



DFES  
Department of Fire & Emergency Services

FOR A SAFER STATE

# Fuel Management Activities in Western Australia

Summary of 2020–2021





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Photo left: The result of a cool burn in jarrah forest

Cover photo: Crews lighting a planned burn in the Perth Hills



# Message from the Executive Director Rural Fire Division

I am pleased to present the 2020-21 annual summary of activities undertaken to manage bushfire risk across Western Australia. It was a busy year for our emergency responders, with several major incidents sadly resulting in significant damage to people's livelihoods, property, and the environment. However, as can be seen in this report, it was also a busy year for people working to prevent bushfires, with a huge amount of fuel management and other prevention activities being completed by a wide range of organisations.

The Office of Bushfire Risk Management has reported annually on the State's bushfire risk since its inception in 2012. Over that time, the report has grown from an internal memo describing the number of burns undertaken in each local government area, to the more comprehensive discussion of fuel management you are reading today. It has also evolved to include a broader spectrum of fuel managers across the State, with many State Government agencies and private land management organisations now joining local governments in contributing information.

The diversity of contributors to this report reflects the shared responsibility for managing bushfire risk in WA. Federal and State Government agencies, local governments, private organisations and individual landholders all have important roles to play in keeping us safe from bushfires.

**Together, we all contribute to ensuring that fuel is managed to reduce the potential intensity of bushfires, communities are resilient to fire's impacts, and responders can react quickly and effectively when fires are reported.**

Although the Department of Fire and Emergency Services (DFES) plays an important role in this, it is only through the combined efforts of the entire community that we can effectively manage bushfire risk.

I am pleased to see the report again shows that collaboration is a priority when managing bushfire risk in WA. It shows stakeholders work together well, but many people have a desire to collaborate even further. Facilitating this collaboration continues to be a major focus for DFES. Within the DFES Rural Fire Division, our Bushfire Centre of Excellence is driving collaboration across WA, and supporting our communities to better understand and manage their bushfire risk. During 2021, we held our inaugural Bushfire Community Day, welcoming the public to the state-of-the-art Nambeelup facility to learn how to prepare their households and communities for the bushfire season ahead.

DFES also supports fuel management through the Mitigation Activity Fund Grants Program. In 2020-21, this program provided \$4.7 million to 31 local governments with Bushfire Risk Management Plans (BRMP) to complete more than 950 bushfire prevention activities.

Thank you to everyone that contributed information to this report and for your commitment to managing bushfire risk.

## Murray Carter

Executive Director Rural Fire Division  
Department of Fire and Emergency Services



**In 2020-21,  
83 organisations  
reported on their  
fuel management  
programs.  
Together, they  
completed:**

**659 planned  
burns totalling  
5.14 million  
hectares**



**33,200 hectares  
and 56,300  
kilometres of  
other fuel  
management  
activities.**

# Introduction

Western Australia saw the devastating potential of bushfire in early February 2021 when a fire that started near Wooroloo tore through more than 10,000 hectares of the Perth Hills, destroying 86 properties. That was the year's highest profile bushfire but there were many others throughout a busy season, including numerous large fires in the State's north that threatened people, infrastructure and the natural environment.

The large size and varied climate of Western Australia means bushfires can occur somewhere in the State at any time of year. Minimising the size and impact of these fires requires a coordinated effort from the whole community. Federal and State Government agencies, local governments, Traditional Owners, private organisations and individual landholders all have important roles to play.

While responding to bushfires will always be part of our management strategy, preventing bushfires is by far the most efficient and effective way to minimise the harm they cause. In a State with vast areas of natural vegetation, fuel management plays a crucial role in bushfire prevention.

Each year, DFES surveys fire and land managers across Western Australia to ask about the steps they have taken to manage bushfire fuel, factors that helped or hindered their fuel management program, collaboration that occurred and lessons that were learned. This report summarises the responses received for the 2020-2021 financial year.



Preburn briefing

# Why manage fuel?

There are three things that determine how severe a bushfire will be:

- prevailing weather conditions
- the topography (or terrain) of the area
- the fuel available to burn

Of these three things, people can only influence the fuel. Fuel management is the practice of removing or modifying vegetation and leaf litter so that it is not available to be burnt if a bushfire occurs.

