# Fire management 2024-25 Donnelly District Stakeholder presentation Manjimup 10 June 2025

DBCA acknowledges all Aboriginal people as the Traditional Owners of the land and waters it manages throughout Western Australia. We pay our respects to them, their culture and to their Elders past and present.

DBCA values its staff, the community, visitors and stakeholders and provides collaborative delivery of services based on integrity, accountability and diversity.







#### Welcome

# Fire Management Program Meeting



#### Agenda

Welcome and DBCA Responsibility

2024-25 Season Review

**Bushfire Summary 2024-25** 

Burn Options Program 2025-26

**Detection and Aerial Suppression** 

Managing Biodiversity Values

Fire Science Projects



#### Responsibility

- DBCA has a legislated responsibility under the CALM Act 1984 and the Bushfires Act 1954
- For the prevention, management and control of fire on land.
- We (DBCA) live and work as part of the community





#### Guiding Legislation

Conservation and Land Management Act 1984

#### 33.CEO, functions of

- (1) The functions of the CEO are, subject to the direction and control of the Minister
  - (a) to manage —
  - (i) land to which this Act applies; and
  - (ii) subject to the relevant section 8A agreement, section 8A land; and
  - (iii) subject to the relevant order made under section 8C, section 8C land, and the associated fauna, flora and forest produce; and
- (aa) without limiting paragraph (a), to take any measures that the CEO considers necessary or expedient, including planned burning, on
  - (i) land to which this Act applies; and
  - (ii) subject to the relevant section 8A agreement, section 8A land; and
  - (iii) subject to the relevant order made under section 8C, section 8C land, for the purpose of preventing, managing or controlling fire on that land; and
- (d) to promote, encourage and facilitate the conservation, protection and management of biodiversity and biodiversity components in the State; and
- (dab) to promote, facilitate and manage nature-based tourism and recreation, as defined in the *Biodiversity Conservation Act 2016* section 190, in the State in accordance with this Act and the *Biodiversity Conservation Act 2016*; and
- (da) to promote and facilitate public recreation, in accordance with this Act, on land to which this Act applies; and





#### Guiding Policy

Corporate Policy Statement No. 88 – Prescribed Burning

Fire Management Strategy

Bushfire Risk Management Framework





Parks and Wildlife Service

Bushfire Risk Management Framework

Managing fuel hazards on public lands to control bushfire risk

2019



#### **Guiding Policy**

Regional Fuel Management Plan – Warren Region





#### Warren Region

- Spans 9 local governments
- DBCA manages 64% of the land (930,307 hectares)
- Consists of National Parks, Nature Reserves,
   State Forest, Timber reserves, Marine Park and other reserves



#### Warren Region





#### Fire Management Strategies

- Use prescribed burning and other fuel mitigation strategies in the rural urban interface to protect towns, settlements subdivisions from the impacts of bushfire.
- Use prescribed burning to maintain a landscape scale mosaic of fuel age and structure which inhibits the spread of bushfires and creates opportunities for successful fire suppression.
- Apply prescribed fire or other fuel modification techniques with consideration to visitor experiences and visitor safety.



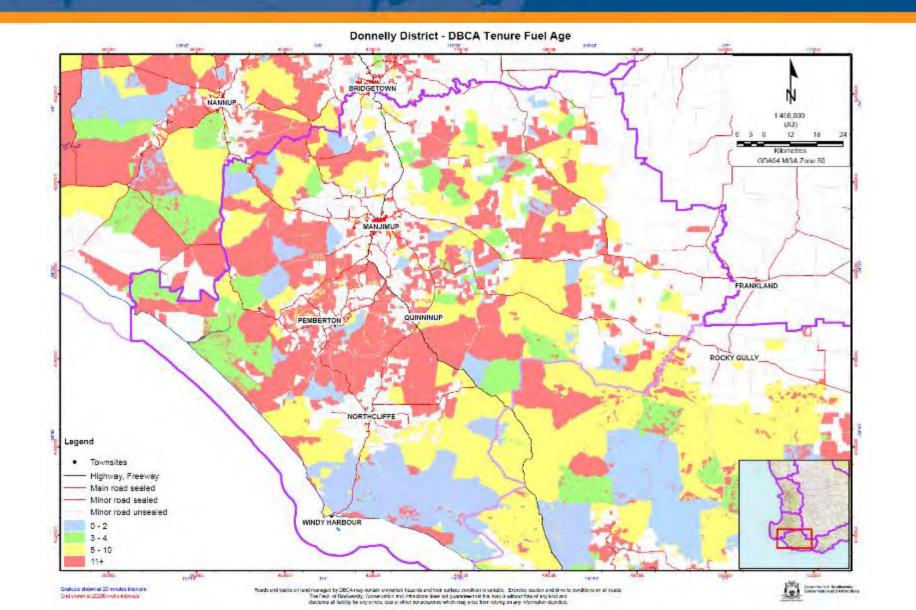
#### Fire Management Strategies-cont.

- Use prescribed burning to maintain adequate habitat linkages for ecosystem resilience and to support biota.
- Apply prescribed fire to the landscape with due consideration of requirements of important species and communities.
- Undertake a comprehensive assessment of cultural values in collaboration with local communities and implement appropriate bushfire mitigation strategies to ensure the protection and preservation of these values.

# Slide 11: Stakeholder presentation – Fire management Manjimup 10 June 2025



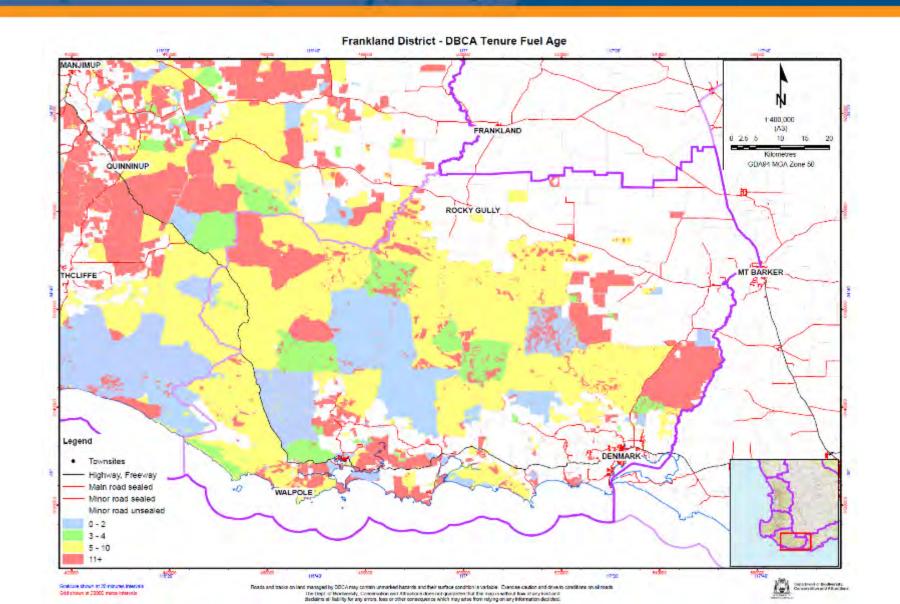




# Slide 12: Stakeholder presentation – Fire management Manjimup 10 June 2025

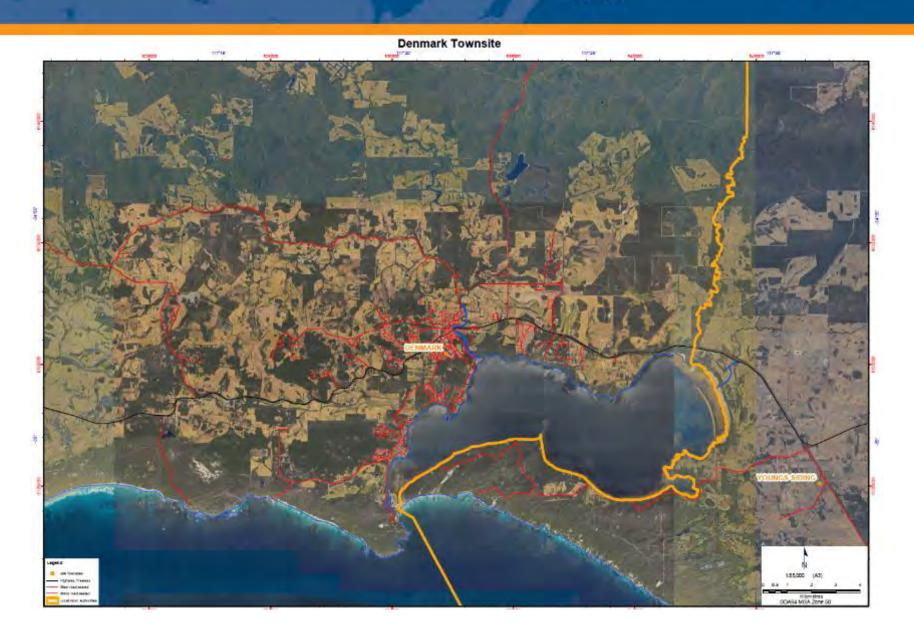






# Slide 13: Stakeholder presentation – Fire management Manjimup 10 June 2025









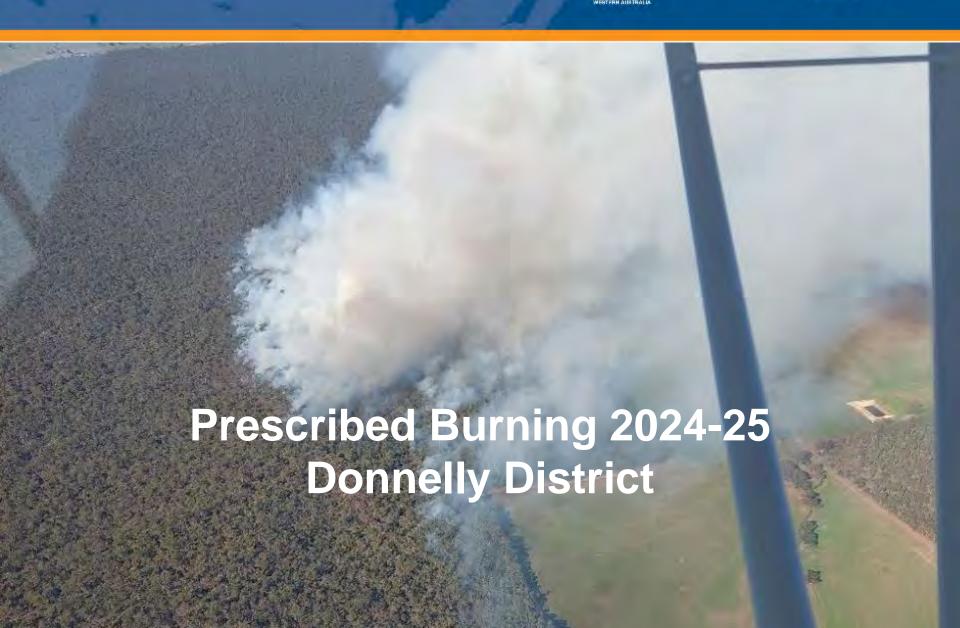
#### Resources for management – Warren Region

- 180 employees (~ 160 actively involved in fire management)
- 23 x fire trucks (including high lift pumper)
- 2 x fire spotter aircraft (based Manjimup)
- 1 x fire tower Mt Frankland
- Plant
  - 3 Bulldozers
  - 2 Front end loaders
  - 3 Prime movers + floats
  - 3 Skidsteers
  - Can-am side-by-side x 4
- Fixed wing water bombers (DFES/DBCA)
  - 2 x Albany
  - 2 x Manjimup





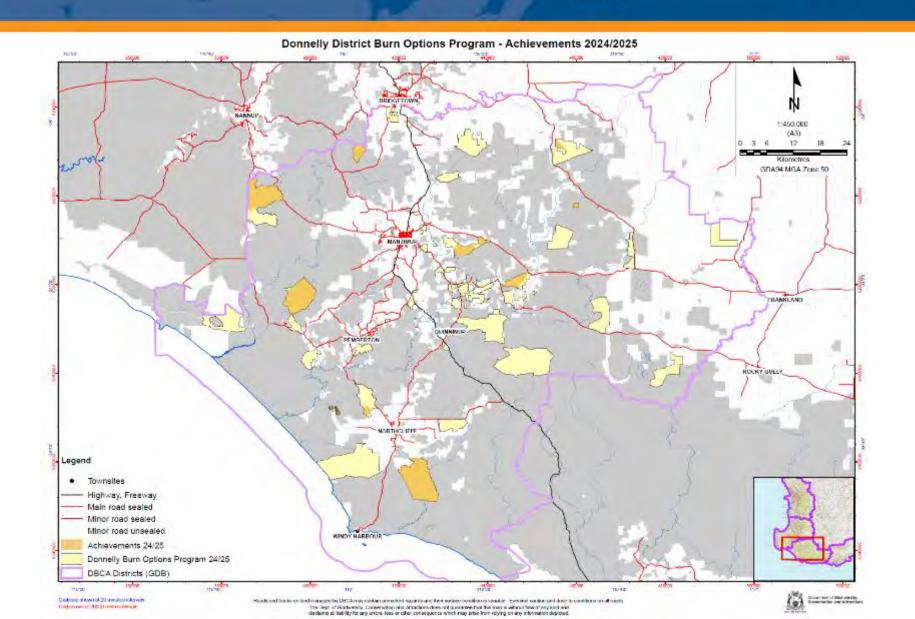




# Slide 15: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025







# Slide 17: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025



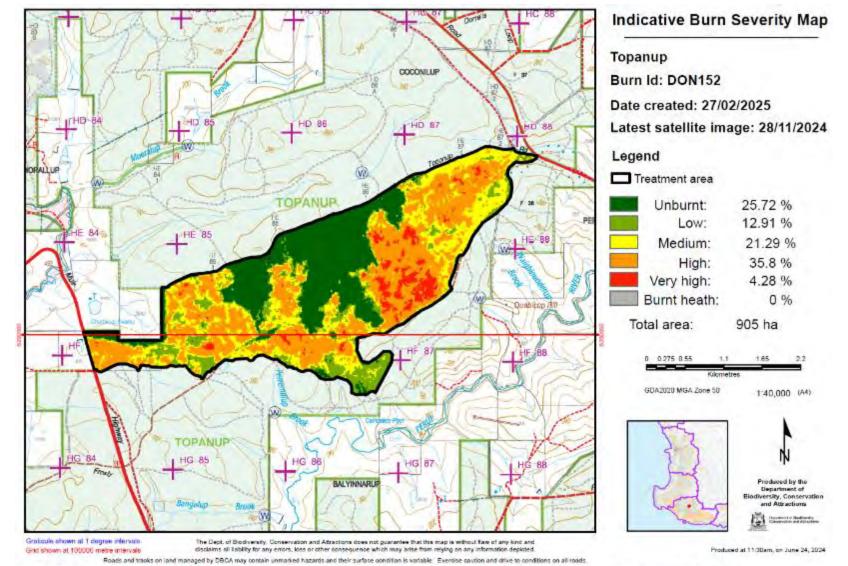




# Slide 18: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025



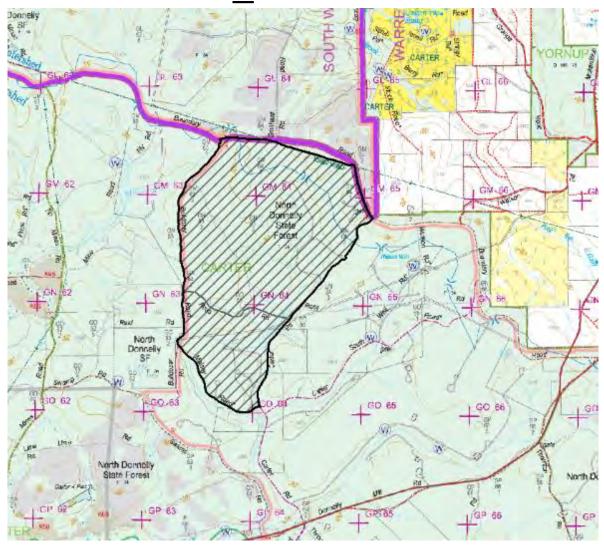








#### DON\_147 Carter



### Slide 20: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025



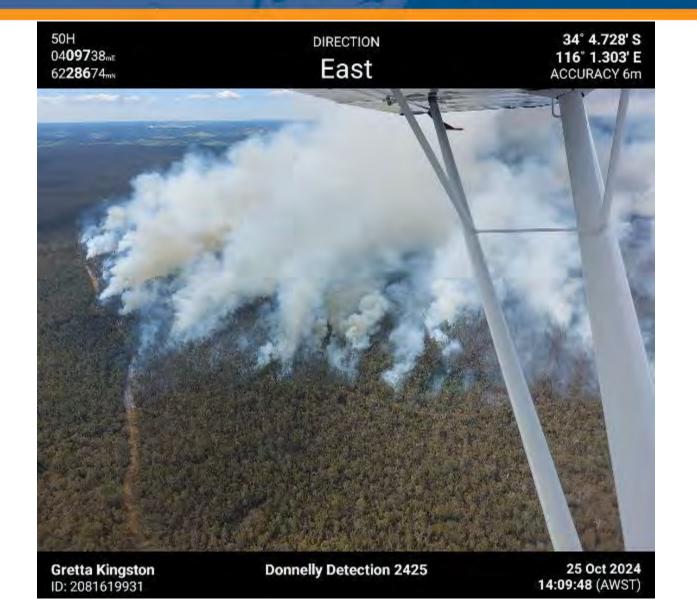




# Slide 21: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025



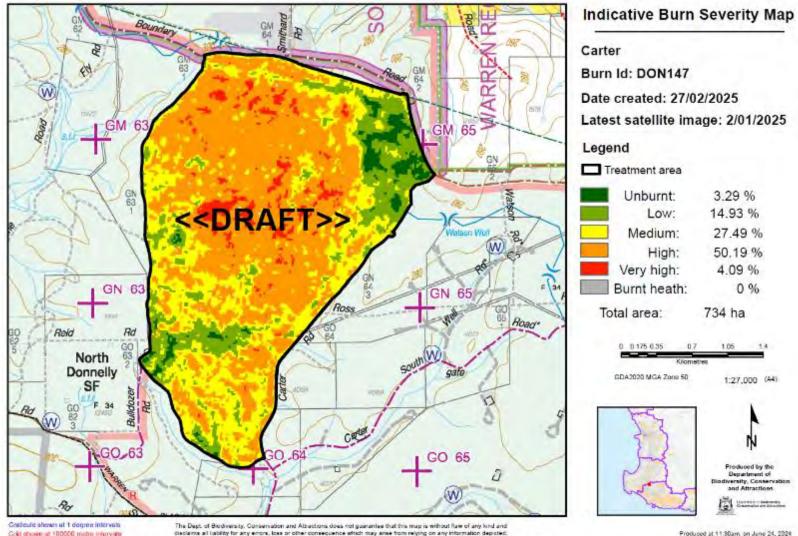




#### Slide 22: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025







Roads and tracks on land managed by DBCA may contain unmarked hazards and their surface condition is variable. Exercise caution and drive to conditions on all roads.

