Introduction to Prescribed Burning

Social & Legal Aspects

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Topics Covered

- Introduction to Prescribed Burning
- Process required by DEWNR to conduct burns

Prescribed Burning Definition

…can be defined as the planned application of fire under prescribed environmental conditions and within defined boundaries, to achieve a resource management objective. (Australian Fire and Emergency Service Authorities Council, AFAC)

Legislative and policy framework in SA

- Fire and Emergency Services Act 2005
- Native Vegetation Act 1991
- Environmental Protection & Biodiversity Cons Act 1999
- National Parks and Wildlife Act 1972,,

- South Australia Prescribed Burning Code of Practice (GAFLC 2004).

- CFS Chief Officer Standing Orders
- DEWNR Fire Policy and Procedures Manual
- SA Interim Burning Prescriptions

- Fire Management Plans
- Bushfire Prevention Plans
- Park & Forest Management Plans

- DEWNR Prescribed Burn Plan

- **Fire Crew,** trained, authorised & equipped to safely do the job

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SA Government Adopted Process for Prescribed Burning

Stages

- Environmental (Impact) Assessment
- Operation Planning
- Conducting the Burn
- Post Burn Assessment/Monitoring

How do we decide on where to burn?

Burn Objectives

By definition a “prescribed burn” must have a specific management objective or objective’s

Objectives largely fall under two broad categories:

- Life and Property Protection (fuel reduction)
- Ecological management

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Locations of Fuel Reduction Burns

- Locations driven by risk assessments undertaken with our Fire Management Plans

- Reserves are broken down into:
  - Asset Zones (A Zones)
  - Buffer Zones (B Zones)
  - Conservation Zones (C Zones)

- The primary objective within A and B Zones is fuel management

  (not just burning)


Asset Protection Burn - Black Hill CP

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Zoning – where fuels are managed

Asset Zone (A-zone)

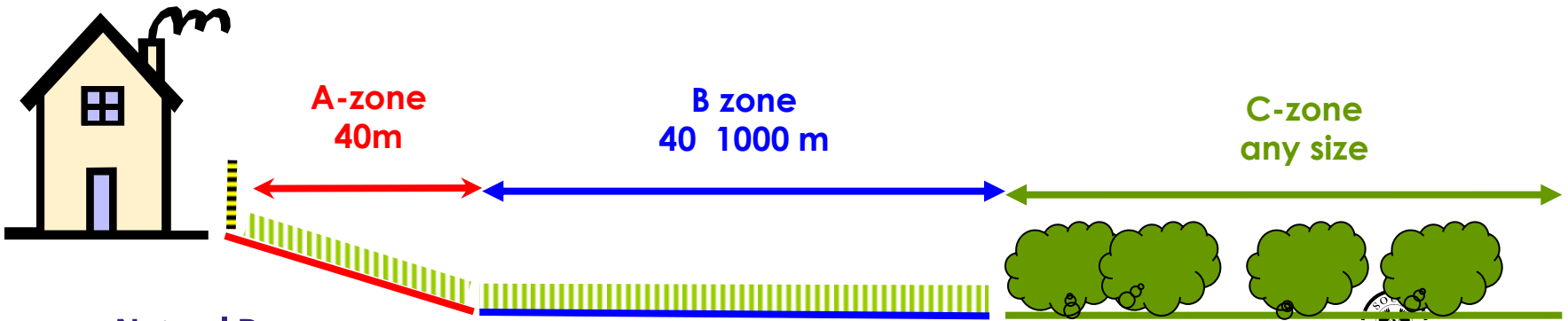
- 40 m to 100m wide
- Fuel hazard should not exceed MODERATE
- Minimises radiant heat impact, flame contact

Buffer Zone (B-zone)

- Not always next to A zone
- 40 m to 1000 m wide
- Fuel hazard should not exceed HIGH
- Reduces ROS and intensity
- Reduced ember attack

Conservation Zone (C-zone)

- Default zone
- No max. fuel level
- Burning within these areas can potentially increase chance of suppressing bushfire
- Burning within ecological fire management guidelines



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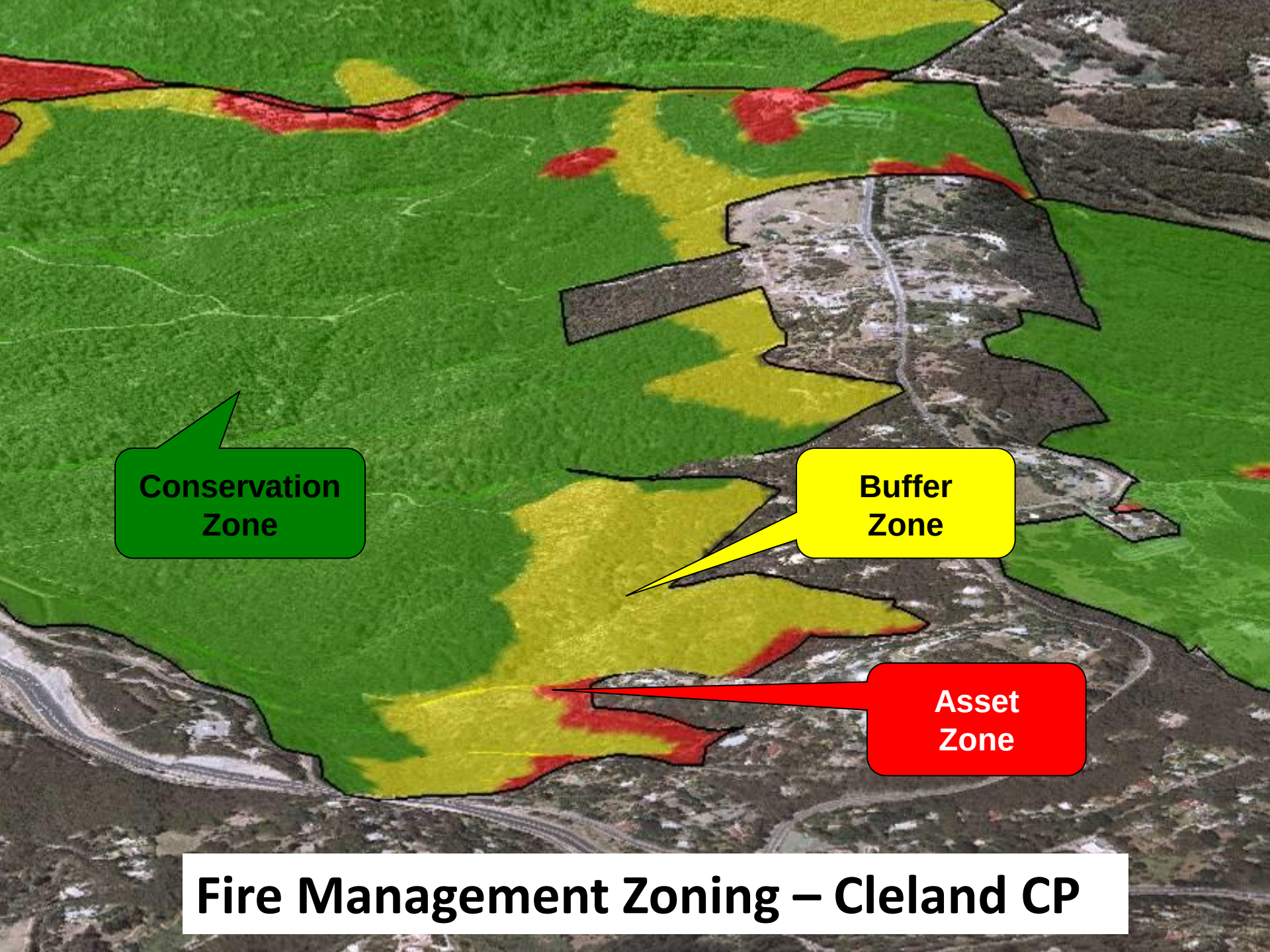