Where there is little fuel available to burn, bushfires are less likely to become established after an ignition and fires that do occur will burn less intensely. This makes them easier and safer for firefighters to contain and extinguish. Fuel management can also create a buffer between a potential fire front and vulnerable assets, reducing their exposure to flames, radiant heat and ember attack. While fire is a natural element of many Western Australian ecosystems, the high intensity fires that occur when areas with large amounts of fuel are burnt can cause great environmental harm.

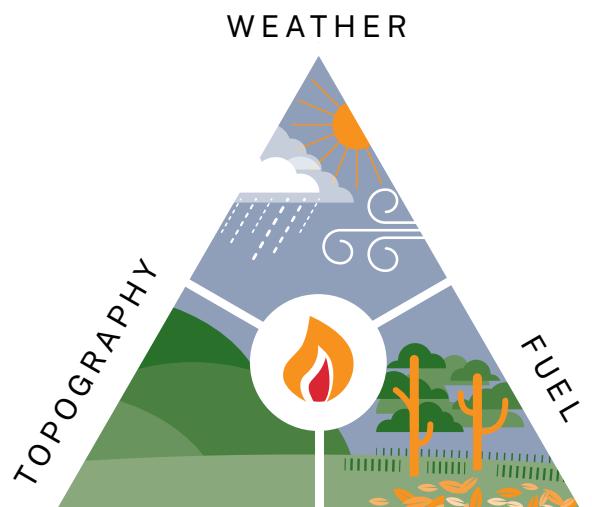


Figure 1: The Fire Behaviour Triangle

‘Breaking up’ the vegetation with fuel-reduced areas makes such fires less likely.

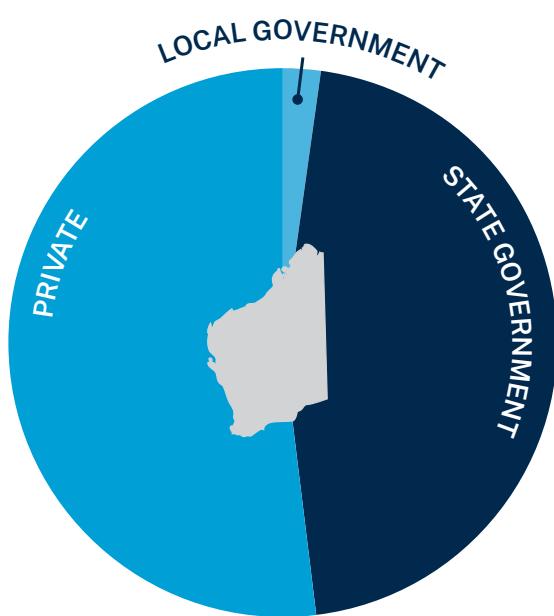
An effective regime of fuel management makes it less likely that bushfires will cause harm to people, communities, economic and cultural assets or the natural environment.



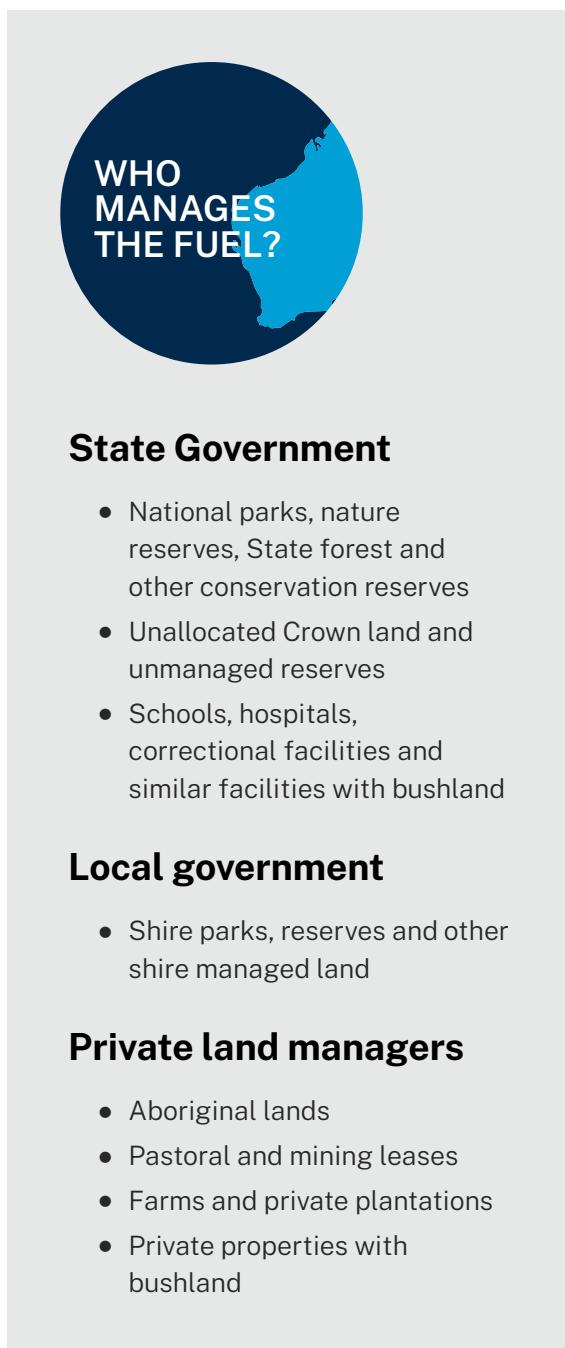
# Who manages fuel in Western Australia?

