



# Prescribed burning implementation: using prescribed burning to mitigate the effects of wildfires

Dr Simon Heemstra, NSW Rural Fire Service

National Fire Fuels Science Webinar **20 May 2020**

The practice of hazard reduction: what are the potentials and limitations?

# Wildfires and Effects

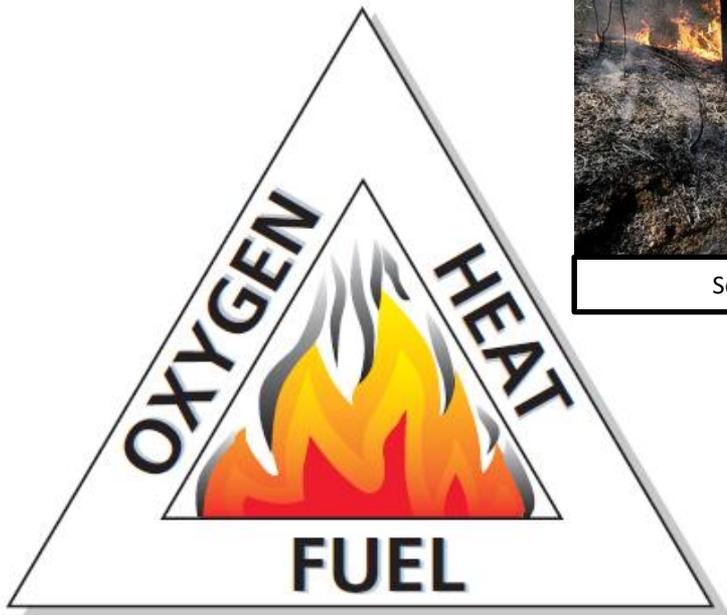


Top Wambelong Fire 2013 (Source: facebook), regrowth (C Quinn) Grassfire Tamworth, Property impact Mudgee (LMcCoy).  
Above Smoke under an inversion Tweed Valley 2006 bush fires, Kinglake area 2009 (LMcCoy NSW RFS)

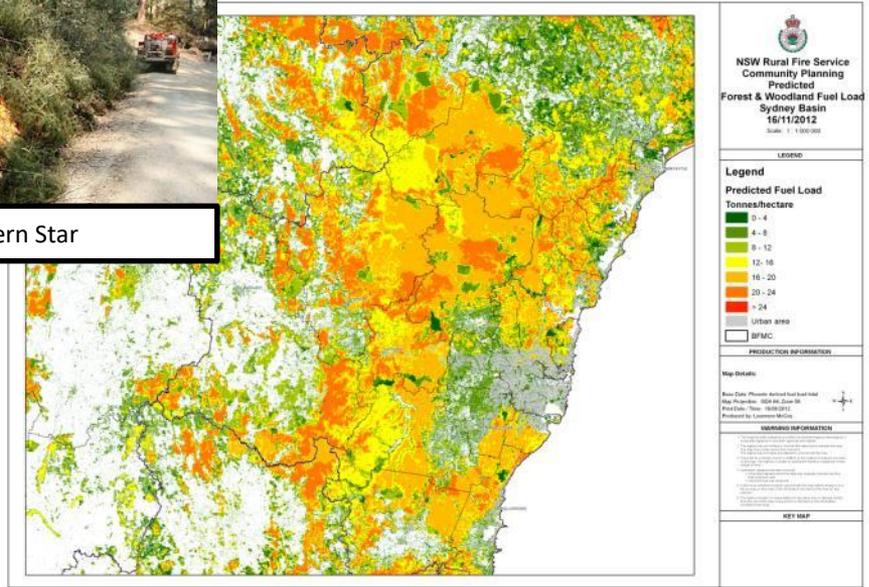
# Principle of Prescribed Burning

- Fuel reduction
  - Byrams equation:

Intensity = Heat output x Weight of fuel x Rate of Spread



Source: Northern Star



# Prescribed burning in practice



# Current planning process workflow

Bush Fire Risk Management Plan

- Identify assets at risk from fire
- Identify treatments (including prescribed burns) to reduce risk

District Annual Works Program

- Identify which burns to be completed for the coming year

Environmental Approval Process

- Hazard Reduction Certificate or other environmental approval

Prescribed Burn Plan

- Plan for the operational implementation of the burn

**Implement Burn**

- Smoke plume modelling of potential smoke trajectories in the days leading up to burn implementation

# Tactical Planning of Prescribed Burns

NSW has a hierarchy of burn plan types that match the complexity of the burn activity.