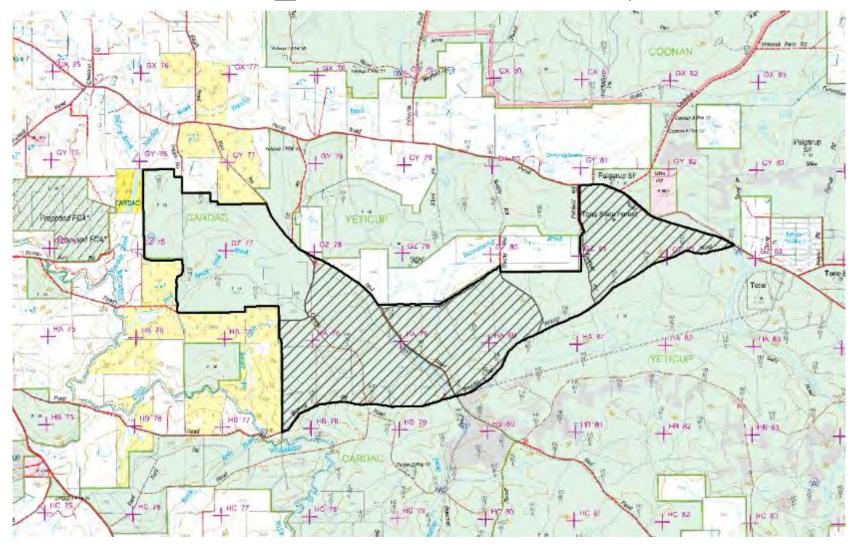
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Department of Biodiversity, Conservation and Attractions



#### DON\_073 Cardac / Yeticup



#### Slide 24: Stakeholder presentation – Prescribed burning







# Slide 25: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025



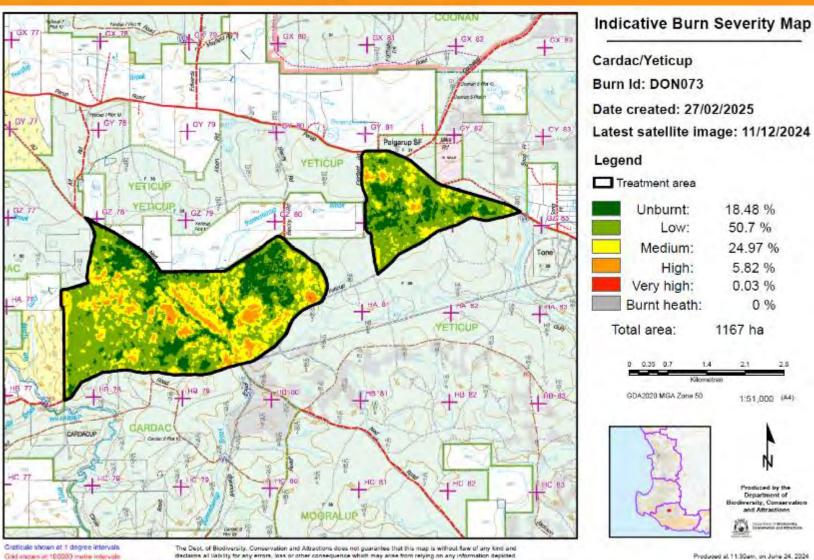




#### Slide 26: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025







18.48 %

50.7 %

24.97 %

5.82 %

0.03 %

1167 ha

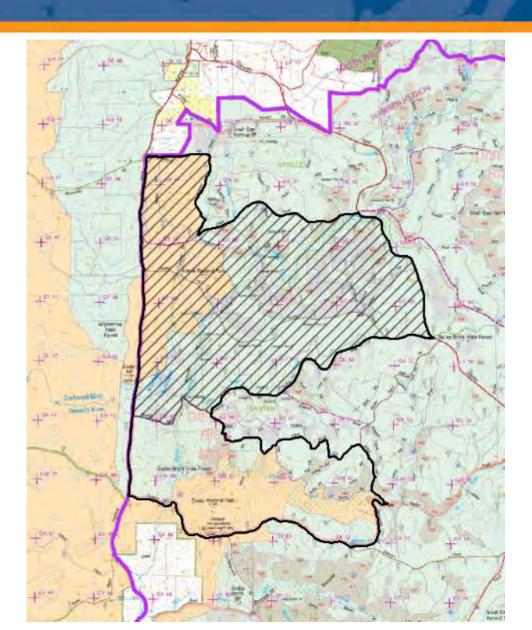
0 %

1:51,000 (A4)

odiversity, Conservation

# Slide 27: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025





DON\_140 Barlee/Easter

# Slide 28: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025





# Slide 29: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025







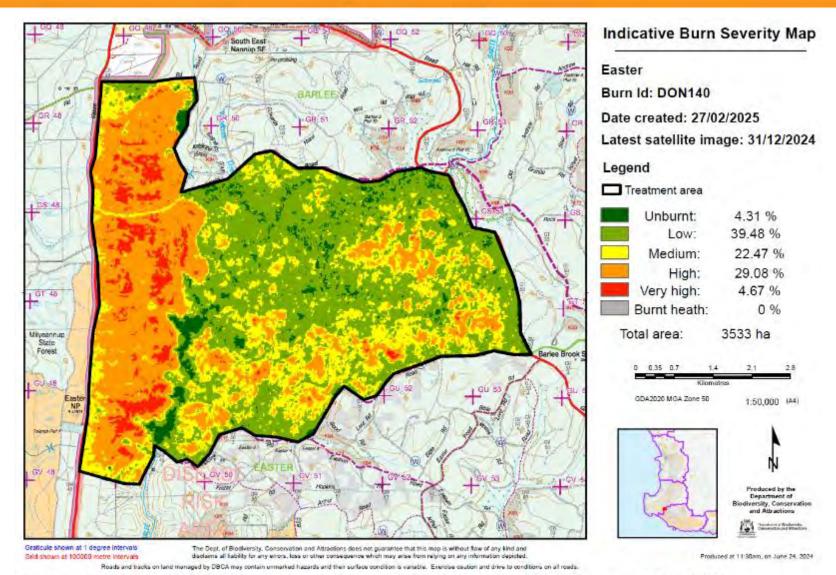


### Slide 30: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025



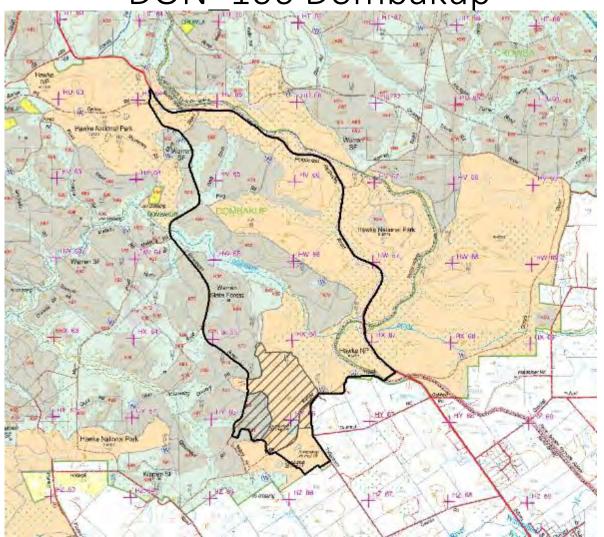
Department of Biodiversity, Conservation and Attractions







DON 106 Dombakup



# Slide 32: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025





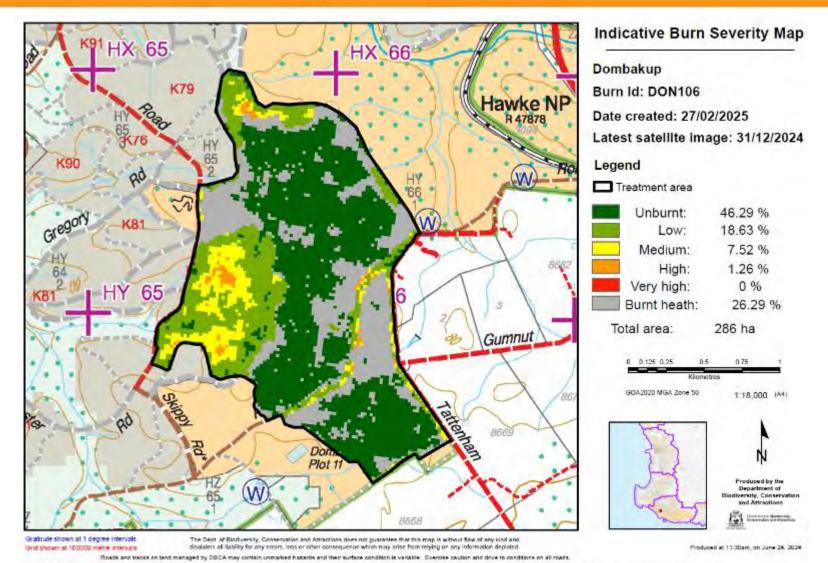




# Slide 33: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025

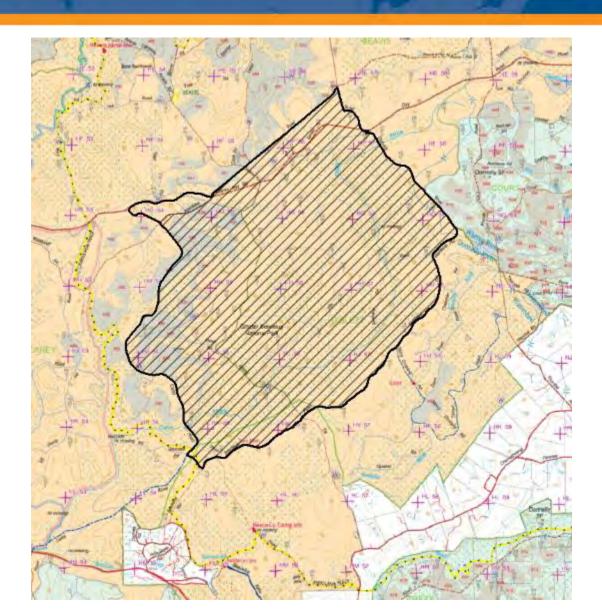












# DON\_153 Giblett

# Slide 35: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025









## Slide 36: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025



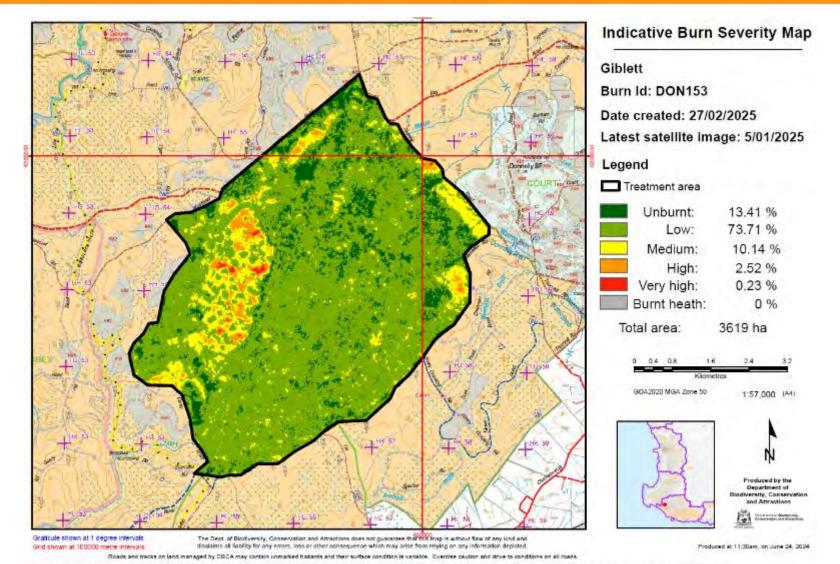




## Slide 37: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025

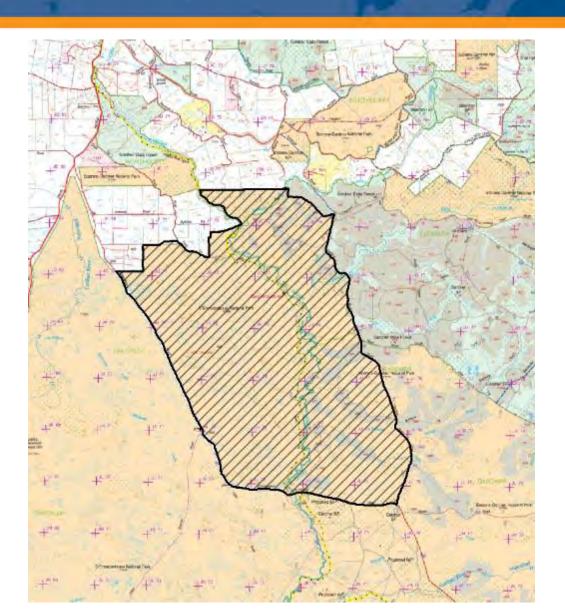






## Slide 38: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025



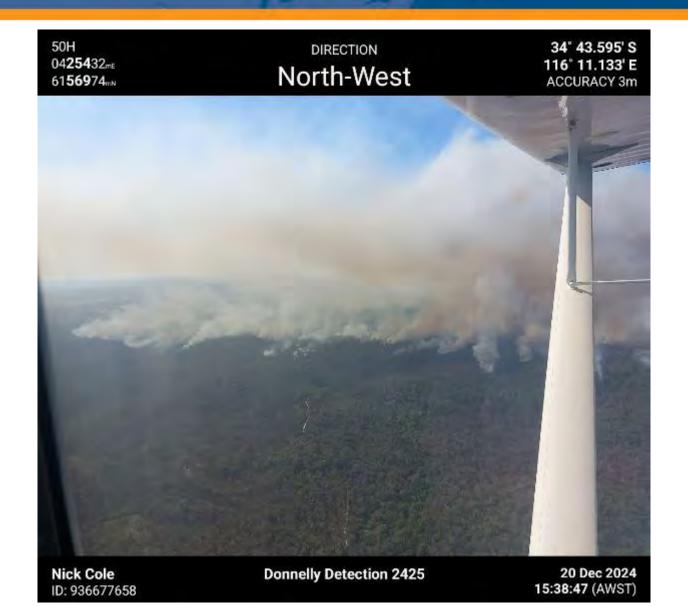


DON\_157 Chudalup-Boorara

## Slide 39: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025







## Slide 40: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025







## Slide 41: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025



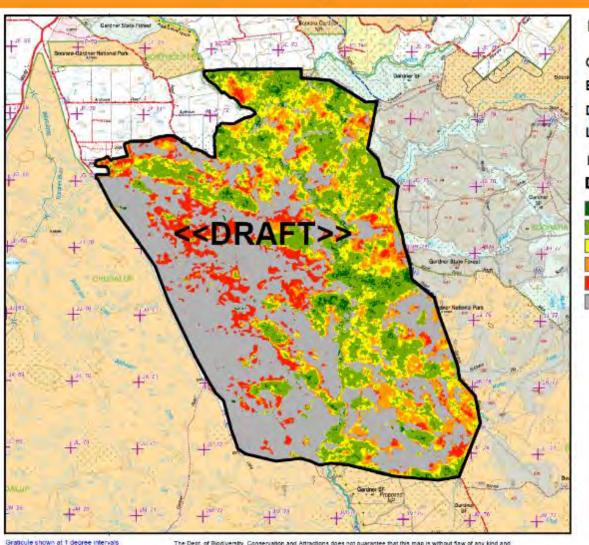




## Slide 42: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025







#### Indicative Burn Severity Map

Chudalup-Boorara

Burn Id: DON157

Date created: 27/02/2025

Latest satellite image: 16/02/2025

#### Legend

Treatment area

Unburnt: 2.06 %

Low: 22.47 %

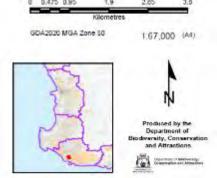
Medium: 12.4 %

High: 11.85 %

Very high: 9.28 %

Burnt heath: 41.93 %

Total area: 5467 ha



The Dept, of Riccilventry, Conservation and Attractions does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence which may arise from relying on any information deploted.

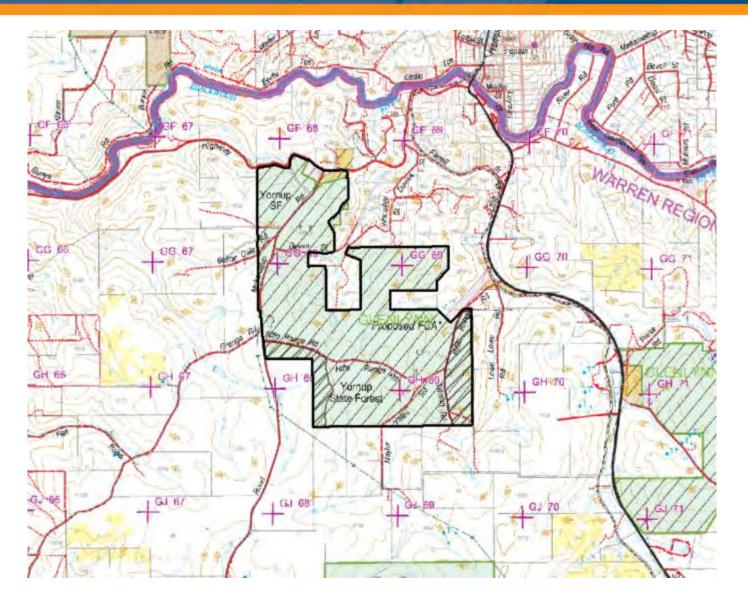
Roads and tracks on land managed by DBCA may contain unmarked hazards and their surface condition is variable. Exercise eaution and drive to conditions on all roads

Produced at 11:30am, on June 24, 2024

## Slide 43: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025







### DON\_154 Glenlynn

## Slide 44: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025





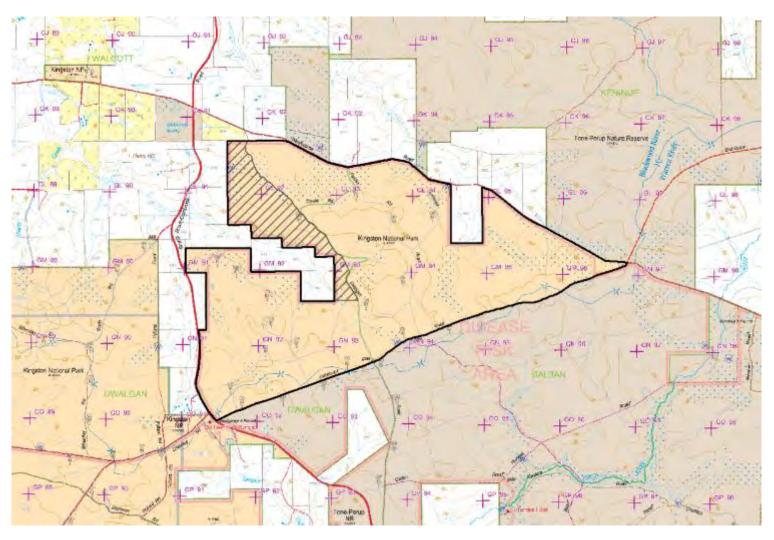








### DON\_159 Dwalgan



## Slide 46: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025







Slide 47: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025



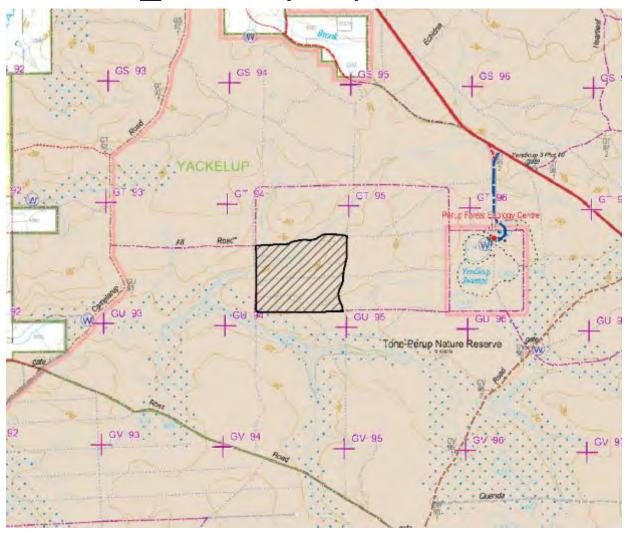








### DON\_123 Boyicup/Camelar



## Slide 49: Stakeholder presentation – Prescribed burning Manjimup 10 June 2025











# Prescribed Burning – Donnelly District History

Financial Year	Number of burns on BOP	No. burns implemented or commenced	Area burnt prescribed burning (ha)	Number Escapes	Number Bushfires	Area burnt bushfire (ha)
2024/25	34	11	16123	0	48	43987
2023/24	37	17	12161	1	32	14867
2022/23	40	17	12404	2	29	321
2021/22	39	20	20268	1	37	17391
2020/21	36	15	18687	2	31	4426
2019/20	30	20	13002	2	33	113
2018/19	35	27	38172	0	24	62