In Western Australia, the land owner or occupier is responsible for managing bushfire fuels on their land. Private residents and companies must manage fuel on the land they own or lease according to the requirements set by local governments. These requirements are published in local governments' annual fire management notice, often called a fire break notice.

State Government agencies that manage land are not legally required to comply with local government fire management notices. They do, however, still have a legal and moral obligation to take reasonable steps to prevent bushfires on their lands, including by managing fuels. Local governments are similarly responsible for fuel management on all lands vested in them, such as Shire reserves.



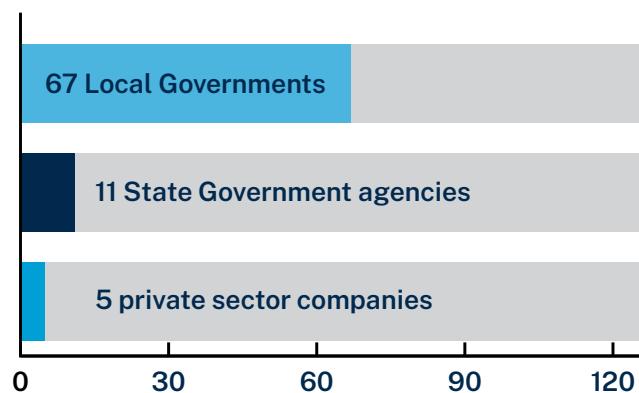
**Figure 2:** The approximate proportion of the State managed by different groups for the purpose of bushfire prevention. The private management category includes farms, pastoral leases, residential lots, Native Title lands and areas managed by companies or corporations.



