

EDAP 2018 Mudgee Conference

Planning for Bushfire Protection

Presented by Erika Dawson



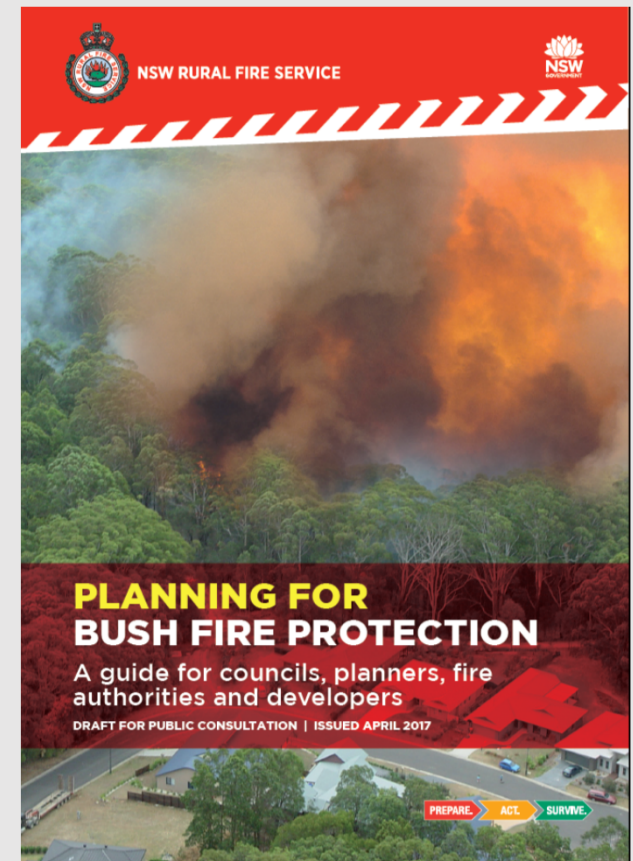
Introduction

- Update on Draft Planning for Bush Fire Protection (PBP)
- Measuring Bushfire Impact
- Determining Bushfire Impact
- Short run fires
- APZs v BAL Construction Standards
- Fuel Loads
- Grassland
- Changes to Special Fire Protection Purpose (SFPP) Developments
- Bush Fire Prone Mapping



Draft Planning for Bush Fire Protection

- Expected to be published on the RFS website in late April/early May 2018
- But won't have any legislative effect because the supporting legislation has not been changed.
- What does this mean?
 - The existing PBP will remain in force and will need to be complied with.
 - The draft PBP will become a technical information document until the legislation is changed. This means the technical information in it can be used as the basis for Performance Solutions.