# Bushfires 2024-25 Warren Region









58 fires attended to by DBCA in Warren Region

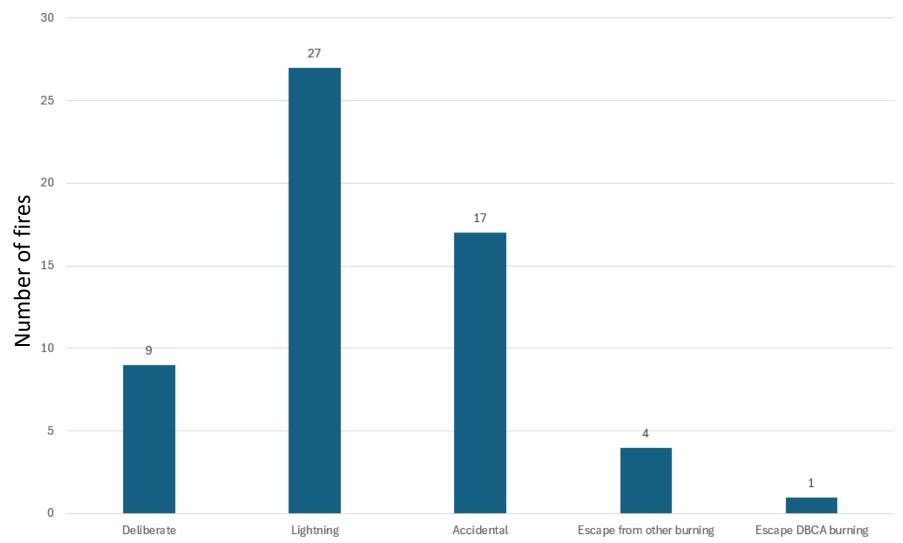
10 fires in Frankland 48 fires in Donnelly

One larger fire in Frankland and a major complex set of fires in Donnelly







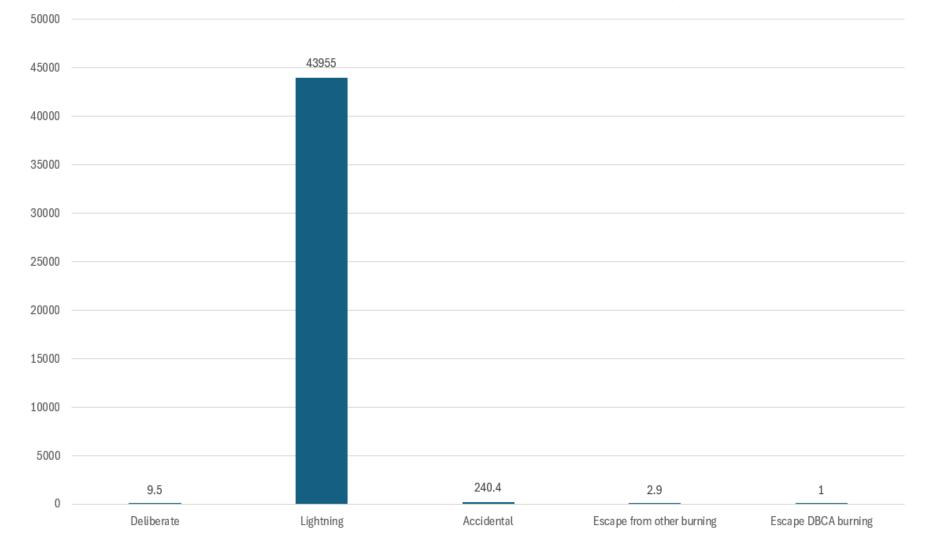


## Slide 53: Stakeholder presentation - Bushfires Manjimup 10 June 2025











# Peaceful Bay/Bow Bridge FRK Fire 006

- 2 January 2025
- Escape from private property.
   Illegal fire lit on private property
- 204 hectares
- Burnt through 167 hectares of National Park and Nature Reserve and 37 hectares of private property and other crown land
- Supported by water bombers and local brigade crews
- Travelling at 1.5 kms per hour































## Slide 61: Stakeholder presentation - Bushfires Manjimup 10 June 2025





## Slide 62: Stakeholder presentation - Bushfires Manjimup 10 June 2025



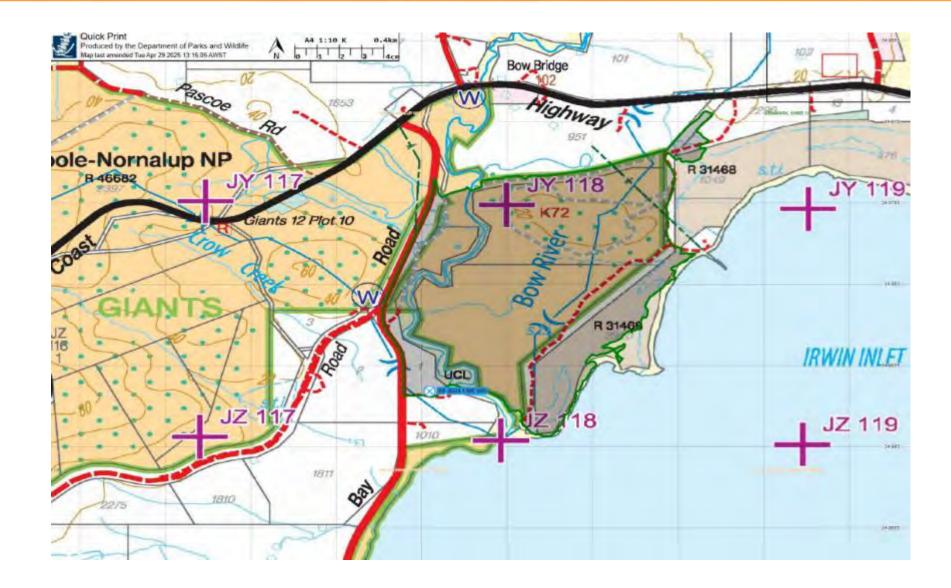
















# Donnelly Complex Fires

- 14 Fires
- Lightning event in early hours of the morning
- 9 February 2025
- Long duration over 33 days
- Involved 5 Pre-formed teams from across the state
- Had assistance from interstate
- Emergency warning for Windy
   Harbour settlement
- SW Hwy closed for a couple of days

Fire Number	Fire Name	Detection Date/Time	Resource Despatched Date /Time	Controlled Date/Time	Fuel Age	Total Area (ha)
DON-011	Collins	9/02/2025 06:20	9/02/2025 06:50	9/02/2025	69	11
DON-012	Eastbrook	9/02/2025	9/02/2025	9/02/2025	25	0.1
DON-013	Wildwood Road	9/02/2025	9/02/2025	9/02/2025	21	0.2
DON-014	Waistcoat Road	9/02/2025	9/02/2025	9/02/2025 16:18	43	2.51
DON-015	O'Sullivan Road	9/02/2025	9/02/2025	22/02/2025	10	3,283
DON-016	Beavis	9/02/2025 10.16	9/02/2025 10:17	17/02/2025 Burnt out to strategic roads	16	2,168
DON-017	Chesapeake	9/02/2025	9/02/2025	14/03/2025	10	37,370
DON-018	Quinninuo	9/02/2025	9/02/2025	9/02/2025	15	1.8
DON-019	Sutton Road	9/02/2025	9/02/2025	9/02/2025	40	0.1
DON-020	Maringup	9/02/2025 11:27	9/02/2025 11:27	18/02/2025 18:00 Included into Chesapeake fine	13	1.2
DON-021	Dannelly River	9/02/2025	9/02/2025	9/02/2025	16	0.4
DON-022	Dog Road	9/02/2025	9/02/2025	Included into DON-015	10	16.06
DON-023	Edwards Road	9/02/2025 14:56	9/02/2025 15.00	9/02/2025 18:15	10	1.6
DON-024	Kessell Road	09/02/2025 22:52	10-02-2025 07:00	10/02/2025	21	33

Table 1 – Summery of Lightning strike counsed bushfire occurring in Donnelly District from the 9/2/2025



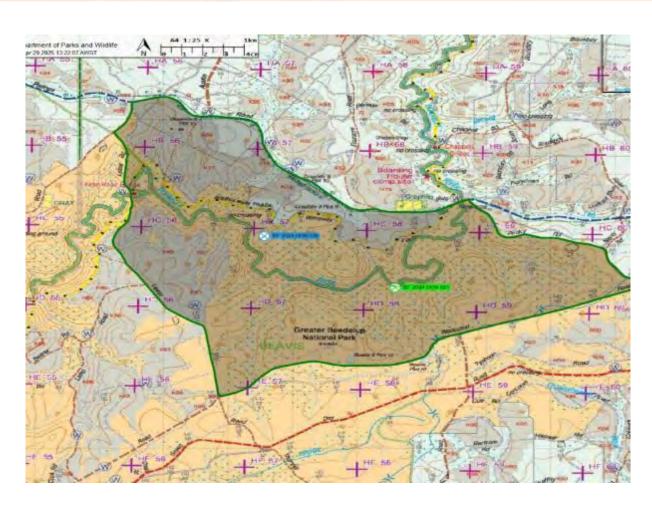


Map showing origin of 14 lightning strike fires that occurred on 9 February 2025. NB: Above map does not show Chesapeake Escape on 5<sup>th</sup> March.



#### Beavis – DON 016

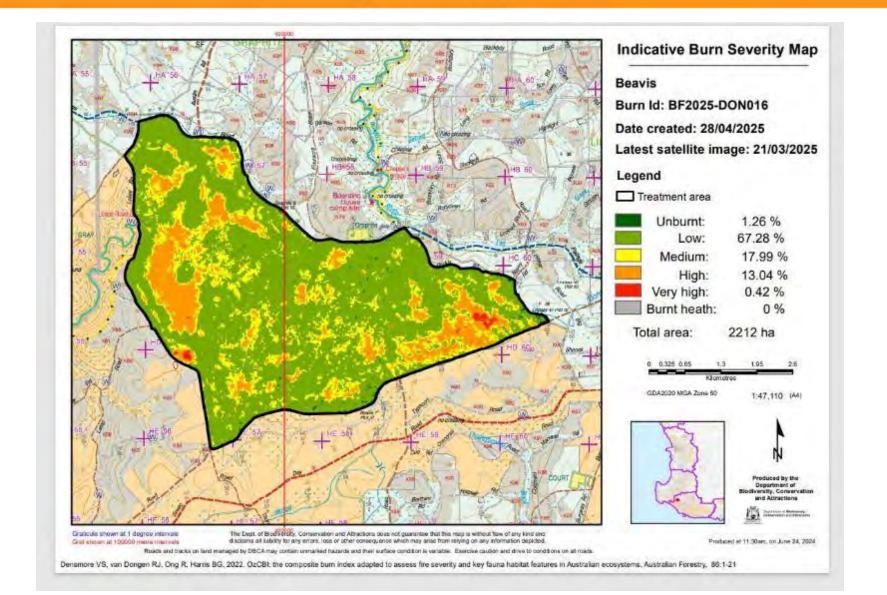
- Detected 9 February 2025
- 2197 hectares
- Lightning cause
- Water bombers attempted to suppress fire
- Could not track the fire edge as the area was in steep, rocky inaccessible terrain. Too hazardous to manually put a firebreak around the fire.
- Decision was to burn out to strategic roads under prescribed burn conditions.



## Slide 68: Stakeholder presentation - Bushfires Manjimup 10 June 2025



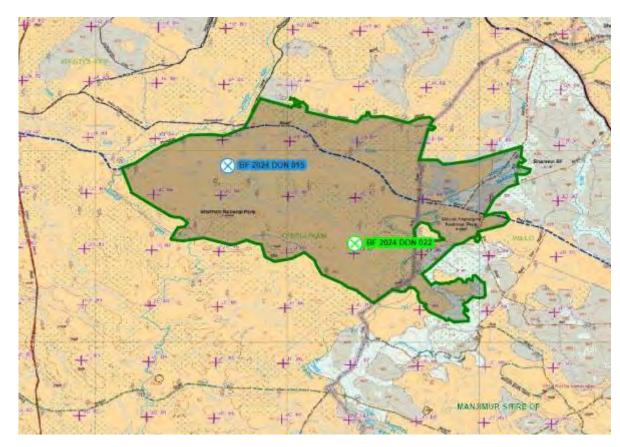






### O'Sullivan DON 015

- Detected 9 February 2025
- Lightning cause
- 3,283 hectares
- 10 years since last fire.
   Last burnt in the
   O'Sullivan bushfire
- Strategy was to fall back to strategic roads due to fast moving fire





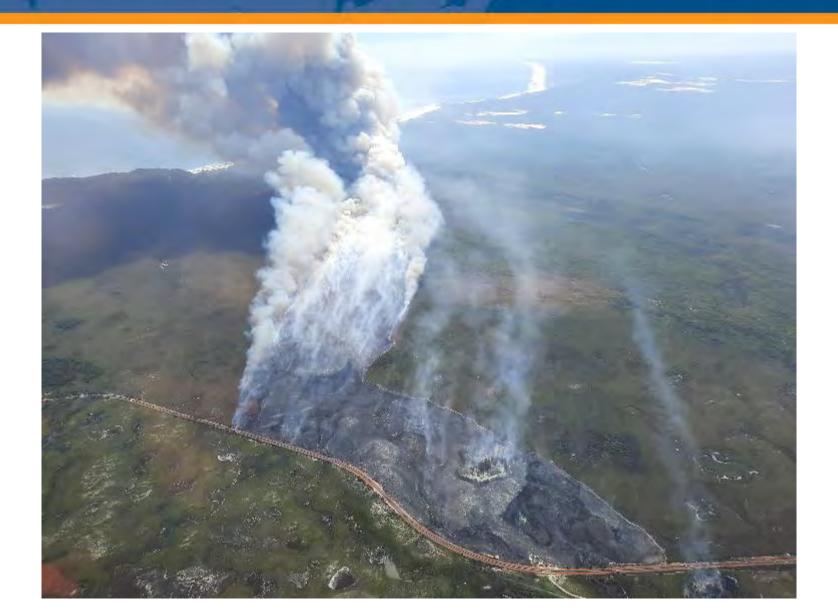












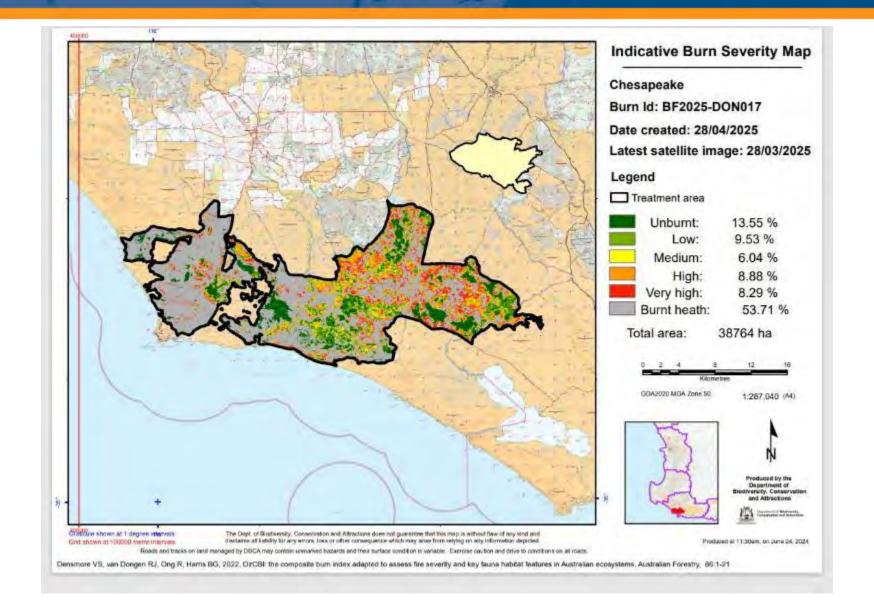




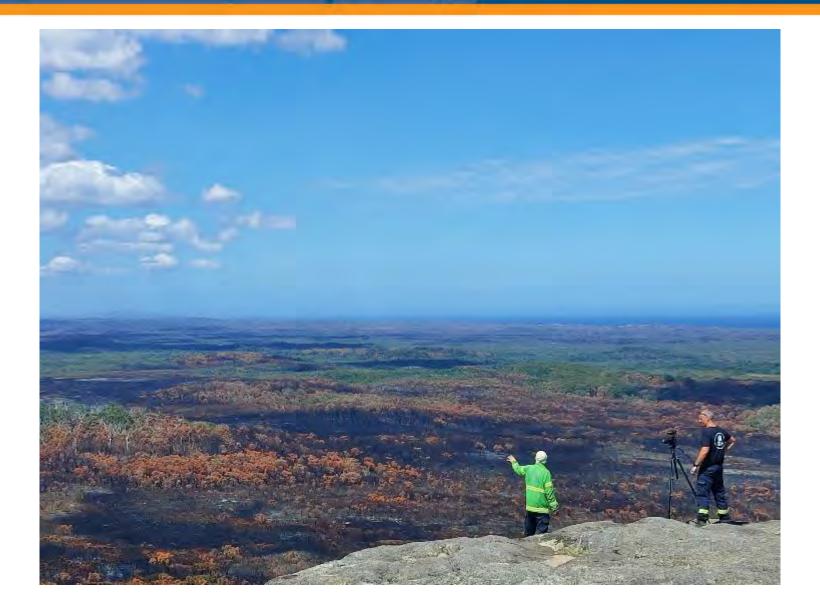
# Slide 74: Stakeholder presentation - Bushfires Manjimup 10 June 2025















