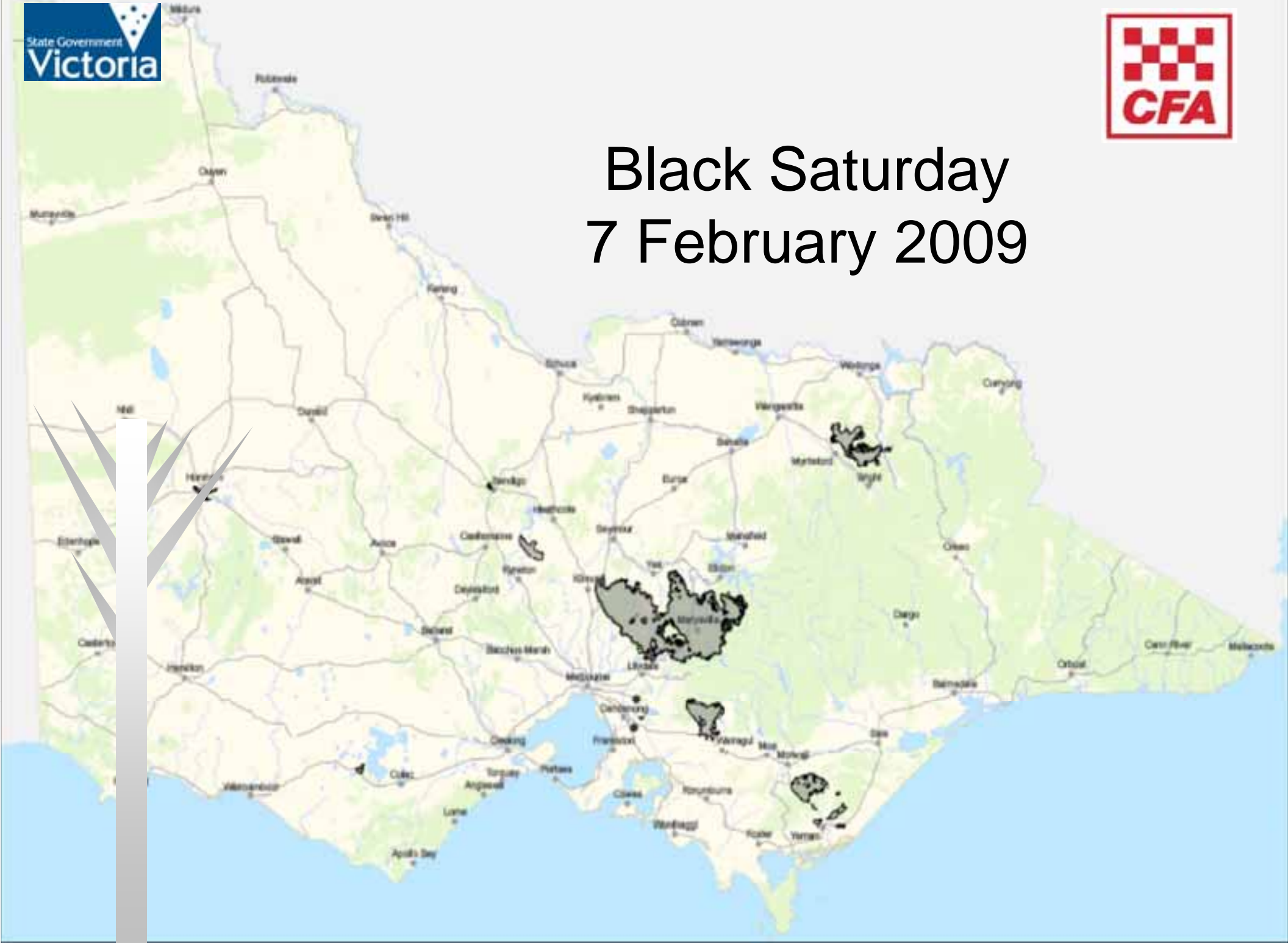


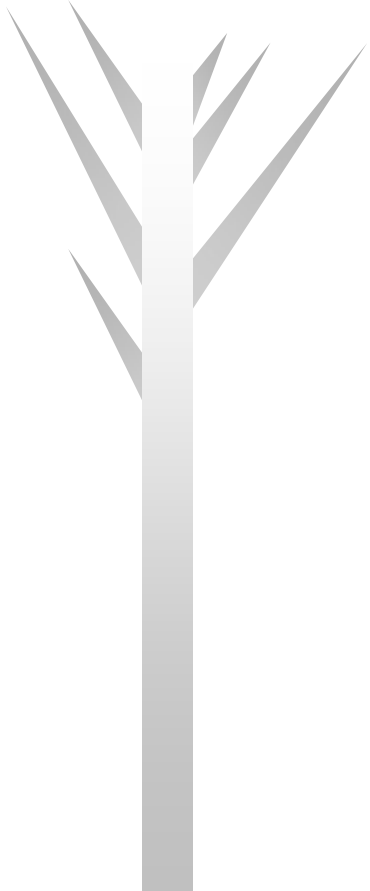
Black Saturday and the re-build of spatial systems in Victoria