- NSW RURAL FIRE SERVICE**

NSW LOCAL GOVERNMENT AREAS FDI

COMMUNITY RESILIENCE

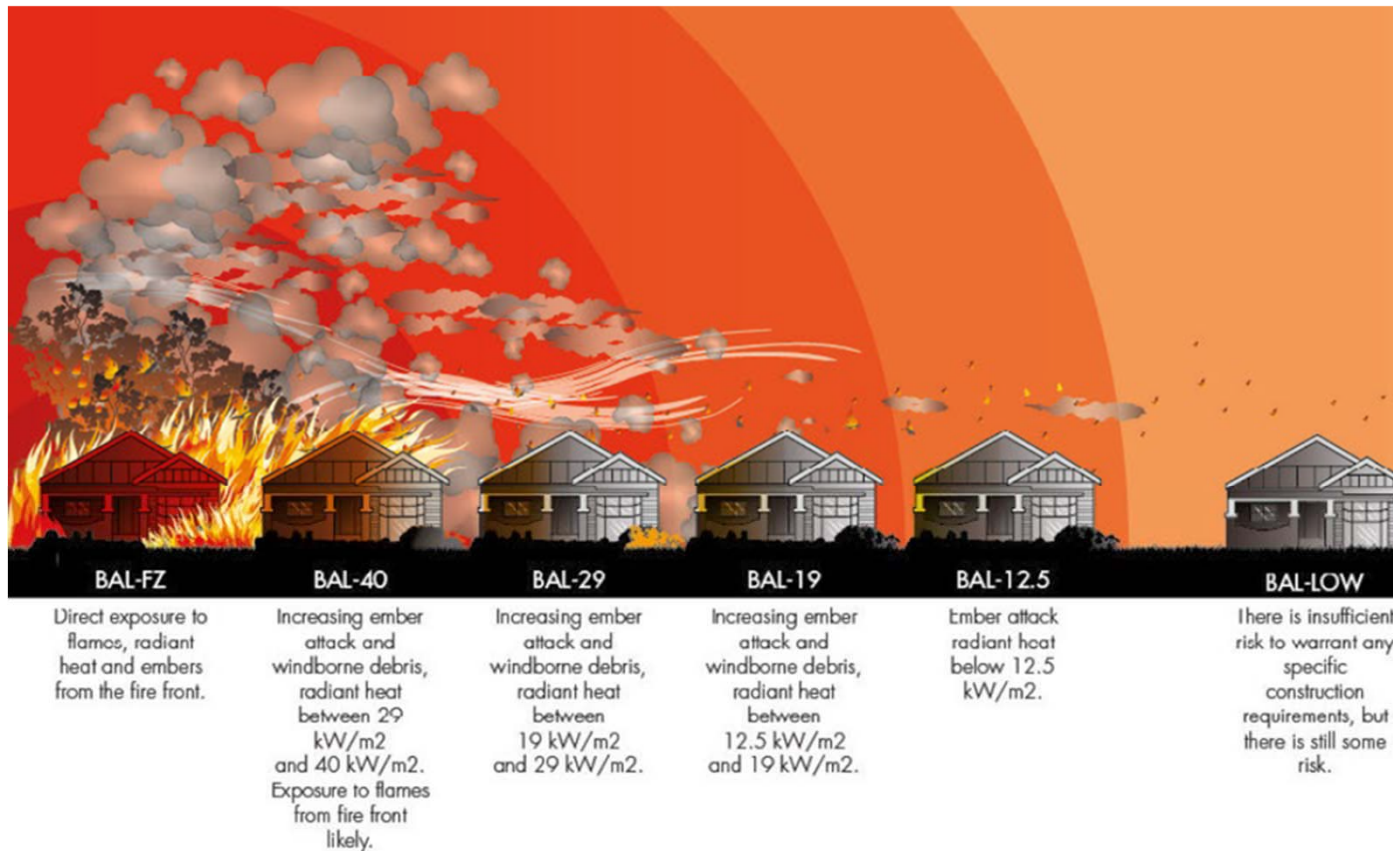
May 2017

Fire Weather Districts and FDI for NSW Local Government Areas: for use with Planning for Bush Fire Protection

LOW RISK	MODERATE RISK	HIGH RISK	VERY HIGH RISK
FAR NORTH COAST (NS) Bellina Byron Clarence Valley Kyngarie Lismore Richmond Valley Tweed	FAR SOUTH COAST (NS) Bega Valley Eurobodalla Kangaroo Snowy Monaro	NORTH WESTERN (NS) Albury Murrumbidgee Waggonville Warrumbungle	SOUTHERN RIVERINA (NS) Berrigan 2 Sheat River Federation Murray River Murrumbidgee
NORTH COAST (NS) Bellingen Coffs Harbour Mid Coast Port Macquarie Hastings Kempsey Narumbra	SOUTHERN RANGES (NS) Goulburn Yass Valley Yass Valley	LOWER CENTRAL WEST PLAINS (NS) Bogan Castlemaine Gilgandra Warren	NORTHERN RIVERINA (NS) Leeton Griffith
GREATER HUNTER (NS) Dungay Lake Macquarie Maitland Murrumbidgee	CENTRAL RANGES (NS) Bathurst Bega Valley Cobar Gilgandra Gungahlin Regional Oberon Orange Uxbridge	LOWER CENTRAL WEST PLAINS (NS) Bogan Dubbo Regional Forbes Lachlan Narromine Lachlan Temora Wodden	SOUTH WESTERN (NS) Batemans Wimmeroo
GREATER SOUTHERN REGION (NS) Albury Port Stephens Singleton Upper Hunter	NEW ENGLAND (NS) Armidale Regional Gungahlin Gungahlin Regional Uxbridge	SOUTHERN SLOPES (NS) Albury Gundahlin Gundahlin Regional Snowy Valleys	FAR WESTERN (NS) Bourke Boreenbri Broken Hill Central Darling Cobar Unincorporated NSW
GREATER SOUTHERN REGION (NS) Albury Port Stephens Singleton Upper Hunter	NORTHERN SLOPES (NS) Armidale Gungahlin Gungahlin Regional Uxbridge	EASTERN RIVERINA (NS) Albury Gundahlin Gundahlin Regional Snowy Valleys	