### Burn Options Program 2025-26 Donnelly District







#### DBCA Burn Options Program

Approved by DBCA Director General



**Endorsed by Executive Director** 



Endorsed by the Regional Team

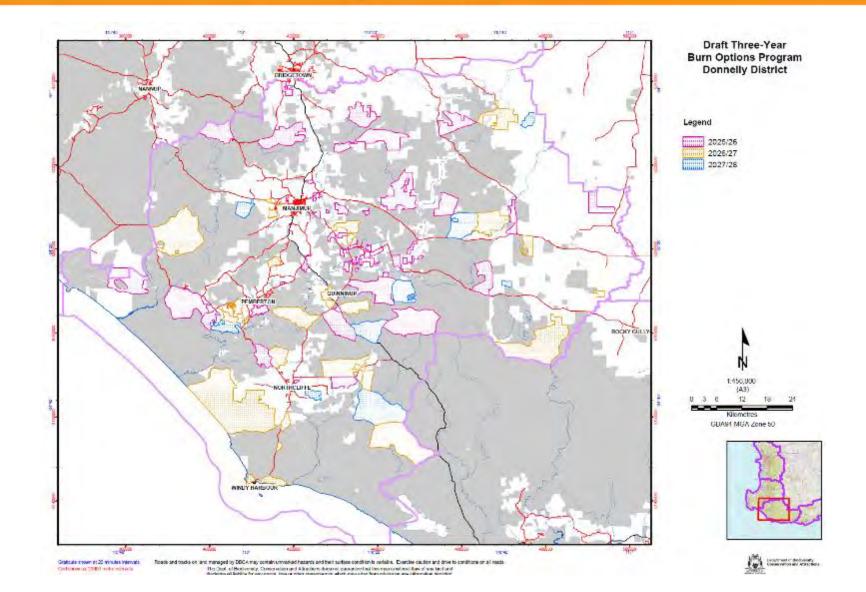


Developed by the District Team

# Slide 78: Stakeholder presentation - Burn Options Program Manjimup 10 June 2025



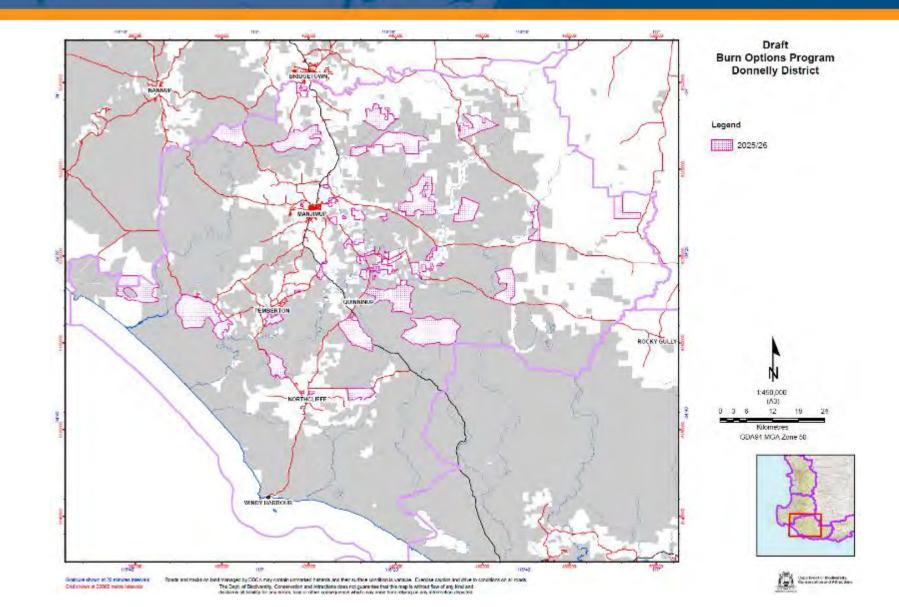




Slide 79: Stakeholder presentation - Burn Options Program Manjimup 10 June 2025







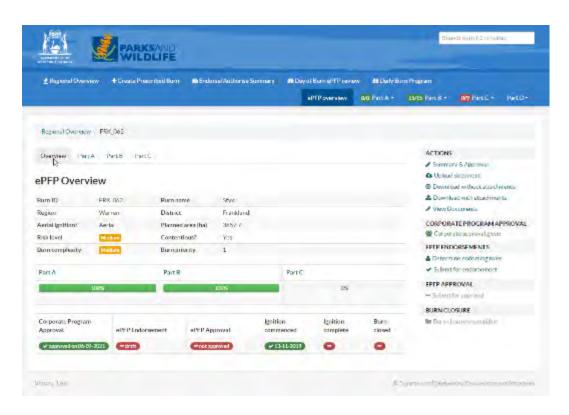






#### 3-6 months prior

- Prescribed Fire Plan
  - Objectives
  - Success criteria
  - Values in the area
  - Pre-Burn inspections
  - Maps
  - Fuel measurements
  - Prescribed fire behaviour
  - Approvals
  - Traffic Management Plan
  - Contingency Plan
  - Risk Analysis





## Approvals and Notifications

- DBCA -District/Regional/State
- Minister approval to include non-CALM tenure
- PP owners agreements
- s40 BC Act approvals
- ARC infrastructure
- DFES
- Prohibited Season exemptions
- Local Governments

- Main Roads
- Regional ILUA groups
- DPLH
- Western Power
- Telstra
- Vineyard Associations
- Water Corporation
- DWER
- Neighbour notifications





#### **Spring**

- Widespread moisture in landscape = more patchiness
- Lower scorch
- Gradual drying of vegetation and vegetation types
- Wider window of opportunity for burning
- Potential for reignition (and escape) throughout summer

#### **Autumn**

- Winter rainfall prevents reignition
- Grass intrusion/
- Weed/Introduced species management

- Landscape is more uniformly dry = less patchiness
- Higher scorch
- Potential impacts on winery industry
- Generally short window due to rainfall





#### DBCA Day of Burn Approval Process

**State Duty Officer** 



**Regional Duty Officer** 



**District Duty Officer** 





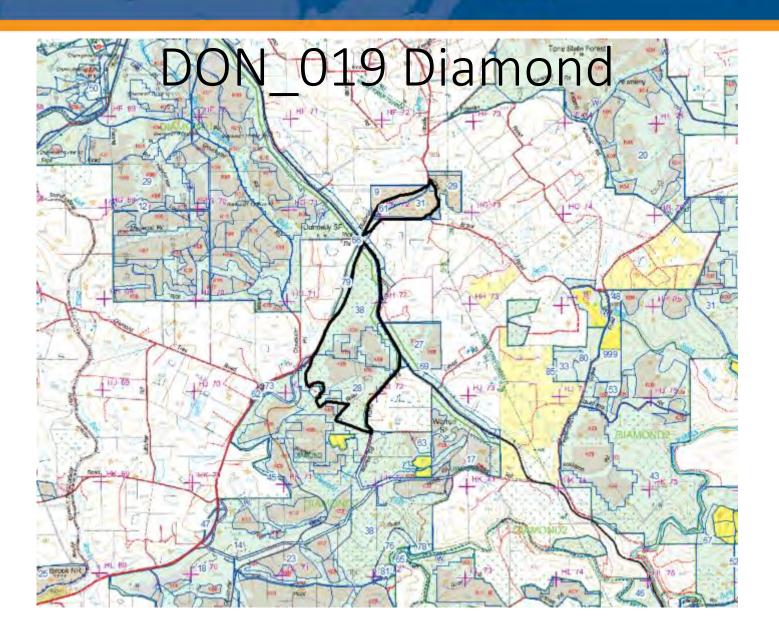
#### Overview

# 32 burns on Burn Options Program 2025/26

- 15 carry over burns from 24-25 with previous ignitions
- 11 carry over burns from 24-25 with no previous ignitions
- 6 burns new to the program