Mark Garvey AFSM
CFA – Country Fire Authority

Black Saturday 7 February 2009



A ten year drought
preceded
Black Saturday

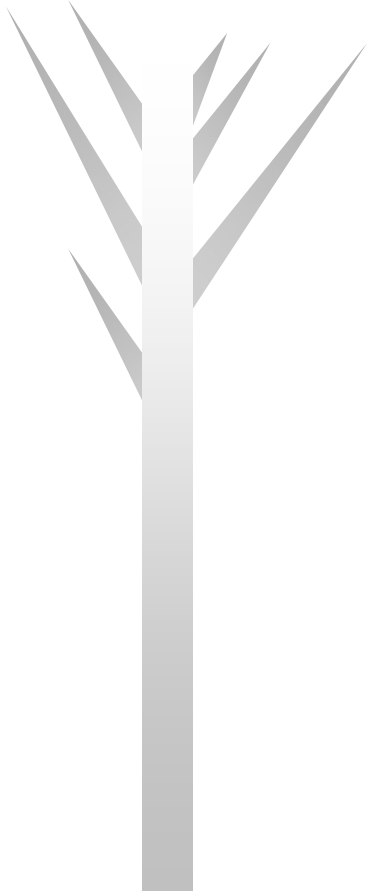




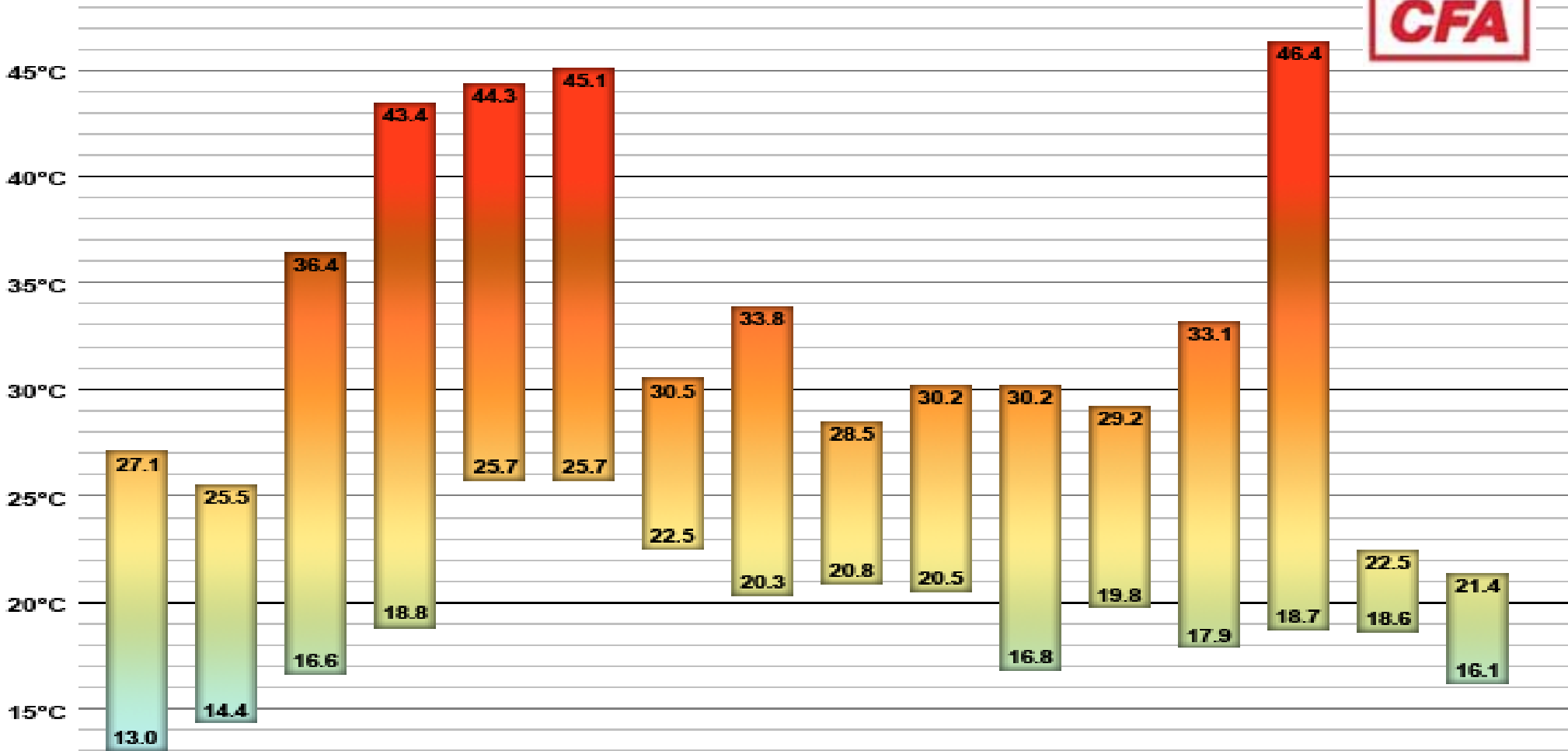
The heatwave preceding Black Saturday

+ 45⁰ Celsius

+ 115⁰ Farenheit



MELBOURNE CITY MIN / MAX TEMP

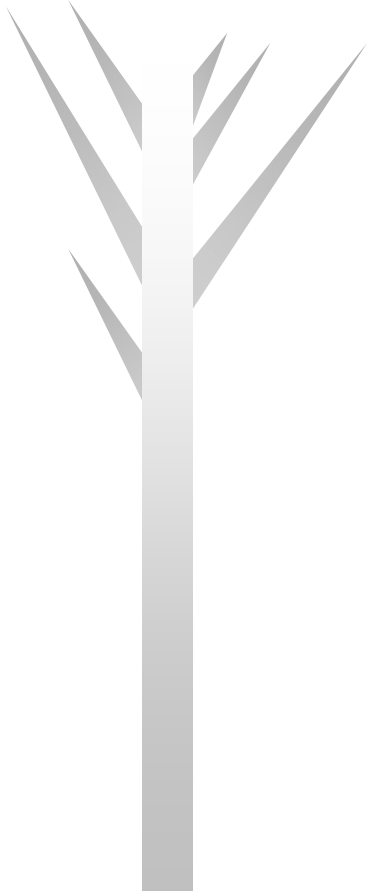


January

February

25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday

Fire Weather indices “off the scale”



Meteorology – 7 Feb 2009



DNV18500
Australian Government Bureau of Meteorology
Victoria

Five Weather Forecast
for Saturday 7 February 2009
Issued at 4:45 pm EDT on Friday 6 February 2009.

FURNACETS ARE ISSUED REGULARLY: PLEASE ENSURE YOU HAVE THE LATEST VERSION

Location	MaxT (C)	MinT (C)	RE (%)	Wind (kph)	Dir	SPD	GUST	DP (kPa)	POB (%)	CPD (%)	Wind Change
Wipacup	46	2	6	NW	50	80	10	100	148	190	SW 50 16-19
Swan Hill Airport	46	-3	4	N	50	80	10	100	159	210	SW 45 16-22
Mallee	LAL: 0		RAIN: NO						MIX (M): 4400		
											WIND (1000): NW 60 FDI above 35: Late AM
Soreham Airport	44	1	7	NW	50	80	10	100	137	178	SW 50 14-18
Stawell	41	1	8	NW	55	80	10	100	133	195	WSW 50 13-19
Wimmera	LAL: 0		RAIN: NO						MIX (M): 4400		
											WIND (1500): NW 75 FDI above 35: Late AM
Ballarat Airport	41	-4	5	NW	65	100	10	100	185	330	WSW 60 15-17
Portland Airport	34	9	21	NW	45	70	7	90	31	50	WSW 40 09-13
Hazletton Airport	41	3	9	NW	55	90	10	100	128	186	SW 45 12-16
Mortlake	41	8	9	NW	60	80	9	95	102	100	SW 45 13-17
WestEPP	LAL: 0		RAIN: NO						MIX (M): 4100		
											WIND (1000): SW 50 FDI above 35: Late AM
Hendigo Airport	44	-1	6	NW	50	80	10	100	143	186	WSW 60 17-21
Shepparton Airport	42	0	7	N	50	80	10	100	127	167	WSW 45 20-00
Northern Country	LAL: 0		RAIN: NO						MIX (M): 4400		
											WIND (1000): NW 55 FDI above 35: Late AM
Mangalore Airport	43	1	7	N	50	78	10	100	131	171	WSW 45 19-24
North Central	LAL: 0		RAIN: NO						MIX (M): 4400		
											WIND (1500): NW 65 FDI above 35: Late AM
Oonlong Airport	44	4	8	NW	50	75	10	100	129	167	WSW 50 14-18
Coldstream	44	-1	6	NW	50	80	10	100	142	160	WSW 45 18-22
Tullamarine	44	-3	5	NW	55	85	10	90	164	178	WSW 50 16-20
Dunns Hill	39	1	9	NW	60	85	10	90	136	153	WSW 50 17-21
Wentthaggi	40	12	15	NW	60	80	10	100	79	110	WSW 50 15-19
Central	LAL: 0		RAIN: NO						MIX (M): 4300		
											WIND (1000): NW 70 FDI above 35: Late AM
Albury-Wodonga	44	5	9	NW	45	85	10	100	82	77	
Mangaratta Airport	44	2	7	NW	35	60	10	100	95	83	
Eastern Hill	38	3	11	NW	45	70	10	100	85	102	
Northeast	LAL: 0		RAIN: NO						MIX (M): 4400		
											WIND (1500): NW 50 FDI above 35: Late AM
Lalrobe Valley	43	0	7	NW	50	80	10	100	133	175	WSW 45 18-22

East Sale Airport	47	9	8	NW	45	65	10	100	112	129	WSW 45 19-23
Mount Moorunga	41	1	8	NW	50	80	10	100	125	163	WSW 35 20-00
W & S Gippsland	LAL: 0		RAIN: NO						MTX (M): 1400		
											WIND (1000): NW 65 FDI above 35: Late AM
Orbost	43	6	10	NW	35	55	10	80	84	29	SW 45 20-00
Gelantipy	40	4	11	NW	55	85	8	100	95	178	
East Gippsland	LAL: 0		RAIN: NO						MIX (M): 4300		
											WIND (1500): NW 45 FDI above 35: Late AM
Falls Creek	29	3	18	NW	60	100	8	100	56	126	
Alpine Areas	LAL: 0		RAIN: NO						MIX (M): 4400		
											WIND (2000): SW 50 FDI above 35: Late AM
Interstate:											
Mount Gambier	35	5	15	NW	45						N 50 09-12
Mackay	41	2	9	NW	50						SW 50 19-14
Rocky	48	0	5	NW	40						NW 50 16-20
Timberlake	40	5	11	NW	45	60					
Deniliquin	43	3	7	NW	45	60					SW 50 19-23
Bombala	31	5	13	NW	45	60					

Ballarat
Forestfire Index – 185 (100)
Grassfire Index – 330 (150)

Saturday: A very severe fire weather day with a combination of strong and gusty north/northwesterly winds ahead of a low frontal trough passage Saturday afternoon and night. Air ahead of the change will become dry with a well mixed atmosphere. Temperatures will be very hot, perhaps breaking some February records. Gusty west/southwest winds behind the change make this an extremely dangerous day. Extreme ratings expected in EVERY DISTRICT and many ratings exceeding 100. Isolated showers are expected near and following the change, with the slight chance of lightning. Areas of raised dust are likely during the day, particularly near the change.