Measuring Bushfire Impact

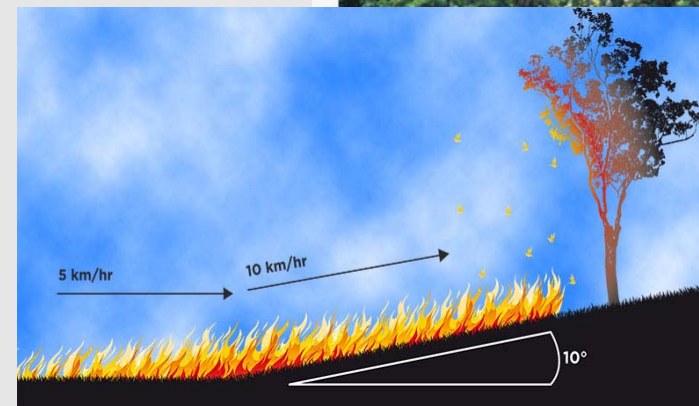
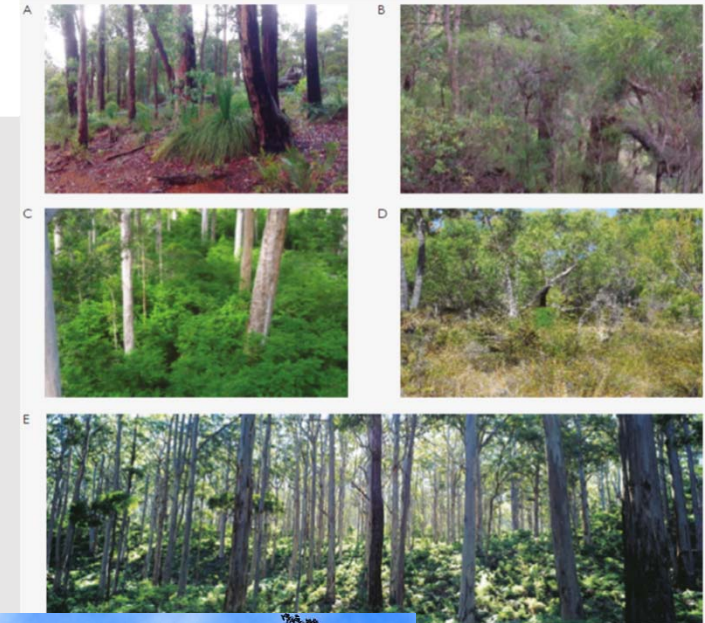


Source: WAPC, 2015 p. 19

- Radiant Heat Flux = main measure of the exposure to a bushfire, measured in kW/m², and known as Bushfire Attack Level (BAL).
- BALs are used:
 - In planning – to determine the appropriate location of development (APZ); and
 - In building - determining appropriate construction standards for buildings (BAL)