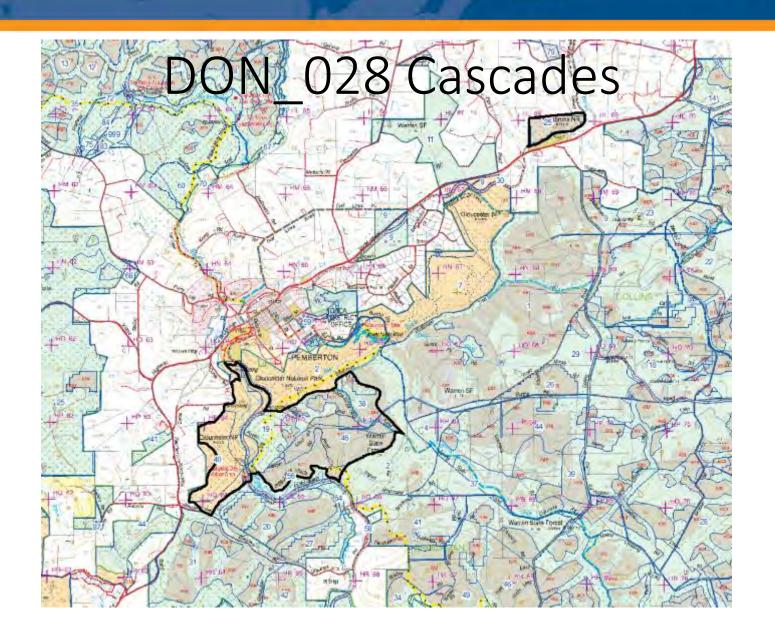






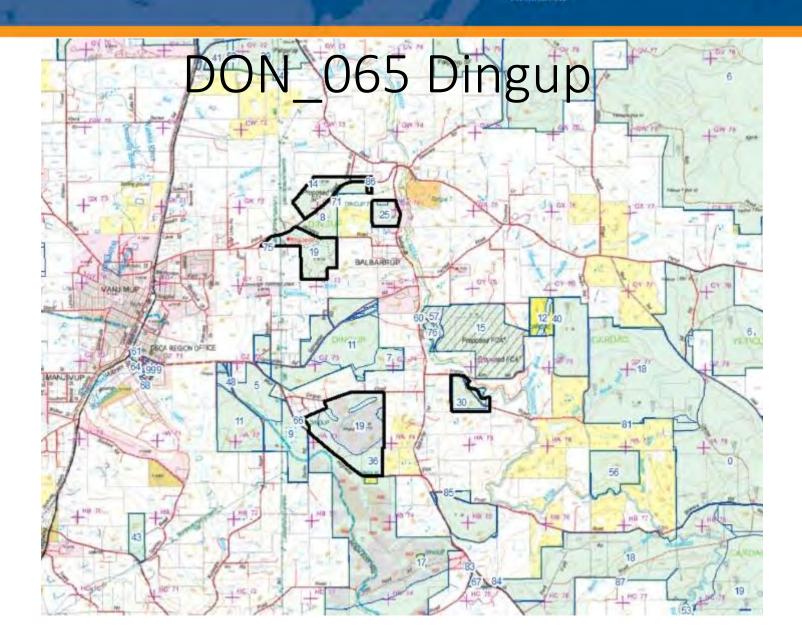






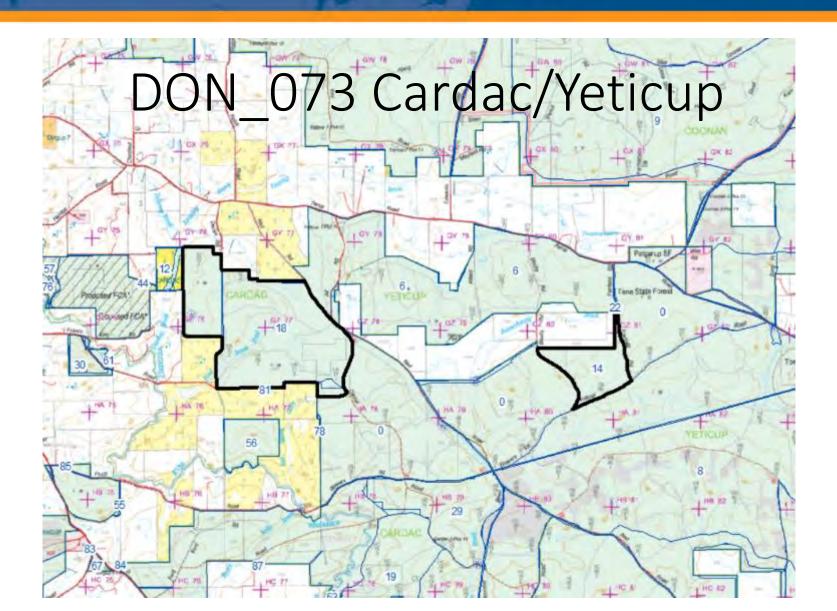






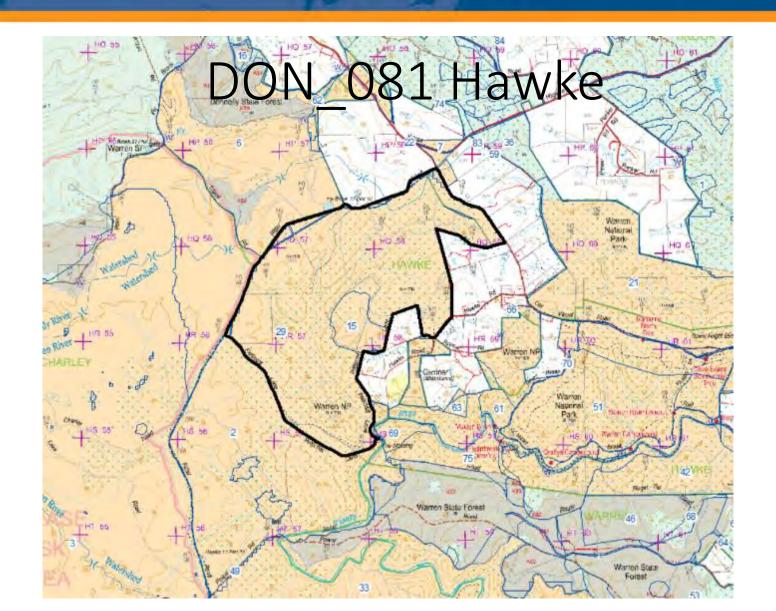






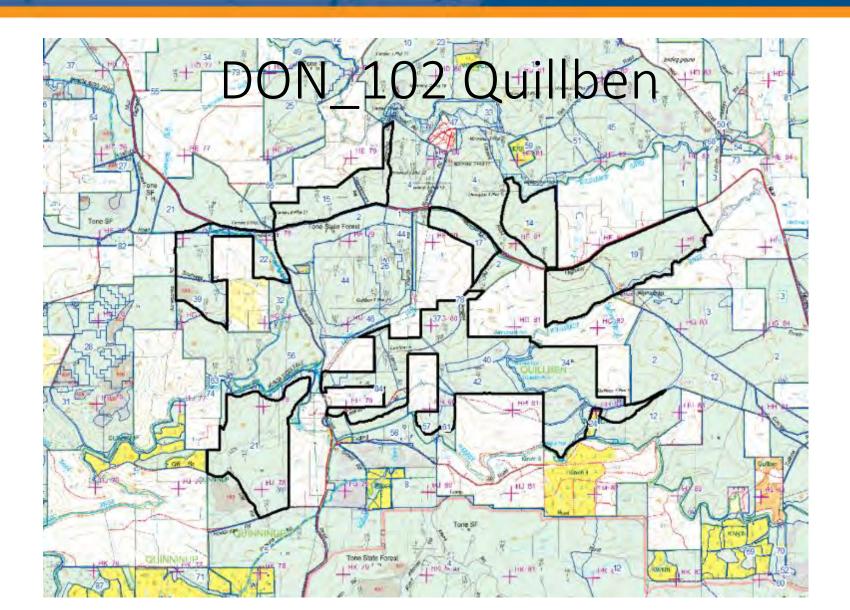






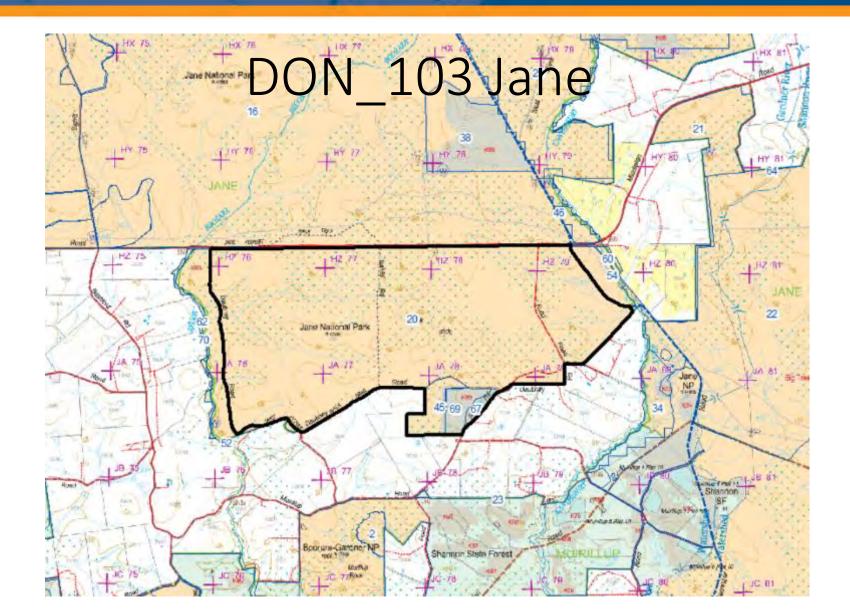






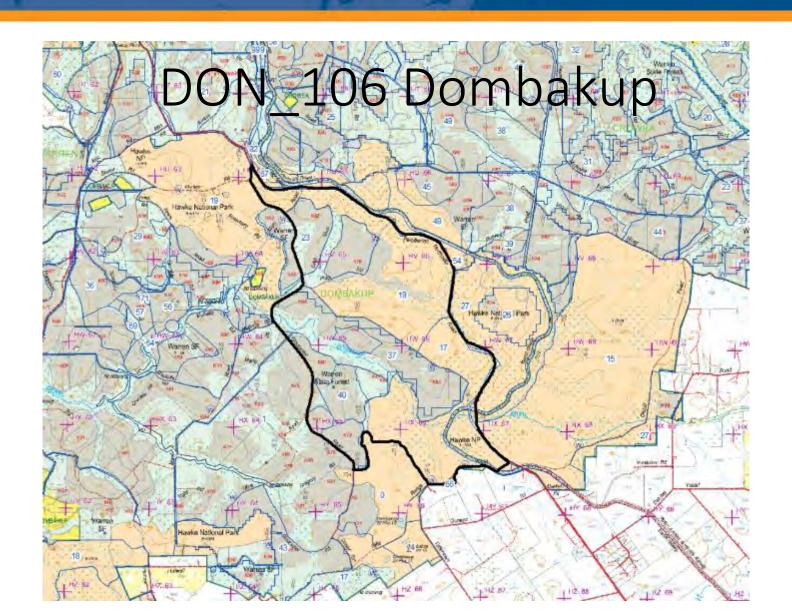






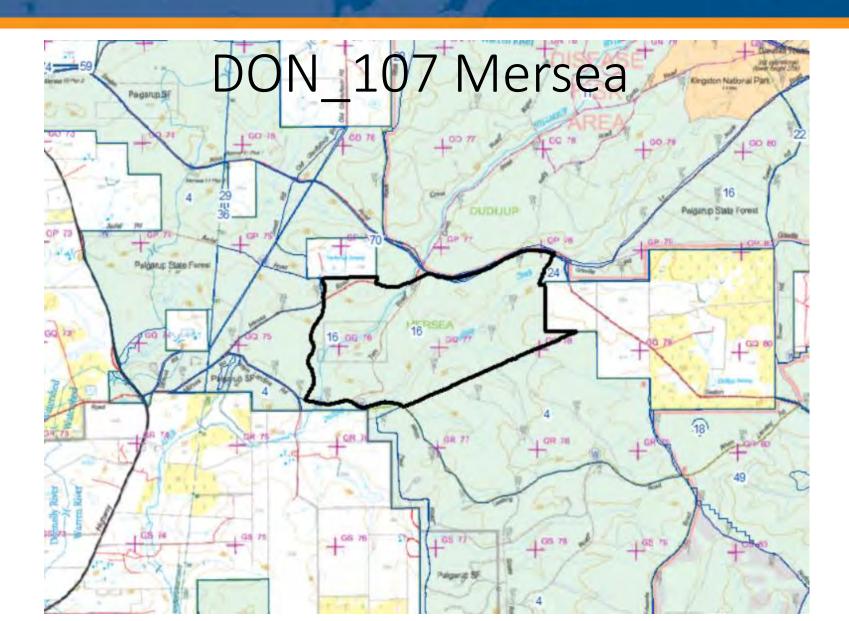






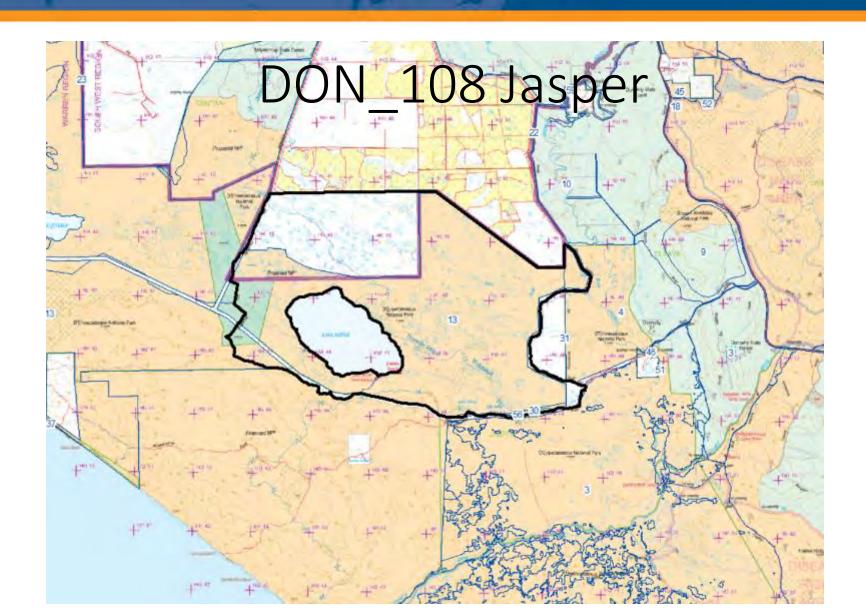




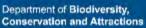






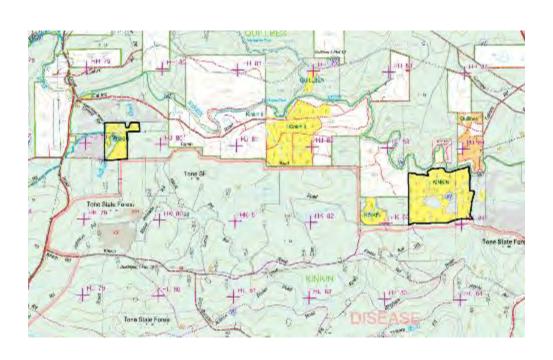


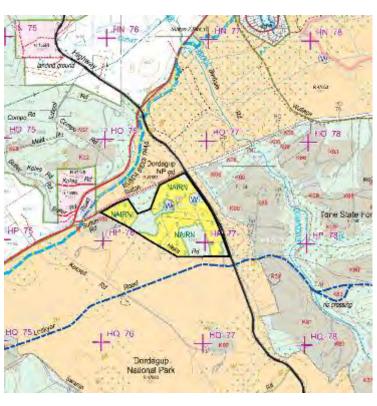






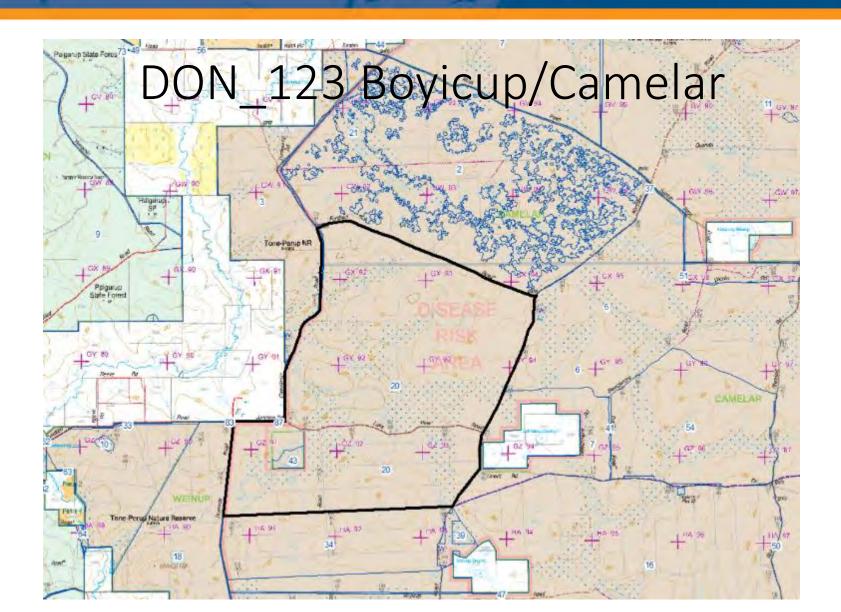
## DON\_109 Kin Kin & DON\_158 Nairn





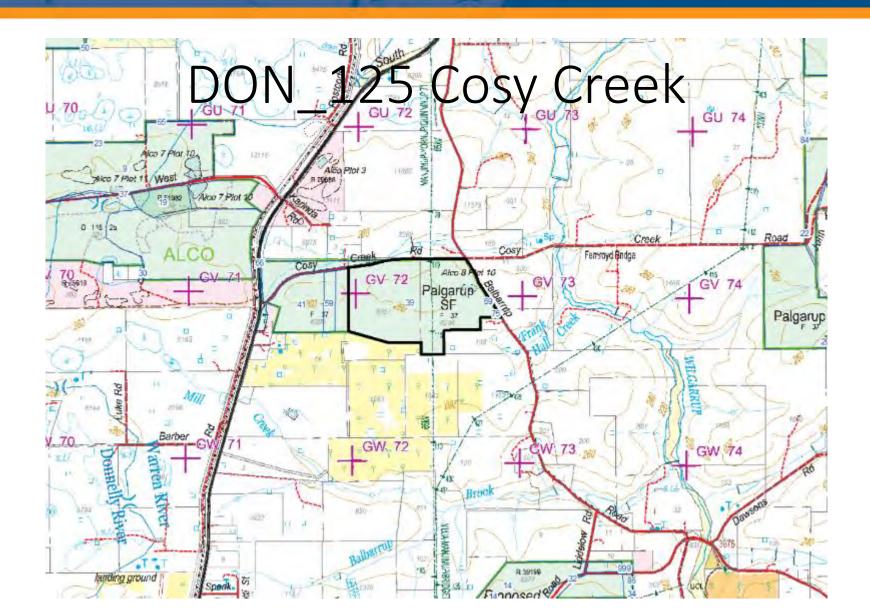






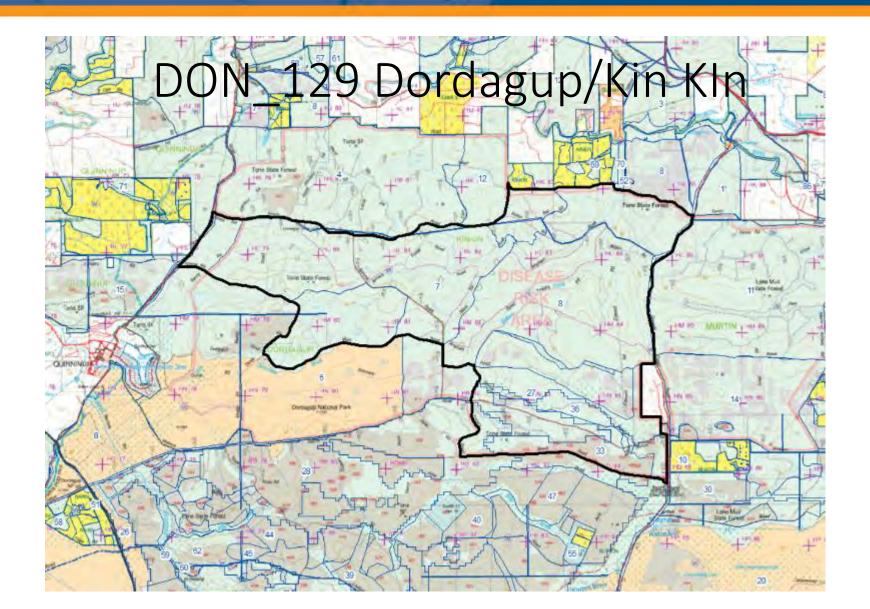






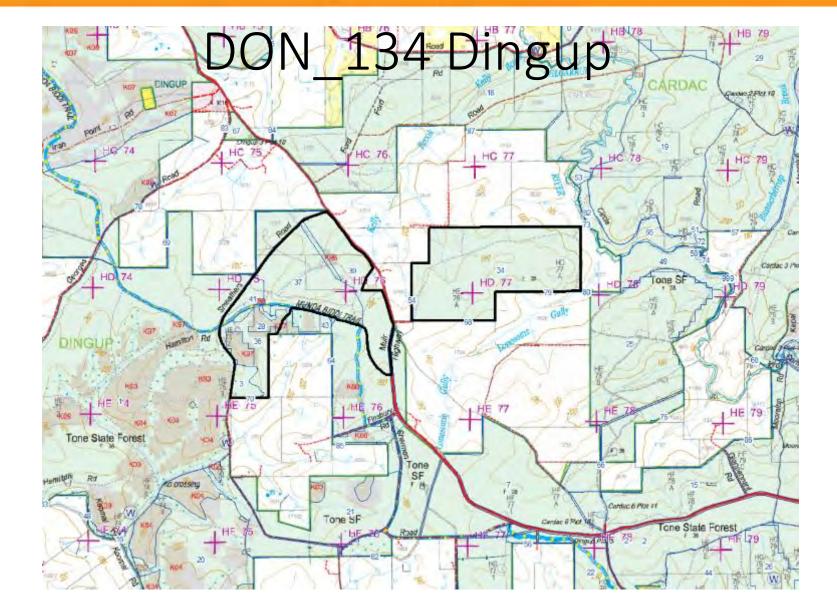






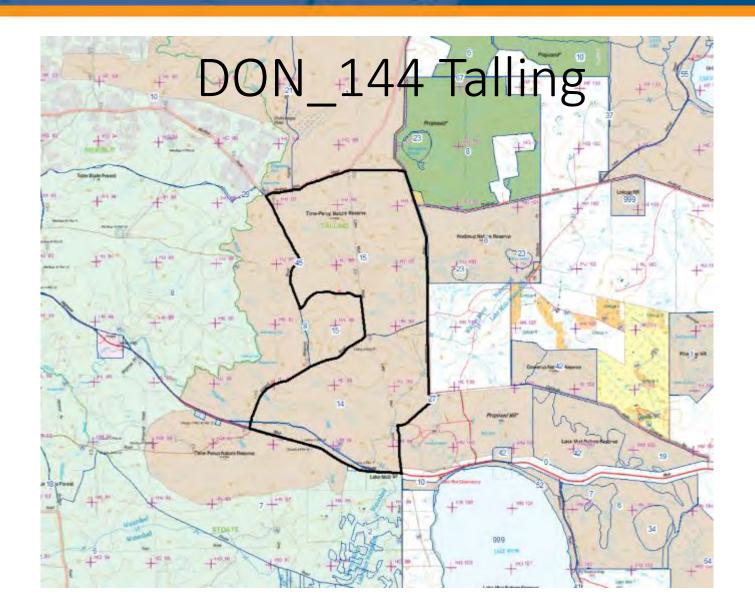






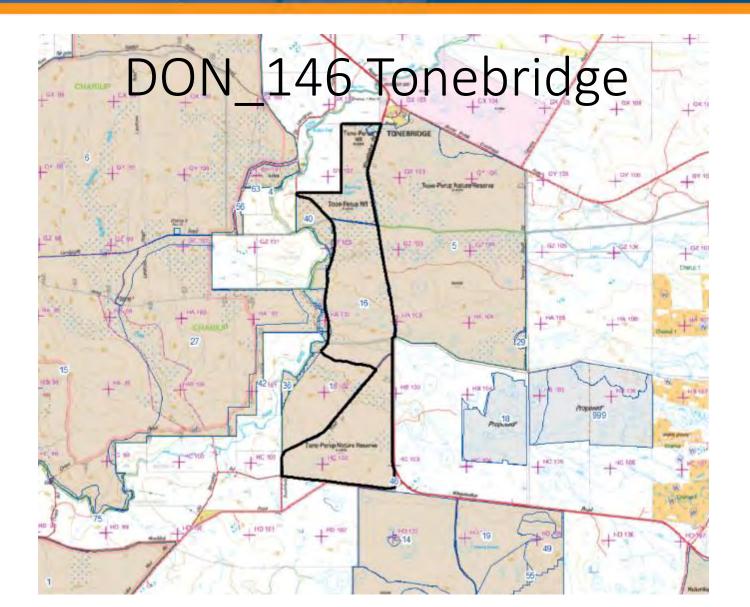






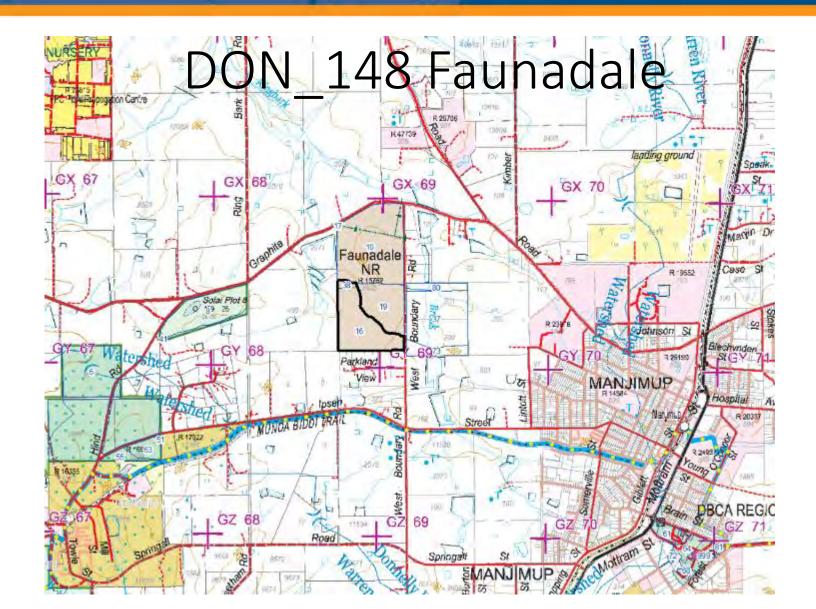






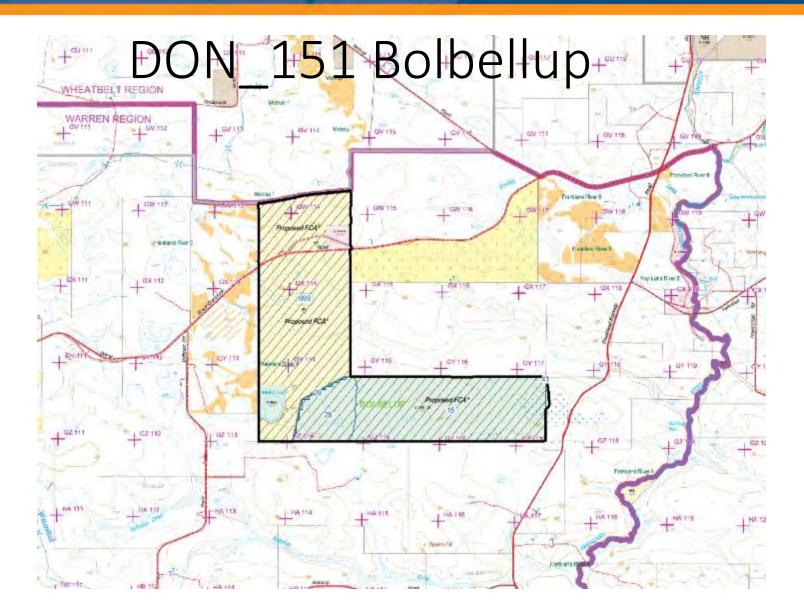




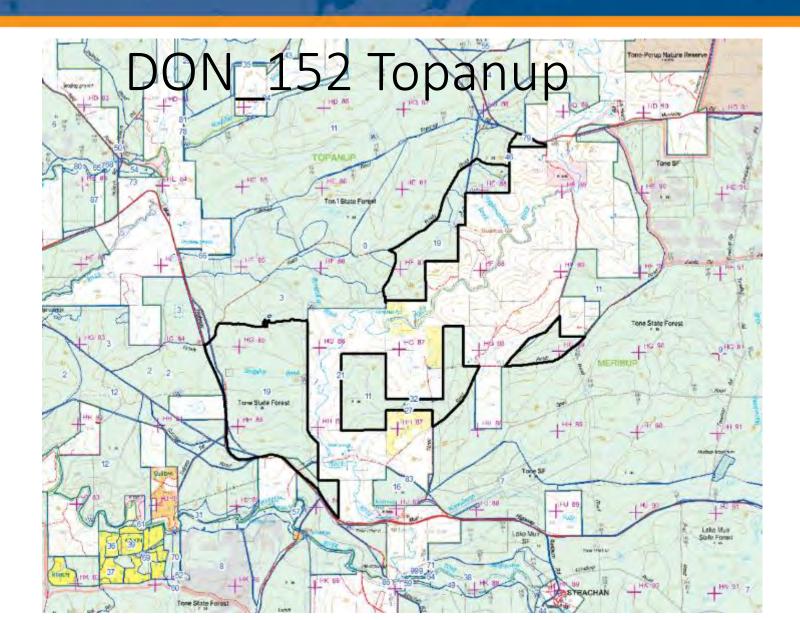


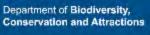




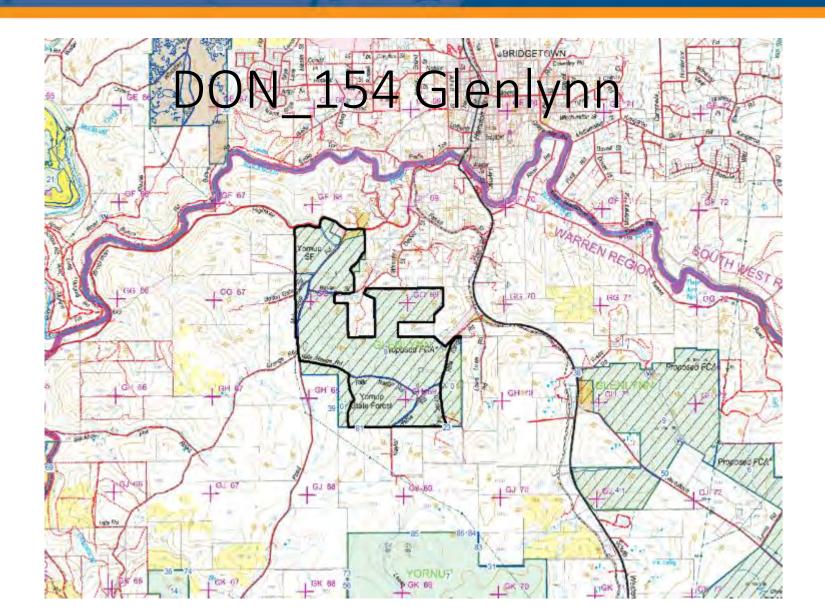


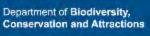




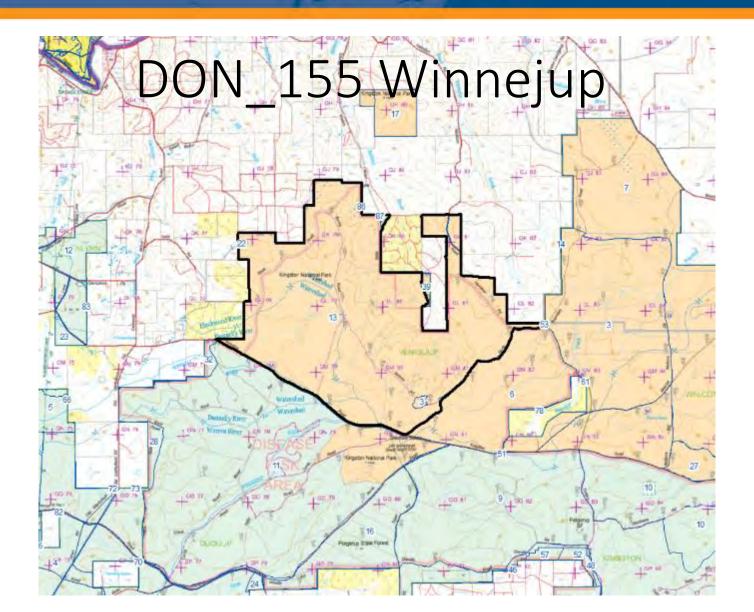








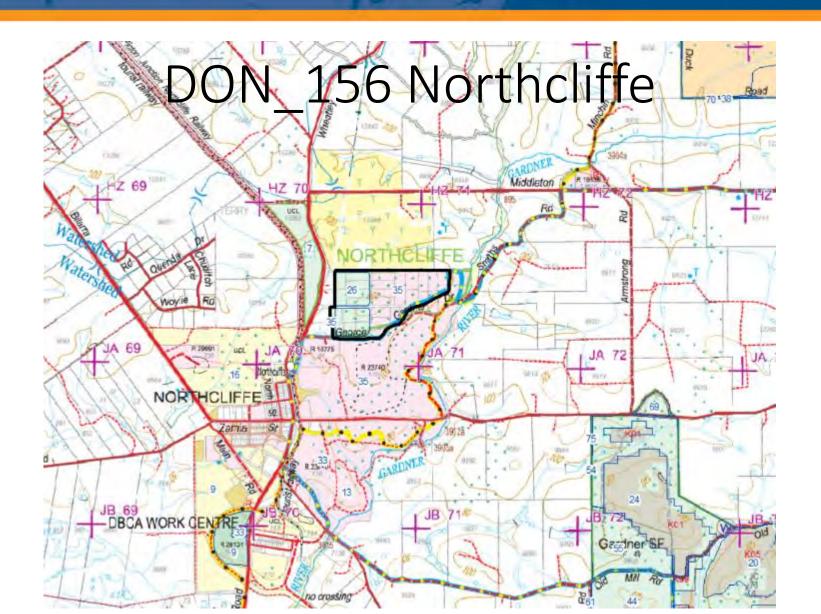






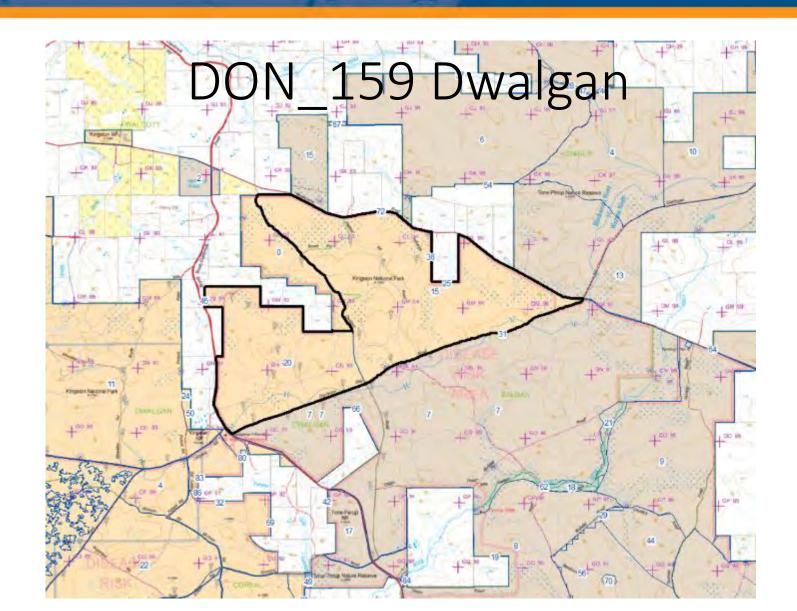