↑ 724
Healesville

B300
Melbourne →

← Yea

vic roads

Tadlangi Forest
Discovery Centre ↑







BLACK SATURDAY



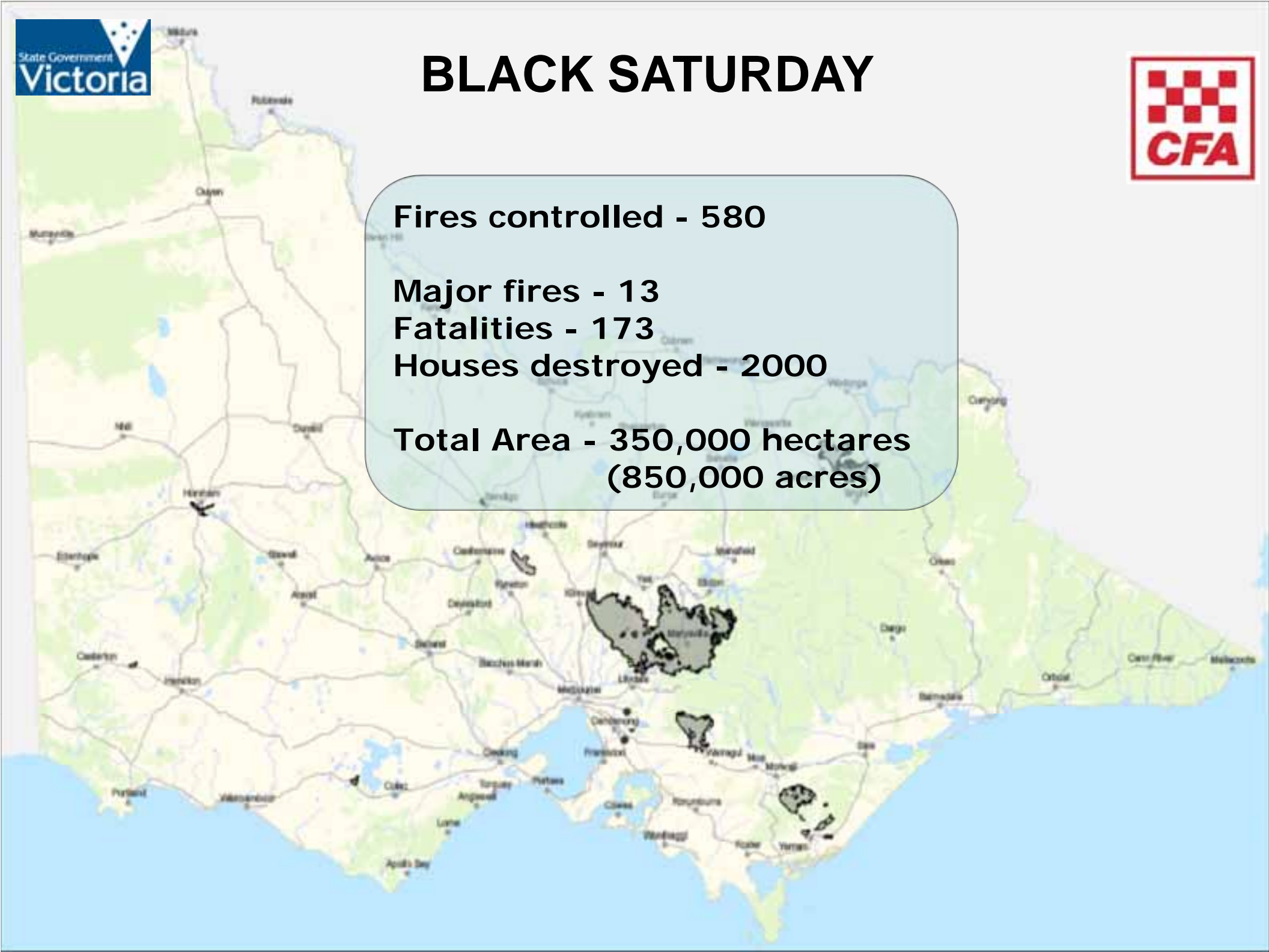
Fires controlled - 580

Major fires - 13

Fatalities - 173

Houses destroyed - 2000

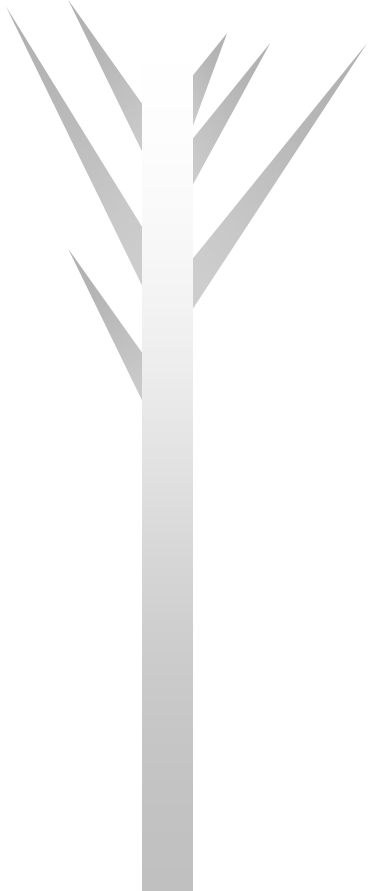
**Total Area - 350,000 hectares
(850,000 acres)**



The Victorian Bushfires Royal Commission

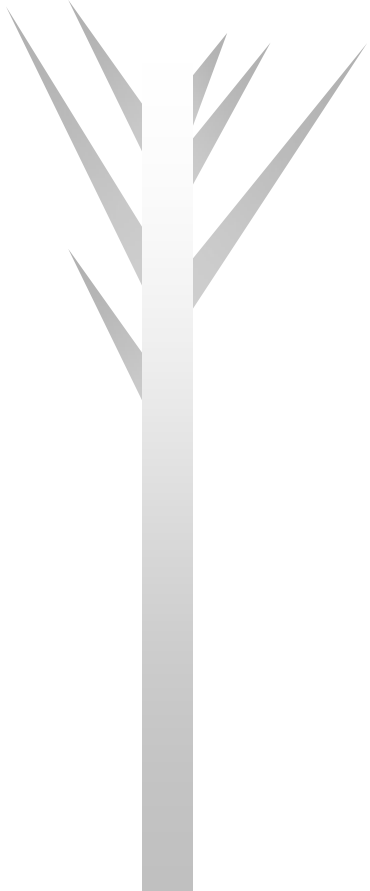
A major formal public inquiry
with wide ranging powers of
investigation

<http://www.royalcommission.vic.gov.au>



Intense scrutiny of many issues including mapping and spatial

- Herald Sun newspaper
 - <http://bit.ly/roTGyG>
- The Age newspaper
 - <http://bit.ly/opHRRH>
- ABC Television News
 - <http://www.youtube.com/watch?v=5TfjNrD6b2E>



Spatial issues covered by the Royal Commission included:

Paper maps and map directories

Quality of state digital map base

Data Licensing

Networks

Interoperability

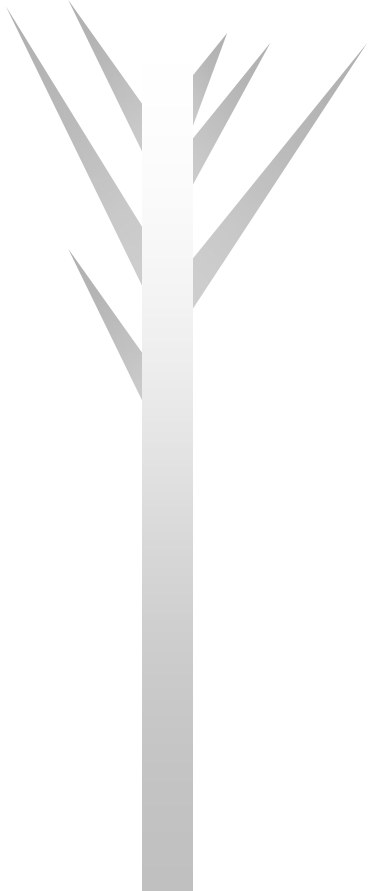
Joint training

Data gathering

GPS standards

Information flows

Bushfire prediction models



Systemic Issues - Mapping Submission of Counsel Assisting

Submissions of Counsel Assisting

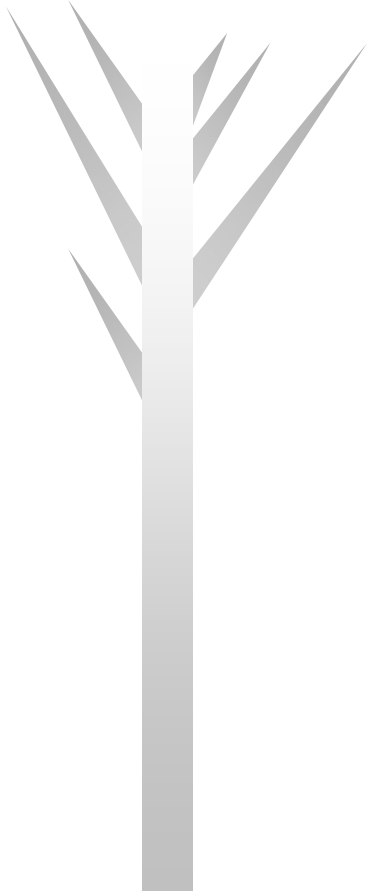
2009 Victorian Bushfires Royal Commission
Letters Patent issued 18 February 2009

SYSTEMIC ISSUES – MAPPING
SUBMISSIONS OF COUNSEL ASSISTING

CONTENTS

1	INTRODUCTION	2
2	SYSTEMIC ISSUES	2
	Accuracy of VicMap books	2
	Interoperability and integration	3
	Sharing spatial information	4
	Mapping units in IMTs	5
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	Integration of mapping systems on 7 February 2009	19
	Integration of mapping systems since 7 February 2009	20
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8	MAPPING UNITS IN IMTs	22

<http://www.royalcommission.vic.gov.au/getdoc/6a2011ea-150d-4526-b530-eeeeae1c693a5/SUBM-505-001-0001>



Royal Commission Recommendations

FINAL REPORT RECOMMENDATIONS

2009 Victorian Bushfire Royal Commission

VICTORIA'S BUSHFIRE SAFETY POLICY

RECOMMENDATION 1

The State revise its bushfire safety policy. While adopting the national Prepare, Act, Survive, framework in Victoria, the policy should do the following:

- enhance the role of warnings—including providing for timely and informative advice about the predicted passage of a fire and the actions to be taken by people in areas potentially in its path
- emphasise that all fires are different: events that require an awareness of the conditions, local circumstances and personal capacity
- recognise that the heightened risk on the worst days demands a different response
- retain those elements of the existing bushfire policy that have proved effective
- strengthen the range of options available in the face of fire, including community refuges, bushfire shelters and evacuation
- ensure that local solutions are tailored and known to communities through local bushfire planning
- improve advice on the nature of fire and house defensibleity, taking account of broader landscape risks.

RECOMMENDATION 2

RECOMMENDATION 10

The State clarify whether, during major fires, Victoria Police should discharge its coordination functions from the State Emergency Response Coordination Centre or from the State Control Centre.

RECOMMENDATION 11

The State consider amending the Emergency Management Act 1986 and the Emergency Management Manual (Victoria) in order to achieve the following:

- remove the title of Coordinator in Chief of Emergency Management from the Minister for Police and Emergency Services
- clarify the function and powers of the Minister
- designate the Chief Commissioner of Police as Coordinator in Chief of Emergency Management, who would have primary responsibility for keeping the Minister informed during an emergency.

RECOMMENDATION 12

The State consider either amending the Emergency Management Act 1986 or adopting a standing practice to require the Minister for Police and Emergency Services or the Chief Commissioner of Police to consult the Premier about the possibility of declaring a state of disaster for all of or any part of Victoria whenever the State or the Chief Commissioner of Police becomes aware of the occurrence of a fire.

<http://www.royalcommission.vic.gov.au/Assets/VBRC-Final-Report-Recommendations.pdf>

Outcomes

Data Licensing issues sorted

A single system for mapping bushfires across Victoria

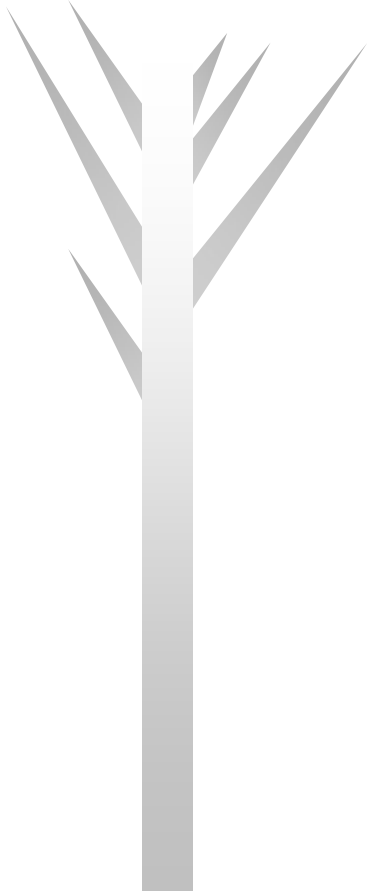
Multi hazard capability

Joint training across Agencies

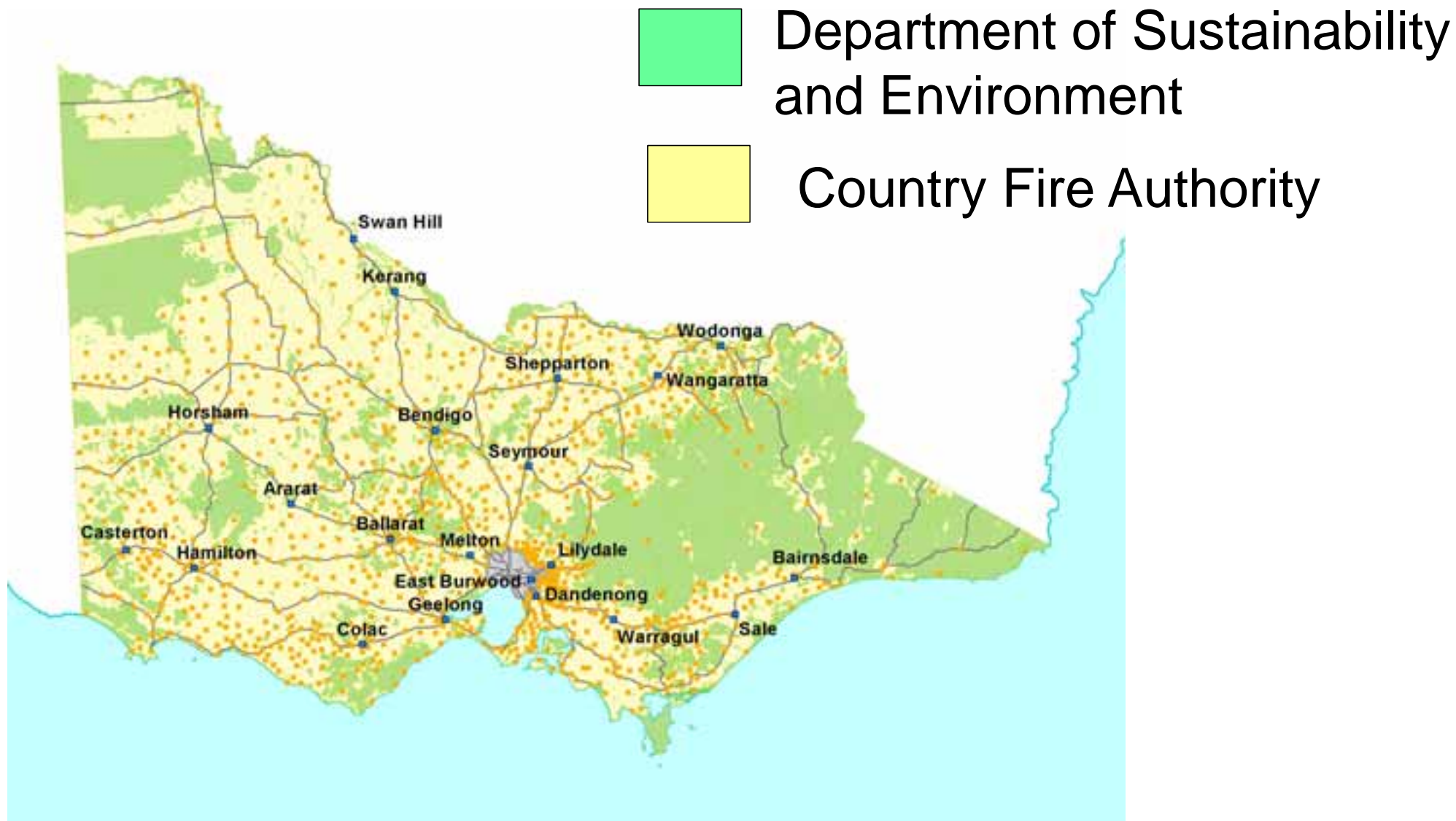
Funds provided

Much R&D occurring

Emergency Map (eMap)

