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The Chairman
House of Representatives Select Committee on the Recent Australian Bushfires
Parliament House
CANBERRA ACT 2600

Attention: Secretary of Committee

Dear Sir

This submission to the House of Representatives Select Committee on the recent Australian bushfires has been compiled by the lead agencies for land management and fire management in this State, that is the Department of Conservation and Land Management (DCLM) and the Fire and Emergency Services Authority (FESA).

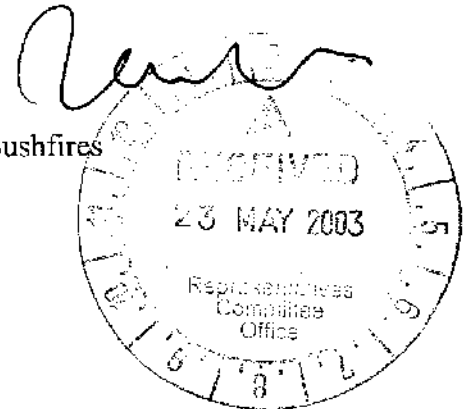
This submission provides information in response to the ten Terms of Reference.

Scope

Given that the Select Committee Inquiry has been initiated primarily as a result of the bushfires that have impacted the rural-urban interface and populated areas of south-eastern Australia, the Western Australian submission is focused on the South-west Land Division of WA, which is where the threat of fires to life, property and industry is greatest. Biodiversity conservation values on natural lands in this region are also very important. With the high population concentrations and a large number of human-caused fires, there is also a heightened community awareness and concern about fire management in the south-west, placing great expectation on DCLM, FESA, Local Government and the local bushfire brigades.

Whilst the south-west of the State is the principal area of concern in relation to bushfires and the potential threat to human life and property, it is also important to recognise that bushfires in other regions of the State have the potential to be extremely large and excessively frequent, and to thereby have a corresponding serious impact on biodiversity and other values. Many fires in these regions reach hundreds of thousands of hectares in size. The sheer magnitude of these fires presents specific resourcing and management difficulties for FESA, Volunteer Brigades, DCLM and Local Government.

The south-west region experiences a severe fire season every year, and vegetation or fuel complexes (forests, heaths, mallee) are such that fires have the potential to burn with far greater intensity than other ecosystems (such as hummock grasslands, tropical savannas, etc). Consequently the potential for damage and suppression difficulty are both significantly greater.



South-west bioregions, particularly the Swan Coastal Plain and Avon Wheatbelt, are highly fragmented with many small remnants of native vegetation. Disturbances such as wildfires have the potential to seriously degrade ecosystems in these bioregions through introduction and spread of weeds, feral animals and introduced diseases, unless these effects are managed.

The south-west of Western Australia is recognised as one of the world's 25 biodiversity hotspots and is a refuge of many native animal species that were once more widespread across Australia.

The forests and bushland areas that surround main population centres are highly valuable State assets for conservation, nature-based tourism and recreation, water, timber and other products (eg. honey, wildflowers). These ecosystems must be managed and protected from wildfires and inappropriate fire regimes.

The hot Mediterranean-type climate, accumulations of flammable vegetation, and numerous ignition sources make it axiomatic that fire cannot be prevented or excluded from sizeable tracts of bushland in south-west WA. The decision to deliberately exclude fire from naturally fire-prone ecosystems inevitably leads to periodic large-scale, high intensity fires that burn through the landscape and mostly result in homogenous even-age vegetation. Thus even if it were possible to exclude fire for a long period, it would be undesirable for the conservation of biodiversity and the security of adjacent rural and residential communities. Equally undesirable is a regime of large, intense wildfires or a regime of very frequent fires. The results of numerous fire ecology studies conducted in south-west ecosystems indicate clearly that spatial and temporal fire diversity promotes biodiversity at both the landscape and local habitat scale.

Having said that, there are some areas for particular biodiversity conservation or other (eg. scientific) reasons, where deliberate strategies have been in place over long periods to exclude fire to the greatest extent practicable. An example is Mt Gardner in the Two Peoples Bay Nature Reserve where long-unburnt, dense vegetation was considered critical to the survival of the Noisy Scrub-bird when it was rediscovered, and is now considered critical to the more recently rediscovered Gilbert's Potoroo, which is Australia's most endangered marsupial.