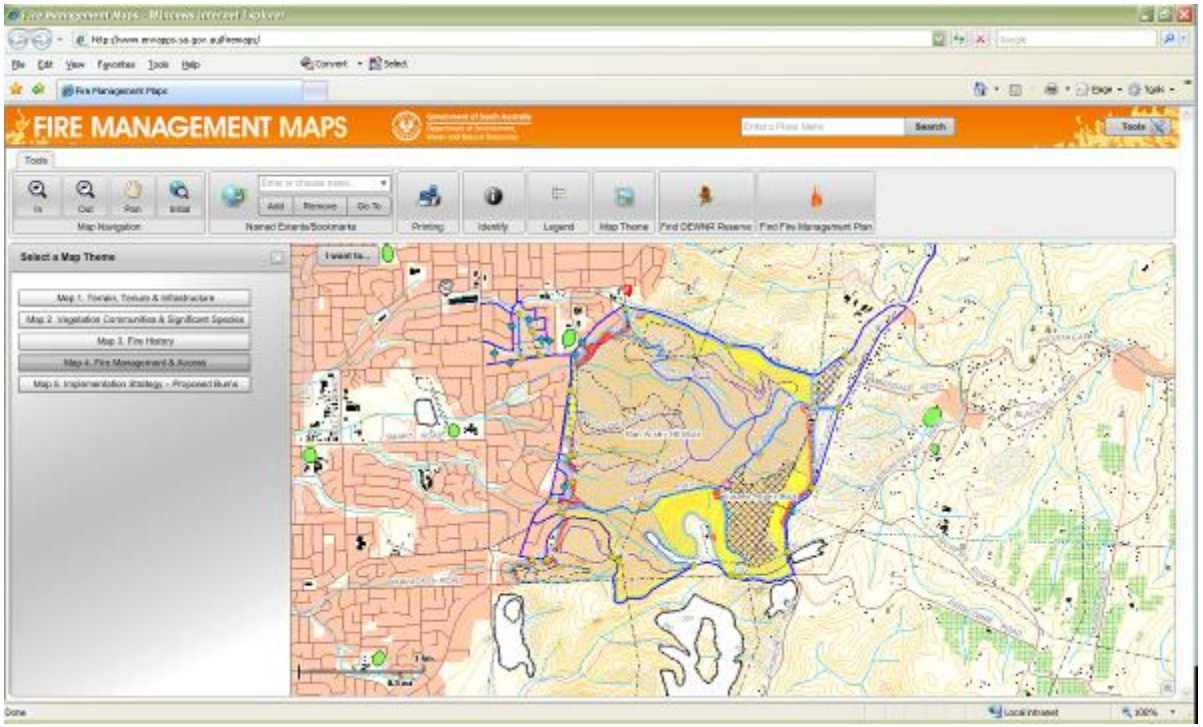
Fire Management Zoning – Cleland CP

Fire Management Maps

http://www.envapps.sa.gov.au/firemaps/

Public can view:

- Fire Management Zoning across Reserves
- Proposed Prescribed Burns
- Fire History
- Flora/Fauna data



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Fuel Hazard Assessment

- Fuel hazard assessed using the Overall Fuel Hazard Guide

- Not just about fuel weight / load of surface fine fuel

- Fuel hazard also assesses factors that determines both the ease of ignition and fire suppression difficulty
  - Fuel continuity
  - Fuel height
  - Proportion of dead material

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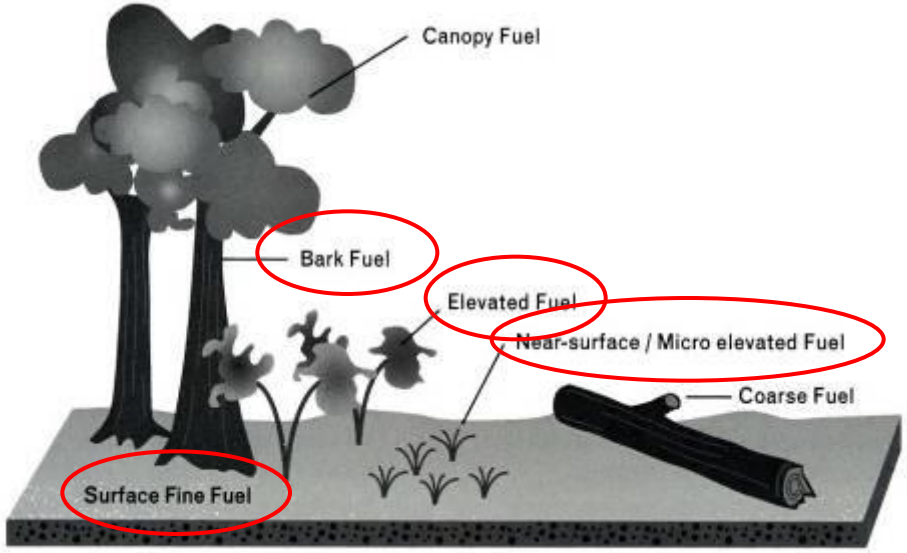
Fuel Hazard Assessment