Determining Bushfire Impact

- Put simply, bushfire impact is determined as a function of:
 - Vegetation Classification
 - Effective Slope (slope under the vegetation)
 - Separation Distance (distance between asset and veg)
- Determination of the impact is based on a number of models (see Method 2 AS3959)
- Models attribute fuel loads to each vegetation class
- Fire behaviour in the models is determined by different characteristics based on the vegetation type:
 - Forest/woodland = fuel loads
 - Scrub/shrubland = wind speed
 - Grassland = fire danger index (FDI)
- Slope affects bushfire behaviour – fire burns faster uphill. $10^\circ \uparrow$ in slope \rightarrow 2 x fire speed



Short Run Fires

- The bushfire models used assume that a fire has reached its quasi rate of spread (1ha fire area, 100m wide x 100m deep fire)
- In reality, a fire takes time to develop from the point of ignition to reach the fully developed fire state.
- Fire development will depend on weather, but also available fuel (i.e. vegetation)
- In the draft PBP RFS has provided a methodology for determining bushfire impact in restricted vegetation. i.e. short run fires
- This methodology can be used in a Performance Solution for determining APZs and BALs.



APZ's v BAL Construction Standards

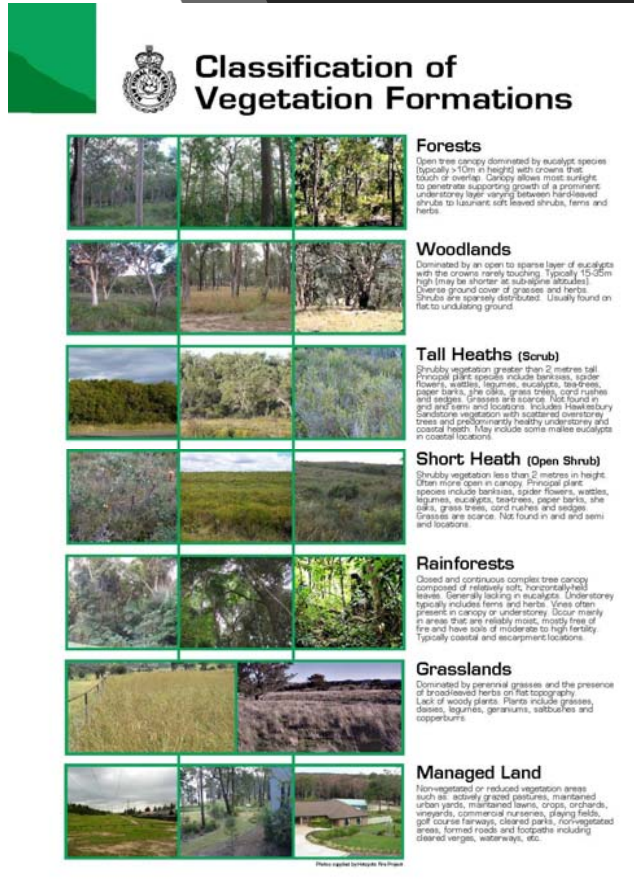
- Planning (DA Process) - APZ provides for appropriate location of development in accordance with PBP:
 - Special Fire Protection Purpose Development (SFPP) = 10 kW/m²
 - All other development = 29kW/m²
- Building (CC/CDC Process) – BAL used to determine appropriate construction standards for the building in accordance with AS3959.
- The process to determine both the APZ and Construction BAL is essentially the same...
- Therefore it should follow that if we have a compliant APZ for a non-SFPP development we should automatically get BAL-29 construction standard... right?

Radiant Heat Flux	Likely Effects	Approx. distances
>29 – 110 kW/m ²	Flame Zone	0 - 20 metres
29 kW/m ²	Ignition of most timbers without piloted ignition (3 minutes exposure) (Level 3 construction) during the passage of a bush fire. Toughened glass could fail.	20 metres
19 kW/m ²	Screened float glass could fail (Level 2 construction) during the passage of a bush fire.	27 metres
12.5 kW/m ²	Standard float glass could fail (Level 1 construction) during the passage of a bush fire. Some timbers can ignite with prolonged exposure and with piloted ignition source (eg embers)..	40 metres
10 kW/m ²	Critical conditions. Firefighters not expected to operate in these conditions although they may be encountered. Considered to be life threatening < 1 minute in protective equipment. Fabrics inside a building could ignite spontaneously with long exposures.	45 metres
7 kW/m ²	Likely fatal to unprotected person after exposure for several minutes	55 metres
4.7 kW/m ²	Extreme conditions. Firefighter in protective clothing will feel pain. (60 seconds exposure)	70 metres
3 kW/m ²	Hazardous conditions. Firefighters expected to operate for a short period (10 minutes)	100 metres
2.1 kW/m ²	Unprotected person will suffer pain after 1 minute exposure – non fatal.	140 metres