Fire Management Responsibility

DCLM is responsible for managing national parks, conservation parks, nature reserves, State forests and timber reserves in south-west WA. Fire management is an integral part of conservation and land management. The Department's mission to protect and conserve biodiversity includes a key role as the lead fire management agency in the parks and forests of WA. This role is undertaken by the agency because it is a fundamental part of being a land management agency, and because of the history of forest fire management in the region, and because some of the Local Government Bushfire Brigades do not have sufficient skills, experience and equipment needed to deal safely and effectively with the complex forest fuels and high intensity fires.

The complexities and risks associated with forest fire management planning and operational activities dictate that fire controllers are highly trained and have extensive, relevant experience in both suppression and prescribed fires, as well as other relevant land management and conservation programs.

Within the south-west region, DCLM has a current workforce of 240 trained, fire fighters and an additional 200 staff (approximately) trained to carry out various Incident Management roles. An additional 30 trained staff are located in other regions who can provide assistance in large fire emergencies within the south-west. Approximately 60 fire officer staff from the Forest Products (FPC) Commission contribute to DCLM's fire management. The FPC's staff are provided the same fire training and accreditation opportunities as are DCLM staff, and fill similar roles in Incident Management and prescribed burning.

DCLM maintains a workforce of professional, trained fire controllers/managers and fire crews that have responsibility for the conduct of the prescribed burning programs and responding to wildfires. The number of fire personnel and fire fighting equipment (fire tankers, detection aircraft and towers, water bombers) located at each of the Department's fifteen work centres in the south-west has been determined to ensure that there are adequate resources to deal simultaneously with at least three large, multi-shift fires, or nine initiating wildfires within the entire region.

DCLM has maintained a high level of preparedness in a number of ways including:

- Bolstering fire crew numbers with seasonal fire fighters and mobile burning crews;
- Extensive training programs for all levels of fire response and support personnel;
- Maintaining inter-agency working arrangements with fire services of FESA and Volunteer Bushfire Brigades; and
- In conjunction with FESA, maintaining and expanding the water bombing capacity to assist ground forces in initial attack on new wildfires.

Prescribed burning and suppression in the south-west depend heavily on access to the trained fire staff working with the FPC and timber industry. Significant reductions in availability of machinery owned by logging contractors as a consequence of reductions in the native forest timber industry will require changes in DCLM's arrangements for provision of bulldozers and other heavy plant for fire suppression response. This has been kept under close review and adequate availability of machinery has been able to be maintained to date, and ongoing attention to measures to accommodate future changes in machinery availability will be maintained.

FESA was established in 1998 with functions relating to the provision and management of emergency services throughout Western Australia. The Fire Brigades Act was established to provide a law relating to the prevention and extinguishing of fires and the protection of life and property from fire, hazardous material incidents and accidents. Principally this Act applies, in the context of this submission, in the urban rural interface in the defined fire districts. In relation to the remainder of the State the Bush Fires Act applies, and whilst this is primarily implemented by the local government authorities, FESA staff provide technical and operational support and also have some statutory responsibilities and powers.

FESA maintains a statewide workforce of 830 career fire fighters dealing with both structural and rural fires. There are also around 20,000 volunteer bushfire brigade members across the State. These volunteers also have appropriate fire suppression vehicles and equipment. A State the size and as diverse as WA could not provide adequate bushfire protection without the volunteer fire fighter. FESA also provides high quality training support for these fire fighters so they are competent to undertake the very arduous tasks of protecting the community.

There are also approximately 2,500 Fire and Rescue Volunteers throughout the State who primarily are focussed on urban fire fighting and hazardous materials and rescues, but also become involved in bushfire fighting operations.

FESA career staff and volunteers are available 24 hours a day 7 days a week. The resource levels of the volunteer brigades is matched to the needs analysis profile to ensure that there is adequate community protection.

FESA was established to provide and manage emergency services in Western Australia and it is a young and dynamic agency based on a long history (some 115 years) of fire and emergency management within the State.

Fire Management Policy

DCLM's fire management policy is based on a systematic assessment of values and risks, a scientific underpinning and extensive field experience. Policy and operational practice are regularly reviewed and improved to take account of new information, including results of scientific studies and operational trials.

The policy and practices of fire management in WA's forests, parks and reserves are currently under review to ensure that contemporary fire management is appropriate to meet fire protection and biodiversity conservation objectives.