Assess fuel across:

- Surface/near surface
- Elevated
- Bark



Why Bark & Elevated Fuels?

- allow forest fires to develop ***vertically*** and this is the main reason for first attack failure
  - Crown fire development
  - Increased spotting

Burning within Conservation Zones

- Guided by Ecological Fire Management Guidelines (EFMGs) *available online*
- For each major veg type, guidelines identify:
  - Ecologically desirable fire frequencies
  - Desirable proportion of habitat in landscape across post fire age classes

Ecological Burns

- Habitat Manipulation

  (Southern Emu Wren)

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Ecological Restoration Burns

Restoration Projects

- Re-vegetation
- Native germination

Craigburn Farm – Revegetation / Restoration

Para Woodland – Revegetation / Restoration

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Ecological Burns – Weed Management

Cleland CP – Burning of Callystachys infestation

Private Property – Burning of Blackberry / Gorse

Landscape Protection Burns

Objectives are generally to prevent whole reserves, critical habitat patches from being burnt in a single bushfire event

Burns are generally positioned across reserves and aim to provide a strategic low fuel buffer where a fire fighting efforts might be assisted

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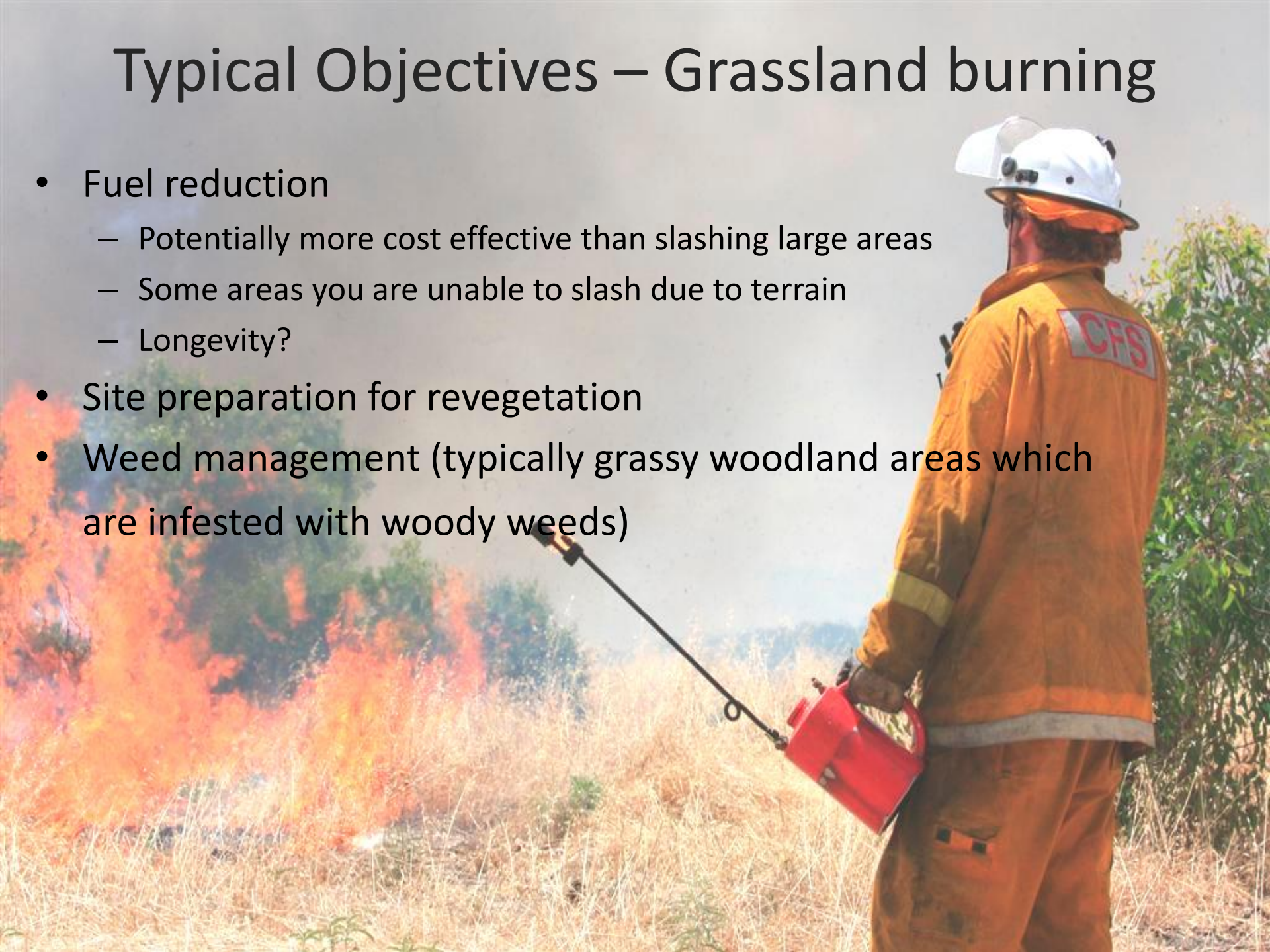
Typical Objectives – Grassland burning

- Fuel reduction
  - Potentially more cost effective than slashing large areas
  - Some areas you are unable to slash due to terrain
  - Longevity?
- Site preparation for revegetation
- Weed management (typically grassy woodland areas which are infested with woody weeds)