Note: assumes flame temperature of 1090K for all scenarios.

Table A3.1 Radiant heat flux and effects on buildings and people for a modeled forest fire (FDI 100 on flat ground)

APZ's v BAL Construction Standards



- Insert negative buzzer sound
- PBP & AS3959 use different fuel loads inputs for the vegetation. And the new PBP uses different fuel loads again.
- Example:
 - FDI = 80
 - Vegetation = Grassy Woodland
 - Effective Slope = Flat/upslope
 - To achieve 29kW/m^2 = non-SFPP development APZ size & BAL-29, separation distance for each:
 - Current PBP = 10m
 - Draft PBP = 11m
 - AS3959 = 14m
- What does this mean? If at DA stage the development is sited 10 or 11m off the vegetation, then at CC stage they will get a BAL-40 construction standard, because the separation is less than 14m.

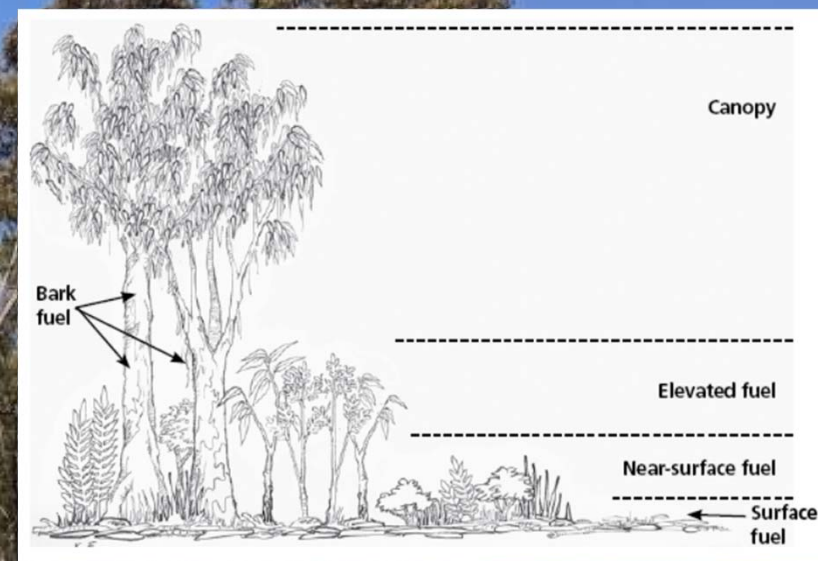
DIRECTION
186 deg(T)

32.04612°S
149.72737°E

ACCURACY 6 m
DATUM WGS84

Fuel Loads

- Bushfire modelling looks at both surface/elevated fuels & bark/canopy fuels
- The draft PBP includes revised and more detailed fuel loads, from a new study by University of Wollongong,
- The fuel loads are specifically for NSW, based on the Keith classifications referenced in PBP.
- These are considered to be best practice.
- Whilst the new PBP won't be legally enforceable, the new fuel loads can be used for Performance Solutions.