The review of DCLM's fire management being undertaken by the State Government is in three stages:

- An internal review of fire management in the south-west was completed in September 2001 by DCLM to examine the current issues, constraints and procedures in all aspects of fire management planning and application (Appendix 1). This review was responded to by the DCLM Corporate Executive (Appendix 2).
- A 3-day symposium was held in April 2002 to identify the scientific basis for fire ecology and fire management strategies. Both the scientific papers and other papers presented at this symposium have recently been published as part of the Department's commitment to informing and involving the community on fire management (Appendices 3 and 4).
- A public review of fire management is to be conducted by the Western Australian Environmental Protection Authority. The public review will examine the way in which DCLM carries out its fire management and will identify recommendations for further improvements.

DCLM's fire management policy places great emphasis on the role and use of fire in conserving the state's biodiversity, while at the same time acknowledging community concerns in relation to the need to protect community values from damaging wildfires.

DCLM's current Fire Management Policy is attached (Appendix 5). This policy was established in 1987 and revised in May 1997. The policy is currently being reviewed by the Department and will soon be circulated for public comment. A copy of the current draft (February 2003) Fire Management Policy is attached in Appendix 6.

Setting clear fire management objectives for the conservation of biodiversity and for the protection of values is fundamental in the development of fire management plans and

standards, and in determining strategies and tactics. The best available knowledge on fire effects and fire interactions within the various components of the ecosystems in the south-west forests has to be compiled, analysed and applied to develop these fire management strategies and tactics.

Current knowledge indicates that in order to maintain and protect biodiversity, fire regimes need to be applied that provide for an interlocking mosaic of patches of vegetation and habitats that represent a range of fire frequencies, fire intervals, seasons, intensities and scales.

These ecologically based fire regimes will need to take into account the requirement to provide an adequate level of protection for both conservation and societal values. This can be achieved through systematic and structured Wildfire Threat Analysis (WTA) and risk management. FESA and CALM are jointly seeking to have a new WTA for the whole of the State and have submitted a joint funding application for a Commonwealth research assistance grant (Natural Disaster Risk Management Studies Programme) for its development.

The State Government recognises that the fuel that accumulates in State forests and conservation reserves must be managed in order to avoid destructive wildfires and loss of lives and community assets. The use of planned fire is an important means of managing these fuel loads, and an irreplaceable method for helping to maintain nature conservation values and ecological processes.

FESA is undertaking some fuel modification and hazard reduction burning, on behalf of the Department of Land Administration to protect landowners from bushfires initiating on unallocated Crown land and unmanaged reserves.

Fire Season 2002/03

This year, Western Australia has experienced one of the most severe fire seasons in the 42 years since 1960/61, which saw the destruction of south-west towns including Dwellingup, Karridale, Holyoake and Nanga.

FESA estimates that in 2002/03 the FESA Fire Services (both career and volunteer brigades and the Local Government Bushfire Brigades) attended over 11,000 fires throughout the State, including the Perth metropolitan area.