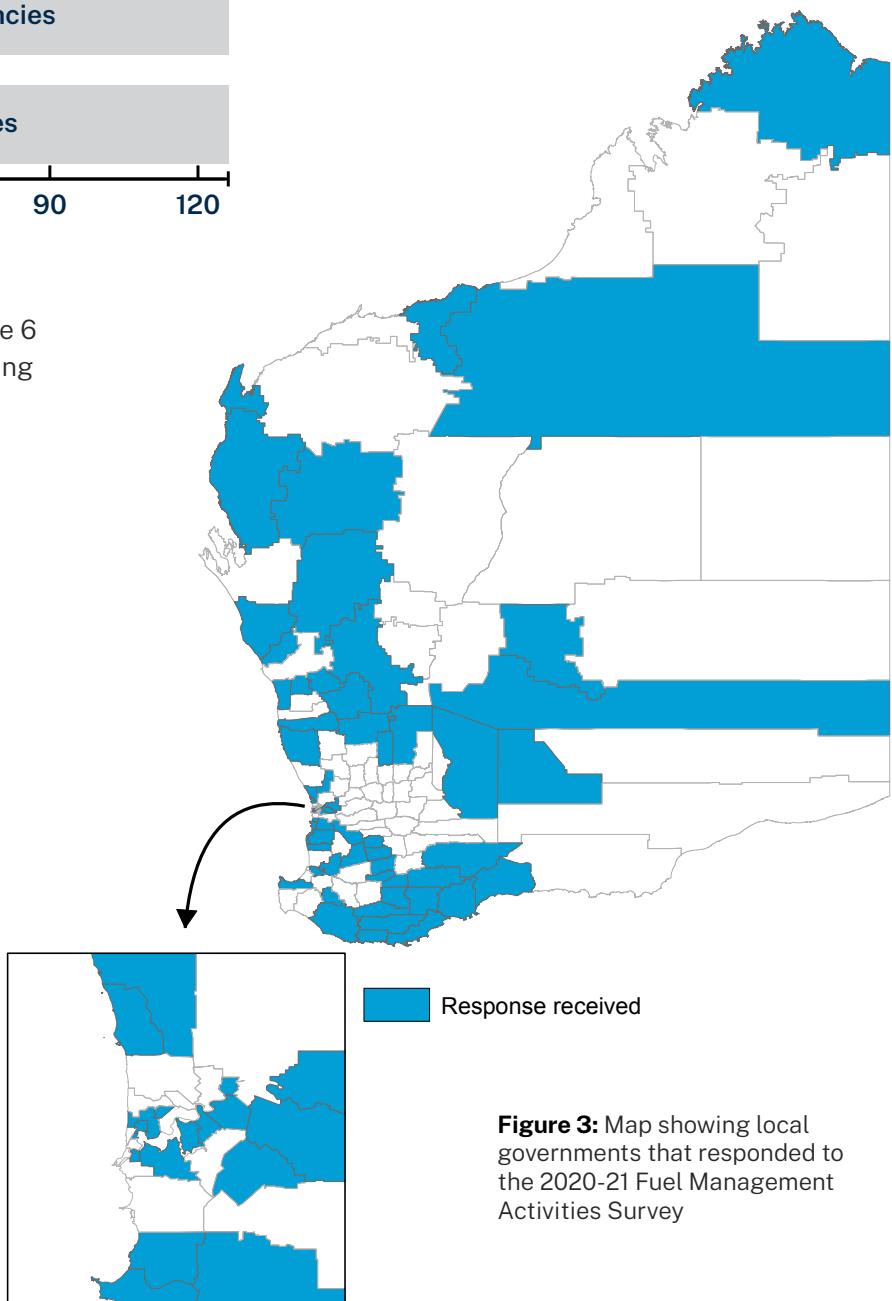
## Compiling the report

In August 2021, DFES sent a survey to all of Western Australia's local governments and various Government agencies and private companies with significant land or fire management responsibilities. The survey contained 18 questions about the respondent's fuel management activities in 2020-2021.

126 responses were received from 83<sup>1</sup> different organisations representing:



A full list of the responding organisations is provided in Table 6 and a map showing the responding local governments in Figure 3.



**Figure 3:** Map showing local governments that responded to the 2020-21 Fuel Management Activities Survey

<sup>1</sup> Some State Government agencies provided a response for each region or property they manage.

# Planned burning

Planned burning is the most efficient way to reduce bushfire fuel over large areas. Well planned and executed burns are also safe and environmentally sustainable. In fact, as many of Western Australia's ecosystems have evolved with fire, planned burning can make a vital contribution to maintaining ecological function and protecting against harmful bushfires.

In 2020-2021, 44 organisations reported undertaking planned burning, collectively completing 659 burns totalling 5.14 million hectares. Although fewer organisations reported undertaking burning compared to 2019-2020 and fewer burns were completed than that year, the total area of burning increased by about 20,000 hectares. The smaller number of organisations reporting burning may be a result of fewer organisations responding to the survey. The increase in the area of burning is largely attributable to larger programs being completed by the Kimberley Land Council and the Indigenous Desert Alliance.

The largest contributors to the area of planned burning achieved were:

- Department of Biodiversity, Conservation and Attractions (DBCA) completed 167 burns totalling about 3,773,000 hectares
- Kimberley Land Council completed 173 burns totalling about 1,031,000 hectares
- Indigenous Desert Alliance completed 14 burns totalling about 194,000 hectares
- Bush Heritage Australia completed 6 burns totalling about 129,000 hectares.