Pile Burn Checklist

Brigade assisting a landowner conducting a pile burn. Checklist confirms environmental approval, notifications and weather.

Burn Checklist

Brigade assisting a landowner in conducting a broad area burn. Checklist confirms environmental approval, notifications and weather.

Level 1 (Simple)  
Prescribed Burn Plan

A prescribed burn generally < 1Ha  
Minor hazards and safety issues.  
No Sectors or Divisions. Map not required.

Level 2 (Complex)  
Prescribed Burn Plan

A larger burn activity requiring more complex planning and a map.

# Hazard Reduction Certificate & Smoke

- Neighboring resident notification 50/200m
- Sensitive locations 100/1000m
- Traffic
- Tourism
- Power lines
- Bat Colonies
- No Burn Notices
- Code review

## **BUSH FIRE ENVIRONMENTAL ASSESSMENT CODE**

for

**New South Wales**

February 2006

**NSW RURAL FIRE SERVICE**

*...for our community*



# Draft Risk Assessment Tool

- chance of escape
- consequence of escape
- Provides a comparative risk score and recommendations

Prescribed Burn Plans | **Risk Assessment** | SMS Mitigation | Land owners | Planning | Scheduling | Delivery | Pos

Risk Assessment

**Likelihood of Escape**

**Complexity of objective**  
B - Objective should be achievable unless unexpected conditions occur

**Control Lines**  
B - Fire trails or hand tool lines with some potential for breaching by embers or

**Likely Duration of Fire Activity**  
B - Residual burning is expected for two days. Fuel types have the potential to

**Fire Behaviour Potential**  
B - Moderate intensity fire could occur due to moderate fuel loads (8-15 tha) or

**Spotting Potential**

Overview | Event Map | Site Analysis | Prescribed Burn Plans | **Risk A**

**Risk Score**

Risk Matrix	Potential Consequence Rating		
Likelihood of Escape	Low	Moderate	High
Low	Low	Moderate	High
Moderate	Low	High	High
High	Moderate	High	High

Overview | Event Map | Site Analysis

**Standard Recommendations**

- Requires a standard burn plan
- Contingency Fall Back Map
- Contingency Fall Back Plan
- Weather Constraints Analysis
- Pre Burn Escape Simulation.