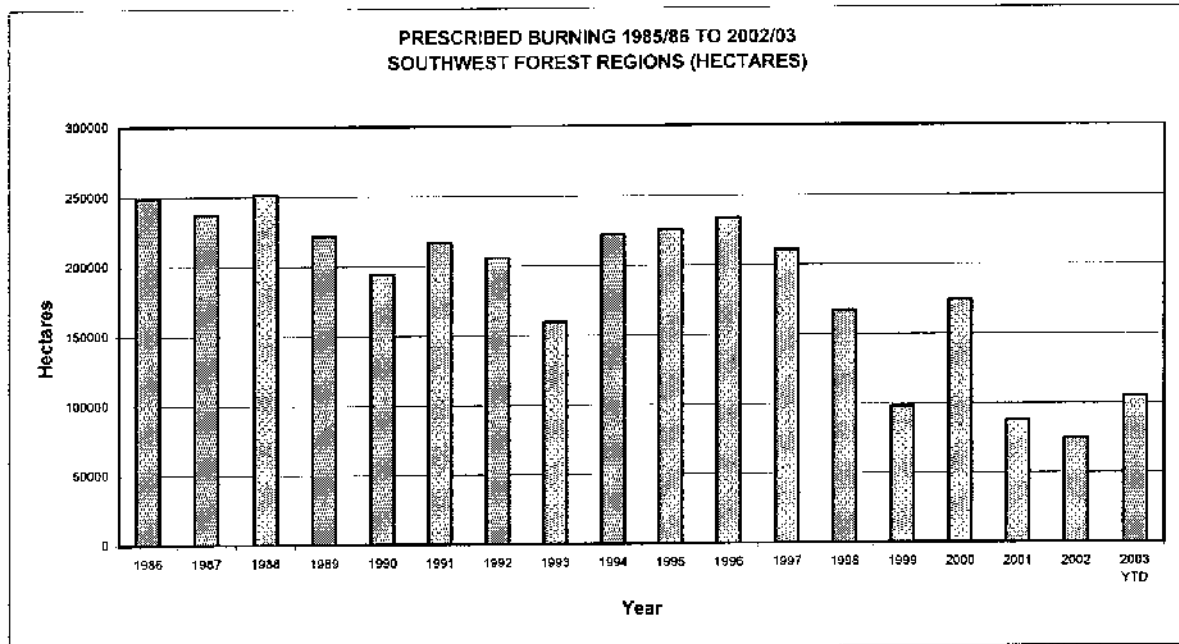
As at 1 May 2003 DCLM fire fighting forces have attended 600 fires that have covered 754,000 hectares of Crown lands and private property between Geraldton and Esperance. In the south-west forest regions, DCLM has suppressed 512 wildfires covering 133,000 hectares of which 95,000 hectares was on Department-managed lands. The area of wildfires represents an eight-fold increase on the long-term average (over the last 20 years).

In the past four to five years much of Western Australia has experienced drought conditions, which have greatly increased the dryness and flammability of the ground fuels and vegetation. Below average rainfall during winter 2002 meant that the larger dimension fuel elements (logs, branches, etc) did not reach saturation, as is the case in normal rainfall years. This meant that fire behaviour during the spring months was much more intense and difficult to control than normal, and the number of suitable burning days was very limited.

The restriction in the number of suitable burning days during spring 2002 meant that the prescribed burning programs planned by DCLM was again curtailed from the planned target of about 200,000 hectares for the spring 2002 to autumn 2003 period, to about 110,000 hectares as at 1 May 2003. The autumn burning program is continuing at the time of compilation of this submission.

Similar shortfalls in the actual burn program achieved occurred during each of the drought years of 1998/99, 2000/01 and 2001/02.

The graph below shows the achievement of prescribed burning since 1985/86.



The decline in burning in the south-west since 1998/99 has meant that there has been a decline in the proportion of the areas with reduced fuels (within 6 years since last burn) from the target of about 40 percent to about 25 percent of Department-managed lands.

Appendix 7 shows the distribution of the fuel-age categories in the south-west forest regions as at 2002.

The State Government recognises the importance of taking all practical measures to overcome the backlog in burning once favourable conditions prevail. In particular, in November 2002 the Western Australian Minister for the Environment and Heritage, Dr Judy Edwards MLA publicly announced that the Western Australian Government strongly supported the prescribed burning program planned by the Department, and that she had asked the Department to step up its prescribed burning activities during November and December 2002 in the face of a potentially serious summer bushfire season. Dr Edwards said the Government recognised that accelerating the burning program might result in some short-term smoke impacts in built-up areas, but that this would need to be tolerated in order to allow for the burning program to be completed. A copy of the Minister's media release on 12 November 2002 is at Appendix 8.

On Thursday 8 May 2003, the Minister for the Environment and Heritage made a statement to the Legislative Assembly about the 2002/03 fire season. The Minister stated:

Mr Speaker, I draw the attention of the House to the impact the recent bushfire season has had on the State's conservation lands, particularly in the south west. The Department of Conservation and Land Management advises that the season was the worst in more than 40 years in the number of wildfires, their intensity and the area burnt. Since the season began, the department has faced approximately 600 wildfires that have burnt through 754 000 hectares between Geraldton and Esperance. There were three fire events of note. One fire in January at Mt Cooke, about 70 kilometres south east of Armadale, burnt through 18 000 hectares. This was the biggest single fire event in the northern jarrah forest since the disastrous Dwellingup fires in 1961. It is significant that the department's director of science, Dr Neil Burrows, visited the fire and remarked that it was one of the most intense he had seen in his 30 years of experience in forest and fire research. The fire was so intense that it melted glass bottles and aluminium signs marking the Bibbulmun Track. In the proposed Walpole Wilderness Area, a fire that began in February flared in March and ultimately burnt through 35 000 hectares. This was the single biggest forest fire event in the south west since the Boorara fires of 1967. In late March, another group of fires burnt through 25 000 hectares in the D'Entrecasteaux National Park. The cost of suppressing fires on the State's conservation lands this season is in the order of \$11.5 million. Of the 600 wildfires, approximately 200 were a result of lighting. In fact, between 21 and 22 March, the department responded to 30 lightning-caused fires between Yanchep and Walpole. These included five strikes in the D'Entrecasteaux National Park.

The department often receives criticism from some in the community about escapes from planned burns. It is important to note that of the 600 fires to which the department responded this season, six - or one per cent - were a result of escapes from prescribed burns. These fires burnt through 18 505 hectares, or approximately 2.5 per cent of the total wildfire area. Two of these fires were in the Walpole area last November, when extremely hot and dry conditions, combined with strong, gusting winds, caused re-ignitions from unburnt pockets inside two burns that had been carried out several weeks earlier. The department has achieved 105 000 hectares of its annual planned burning program of 200 000 hectares. The first part of the program in spring was carried out successfully under difficult and dry conditions. However, the autumn program will also be very problematic because of the pressure to burn before winter rains. The Government supports the use of planned burning to achieve biodiversity and protection outcomes, and has provided additional funds to ensure that the department has sufficient resources to achieve the planned burning program.

I ask the House to join with me in commending the efforts of the department's fire crews. Firefighting is a dangerous and demanding business, and we have had only one instance this season in which a fire crew member has been injured. I express my appreciation to the many volunteer bush fire brigades, the Forest Products Commission, the Fire and Emergency Services Authority of Western Australia, the Department of Conservation and Land Management staff, and the support organisations, for all the assistance they have given to the community.

In the past three years, the State Government has provided additional funding to DCLM to increase the number of burning crews for the south-west forests, and for the hire of helicopters for aerial ignition. These additional resources have allowed DCLM to maximise the burning opportunities during the very limited number of suitable burning days.

Term of Reference (a): The extent and impact of the bushfires on the environment, private and public assets and local communities.

The 2002/03 summer was one of the worst on record due to the combination of a number of factors. These included:

- It was the fourth year of drought conditions with no significant rains occurring from late October 2002 to late March 2003.
- Extensive and frequent lightning storms occurred resulting in a 6-fold increase in the number of lightning caused fires. Many of these lightning fires occurred away from roads and were often large by the time fire fighting resources were able to reach them.
- Extended periods of very hot, dry and windy conditions, which cause fire danger levels to reach Very High and Extreme during the months of November 2002 to March 2003.

It is estimated that FESA Fire Services and the bushfire brigades under the control and management of the local government authorities in WA have attended over 11,000 bushfires in the 2002/03 fire season.

In the more populated areas the physical size of these fires is generally kept to a small size, less than 5 hectares. In the more isolated areas of the State, that is the areas outside of the South-West Land Division, bushfire sizes were significant and burnt several hundred thousands of hectares. Fire response resources in these remote areas are such that in many of these instances few resources are applied. In general, the fire suppression response matched the values at risk from the fire.

FESA is very concerned with the apparent increase in the number of deliberately lit bushfires that occur frequently near to settlements, towns and cities. In some areas these frequent fires are causing the displacement of native flora with introduced weed species, which become a readily available annual bushfire fuel.

Throughout the South-West Land Division between Geraldton and Esperance, DCLM forces with direct assistance from regionally based FESA staff and Local Government Bushfire Brigades attended 600 fires that affected 754,000 hectares of Crown and private lands. In the south-west forest region DCLM forces attended 511 wildfires covering 133,000 hectares. Table 1 shows the area, number and causes of wildfires for the south-west region.

Rapid response by aerial and ground based suppression forces enabled 78% of these fires to be contained to less than 10 hectares; 93% to less than 100 hectares; and 97% to less than 1,000 hectares. Table 2 shows the distribution of the number of DCLM wildfires in 2002/03 within each size category. A map showing the large wildfires to 1 May 2003 is at Appendix 9.