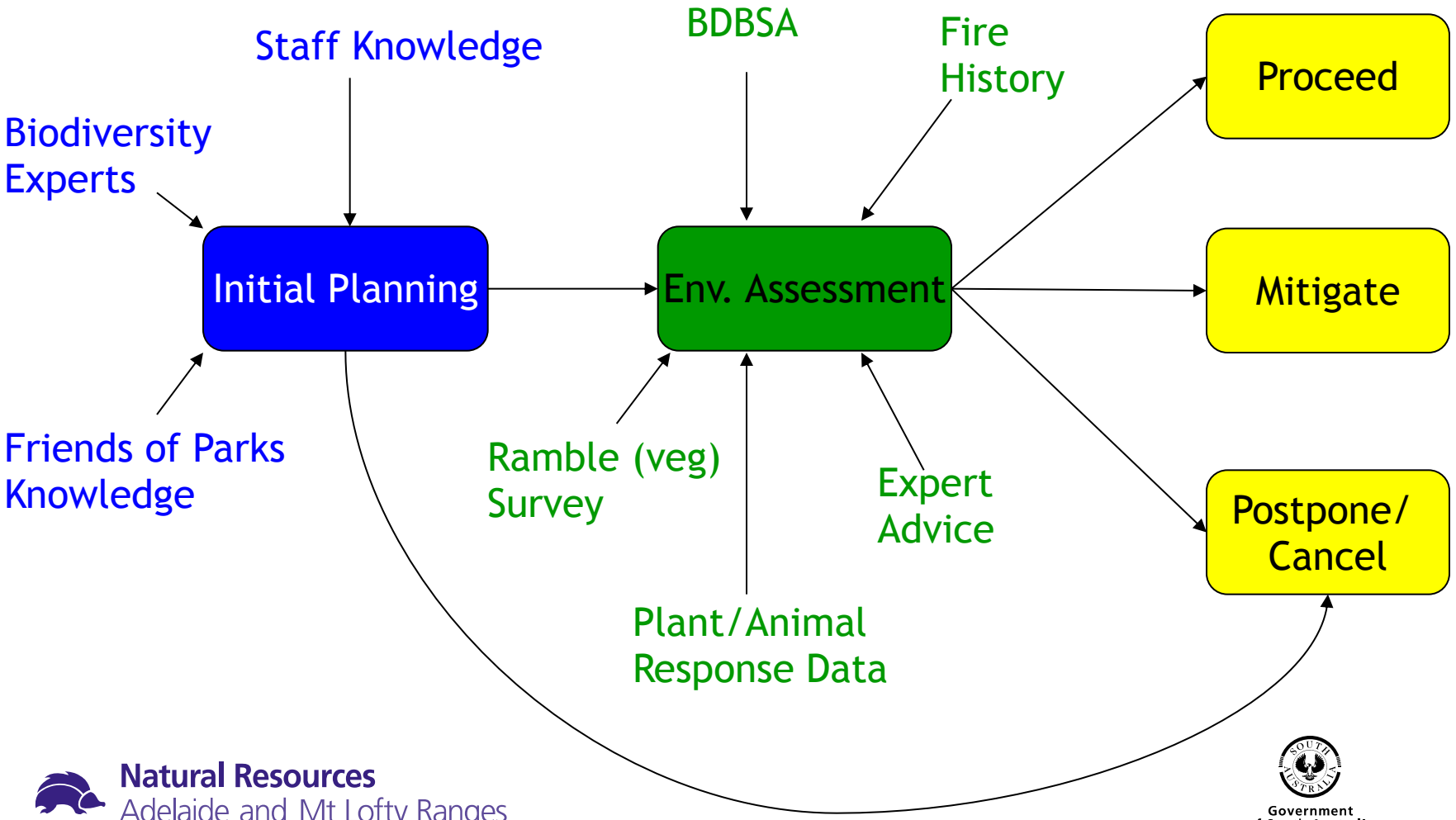

Environmental Assessment

Environmental Assessment

- Burning considered clearance under the Act and requires approval by Native Veg Council OR Delegate
  - High Impact (Native Veg Council)
  - Low Impact (Agency Delegate)
- Key for the Environmental Assessment is to determine what the impact will be (what approval is required)
- Are nationally rated species likely to be impacted which will require the action (prescribed burn) to be referred to the Commonwealth Environment Minister (EPBC Act)

Environmental Assessment

minimising impacts, maximising benefits



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Environmental Assessment

- Fire Information Management System (FIMS) developed to improve the burn planning process
- Automatically imports all the corporate environmental data into the system (BDBSA)
- Now used by DEWNR, SA Water and ForestrySA

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Mitigating Actions

- Weed Control
- Exclusion zones
  - Threatened fauna habitat
  - Fire sensitive species
- Reduce burn size
- Conduct patchy burn
- Change burn timing
  - Threatened orchid species

Mitigating Actions

- Protect vulnerable trees
- Hygiene procedures
- Monitor (knowledge gaps)