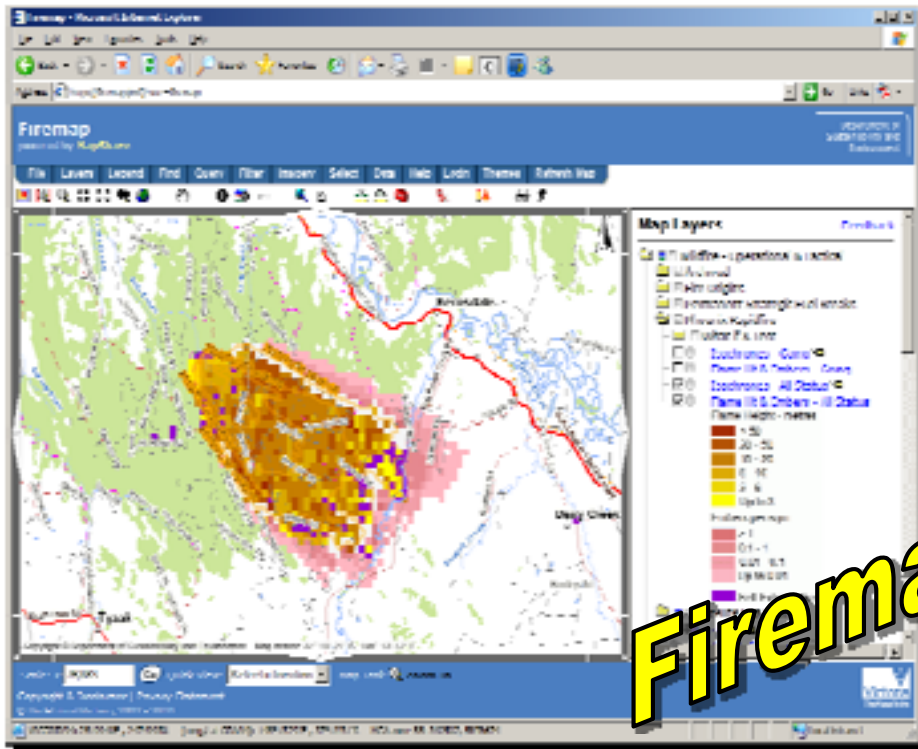


Bushfire Management in Victoria



Previous mapping systems

ArcIMS



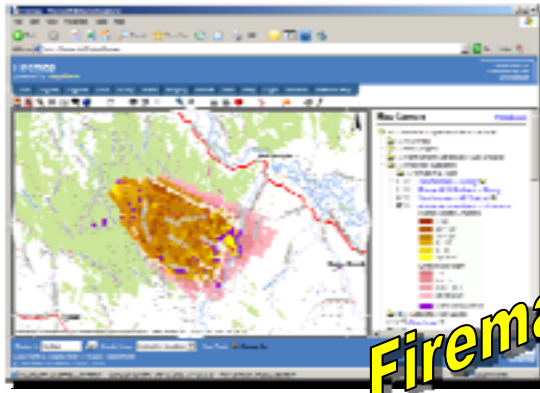
DSE – Web system

Map Objects



CFA – standalone/mobile system

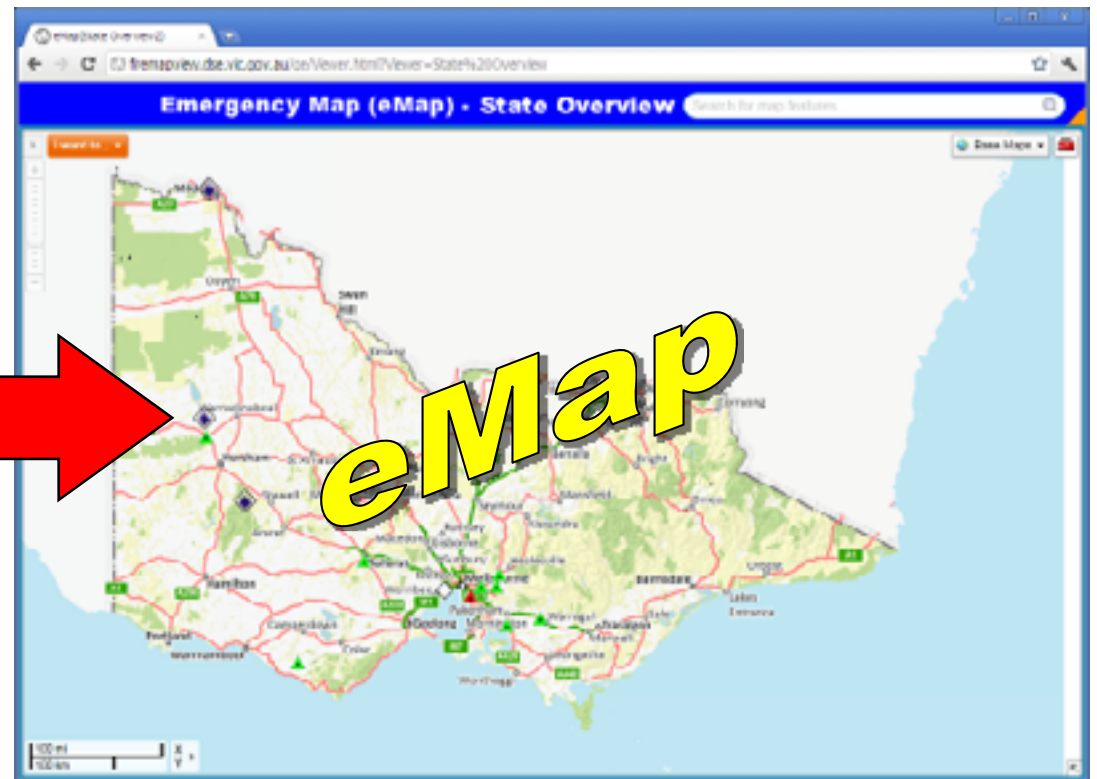
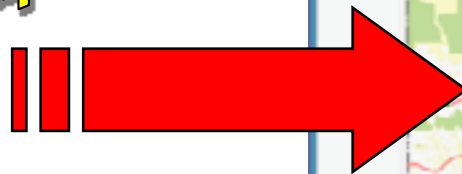
New mapping systems



Firemap



EIMS Mapper



eMap

Systems Development

eMap Web: DSE

ESRI / Geocortex

eMap Field - CFA

ESRI ArcGIS Runtime

eMap Analyst – CFA / DSE

ArcGIS extensions / tools

Principals

- Common Operating Picture
- Interoperability
- Flexibility
- All Hazards
- Simplicity
- Works with or without connectivity
- Real time data and modelling
- One site for fire / flood / storm
- Themes, data, workflows consistent across platforms

Emergency Map (eMap)

