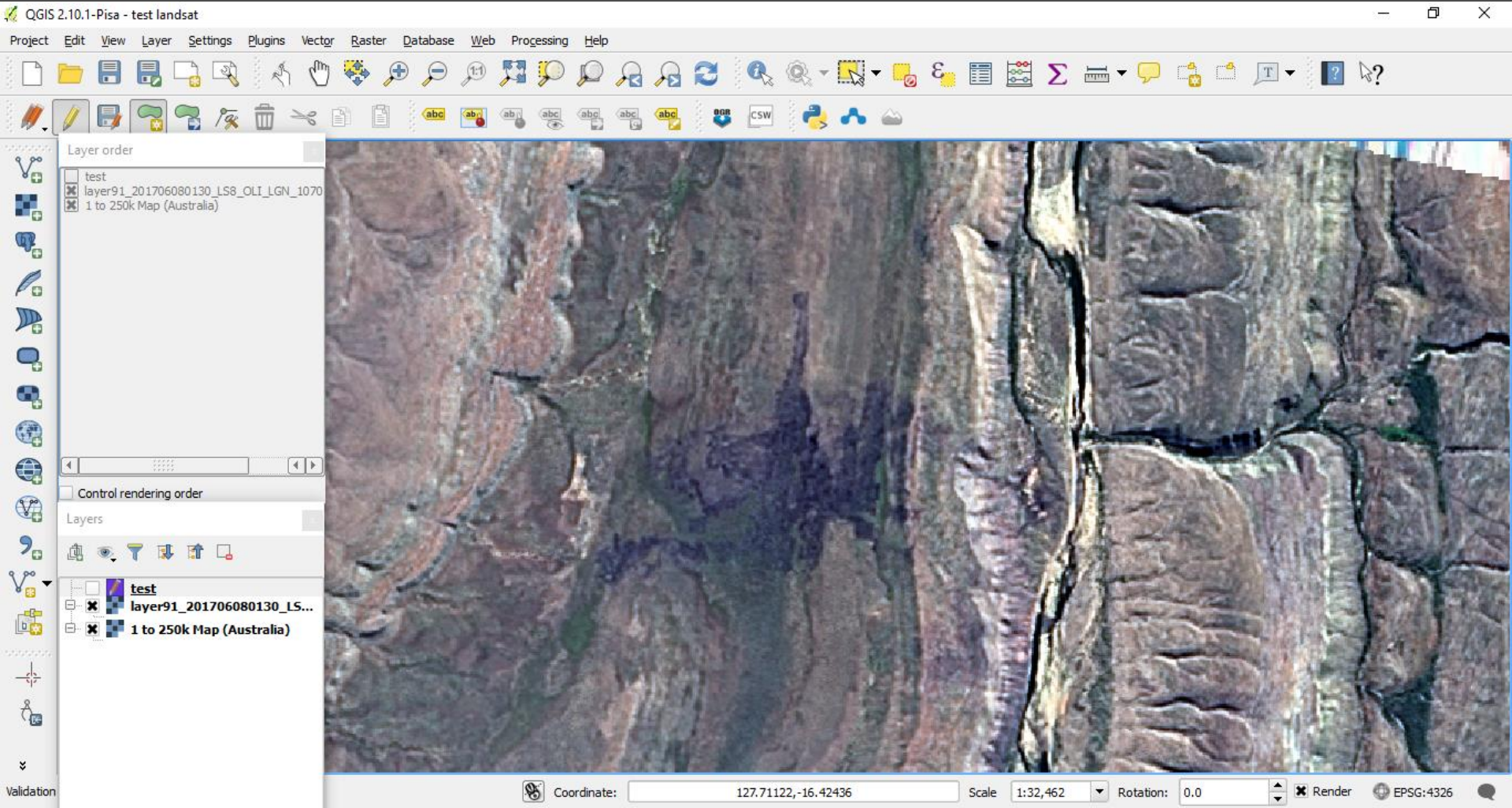
Layers

- layer91_201706080130_LS...
- 1 to 250k Map (Australia)

Coordinate: 133.40,-11.07 Scale: 1:8,164,758 Rotation: 0.0 Render EPSG:4326

Landgate Update - Firewatch / Aurora

NAFM 2017



Aurora Update

- Added time of impact isochrones to the download fire spread ZIP file
- Ability to enter a wind origin bearing
- Disaster Recovery / Failover sites developed in AWS cloud
<http://auora-dr-aws.landgate.wa.gov.au>
- Modify variables – curing values and drought factor values and grassland model selection
- Offer to include other states vegetation data
- ***New Project 2017/2018*** – integrate the BoM ADFD data in replacement of ACCESS weather.

Thank you

Adrian Allen

adrian.allen@landgate.wa.gov.au

Landgate SRSS

srss.landgate.wa.gov.au

Firewatch

firewatch.landgate.wa.gov.au



Satellite Remote Sensing Services

Landgate Update - Firewatch / Aurora

NAFM 2017