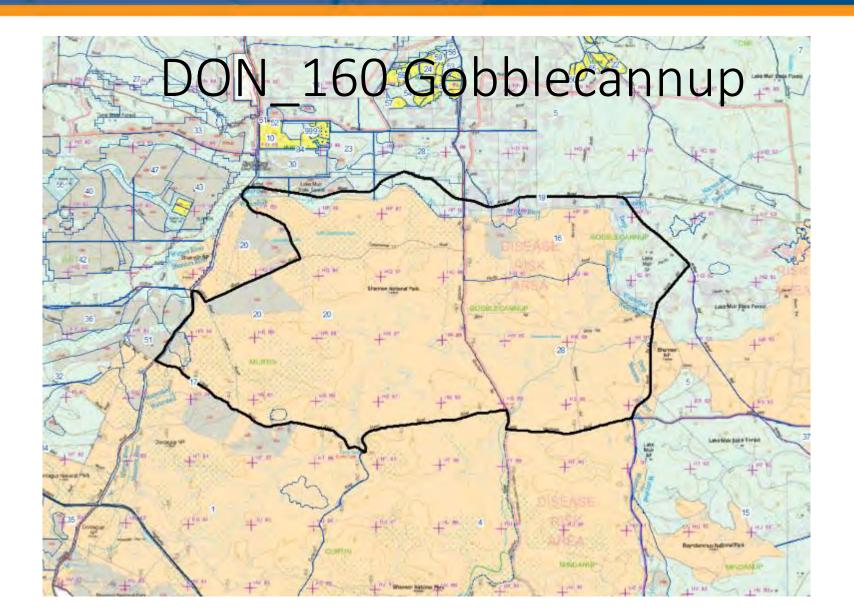








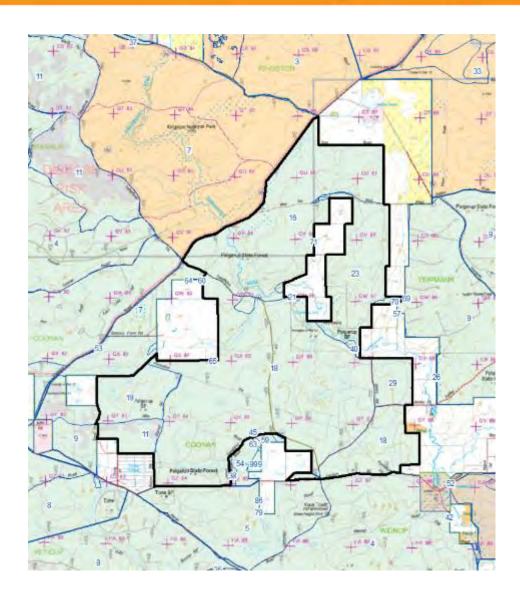








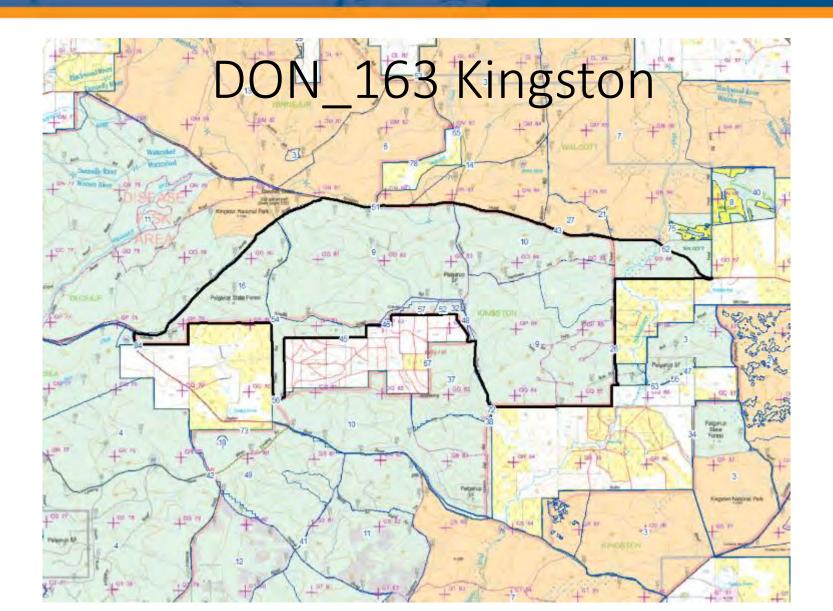


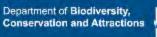


DON\_162 Coonan/ Yerramin

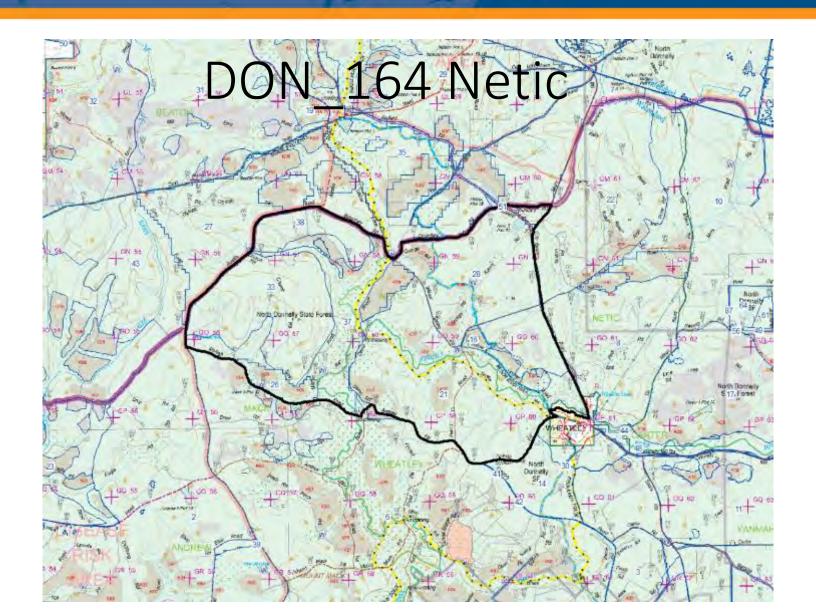


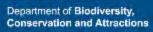




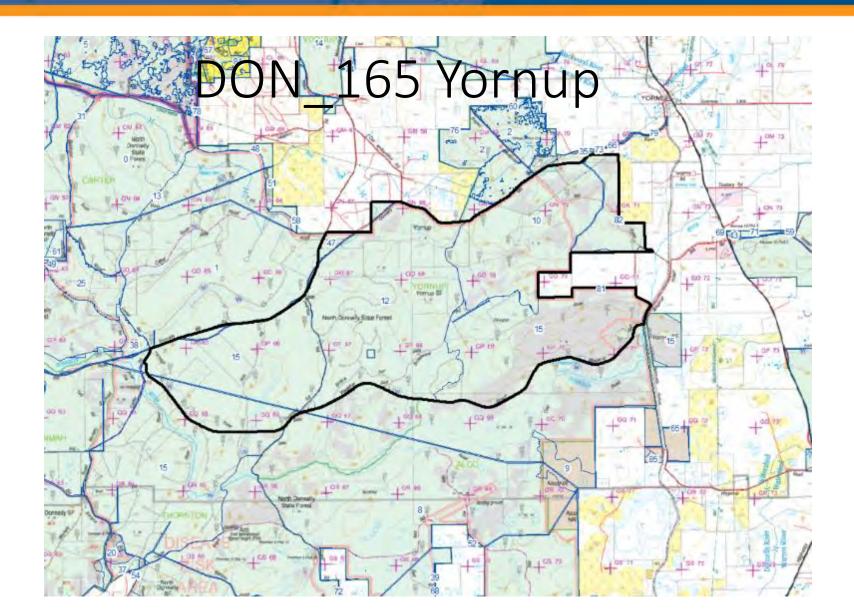






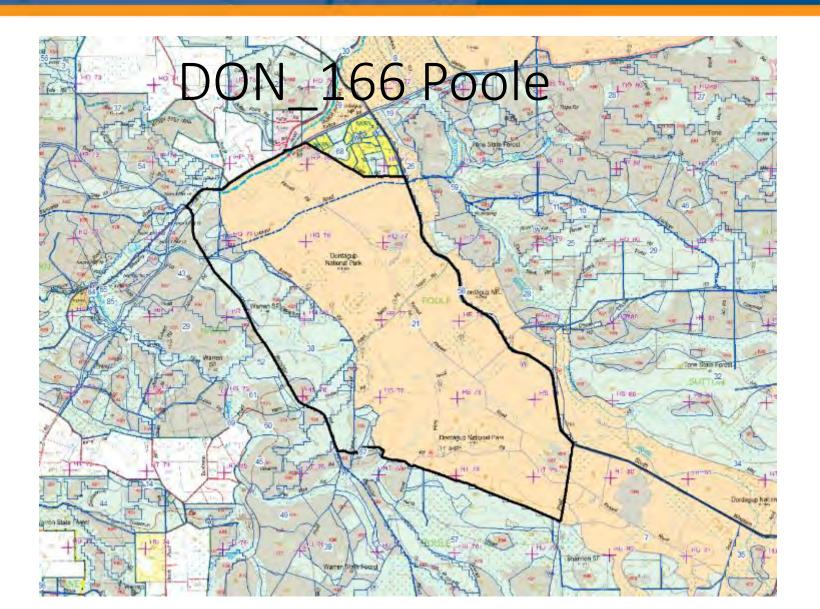




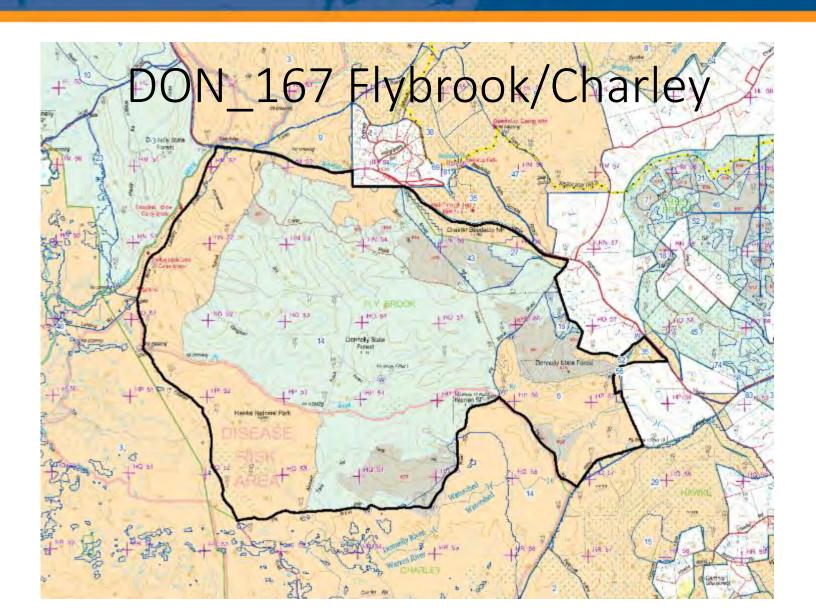










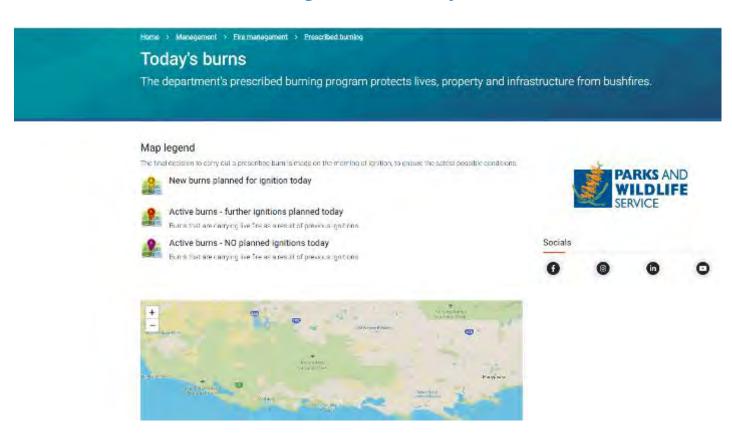






## Parks and Wildlife Service – Burn Information

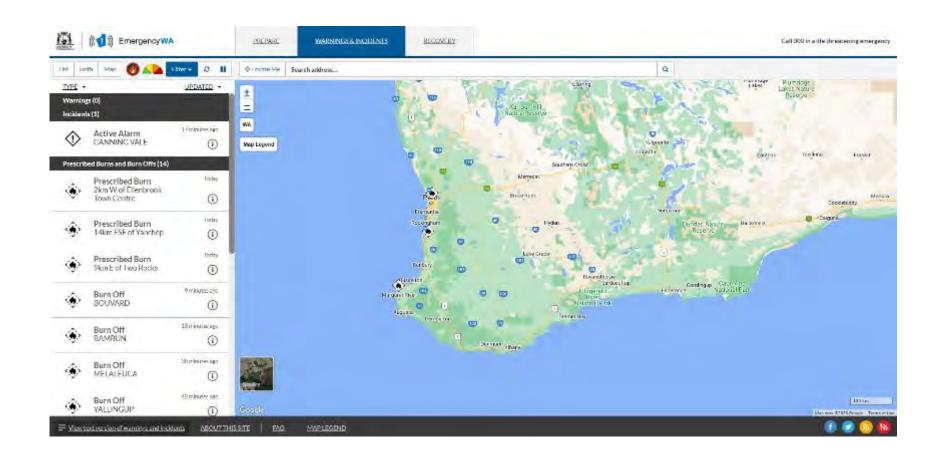
## www.dbca.wa.gov.au/todaysburns







## www.emergency.wa.gov.au



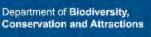


## To find out more...

- DBCA Donnelly District (Pemberton)
- 9776 1207
- donnellyd@dbca.wa.gov.au



Slide 120: Stakeholder presentation – Detection and response Manjimup 10 June 2025





# DBCA's Fire Detection and Rapid Response

2025





# Timely detection and response

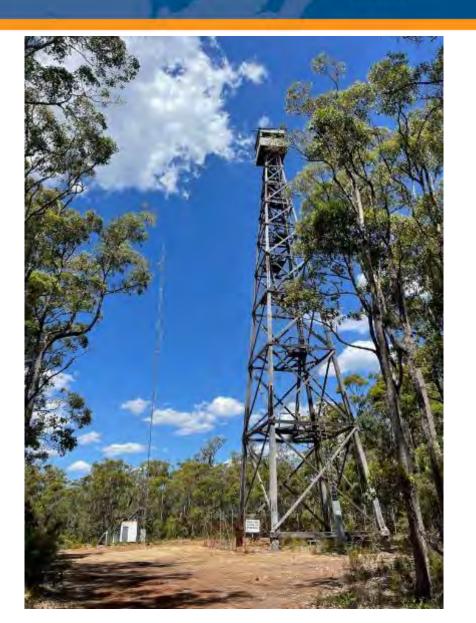
## Science and experience based:

- VESTA 150m fire length required to realise maximum potential ROS.
- >45 minutes = ~double chance of >10ha.
- Multilateral Aggressive Initial Attack increases success likelihood.
- Timely detection is essential.