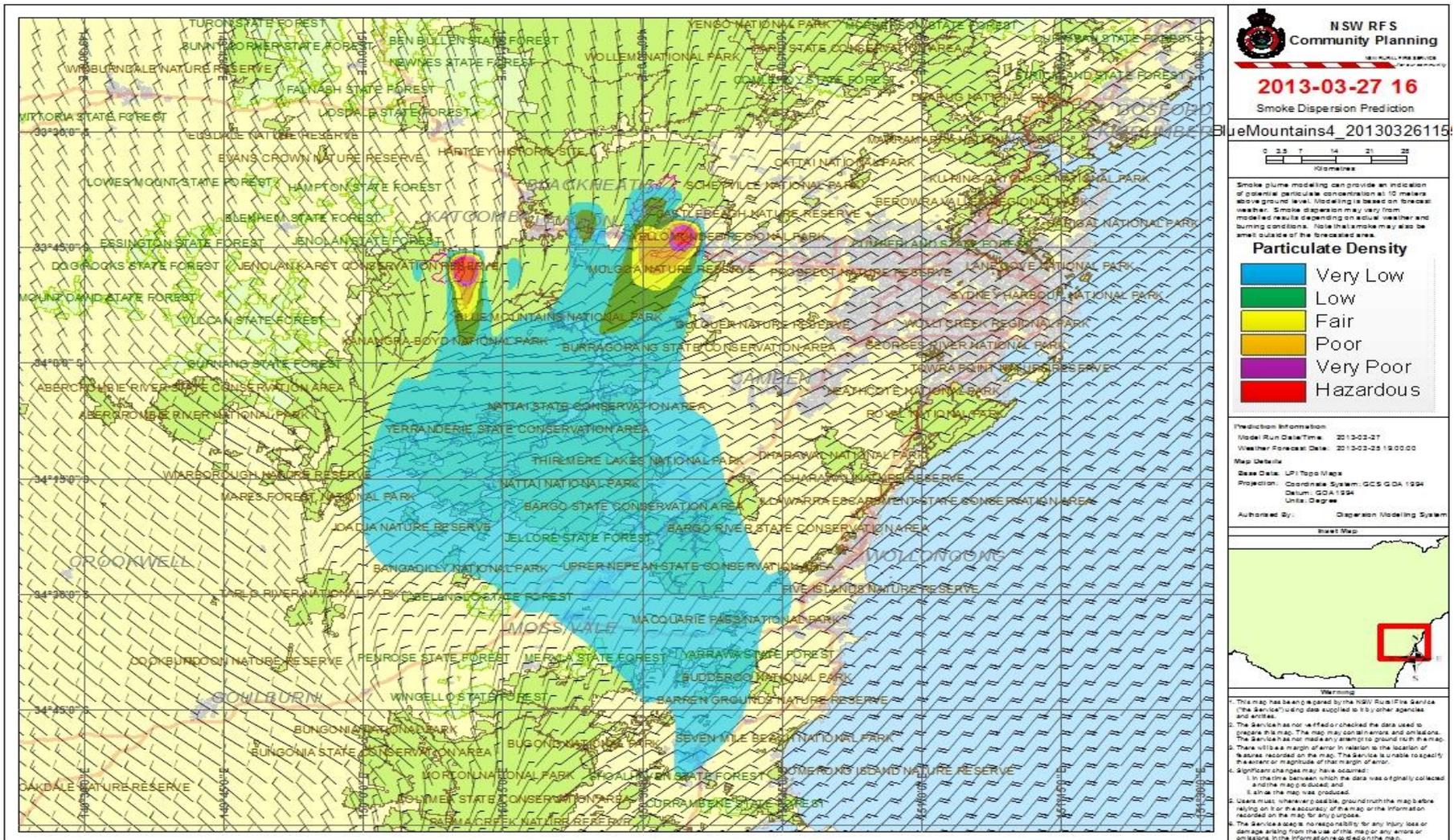
# NSW RFS Smoke Plume Modelling

## Why is the NSW RFS Smoke Modelling?

- Strategic Planning and analysis of potential impact.
- To assist prescribed burn planners inform communities and decisions.
- Available to all fire agencies in NSW