These four organisations all conduct extensive aerial planned burning programs in the Kimberley. In that region large, patchy, low-intensity burns are undertaken in the early dry season to reduce the impact of damaging late dry season bushfires.

Thirty local governments reported completing some planned burning, with the most active being the City of Busselton whose 27 burns totalled about 300 hectares. The Shire of Chittering and City of Kalamunda each completed 25 burns.

In the south west of the State, where there is the greatest number of people exposed to bushfire risk, 309 burns were completed totalling 173,000 hectares. Most of this area was burnt by DBCA, with 36 local governments reporting 154 burns completed with a total area of 853 hectares.

**State Government agencies completed about 3.78 million hectares of planned burning, private organisations about 1.36 million hectares and local government about 1,600 hectares.**



Nyul Nyul rangers receive a briefing before a planned burn on the Dampier Peninsula

## Planned burn escapes

The management of burns was excellent in 2020-2021, with only two organisations experiencing a burn escape and six burns escaping in total. This means that just 0.9 per cent of burns undertaken throughout the State escaped their boundaries. The total area burnt in these escapes was 111 hectares, meaning the area burnt in escapes was 0.02 per cent of the area of planned burning. The number of burn escapes has trended downward for the last four years.

# Mechanical and chemical fuel management

Mechanical fuel management involves removing or modifying fuel by hand or using machines. The most common forms of mechanical fuel management are slashing or mowing vegetation, followed by clearing fire breaks. About 75 per cent of survey respondents reported that they had undertaken the former and 65 per cent the latter in 2020-2021. Spraying herbicides to eradicate weeds was also a common method of reducing bushfire risk, with half of survey respondents having undertaken chemical fuel management.

Table 1 shows the amount of mechanical and chemical fuel management activities completed by responding organisations. In total, 107 respondents reported completing 33,200 hectares and 56,300 kilometres of mechanical and chemical fuel management.



A mulcher creating a fuel reduced break

Treatment	# of respondents	Area (hectares)	Length (kilometres)
Vegetation clearing	35	542	1,075
Chemical spraying	63	11,196	10,411
Slashing or mowing	94	10,347	15,600
Weed management	39	5,940	7,680
Fire breaks or access	83	1,564	20,962
Scrub rolling	2	0	50
Mulching	28	742	500
Other	8	2,873	2,831
<b>TOTAL</b>		<b>33,204</b>	<b>56,278</b>

**Table 1:** The amount of mechanical and chemical fuel management completed by respondents.



Those respondents that had a predetermined program of works had an excellent completion rate for activities. Table 2 shows that more than 80 per cent of respondents completed most of their programmed works across all forms of mechanical and chemical fuel management. At least two thirds of respondents completed all planned works of these types.

Planned burning again proved to be the most challenging activity to complete, with half of respondents completing most of their planned program. This was a significant improvement on 2019-2020 though, and represents a return to the pre-Covid completion rate.

% of respondents completing >75% of planned works			
Fuel management method	2018-19	2019-20	2020-21
Clearing	75	77	84
Chemical spraying	81	81	82
Slashing or mowing	88	84	93
Fire breaks or strategic access	89	84	91
Mulching	77	63	96
Planned burning	49	35	50

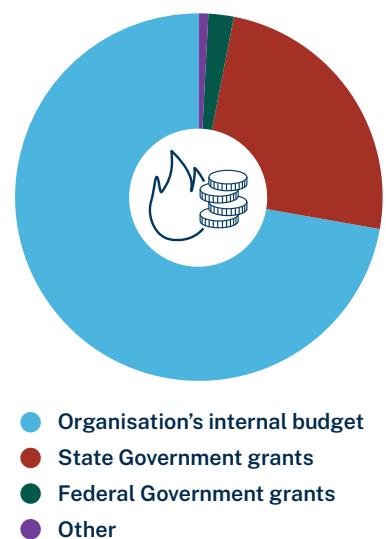
**Table 2:** Proportion of respondents that reported completing at least 75 per cent of their programmed fuel management activities. Percentages are based only on those that intended to undertake the activity and had a set program.