Slide 122: Stakeholder presentation – Detection and response Manjimup 10 June 2025







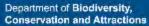
# Slide 123: Stakeholder presentation – Detection and response Manjimup 10 June 2025







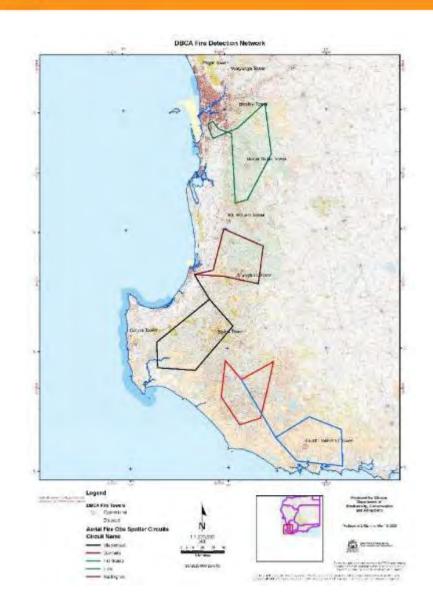
AIRCRA	gement Services FT FACT SHEET Attack and Reconnaissance
	Champion Scout
	99, 30, 40, 40, 40, 40, 40, 40, 40, 40, 40, 4
4	
1	
2	
131	
Aircraft Length	7m
Aircraft Length Wing Span	/m 11m
Wing Span	- 110
To the end of the statement	11m
Wing Span	11m Single, 6 litre 4 cylinder, 180
Wing Span Engine(s)	11m Single, 6 litre 4 cylinder, 180 HP
Wing Span Englne(s) Fuel Type	11m Single, 6 litre 4 cylinder, 180 HP Avgas
Wing Span Englne(s) Fuel Type Fuel Consumption	11m Single, 6 litre 4 cylinder, 180 HP Avgas 33 litres per hour
Wing Span Engine(s) Fuel Type Fuel Consumption Cruise Speed	11m Single, 6 litre 4 cylinder, 180 HP Avgas 33 litres per hour 110 knots 5 hours
Wing Span Engine(s) Fuel Type Fuel Consumption Cruise Speed	11m Single, 6 litre 4 cylinder, 180 HP Avgas 33 litres per hour 110 knots 5 hours High wing light aircraft for fire surveillance, reconnaissance
Wing Span Englne(s) Fuel Type Fuel Consumption Cruise Speed Endurance	11m Single, 6 litre 4 cylinder, 180 HP Avgas 33 litres per hour 110 knots 5 hours High wing light aircraft for fire
Wing Span Englne(s) Fuel Type Fuel Consumption Cruise Speed Endurance	11m Single, 6 litre 4 cylinder, 180 HP Avgas 33 litres per hour 11D knots 5 hours High wing light aircraft for fin
Wing Span  Engline(s)  Fuel Type  Fuel Consumption  Cruise Speed  Endurance  Use  Aircrew	11m Single, 6 litre 4 cylinder, 180 HP Avgas 33 litres per hour 110 knots 5 hours High wing light aircraft for fin surveillance, reconnaissance and air attack Pilot +1 (in tandem)
Wing Span Engline(s) Fuel Type Fuel Consumption Cruise Speed Endurance Use	11m Single, 6 litre 4 cylinder, 180 HP Avgas 33 litres per hour 110 knots 5 hours High wing light aircraft for fire surveillance, reconnaissance and air attack





# Combined fire detection south-west

- 5 spotter circuits
- 9 Detection Towers
- DFES '000' notifications







# Remote sensing

- Satellite detection
- Detection cameras



#### Department of Biodiversity, Conservation and Attractions



# Aggressive Initial Attack

#### FIRE SUPPRESSION

#### 9.1. DESPATCH TABLES

Shows size of time lighting forces and equipment to be despatched for suppression of times in Northern Jamah Southern Forest and Pine fivels. Size depends on time to reach the five and level of fire behaviour.

#### 9.1.1. Northern Jarrah

The Danger Hoto		Time between detection and attack															
	hour					Thaw				† î	your	ia .	Zhours				
	G	HD	WL	BC	G	H	VIL	90	G	HD	en,	BC	G	На	V21	80	
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1 50	2	2	11	H	2	2	T	13	3	2	I	10	3	3	9	0	
51.140	8	2	+	0	3	3	+	T	#	4	T.	03.	4	4	2	13	
14-140	3	3	1	0	33.50	3	2	1	3.	4	1	1	3	8	2	2	
241-400	2	3	7	1	5	5	3.	3	5	6	3	3	ď.	1	4.	1	
A300	2	4	7	2	8	F	3	4	10	11	3	14	å.	8	4	E	

G Gang HD Heavy Doly WL Wheeled Loader BD Buildozer

#### 9.1.2. Southern Forest

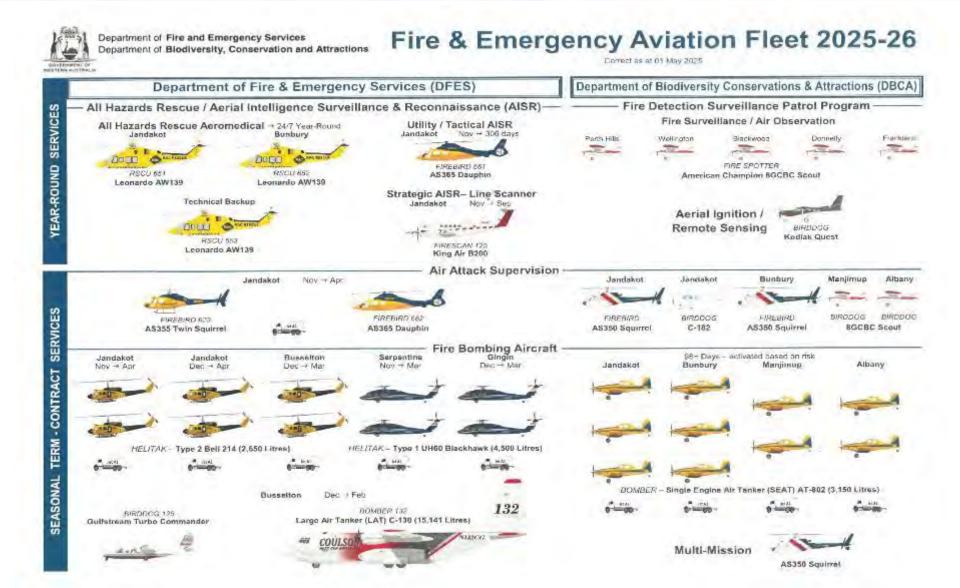
Eije Danger mini		Time between detection and strack														
	Stear				Shoor					151	io Jin	5	2 hours			
	G	HD	WL	CB	G	нэ	w	80	G	HD	WL.	BD	(3	но	w.	GE2
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61-340	n	3	7	1	3	3	3	3	a	à	2	4	5	5	5	16
141-243	2	â	2	+	3	4	2	2	a	- 5	2	4	2000	6	3	5
241-400	4	2	3	2	3	E	2	3	E	9	A.	5	1	7	4	T.
400-	4	4	3	2	6	B	0	2	3	-	2	5	6.	3	4	17

G Gang HD Heavy Duty WI Wheeled Loader 3D Buildozer Slide 127: Stakeholder presentation – Detection and response Manjimup 10 June 2025



Department of Biodiversity, Conservation and Attractions

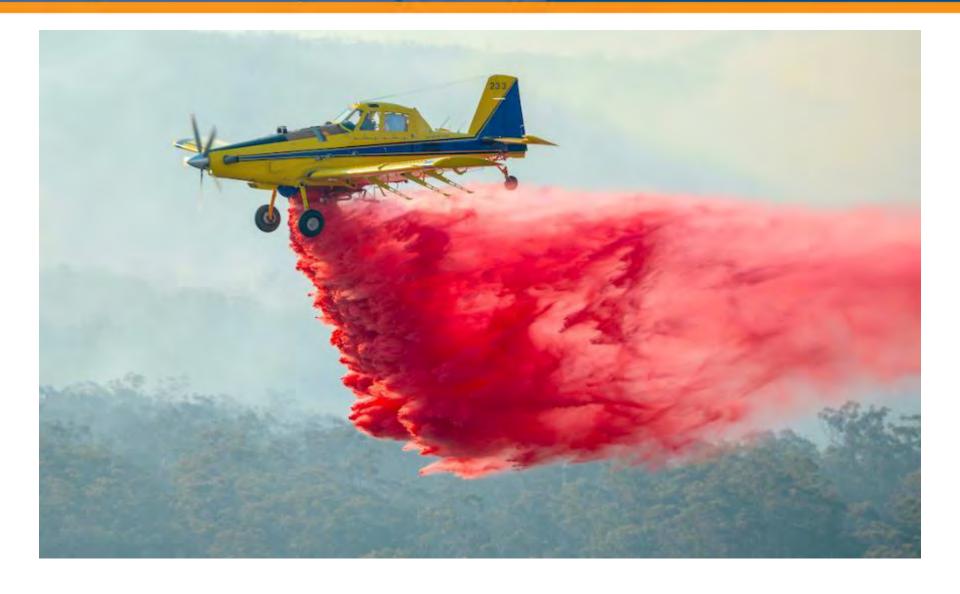




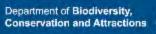
Slide 128: Stakeholder presentation – Detection and response Manjimup 10 June 2025

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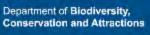
Slide 129: Stakeholder presentation – Detection and response Manjimup 10 June 2025







Slide 130: Stakeholder presentation – Detection and response Manjimup 10 June 2025







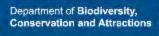
Slide 131: Stakeholder presentation – Detection and response Manjimup 10 June 2025







Slide 132: Stakeholder presentation – Detection and response Manjimup 10 June 2025





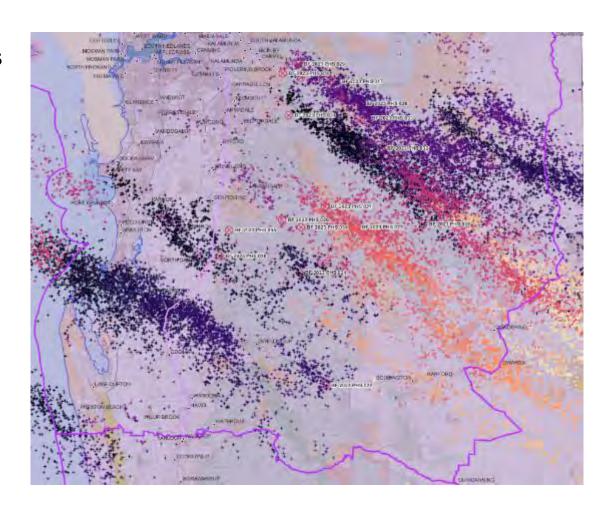


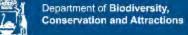




# Lightning strikes 4/11/23

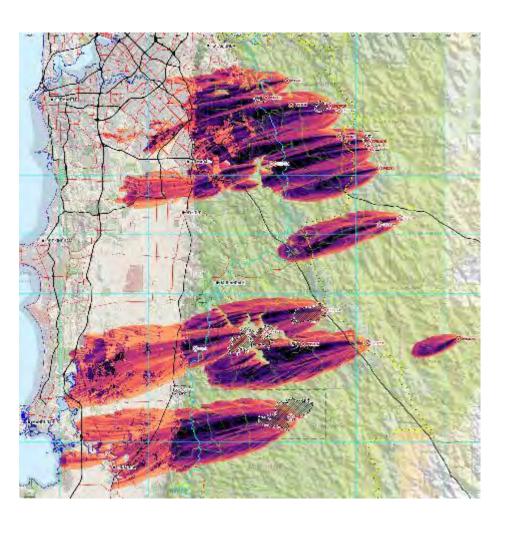
- Hundreds of strikes across Perth Hills in the early hours of Saturday morning
- No significant rainfall
- Elevated Fire Weather Conditions



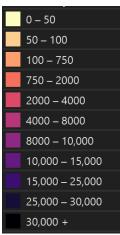




## What if the fuels were older?



- Conservative modelling for 16hrs in 30+yo fuels
- About 165,000ha in 16hrs
- About 56% of fire area above 4000kw/hr
- Does not account for fires merging, Pyro Cb or longrange spotting



Intensity Mapping Simulation







Managing biodiversity in fire management







Fire has been present in the Western Australian landscape for millions of years – since long before the arrival of humans – and it has influenced the evolution of plants and animals.

Since the arrival of the first nations people fire has been used as a tool for managing vegetation and hunting/gathering.

DBCA recognises the importance of the south-west as a global biodiversity hotspot and is committed to protecting and promoting the health of the landscape for future generations.





# Prescribed Burn Options Program planning

- DBCA holds various legislative responsibilities for managing its tenure
- Competing responsibilities often arise, increasing management complexity
- Landscapes can be highly complex with numerous values and specific fire regime requirements
- Districts and Regions must consider all aspects of land management when developing a burn program
- Where conflicting objectives exist, a consultative process is undertaken to align these objectives where possible





# Strategic approach to prescribed burning

Careful planning, consultation, and monitoring to minimis impacts on environmental values and the community.

#### **Key Considerations:**

- Vegetation assessment Identify what to burn and while leave unburnt (mosaic approach)
- Burn characteristics Define desired fire intensity and optimal season
- Fire history Consider history and type of past fire ever across the landscape
- Fuel assessment and analysis Measure fuel quantity arrangement, and moisture content
- Knowledge and tools Determining, monitoring and forecasting the appropriate weather conditions for ignit a burn using specialist knowledge and fire behaviour models and tables
- **Ignition strategy -** Choose the best time of day and igni pattern to complete the burn safely and effectively
- Continuous improvement Apply lessons learned to enhance future operations





# Legislation and Policy – Environmental considerations

Detailed planning is undertaken for each prescribed burn as part of our obligations under the:

- Conservation and Land Management Act 1984
- Biodiversity Conservation Act 2016
- Environment Protection and Biodiversity Conservation Act 1999
- Corporate Policy Statement 19 Fire Management
  - Minimise negative impacts on communities and the natural environment from bushfires on lands managed by the department.
- Corporate Policy State 88 Prescribed Burning
  - Apply prescribed burning activities in the areas where they contribute the most effective mitigation of bushfire risk; and contribute to the management of conservation, biodiversity and Aboriginal cultural heritage values.





# Identifying ecological values within the burn area



To confirm the likelihood of threatened species and ecological community occurrence within the prescribed burn area, DBCA uses various information sources:

- Commonwealth Protected Matters Search Tool – provides baseline data to begin assessment
- DBCA Threatened Species and Ecological Communities Database accurate, up-to-date presence data
- Subject Matter Expert Advice insights from local experienced experts
- Reliable Observations verified local sightings and records
- Surveys targeted field assessments





# Ecological considerations and risk assessment for each prescribed fire plan

#### Risk-assessment:

- Assess the significance of likely impacts on species and ecological communities from prescribed burns
- Consider cumulative impacts on species and ecological communities
- Consider impacts to areas within or adjacent to the burn
- Identify management actions to reduce potential harm

## Key resources used:

- MNES Significant Impact Criteria
- DBCAs Fire Management Information Notes
- Conservation Advice
- Recovery Plans
- Threat Abatement Plans
- Species Profiles and Threats Database (SPRAT)
- Other relevant departmental, state, and federal publications





# Implementing key measures to protect biodiversity values



#### **Key Measures:**

- Clearly define mitigation activities / management actions and avoidance strategies
  - Pre-burn raking around trees, use of foam or retardant
  - Day of burn burn exclusion areas, careful ignition strategies to manage fire behaviour
  - Post burn monitor and review post burn recovery

#### Implementation:

- Communicated to operational staff during briefings
- Actively applied during on-ground fire management operations
- Contingency plans



# Pre-burn monitoring

Informs safe, effective and ecologically responsible prescribed burns:

- Surveys in known threatened species occurrence areas
  - Confirm presence and inform protection measures
- Monitoring of organic soil/peat systems
  - Ensure adequate saturation to prevent extensive substrate loss
- Assessing profile soil moisture and leaf litter moisture content
  - Verify conditions are suitable for ignition prior to prescribed burn implementation





# Day of burn actions: minimising biodiversity impacts



Implement the prescribed burn with precision and care to ensure biodiversity values are protected.



Apply planned mitigation measures – based on preburn assessments and ecological priorities



Control ignition patterns and timing



Ensure all staff are briefed and understand biodiversity protection management actions



Document actions and observations.





# Post burn monitoring and adaptive management

## Post-burn monitoring:

- Evaluates burn success criteria
- Informs and refines future burn operations

## Adaptive management approach:

- Adjust fire regimes and burning strategies as needed
  - Respond to changing climatic conditions
- Apply lessons learned
  - Use past experience to refine future strategies
- Use monitoring outcomes
  - Guide continuous improvement through evidence-based decisions

Slide 146: Stakeholder presentation – Managing biodiversity Manjimup 10 June 2025







Observations from the Warren Region





## Quokka Setonix brachyurus

#### Legislation:

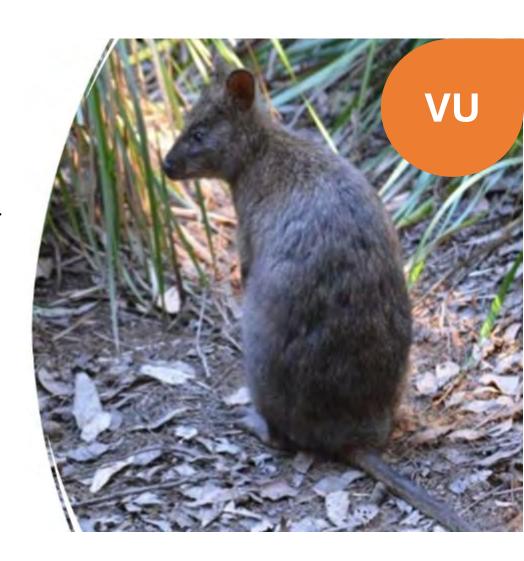
Listed as vulnerable (VU) under BC Act & EPBC Act.

#### Management directed by:

FMIN, current research and Interim Recovery Plan

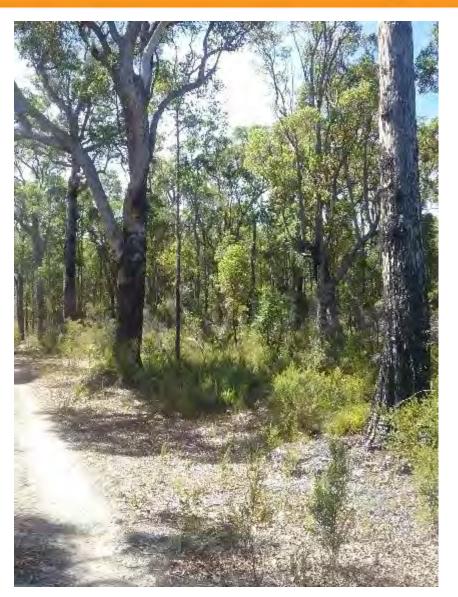
#### Pre and post burn/bushfire monitoring:

- Remote sensor camera monitoring for restricted habitat areas (Northern Jarrah).
- Landscape monitoring for contiguous habitat & distribution (e.g. scat counts).









# Pre & post-monitoring at Charlie Forest Block

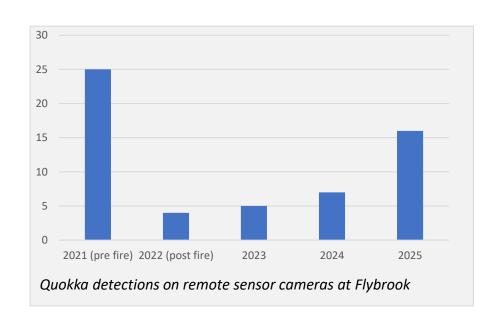
- In March 2022, lightning started a fire (known as Fire 18 Flybrook) that burnt approximately 16,600 ha
- The fire included a large area of what was known to be active quokka habitat and concerns were raised by staff regarding the impact on the species due to the fire intensity
- Fire 18 happened to include a Western
   Shield camera monitoring transect where
   we had pre burn data on a number of
   species, including quokka





## Pre and post-monitoring at Charlie cont...

- Post fire there was a marked decrease in quokka on the cameras
- During the 2023 burn options meeting, the data was used to inform the decision to defer planned burns in the adjacent area with an aim of preserving viable habitat during the vegetation recovery period in the Flybrook Fire scar (e.g. DON 109 Jasper). Fox baiting and feral pig control were also employed to assist in native fauna recovery
- Recent data has shown an increase in quokka numbers which has contributed to the decision to include part of the eastern section of Fly Brook forest block (not burnt in the 2022 fire) in the 25/26 burn program









## Western Ringtail Possum, Ngwayir

Pseudocheirus occidentalis

#### Legislation:

Listed as critically endangered (CR) under BC Act & EPBC Act.