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Weed Management

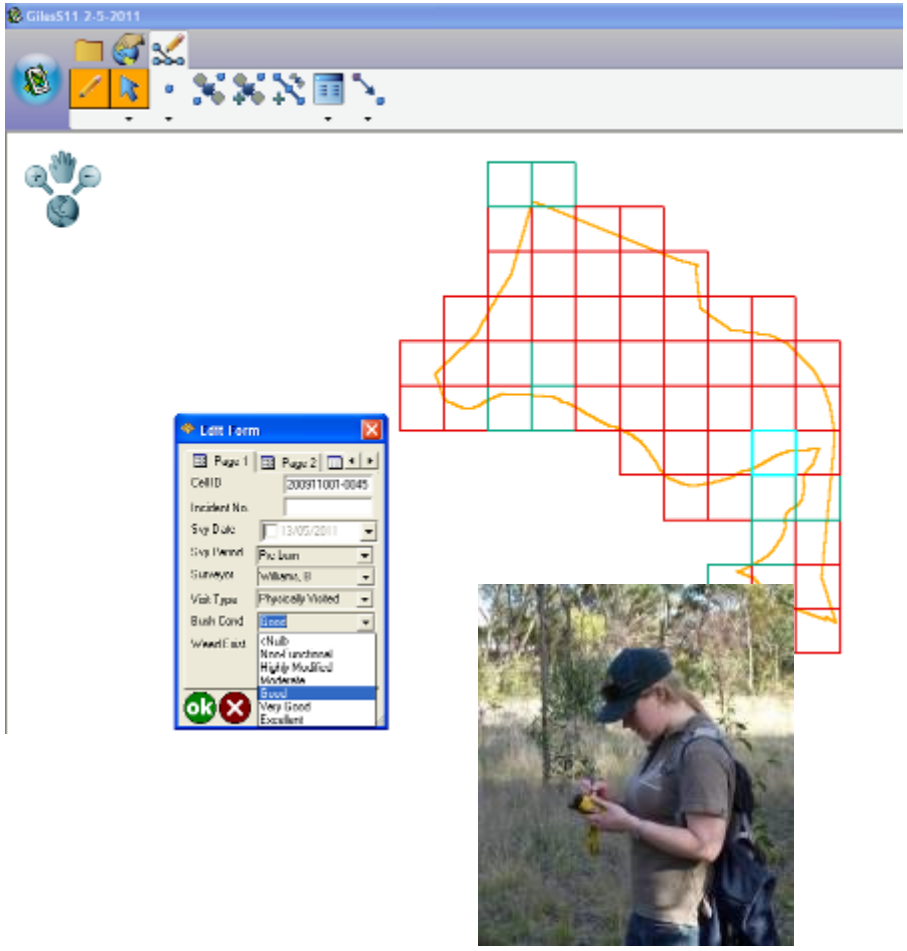
Our Goal (DEWNR) – to ensure vegetation condition doesn't deteriorate post-fire

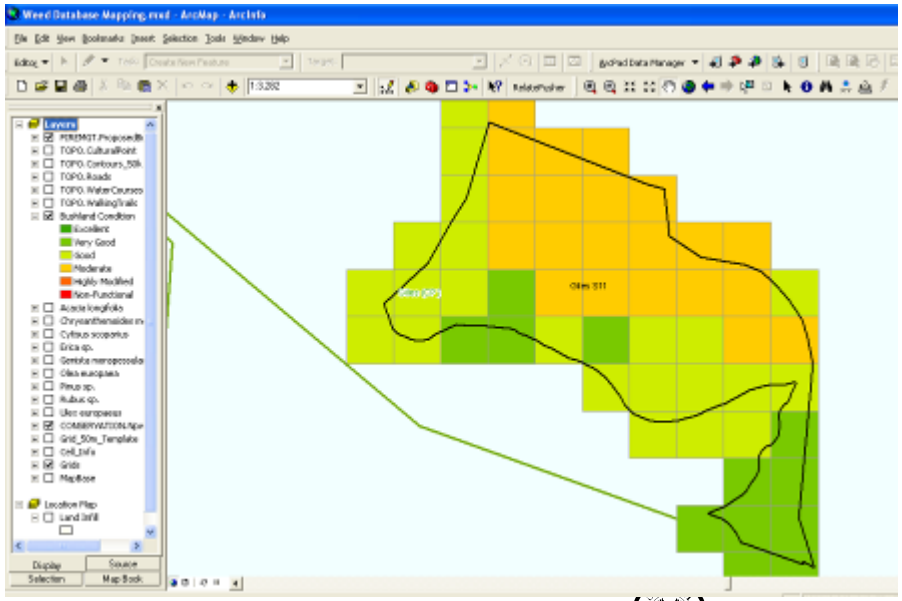
- Priorities are fire responsive weeds and weeds contributing to fuel loads.

Increased resources since 2011

- 2 full-time plus 2-4 seasonal staff
- 'New' weed mgmt planning process

Pre-fire Weed Mapping





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Weed management plans

Park Name: Mount Billy	**Burn Name:** Mt Billy S10
Burn Size: 22.1ha.	**Burn Date:** Spring 2010
Surveyor(s): Brett Williams, Tim Groves	**Survey Date:** 12 August 2010
Author: Brett Williams	**Plan Date:** 13 August 2010

Site Objective(s): Prevent post fire spread of fire responsive species in high quality bushland, particularly in the southern half of the burn.

Site Summary: Numerous vegetation types reflecting variation in slope, aspect and soil type. Central and N section includes mid mallee woodland to open forest, over low trees, mid mallee shrubs/trees, mid-tall shrubs, low-mid sedges/shrubs and low grasses, in various combinations and foliage covers. Ground layer generally dominated by shrubs. S section predominantly low, open woodland to mid-open forest with similar understorey layers. Ground layers generally including a closed low grass layer.
Generally very clean of woody weeds, but with common weedy herbs including patches of *Asparagus asparagoides* (Bridal Creeper), *Watsonia meriana* var. *bulbillifera* (Wild Watsonia) and isolated individuals of *Chrysanthemoides monilifera* (Boneseed) and *Gomphocarpus cancellatus* (Cotton Bush) throughout the S section.

Weed Control Priorities: This table includes only weed infestations considered to be high priorities for post-fire control.

ID #	Location	Weed Species	Control Priority	Level of control	Infestation Description	Control Considerations
	Predominantly W edge of S section, although likely to be scattered throughout.	*C. monilifera*	A3- Priority 1	Monitor regeneration and attempt to eradicate fire responsive species.	Scattered individual juveniles in good to very good bushland. Individuals seen were handpulled during assessment.	Handpull seedlings as they re-emerge post-fire.

Site Opportunities: Opportunities exist to control isolated infestations of *A. asparagoides W. meriana var. bulbillifera* and *G. cancellatus* that are likely to be more conspicuous in the first winter/spring post-burn. Risks of off-target damage can also be minimised by conducting control prior to significant native re-growth.