	Grassy Woodland	
Document	Surface Fuel Load	Overall Fuel Load
AS3959	15 t/ha	25t/ha
Current PBP	10t/ha	15t/ha
Draft PBP	10.5t/ha	18.3t/ha

Grasslands

- The exhibited Draft PBP included a new section on Grassland. Understand this will be amalgamated into the other sections of the revised draft.
- Current PBP provides a very scant inclusion of grassland vegetation. Not included in APZ tables. Small consideration on page 52.
- Draft PBP recognises that grassland provides a very different risk to the other veg classes: grass fires burn at a higher intensity, spread more rapidly with a shorter residence time (5-15 sec v 120 secs) & embers are fewer.
- The advertised draft PBP provided:
 - Residential subdivision - in accordance with the new APZ tables;
 - Residential infill - a blanket APZ of 20m and minimum construction standard of BAL-12.5
 - SFPP development – in accordance with the new APZ tables.



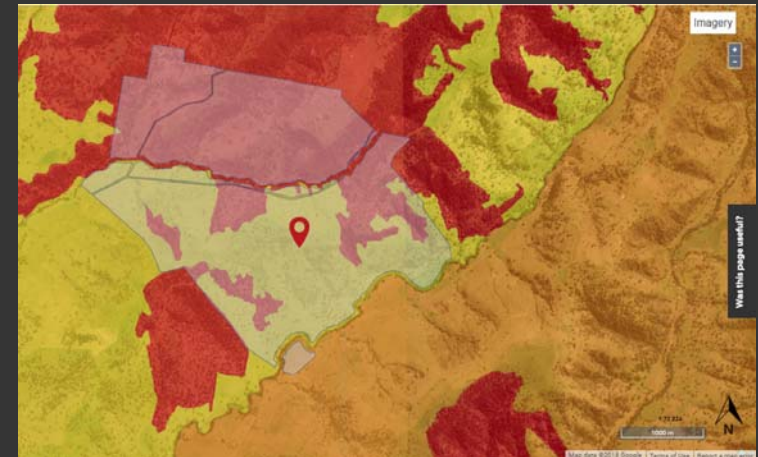
Special Fire Protection Purpose (SPFF) Developments

- SFPP developments are defined by the Rural Fires Act and Regulations and require a Bush Fire Safety Authority (s.100B) from the RFS
- SFPP development have more vulnerable occupants. Therefore generally require more reliance on larger APZs (10kW/m^2 v 29kW/m^2) and emergency management
- Draft PBP recognises that not all SFPP development are the same because of:
 - Lower occupancy levels
 - Presence of on-site management
 - Impracticality of construction to AS3959 – think tents.
- The draft PBP provides for variations to the bushfire protection measures for certain types of SFPP developments to recognise the varied risk, including:
 - Primitive camping (no APZ)
 - B&B's ($\text{APZ} = 29\text{kW/m}^2$)
 - Short term rental accommodation ($\text{APZ} = 29\text{kW/m}^2$)
 - Eco tourism ($\text{APZ} = 10\text{kW/m}^2$ around refuge building)
 - Home-based childcare ($\text{APZ} = 29\text{kW/m}^2$)
 - Manufactured home estates ($\text{APZ} = 29\text{kW/m}^2$)



Bush Fire Prone Mapping

- RFS *Guide for Bush Fire Prone Land Mapping* Version 5b – November **2015**
- New guide includes a new category 3, which includes grassland vegetation (amongst others)
- Council's required to update their Bush Fire Prone Land map within 3 years of the release of the Guide.
- Inclusion of grassland → significantly increased area west of the divide mapped as being bush fire prone. Some LGAs report change from 5% to 95% of the LGA being mapped.
- The map is the trigger for consideration of bushfire in the planning and building systems.
- However, if an area is not mapped and you are concerned there is real bushfire risk, bushfire can be considered under s.4.15 (former s79C) EP&A Act. Note, Building Surveyors are stuck with the map only.