Themes

- State Overview
- Bushfire*
- Flood & Storm*
- * Coming soon

Incident Feeds

- DSE - CFA
- SES -MFB
- NSW RFS -ESTA 000
- SA CFS*

* Coming soon

Integrates field observation systems



Phoenix



Coming Soon

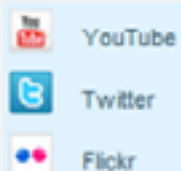
Photos



High Qual. Maps



Integration of Social Media and smart phone/tablet access

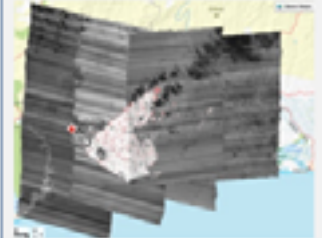


Emergency Map (eMap) - State Overview

Satellite Hot Spots



Firecasts



Resource Tracking



BOM Weather Services



VicMap



Fire History



eMap - Incidents types supported

- Fire
- Flood
- Storm
- Hazmat
- Damage
Assessment
- Motor Accidents



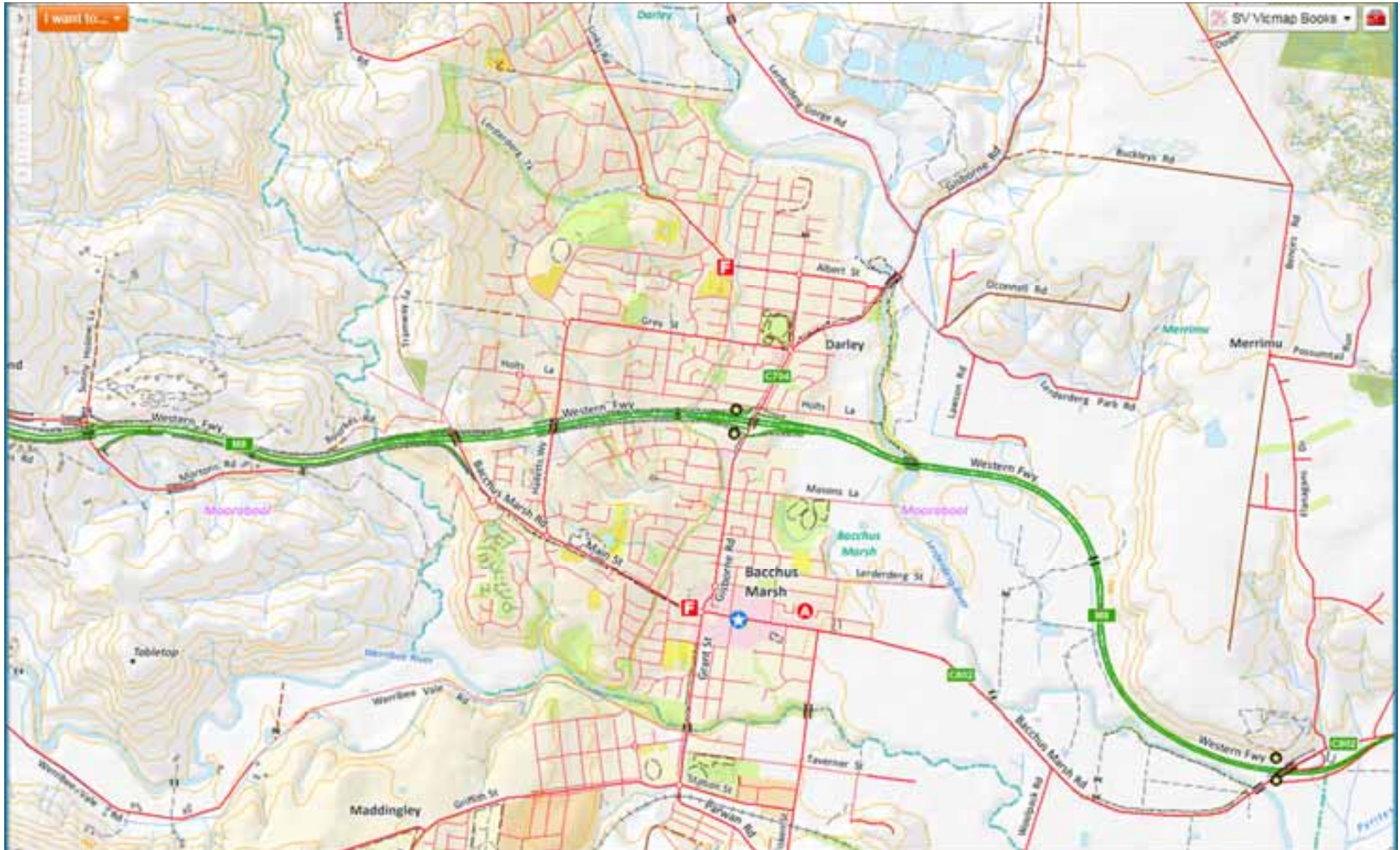
Map Books

Map bases in use for fire season 12/13

- Melways
(Melbourne Street Directory)
- Spatial Vision Map Books
(Topographic Directories)
- Mapscape
New Digital topographic map
cache

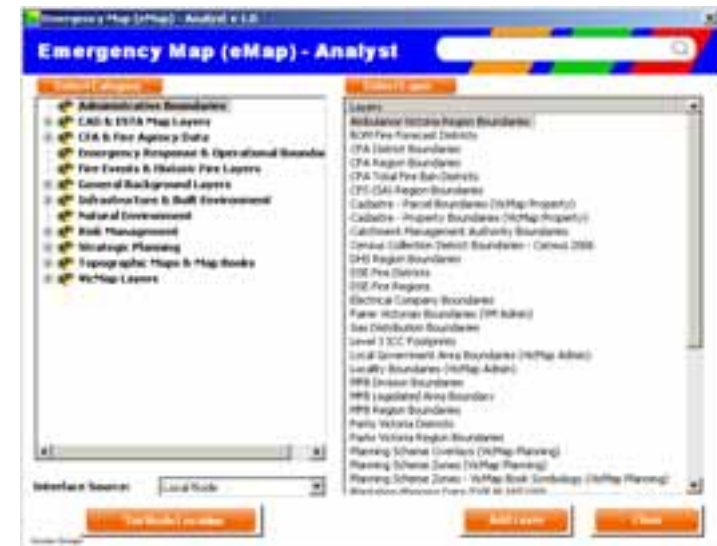


eMap Web – Base Layers



eMap Tools Phase 1

- Web
- Field
- Analyst



eMap Web – Many data layers



Map Layers

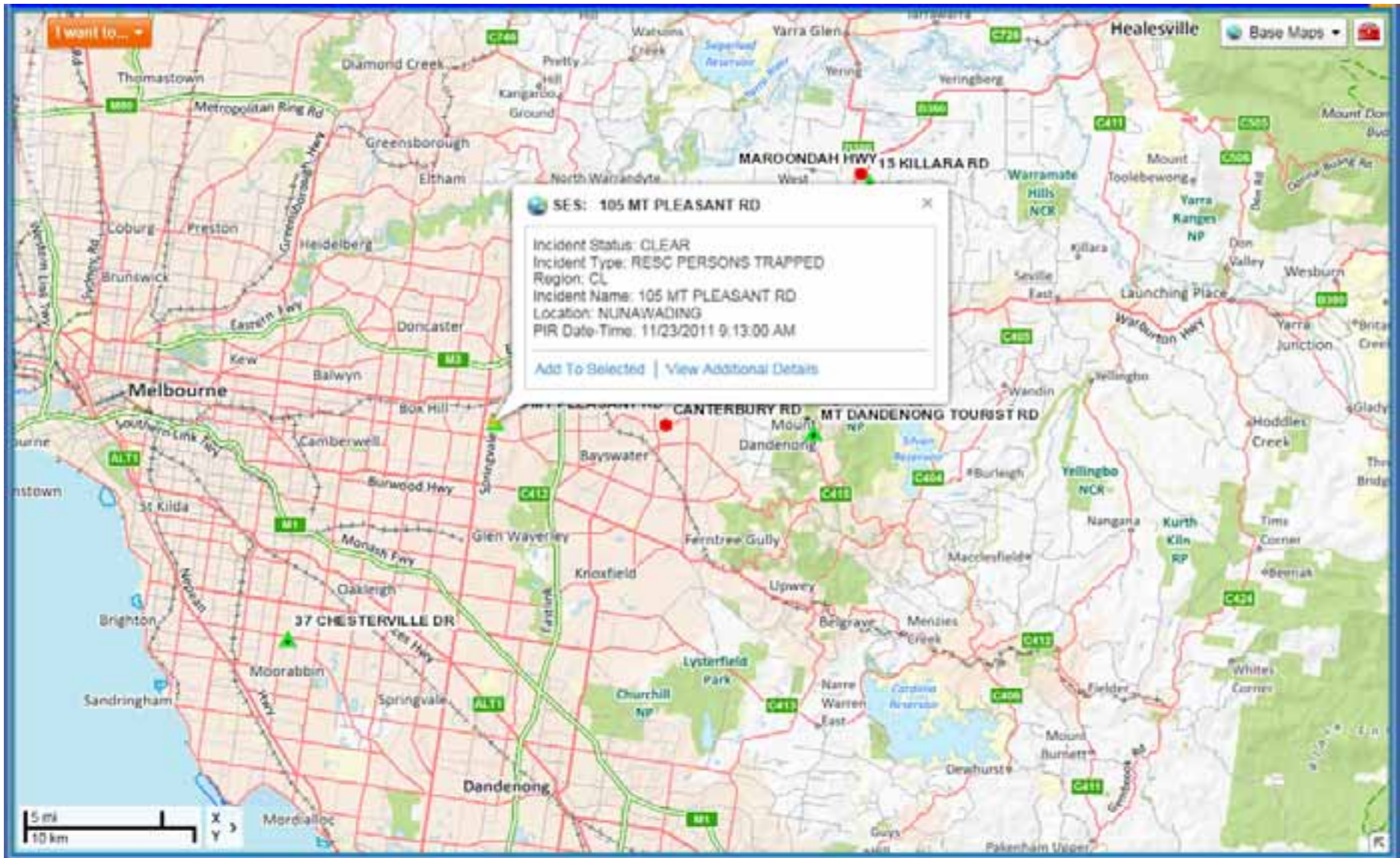
- Operational Layers
 - Incidents
 - Resource and Aircraft Tracking
 - Field Observations
 - Weather
 - Boundaries
 - Land Classification and Use
 - Phoenix
 - Tree Cover
- GeoRSS Layers
 - NSW Rural Fire Service Current Incidents
- Base Maps
 - Topography
 - Firescans
 - SV Vicmap Books
 - Bing Maps - Aerial with Topo
 - Bing Maps - Aerial