SIGNED: _____ (Liaison Ranger) DATE: _____
SIGNED: _____ (Fire Ecologist) DATE: _____

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Mitigating Actions – Grassland burning

- Weed Management
- Protection of habitat trees
- Hygiene Procedures
  - Grass seeds on equipment / vehicles
- Herbivore Management (Roos, Goats)


Prescribed Burn Operations

Ops Planning - Key Considerations

- Mitigation measures identified in Environmental Assessment
- Burn Intensity desired
- Burn Prescription
- Ignition pattern and techniques
- Resources
- Contingency Planning
- Weather forecasts
- Obtaining a Permit – Legislative Requirement

Who conducts the burns?

- Burns are planned and conducted by nationally accredited staff within DEWNR, ForestrySA and CFS who are trained in planning and conducting prescribed burns
- Supported on-ground by trained firefighters from CFS (DEWNR is a brigade of the CFS) and ForestrySA

- State Govt conducts over 100 burns each year.
- Local CFS brigades are invited to attend all of prescribed burns.

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Burn Prescriptions

6. Grassy eucalypt woodlands

Description: Dominated by eucalypt species with an open or dense tree layer and an understorey of a varying mixture of grasses, herbs, sedges and shrubs (Figure 8). Shrubs are sparse, with up to 30% cover.

Distribution: Occupies large areas of Eyre Peninsula, Mount Lofty Ranges, Murraylands, Yorke Peninsula and the upper South East.

Fire behaviour: Wind speed and curing (i.e. percentage of dead fuel) influence fire behaviour. Taller and/or denser sites of tree will reduce the wind speed on the fireline.

Model: Fire behaviour can be predicted the using grassland fire prediction models in Cheney and Gould (1995); Cheney *et al.* (1993, 1998)and Cheney and Sullivan (2008).

Figure 8. Grassy woodland

Grassy eucalypt woodland prescribed burning prescriptions

Parameter	*Range*
Adjusted surface fuel hazard	**L or M**
Max. FROS (km/hr)	1.5
Wind (km/h)	10 to 40
RH (%)	20 to 80
Temp (° C)	15 to 40
Curing (%)	90 to 100
GFDI	≤5
Adjusted surface fuel hazard	**H**
Max. FROS (km/hr)	1.5
Wind (km/h)	5 to 20
RH (%)	20 to 80
Temp (° C)	15 to 40
Curing (%)	80 to 90
GFDI	≤5
Adjusted surface fuel hazard	**VH or E**
Max. FROS (km/hr)	1.2
Wind (km/h)	0 to 10
RH (%)	20 to 80
Temp (° C)	15 to 40
Curing (%)	60 to 80
GFDI	≤5

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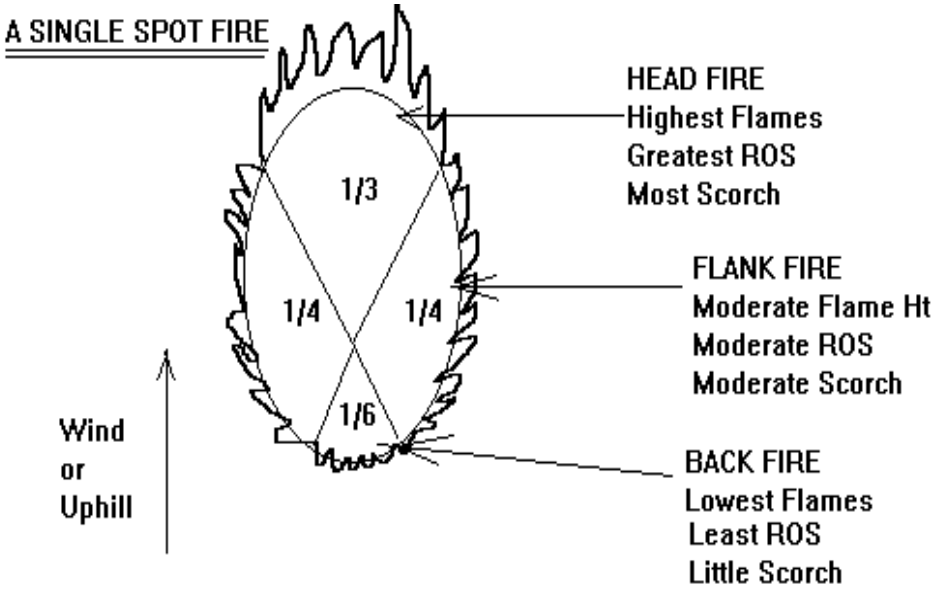
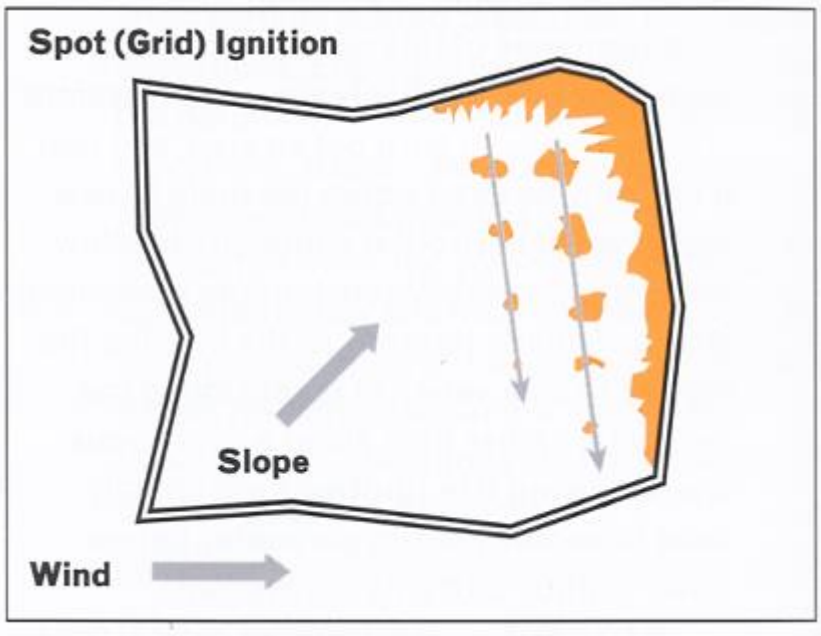
Ignition Pattern and Techniques

- Ignition patterns are the most powerful tool available to the officer in charge of a prescribed burn.