## Enabling fuel management

Survey respondents were asked how they funded their fuel management program. About three-quarters funded their entire program internally. About one-third of respondents accessed some State Government grants funding, with 8 per cent entirely reliant on State Government grants to implement their fuel management program. Figure 4 shows the mean proportion of funding from different sources across all survey respondents.

Most organisations continue to rely heavily on their own staff to achieve their bushfire fuel management activities. More than two-thirds of respondents described their personnel as essential to achieving outcomes and a further fifth said they contributed significantly. Contractors also represented an important workforce, with half of respondents describing them as essential and a further fifth saying their contribution was significant. Only one in ten respondents didn't make some use of contractors to achieve

their fuel management program. About two-thirds relied on the Government fire agencies to some degree to complete their works.



**Figure 4:** Mean proportion of funding for fuel management from different sources for all respondents.

	Essential to outcomes (%)	Participated in activities (%)	Not involved (%)
Organisational staff	69	26	4
Contractors	51	31	18
Volunteer brigades	23	36	37
State Government agencies	18	50	28
Traditional Owners	9	28	56
Bushfire consultants	6	16	76

**Table 3:** Summary of responses to the question ‘How reliant is your organisation on the following sources of labour and expertise in completing your fuel management program?’ Some categories have been amalgamated and non-responses removed from the data.

Collaboration with State and local government was strong, with a fifth of State Government agencies and private organisations having acted collaboratively with local government and about half having communicated or consulted with them in implementing their program. One-third of respondents collaborated with the State fire agencies while almost half communicated or consulted with them. Inclusion of the broader community declined somewhat compared to the previous year, with about two-thirds of respondents having involved residents in their planning process in some way. Similarly, consultation with Traditional Owners was not as comprehensive, with only a third of respondents engaging with them.



Preburn briefing

	Worked collaboratively (%)	Communicated or consulted (%)	Not involved
State Government agencies	32	42	22
Local governments	20	48	26
Volunteer brigades	34	26	38
Traditional Owners	11	26	54
Residents	4	59	31

**Table 4:** Summary of responses to the question ‘How much did you engage with the following stakeholders when planning or implementing your organisation’s annual bushfire risk management program?’ Non-responses were omitted from the dataset.



# Restrictions on fuel management activities



Monitoring a planned burn on the Dampier Peninsula

Most of the factors that limited fuel management activities being undertaken were reported less frequently in 2020-2021 than they were in the previous year. Weather or seasonal conditions continued to be the biggest inhibitor to achieving works, with over half of respondents identifying this as an issue. Lack of in-house capacity and availability of funding were the next most widely reported issues. The number of respondents identifying contractor availability as a limiting factor increased in 2020-2021 compared to previous years and this is now ranked the fourth most significant factor.

Planned burning was identified as the activity most impacted by the factors above, with 44 per cent of respondents saying they were restricted in their ability to complete burning. Chemical spraying, installing fire breaks and fire access were the activities next most commonly impacted, with about one-third of respondents indicating each of these activities was restricted.

Limiting factor	% of respondents who identified as an issue		
	2018-19	2019-20	2020-21
Weather or seasonal conditions	56	68	57
Lack of in-house capacity or expertise	37	55	44
Availability of funding	42	49	44
Contractor availability	30	31	40
Volunteer brigade availability	36	42	33
Environmental approvals	33	39	30
Community concerns	32	37	30
Grant application process	26	30	24
Cultural or archaeological approvals	21	18	12
Access to information for planning	21	18	18

**Table 5:** Issues identified as limiting respondents' ability to complete planned fuel management activities. The figure shown is the sum of those who reported the factor limited their works program somewhat, limited their works program significantly or prevented most works from occurring.

# Other ways of managing bushfire risk

Aside from managing fuels, many organisations reported undertaking communication, education and engagement with the community or other stakeholders as an important part of their approach to managing bushfire risk. A significant number also described developing some form of strategic or reserve scale planning for bushfire risk management. The use of fire break

notices to enforce fuel management on private properties was identified as important by many local governments. Developing policies and procedures for mitigation activities, writing a Bushfire Risk Management Plan and conducting training were other frequently provided responses to questions about approaches to reducing bushfire risk other than fuel management.



A cool burn in coastal heath vegetation

## Lessons learned

When asked what their organisation had done well in 2020-2021, the most frequent responses related to managing fuels. Collaboration with other stakeholders was seen as another area of strength, with fire break inspections and community engagement also mentioned often.