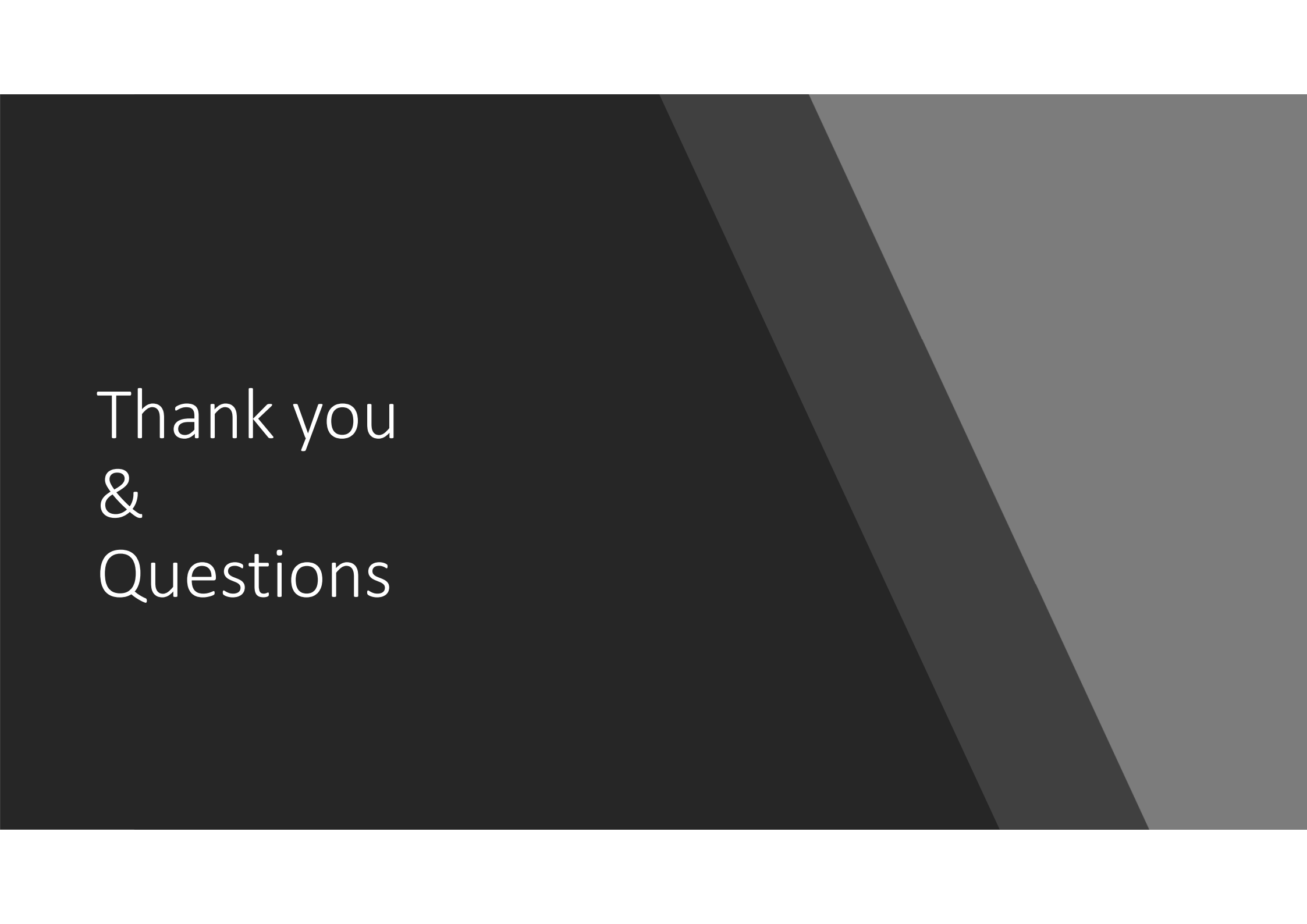


Bushfire Prone Land	
+ Vegetation Category 1 (pub. 2018-03-12)	1
+ Vegetation Category 2 (pub. 2018-03-12)	2
+ Vegetation Category 3 (pub. 2018-03-12)	3

Summary

- Revised draft to be published late April/early May
- Will provide a technical information document until supporting legislation changed
- Technical information can be used in Performance Solutions to the current PBP:
 - Fuel loads
 - Grassland information
 - Variations to SFPP development
 - Short run fires methodology





Thank you
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Questions