Ignition Tools

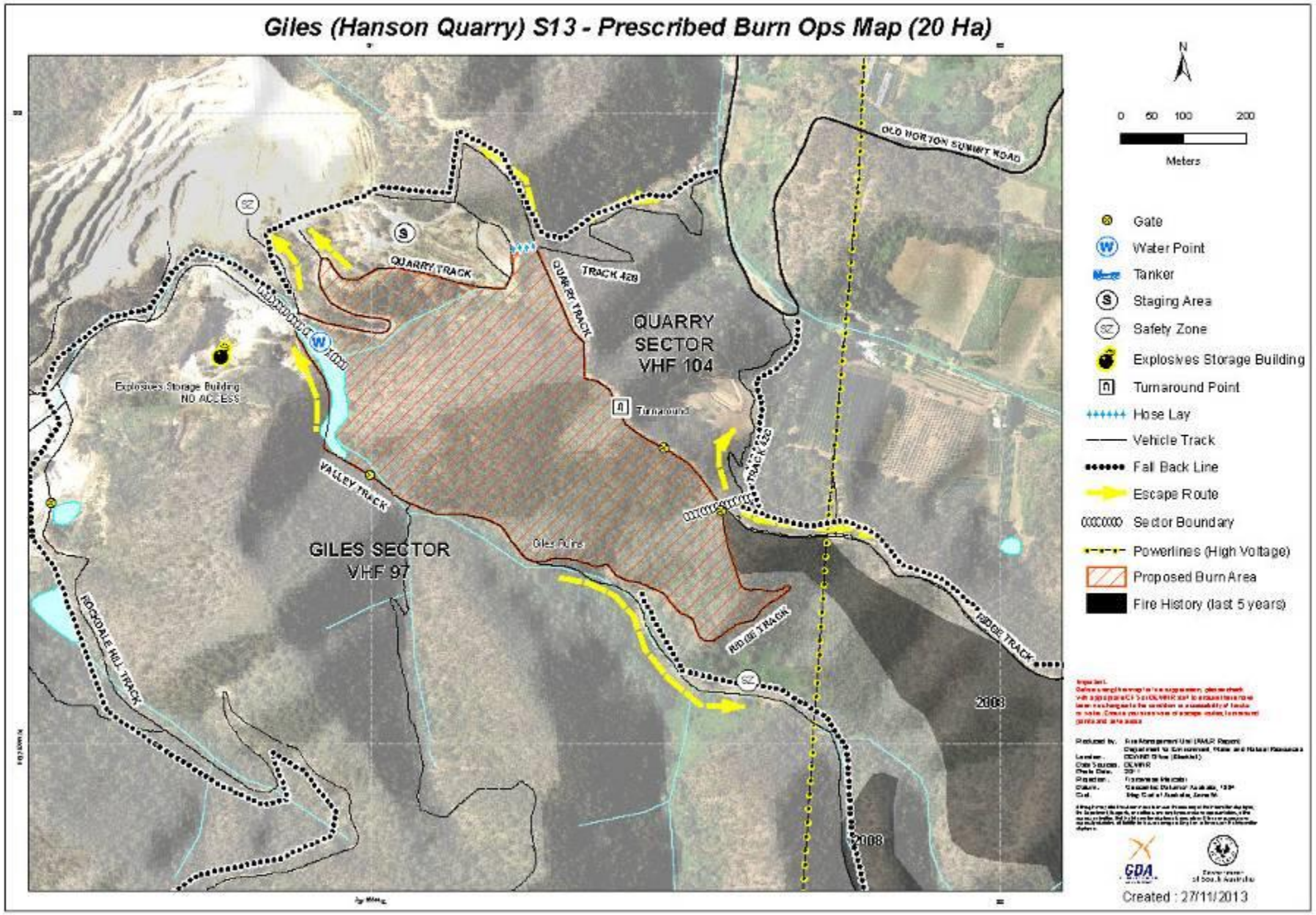

Vehicle Flame Thrower


Aerial Drip Torch


Drip Torch

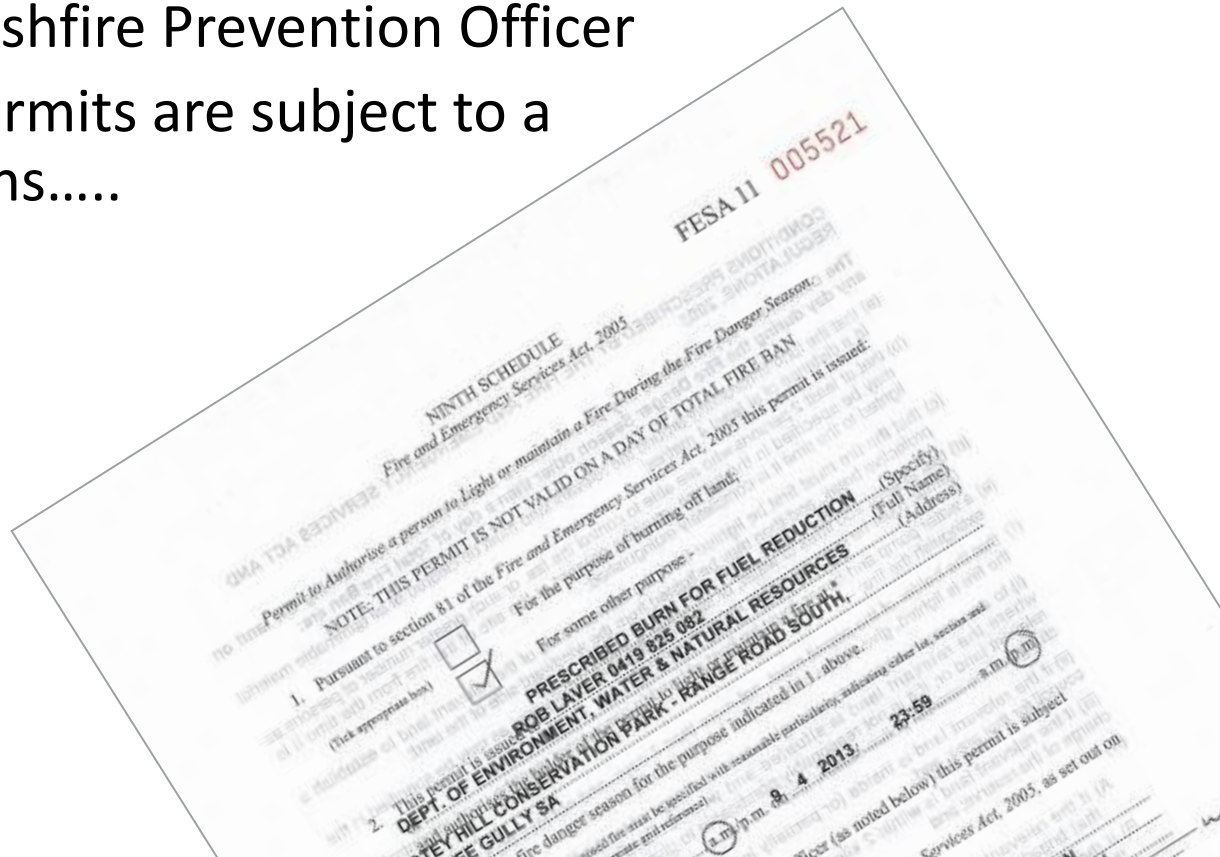

Flare Launcher

Contingency Planning



Obtaining a Permit

- Legislative requirement when seeking to light or maintain a Fire during the Fire Danger Season
- Permit can be obtained through CFS Regional Office or Council Bushfire Prevention Officer
- When issued the permits are subject to a number of conditions…..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NINTH SCHEDULE

Fire and Emergency Services Act, 2005

Permit to Authorise a person to Light or maintain a Fire During the Fire Danger Season

NOTE: THIS PERMIT IS NOT VALID ON A DAY OF TOTAL FIRE BAN

1. Pursuant to section 81 of the *Fire and Emergency Services Act, 2005* this permit is issued:

(Tick appropriate box)

For the purpose of burning off land;

For some other purpose - PRESCRIBED BURN FOR FUEL REDUCTION (Specify)

2. This permit is issued to ROB LAVER 0419 825 082 (Full Name)

DEPT. OF ENVIRONMENT, WATER & NATURAL RESOURCES (Address)

CONSERVATION PARK - RANGE ROAD SOUTH,

GULLY SA