#### Management directed by:

FMIN, current research and expert advice and Interim Recovery Plan

#### Pre and post burn/bushfire monitoring:

- Remote sensor camera monitoring as part of other threatened fauna projects
- Ongoing spotlighting surveys







# Threatened orchids at Tordit-Gurrup Lagoon

- Extensive area burnt in recent bushfire (2023)
- Burnt through populations of threatened orchids:
   Caladenia christineae (EN)
   Caladenia harringtoniae (VU)
   Diuris drummondii (EN)
- Timing of the fire (late December) likely outside of the dehiscence period (seed dispersal)
- Fencing planned to protect population against grazing pressures
- Population re-surveyed in 2024 and found significant number of plants, extending the populations





# Threatened mammal responses to burning

- Project to gain further knowledge on the impacts of fire of key threatened species (e.g. numbat, western ringtail possum, chuditch & woylie) & 2 feral species (foxes & cats)
- Collecting data before and after prescribed burning in the Upper Warren area over the next 6-7 years, using remote sensor camera, trapping arrays & spotlight survey
- To inform prescribed burning strategies and predator management
- Commenced this autumn with Dwalgan treatment area (DON\_159)







## BCS Fire Science Program



Manjimup and Walpole community information forum June 2025

## **Program lead**

Ben Miller: plant ecology, fire regimes

+ 6 Scientists (Manjimup and Kings Park)

plant ecology, fire behaviour, fuels, fauna ecology, fire regimes, fire severity, mosaics, FMP, fire severity/fire regimes and Pilbara projects

- + 6-10 Technical officers
- + 3-5 PhD students



#### Department of Biodiversity, Conservation and Attractions



## ~45 peer reviewed papers published 2024 + 2025 to date. Including:

- Brace et al. (2025) Herbicide, not prescribed burning, drives larger shifts in soil fungal communities in a Mediterranean-type urban woodland. Urban Forestry & Urban Greening
- 2. Garcia-Carmona et al. (2025) Pyrogenic carbon production in eucalypt forests. *Forest Ecology and Management (FEM)*
- 3. Gibson et al (2025) Remotely sensed fire heterogeneity and biomass recovery predicts empirical biodiversity responses. *Global Ecology and Biogeography*
- 4. Hollis et al. (2025) An efficient and comprehensive field protocol for assessing fuel characteristics for fire behaviour modelling in Australian open forests. *MethodsX*
- 5. Miller et al. (2025) Using patterns of post-fire plant reproduction to inform minimum fire intervals for conservation management in a fire-prone woodland. *Austral Ecology*
- 6. Sano et al. (2025) Extreme fire severity interacts with seed traits to moderate post-fire species. *American Journal of Botany*
- 7. Tangney et al. (2025) Defining the pyro-thermal niche: Do seed traits, ecosystem type and phylogeny influence thermal thresholds in seeds with physical dormancy? *New Phytologist*
- 8. Brace et al. (2024) Short-term soil fungal community dynamics following fire in mediterranean climate-type banksia woodlands. *Soil Biology and Biochemistry*
- 9. Davis and Craig (2024) Long-term post-fire succession of reptiles in an urban remnant in south-western Australia. *Int J Wildland Fire (IJWF)*

- 10. Doherty et al. (2024) Multi-year responses of reptiles to prescribed burning in a eucalypt forest ecosystem. *Austral Ecology*
- 11. Doherty et al. (2024) Shifting fire regimes cause continent-wide transformation of threatened species habitat. *PNAS*
- 12. Hollis et al. (2024) A framework for defining fire danger to support fire management operations in Australia. *IJWF*
- 13. Hollis et al. (2024) Introduction to the Australian Fire Danger Rating System. *IJWF*
- 14. Kenny et al. (2024) Australian Fire Danger Rating System: implementing fire behaviour calculations. *IJWF*
- 15. Miller et al. (2024) Plant life history data as evidence of an historical mixed-severity fire regime in Banksia woodlands. *Australian J of Botany*
- 16. Miller et al. (2024) Comment on 'Self-thinning forest understoreys reduce wildfire risk, even in a warming climate'. *Environmental Research Letters*
- 17. Nolan et al. (2024) Incorporating burn heterogeneity with fuel load estimates may improve fire behaviour predictions. *IJWF*
- 18. Overton et al. (2024) Some like it hot: Seed thermal threshold variation in obligate seeding *Acacia pulchella*. *Science of the Total Environment*
- 19. Radford et al. (2024) Prescribed burning beneficial or neutral for native herbaceous vegetation in an invader dominated, commercially grazed savanna. *Austral Ecology*
- Woolley et al. (2024) Nestbox use indicates declining arboreal mammals in an Australian savanna may be limited by tree hollow availability. FEM







## Understanding fuel dynamics

- Improving field assessment methods for fuel characterisation
- Improving Jarrah forest fuel accumulation models, accounting for time since fire, fire severity and forest type
- Developing Lidar/satellite/point cloud methods for assessment of fuel characteristics
- Assessing drivers of woody fuel consumption:
  - for fire intensity, habitat, carbon accounting,
     smoke production and emissions

An efficient and comprehensive field protocol for assessing fuel characteristics for fire behaviour modelling in Australian open forests \*\*,\*\*\*

Jennifer J. Hollis <sup>5,5</sup>, Miguel G. Cruz <sup>b</sup>, W. Lachlan McCaw <sup>c,d</sup>, James S. Gould <sup>b</sup>, Stephanie Λ. Samson <sup>a</sup>

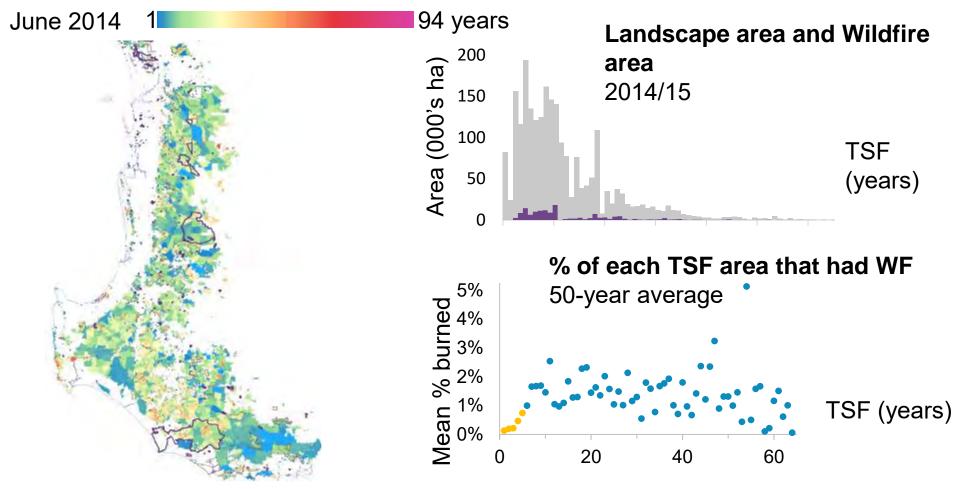






Assessing the effectiveness of prescribed burning in reducing wildfire risk

## Landscape TSF distribution (time since fire)









## Effectiveness of burning in reducing wildfire risk

#### **DBCA Fuel Management Zones**

Dry and Wet Eucalyptus forests:

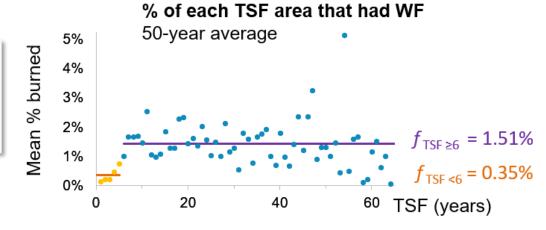
Landscape Risk Reduction FMZ 45% of area <6 y

Settlement Hazard Separation FMZ 60% of area <6 y

flammability

area-weighted mean annual wildfire likelihood

Wildfire extent (or likelihood) is 2-10 (average = 4.5) times lower in fuels <6 years. FMZ targets are effective in reducing wildfire extent







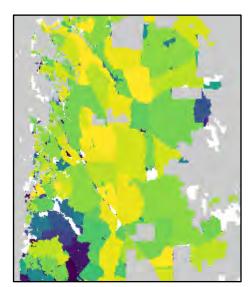


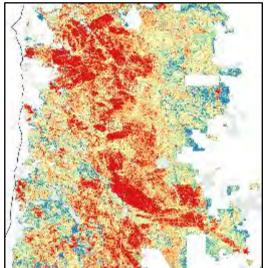
## Understanding fire regimes

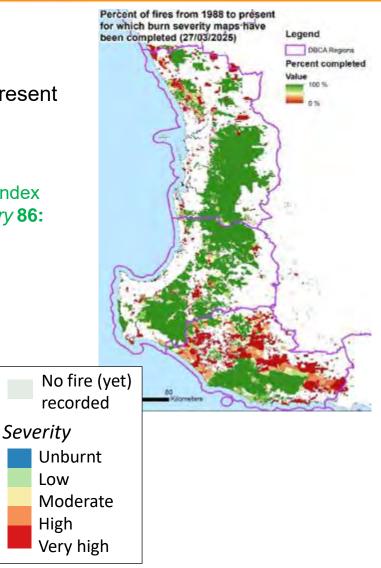
Improving current and past fire/fire regime data 1988-present

- Fire severity / history mapping SW forests.
- ~1000 field assessments to correlate with dNBR

Methods by Densmore *et al.* (2023) OzCBI: the composite burn index adapted to assess fire severity and fauna habitat... *Aust. Forestry* **86**: 1-21





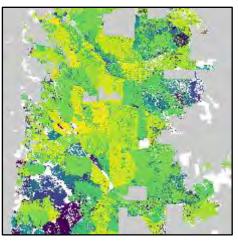


TSF - old mapping

Fire severity - Max observed since 1988







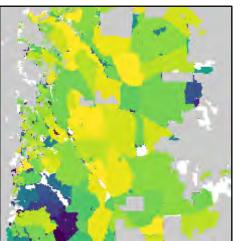
0 1 2 3 4 5 6 7

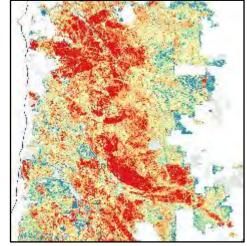
Fire frequency

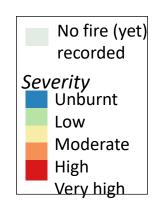
Improved:

- Resolution
- Accuracy
- Information
  - Severity
  - Date
  - Patchiness

TSF – updated data







TSF – old mapping

Fire severity - Max observed

Percent of fires from 1988 to present for which burn severity maps have Legend DEICA Regions Percent completed



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## Understanding effects of varying fire regime

- Long term study: season + interval (Burrows et al 2019)
  - running since 1986, 1987
  - 2 sites in southern Jarrah forests
  - 7 treatment blocks:
     2 season × 3 interval treatments, + fire exclusion
  - Assessing fuels, vegetation structure, plant community composition
- Intensive survey: season + severity (Tangney et al in prep)
  - Assessing understorey seedling recruitment
  - Comparing spring and autumn fire and high, moderate and low severity effects
  - over 3 years after 11 fires in 330 plots

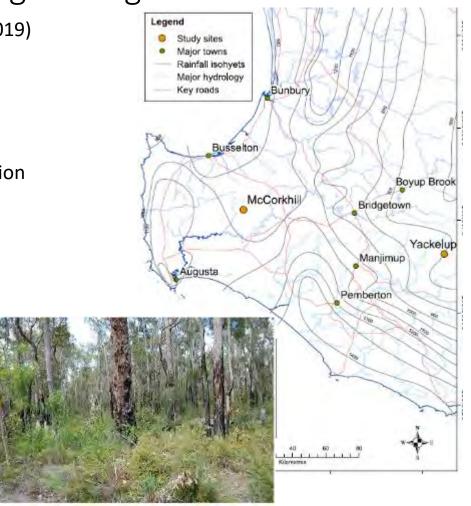


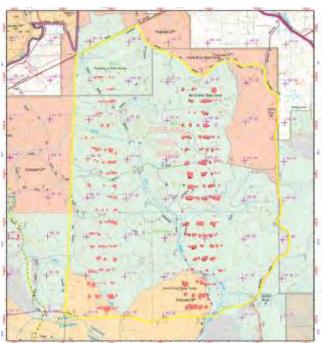
Fig. 2 Frequent spring fire treatment (1.79 fires per decade). In high-rainfall McCorkhill forest, Western Australia, Photo taken December 2018, five years after last fire. Photo by Neil Burrows.





## Testing alternate approaches: fine grained mosaic







Fuel monitoring

Fire behaviour, mosaic outcomes

Fauna and vegetation responses



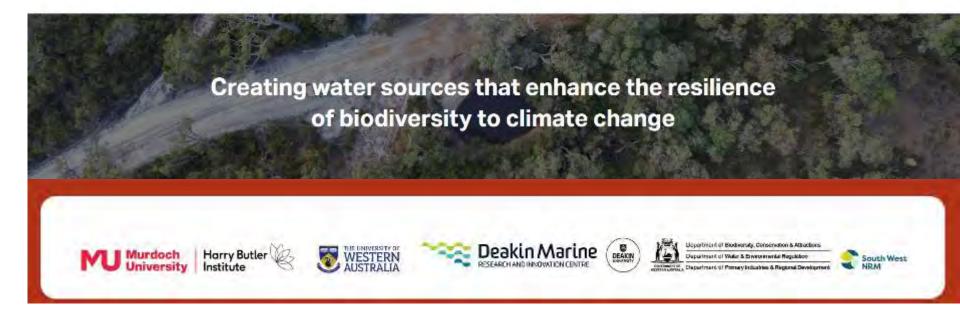




## Testing alternate approaches: waterpoint management. Collaborations

## **Fire Water Points**

About Collaborators Contact





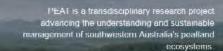
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Protecting Peatland Ecosystems and Addressing Threats in

Southwestern Australia



The project is guided, co-designed, and delivered in partnership with Accelerate Elders, scientists, lend managers, museums, government hodes, and local communities.



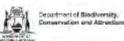
















## Understanding sensitivity of peat and heathland ecosystems

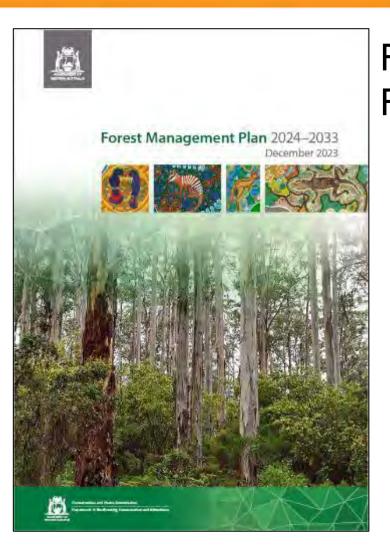


- PFAT collaboration
  - Assessing peat vulnerability to combustion
  - PhD project on fire regime effects on plant community composition, population dynamics of key species
  - Developing fire severity algorithm to support mapping
- On-ground heath severity survey to calibrate remotesensed mapping









## Forest Management Plan 2024-33 Fire Research Collaboration

a scientific research program into prescribed burning, with the aim of investigating the measured impacts on forest ecosystems and biodiversity from fire management strategies and bushfires, to be carried out for the 10-year life of the FMP, without compromising the broader responsibility of prescribed burning.

- design and implementation of the research and review of the results should involve DBCA scientists and experts in the field, including those in the various research institutions in WA.
- provide advice to the Minister, CPC and DBCA.
- enable decisions regarding current practices to identify adjustments to protect vulnerable aspects of biodiversity





## Forest Management Plan 2024-33 Fire Research Collaboration

- Funded July 2024
- Workshop, + pre-& post-workshop surveys: to identify research needs,
  - ~90 invites, 60 attended / responded
  - 21 organisations: all 5 WA universities, CSIRO, WA museum, BirdLife, DBCA, Leeuwin group, SW NRM, unaffiliated experts, etc.
  - $\rightarrow$  58 questions prioritised top 12  $\rightarrow$
- 2, 4-year, phase-1 agreements
  - Murdoch: Flora+
  - ECU: Fauna+
- · Developing implementation plans

## Slide 167: Stakeholder presentation – Fire Science Program Manjimup 10 June 2025







## Forest Management Plan 2024-33 Fire Research Collaboration

### Top 12 research questions

#### Theme

lFauna

Traits, mechanisms

Flora

Other

- 1 What are the population dynamics of <u>threatened fauna</u> in relation to **time since fire**, does this depend on **fire severity**?
- 2 What are suitable fire intervals for vulnerable ecosystems?
- How are <u>plant and ecosystem</u> responses to varying **fire interval or season** influenced by the timing and severity of **climate events**?
- 4 Which ecosystems are most vulnerable to fire?
- What attributes render <u>ecosystems</u> most vulnerable to effects of **varying fire** regime elements (season, severity, interval)?
- 6 Where do species occur that are vulnerable to varying fire regime elements?
- 7 How will **climate change** contribute to change in **fire regimes** across ecosystems?
- **8** What is the effect of varying **fire severity** on key <u>habitat attributes</u> (logs, hollows and other resources provided by large trees?
- **9** How do **spatial fire mosaic** attributes of varying habitat successional age patches influence fauna dispersal, recolonisation, and use
- **10** How are <u>fauna</u> **responses to fire** influenced by the timing and severity of climate-stress events (drought, heatwaves, die-off)?
- 11 Can we use **fire management** to mitigate drying of <u>mesic refugia</u>, <u>peats</u>, <u>riparian vegetation and permanent pools</u>?
- **12** Do fire **interval-severity/ patchiness trade-offs** mitigate short interval effects at population level for <u>interval-sensitive flora</u>?



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#### Fauna research

#### Review

Synthesis of the effects of fire on WA threatened fauna

- Input from 25 fire and fauna experts: 4 universities, 2 museums, DBCA, DPIRD, CSIRO
- · Birds, invertebrates, mammals, reptiles, frogs, fish
- ~170 fire response studies and observations summarised in a database

#### Field experiments

Effects of prescribed burns on threatened mammal populations and habitats

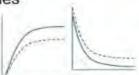
- Camera trapping and spotlighting in southern jarrah forest (E of Manjimup)
- Multi-year experiment
- · Numbat, chuditch, woylie, ringtail possum and many other species
- ECU Masters: pre- and post-burn surveys of hollow logs

### Data modelling

Mammal relationships with time since fire and fire severity

- 35 years of monitoring data in Donnelly District: >1 M detection events, >10 species
- Statistical modelling to determine how species occurrence changes with time since fire (0-55 years) and fire severity (low/high)









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#### Flora research

#### Review of fire regimes impacting threatened species populations

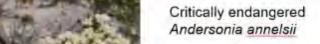
- Review and collate threatened species traits
- Document fire regime since the 1980's.
- Assess plant traits & regime attributes posing the most risk, including absence of fire

#### Peat soil moisture and seasonal flammability

- Assess moisture dynamics with time since fire over seasonal cycles.
- Support prediction of peatland vulnerability by correlating in-situ soil moisture and seasonal weather data.

#### Orchid phenology and seasonal vulnerability to fire impacts

- Track Caladenia erythrochila phenology through flowering and tuber development, accompanied by long-term microclimatic monitoring.
- Identify environmental triggers of tuber development to predict orchid vulnerability to fire.





Caladenia erythrochila (P2) Blood orchid