- Boundaries**
 - Township Protection Plan Extents
 - DSE Fire Districts
 - DSE Regions
 - Total Fire Ban Boundaries
 - CFA Districts
 - CFA Regions
 - CFA Brigade Response Boundaries
 - Localities
 - Victorian Government Regions
 - L3 ICC Footprints
 - PV Division Region Boundaries
 - PV District Branch Boundaries
 - PV RIC Areas
 - Local Government Areas
 - MFB Divisions
 - MFB Regions
 - SES Regions
 - SES Response Boundaries

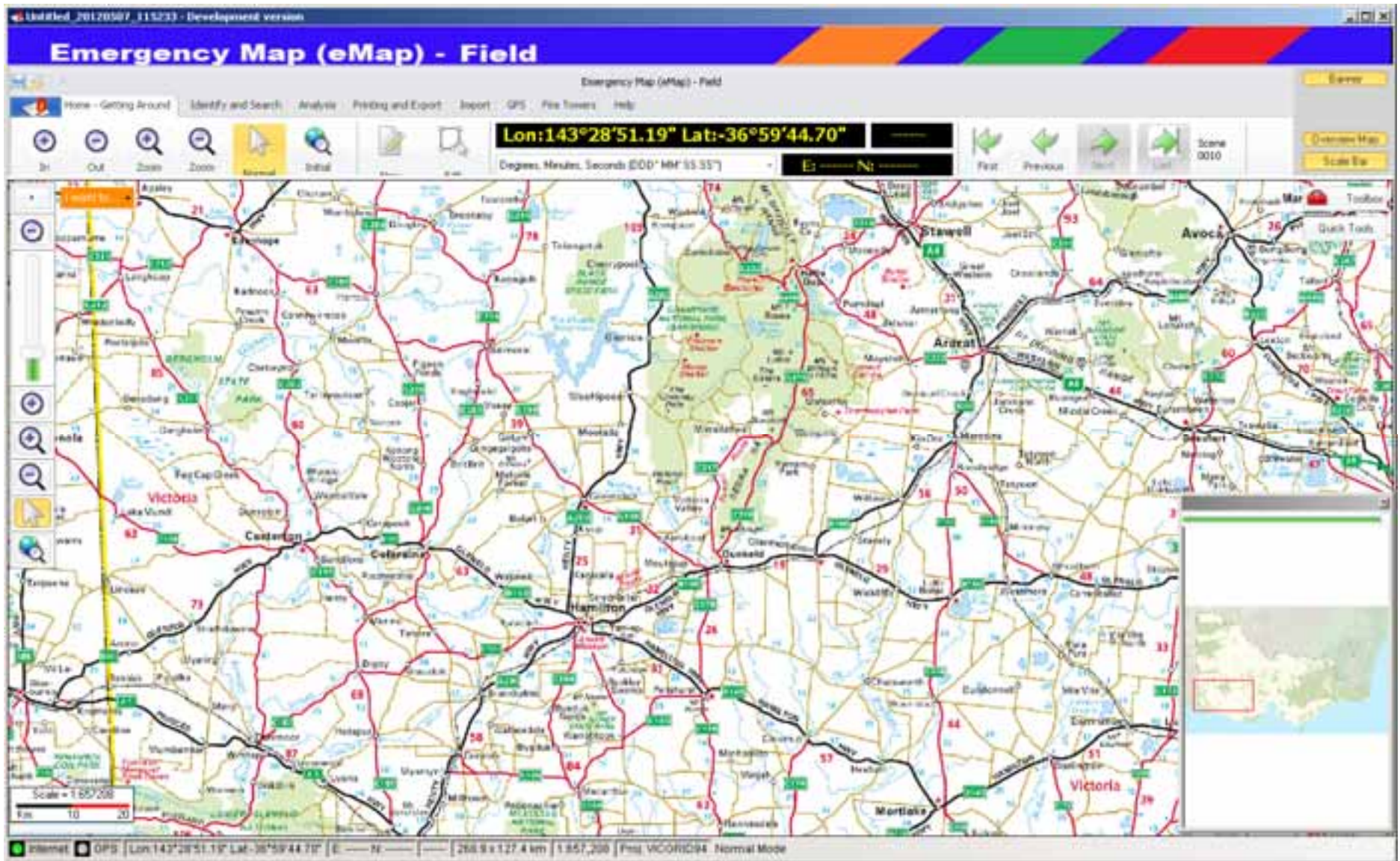
WMS Layers

- WMS Layers**
 - Bureau of Meteorology Services**
 - Surface Obs DryBulb Temp
 - Surface Obs Rel. Humidity
 - Surface Obs Rain Since 9AM
 - Mean Sea Level pressure
 - Radar Bairnsdale Airport VIC
 - Radar Melbourne Airport VIC
 - Radar Melbourne VIC
 - Radar Mildura VIC
 - Radar Yarrowonga VIC
 - Satellite IR Colour Aust. Region
 - Satellite IR B&W Aust. Region

eMap Web – Live Incident Data

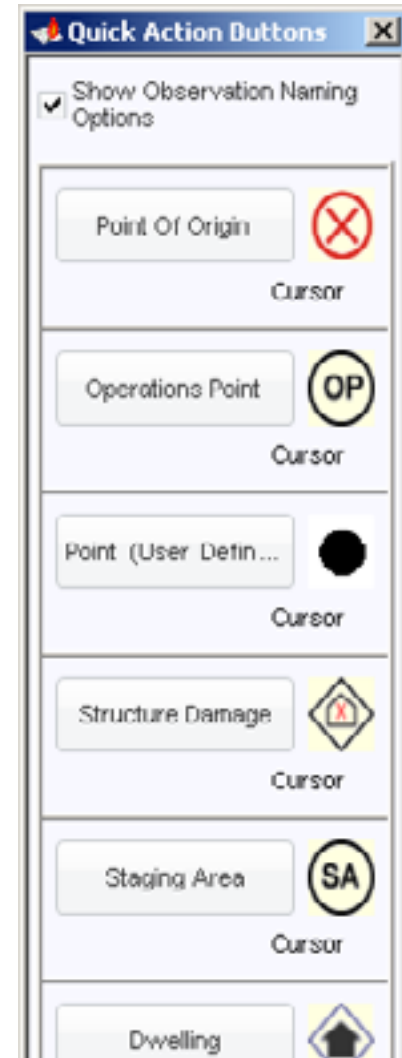


eMap Field



eMap Field GPS tools

- GPS functionality is still available
- Moving map
- Create data based upon GPS position
- Quick action buttons