# Example of Output



# Communication

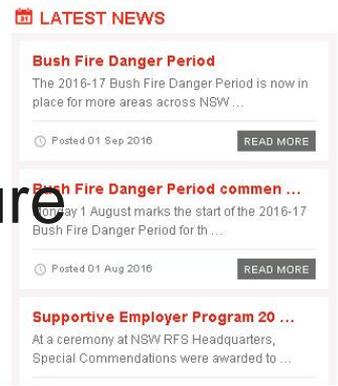
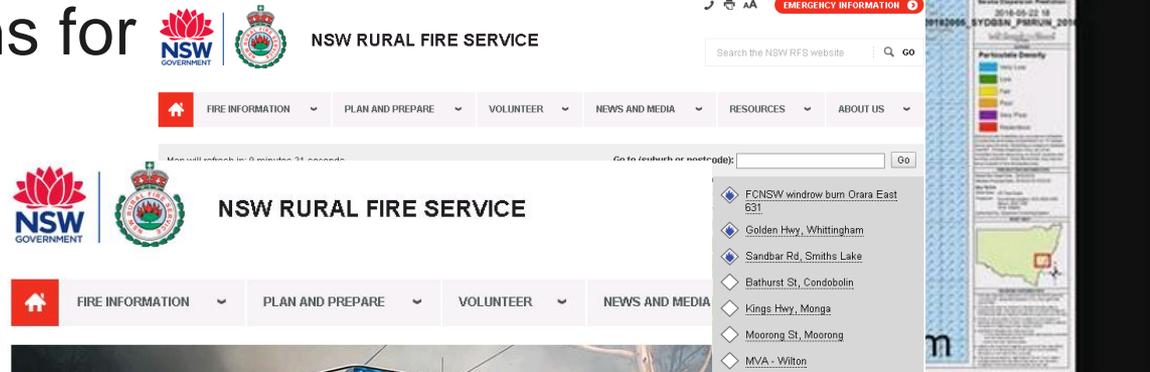
➤ Statutory Obligations for notification

➤ Public messaging

- State
- District

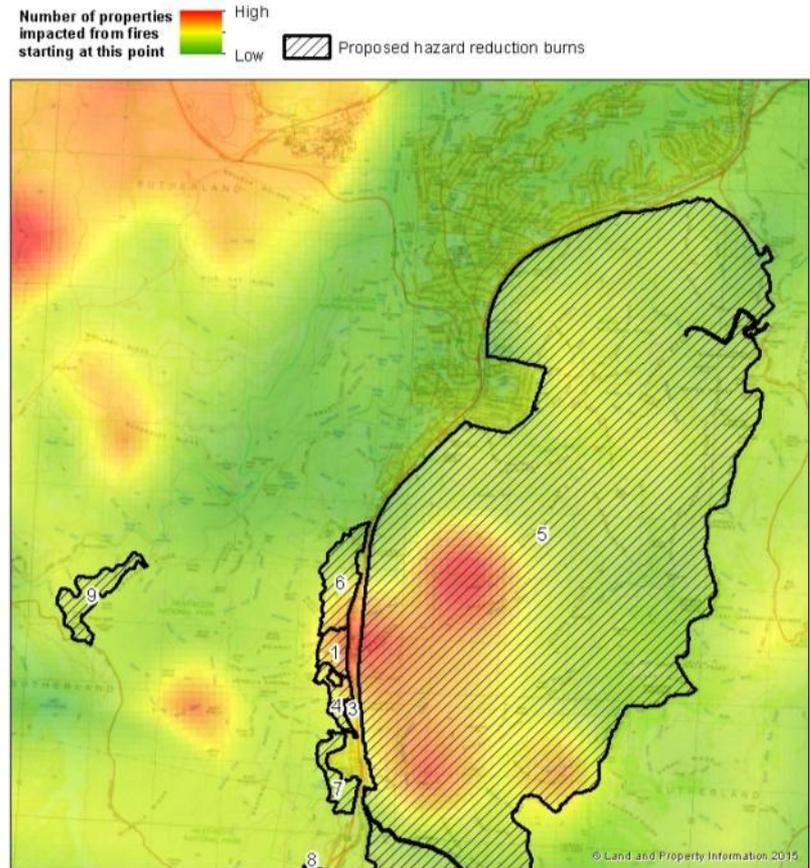
➤ Messaging forms

- Traditional media
- Social media
- RFS website
- RFS app push notifications (future capability)