When asked about opportunities to improve their approach to fuel management, the most common response from organisations related to increasing their funding or staffing for activities. Better communication with the community was

also commonly nominated, followed by better planning for bushfire risk management. This was a very similar outcome to the previous survey.

When organisations were asked what the sector as a whole could do better to manage bushfire risk, the most frequently provided responses related to more assistance from State Government agencies, more awareness raising and community engagement as well as access to more funding for fuel management.



A mulched break provides access for fire appliances on fragile soil

## Conclusion

The 2020-2021 Fuel Management Activities in Western Australia report shows that managing bushfire fuel continues to grow as a priority for land and fire managers across the State. Although the number of responses to this survey was fewer than in the previous two years, the amount of work reported increased. This was certainly the case for planned burning and it was pleasing that despite another increase in the area of burning achieved, the number of escapes and area burnt in these escapes both declined from previous years. It is a great outcome for the State that more people are becoming involved in planned burning, and the strong sense of collaboration in the sector supports widespread good practice.

The area of fuel reported as being treated with mechanical methods fell significantly in 2020-2021 compared to the previous year. This appears to be a result of one respondent having a dramatically reduced program. On a more positive note, the survey also indicated fewer limitations on works than previously.

It is clear that collaboration continues to be a strong feature of the sector in WA. Most respondents reflected positively on collaboration and coordination between State Government, local government, corporations and private land holders.

As always, there remain opportunities for improvement, with many respondents wanting to see State Government agencies playing a larger role in facilitating fuel management.

The DFES Bushfire Centre of Excellence continues to progress programs to drive further improvement in collaboration, training and community education. The Centre's Cultural Fire Program is also growing connections with Traditional Owners and investigating ways to promote greater Aboriginal involvement in fuel management and bushfire prevention. Together, these and many other initiatives in both Government and private enterprise continue to give Western Australia a place at the forefront of bushfire risk management practice.

Local Governments		
City of Albany	Shire of Cuballing	Shire of Narrogin
City of Belmont	Shire of Dalwallinu	Shire of Northampton
City of Busselton	Shire of Dandaragan	Shire of Peppermint Grove
City of Gosnells	Shire of Dardanup	Shire of Perenjori
City of Joondalup	Shire of Denmark	Shire of Plantagenet
City of Kalamunda	Shire of East Pilbara	Shire of Ravensthorpe
City of Kwinana	Shire of Exmouth	Shire of Serpentine Jarrahdale
City of Mandurah	Shire of Gnowangerup	Shire of Upper Gascoyne
City of Melville	Shire of Irwin	Shire of Wagin
City of Nedlands	Shire of Jerramungup	Shire of Wandering
City of Rockingham	Shire of Katanning	Shire of Waroona
City of South Perth	Shire of Kent	Shire of Williams
City of Subiaco	Shire of Koorda	Shire of Woodanilling
City of Wanneroo	Shire of Lake Grace	Shire of Wyndham East Kimberley
Shire of Bridgetown Greenbushes	Shire of Leonora	Shire of Yalgoo
Shire of Broomehill Tambellup	Shire of Manjimup	Shire of Yilgarn
Shire of Carnarvon	Shire of Menzies	Town of Bassendean
Shire of Chapman Valley	Shire of Mingenew	Town of Claremont
Shire of Chittering	Shire of Morawa	Town of East Fremantle
Shire of Collie	Shire of Mount Marshall	Town of Port Hedland
Shire of Coolgardie	Shire of Mundaring	Town of Victoria Park
Shire of Coorow	Shire of Murchison	
Shire of Cranbrook	Shire of Murray	

Government Agencies		
Department of Biodiversity, Conservation and Attractions	Department of Fire and Emergency Services	Main Roads WA
Department of Communities	Department of Health	TAFE
Department of Defence	Department of Justice	Water Corporation
Department of Education	Forest Products Commission	

Private organisations		
Indigenous Desert Alliance	Fortescue Metals Group LTD	The Kimberley Land Council
Bush Heritage Australia	Horizon Power	

**Table 6:** Organisations that responded to the annual fuel management activities survey in 2020-21.