fire danger season for the purpose indicated in 1. above.

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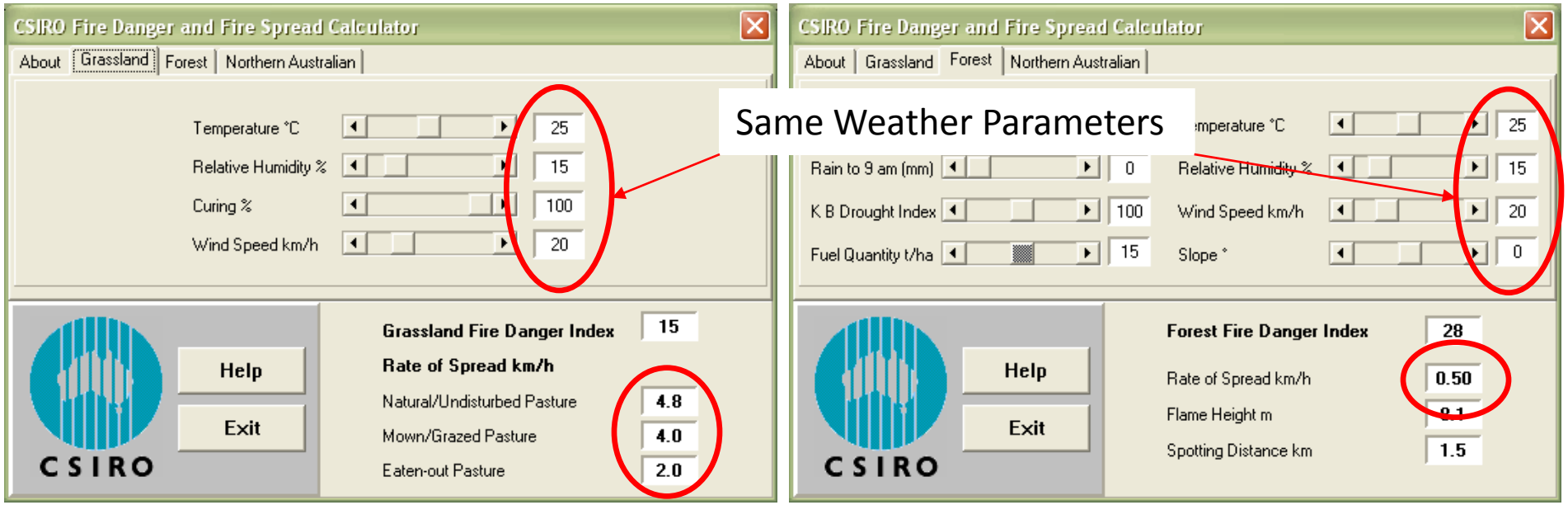
Operational considerations – Grassland burning

- Grass burns are often incorrectly viewed as “less risky” due to the reduced amount of fuel being burnt
- Burns have been under resourced
- Grass fires are extremely reactive to changes in wind speed and direction and will travel at greater ROS
- Generally mop up requirements are less than scrub burns

Grassland FDI Calculator

Forest FDI Calculator



Post Burn Activity and Monitoring

Post Burn Assessment

Key Questions:

- Did we meet the objectives?
- Where the mitigating actions successful?
- Was the fire behaviour as planned?
- Lessons Learned…

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Long-term Monitoring

Stringybark Woodlands in Central Hills

Key questions:

- How does vegetation structure change and composition change in A/B zones?
- Does vegetation recover differently after Spring vs Autumn burns?
- Does tree health and hollow abundance differ with fire frequency

Burning in Grassy ecosystems (Grey Box Woodlands)

Thank you