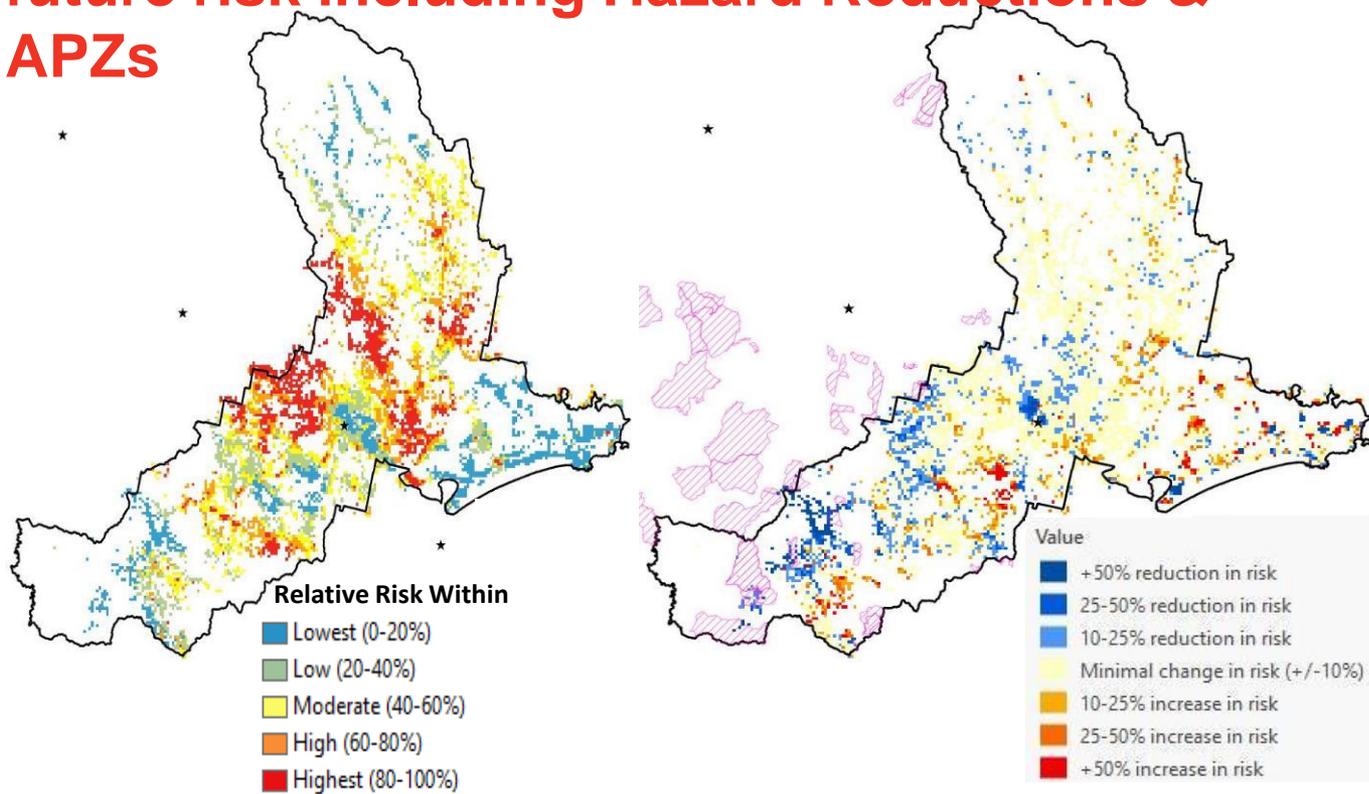


# Future tools for prioritising burning treatments

- Evidence based decision making
  - Quantification of risk reduction achieved
  - Prioritisation of works based on risk reduction



# Risk to residential assets – Current and future risk including Hazard Reductions & APZs



# Prescribed burning research

- › Strategic Bush Fire Risk Modelling- Melbourne University
- › Prescribed burning effectiveness – University of Wollongong
- › Prescribed burning windows – now (Bureau of Meteorology) and future (University of Wollongong)
- › Smoke Evaluation studies
  - › Model Performance
  - › Future Directions - AQFx
- › The Bushfire Risk Management Research Hub:
  - › Dynamic mapping and analysis of fire regimes
  - › Fuel, flammability and carbon dynamics
  - › Emissions and air quality
  - › Fire Regime Thresholds of Potential Concern for Threatened Biodiversity
  - › Health and social benefits of Indigenous fire management
  - › Optimization of cost-effective fire management

# Questions