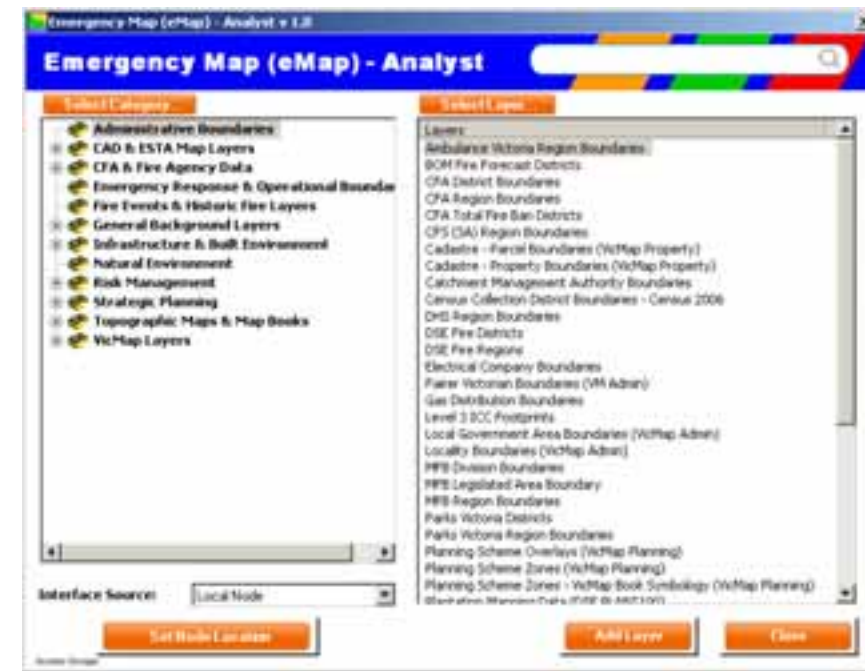


eMap Field Real Time Data

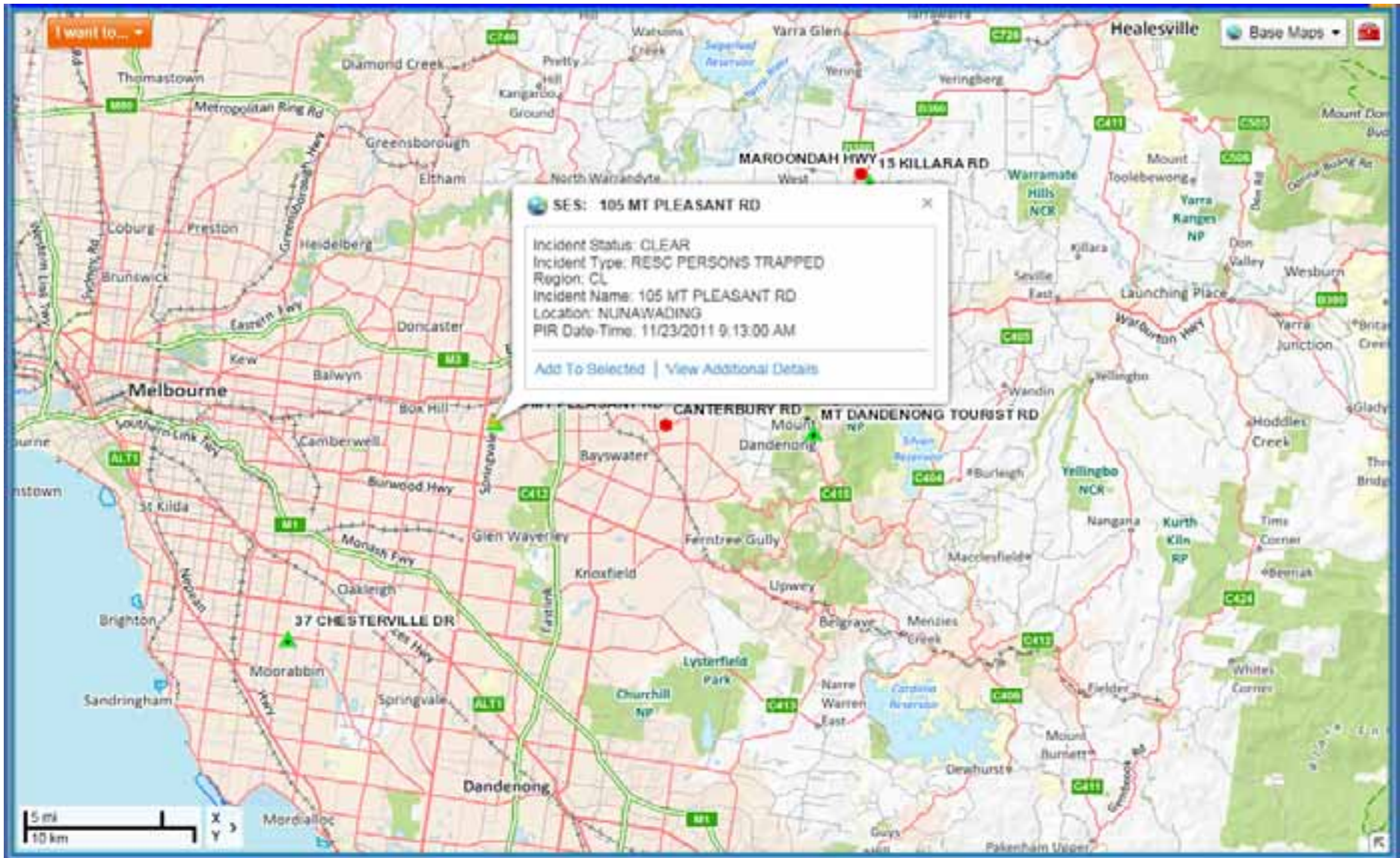
The screenshot displays the 'Emergency Map (eMap) - Field' software interface. The title bar indicates 'Untitled_20120507_115233 - Development version'. The main window has a blue header with the title 'Emergency Map (eMap) - Field'. Below the header is a menu bar with options: Home - Getting Around, Identify and Search, Analysis, Printing and Export, Import, GPS, Fire Towers, and Help. A toolbar contains buttons for 'Start GPS', 'Hide Location', 'Moving Map', 'Show Sight Line', and 'Quick Action Buttons'. To the right of the toolbar are 'GPS Readouts' for Speed, Satellites, and Grid Nth, along with a compass. The main content area is divided into tabs: 'Real Time Data', 'Observations', 'Overlays', and 'Base Maps'. The 'Real Time Data' tab is active, showing a list of data layers with checkboxes and a 'Labels' checkbox. The layers include: Incidents, Fire Perimeters - Victoria, Tactical Observations (CFA Network Only), Victorian Linescans / Firescan, Phoenix Fire Predictions - Hourly Fire Spread, Phoenix Fire Predictions - Flame Height and Embers, Sentinel Satellite Hotspots, Weather Stations, Lightning - 90 mins, Rain Radars, Thunderstorm Tracking, Wind Analysis, Pressure Contours, DSE \ SAU Resources Locations, DSE \ SAU Resources Trail Points, DSE \ SAU Resources Trail Lines, CFA Resources Locations (Mansfield Trail Only), Hydrants (CFA Network Only), and Neighbourhood Safer Places (CFA Network Only). A 'District Forecasts' button is at the bottom of the list. On the right side, there is a map with navigation controls (home, back, forward, zoom in, zoom out, pan, and a location pin) and a scale bar showing 10 km at a scale of 1:657,208. The status bar at the bottom shows 'Internet', 'GPS', coordinates 'Lon:141°00'39.51" Lat:-37°13'44.45"', and other technical details like 'E:----- N:-----', '229.2 x 172.9 km', '1:657,208', and 'Proj: VICC'.

eMap Analyst

- ESRI ArcGIS Extension
- Designed for situations where complex analysis is required
- Used by Level 3 endorsed Mapping Officers at Incident Control Centers's



eMap – Demo



Thank you

