

# REMOTE SENSING OF FIRE SEVERITY IN THE 2013 DUNALLEY FIRE, TASMANIA



bushfire&natural  
**HAZARDS**CRC

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## GEOSPATIAL ANALYSIS AND LANDSCAPE CONTROLS OF FIRE SEVERITY

### BACKGROUND

- ▶ Extreme fire which burnt ca. 25,000 ha
- ▶ High smoke plume injection, carrying emissions to upper atmosphere
- ▶ Model system to study pyrocumulus formation
- ▶ Geospatial analysis of fire severity and smoke plume development allows analysis of the linkages between the two components



### RESEARCH QUESTIONS

1. How did fire severity vary in time and across vegetation types
2. Do intensity metrics obtained from Linescan images (Fig 1) correlate with satellite-based severity maps?
3. How does vegetation, fire weather and terrain influence fire severity?
4. How did fire severity correlate with smoke plume development?

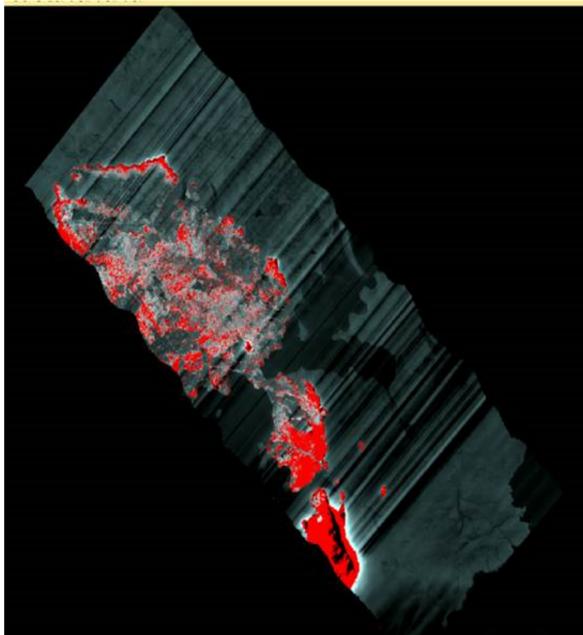


Fig 1: Linescan showing active fire in Dunalley

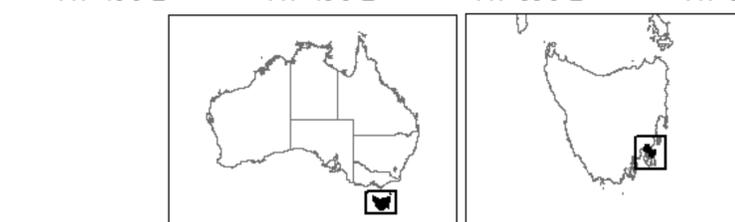
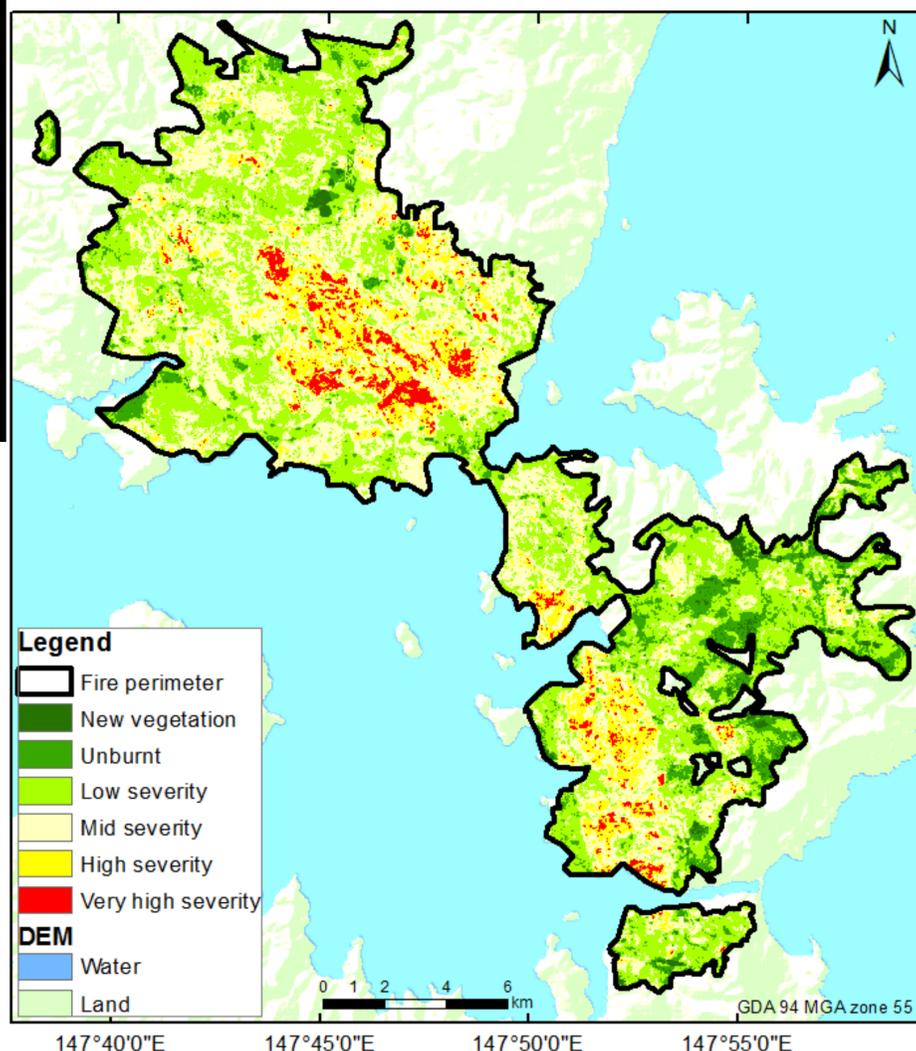


Fig 2: dNBR map from pre- and post-fire LandSat images

### RQ 3,4: Landscape Factors; Smoke Plume

#### Ongoing:

Generalized Linear Modelling:

- influence of weather, terrain and fuel on intensity and severity

#### Later:

- Temporal analysis of plume development
- Geospatial analysis of linkage between fire intensity, severity and plume development

### PRELIMINARY RESULTS

- Five severity classes identified - dNBR map (Fig 2)
- Terrain, vegetation, satellite and fire boundary organised in structured GIS framework

### TAS. FIRE SERVICE STATEMENT

This work will help improve our understanding of factors contributing to changes in fire behaviour and severity

### METHODS

#### RQ1,2: Severity Mapping

- Calculate Burn Ratio (dNBR) from Landsat data
- Validate dNBR with:
  - Aerial photo
  - Ground-truth data
- Classify and correlate Linescan intensity with fire severity
- Use Remote Sensing & management records to determine temporal fire progression