Despite the large increase in the area burnt by wildfire on and near Department-managed lands, there was no loss of life. There were few asset losses with only a few houses and sheds lost, particularly in the Denbarker, Mogumber and Lancelin areas.

Table 1: Areas and Numbers of Wildfires for South-west Forest Regions with Specific Causes – Fire Season 2002/03 (at 14/4/03)

Cause	Region	Swan	South West	Warren	Total
Lightning	Number	112	38	45	195
	DCLM managed lands (ha)	22,395.3	152.6	34,234.8	56,782.7
	Other lands (ha)	4,950.7	80.2	2,501.3	7,532.2
	Region Total (ha)	27,346.0	232.8	36,736.1	64,314.9
Arson	Number	108	25	13	146
	DCLM managed lands (ha)	196.7	1,040.0	6,153.0	7,389.8
	Other lands (ha)	2,545.0	0.8	971.5	3,517.3
	Region Total (ha)	2,741.7	1,040.8	7,124.5	10,907.0
Accidents	Number	25	23	8	56
	DCLM managed lands (ha)	164.8	3.6	13.0	181.4
	Other lands (ha)	554.9	132.7	33.1	720.7
	Region Total (ha)	719.7	136.3	46.1	902.1
Escape from Prescribed Burns	Number		2	4	6
	DCLM managed lands (ha)		59.0	17,649.0	17,708.0
	Other lands (ha)			797.0	797.0
	Region Total (ha)		59.0	18,446.0	18,505.0
Unknown	Number	68	17	5	90
	DCLM managed lands (ha)	952.68	132.3		1,085.0
	Other lands (ha)	8,329.9	576.3	47.6	8,953.8
	Region Total (ha)	9,282.58	708.6	47.6	10,038.8
Cause not listed	Number	9	5	4	18
	DCLM managed lands (ha)	7.3	1077.0	28,568.5	28,682.8
	Other lands (ha)	73.1	13.5	6.0	92.6
	Region Total (ha)	80.4	120.5	28,574.5	28,775.4
TOTAL	Number				511
	DCLM managed lands (ha)				111,829.7
	Other lands (ha)				21,613.5
	Region Total (ha)				133,443.2

Table 2: Distribution of Sizes of 2002/03 Wildfires attended by DCLM

Size Class (Ha)	Number	Percentage
Less than 0.1	44	8.8
0.1 – 10.0	354	69.1
10.1 – 100.0	74	14.5
100.1 – 1,000	24	4.7
1,001 – 10,000	12	2.3
Greater than 10,000†	3	0.6

Major Fires for 2002/03 Fire Season

The following lists the major fires of 2002/03 and their impacts:

- In October 2002, the Cape Arid National Park was affected by a number of fires that burnt approximately 130,000 hectares.
- A complex of large fires in the proposed Walpole Wilderness Area occurred in November 2002 affecting 24,000 hectares of woodlands and wetlands. Some private property assets were lost north of Denmark.
- Lightning caused fires on 9 March 2003 resulted in a large wildfire that burnt 29,000 hectares within the proposed Walpole Wilderness Area.
- Over 30 lightning strikes on 22 March 2003 resulted in a complex of wildfires from Wilbinga (near Yanchep), throughout the forest regions to near Walpole on the south coast. Five fires that occurred in the D'Entrecasteaux National Park burnt 24,500 hectares.
- Three large fires at Jurien and Cervantes just before Christmas 2002 started from lightning strikes and burnt a total of 53,000 hectares. The townsites of Jurien and Cervantes were threatened by the fires at various times, but were protected by intensive and strategic fire combat operations.
- Forty-two lightning strikes in the northern forests, east of Perth, on 22 and 23 December 2002 stretched resources of DCLM and Brigades. All of the fires were contained to relatively small sizes.
- The Mount Cooke fire, 60 km south east of Perth resulted from a lightning strike on 9 January 2003 and burnt approximately 18,000 hectares of Conservation Park and State forest. The fire was contained within areas of low fuel resulting from prescribed burning in past seasons. Appendix 10 is a satellite image of the Mount Cooke fire showing the fuel ages in the vicinity of the wildfire.
- A lightning caused fire in unallocated Crown land north-east of Ravensthorpe developed over the week of the 3 February 2003. The fire escalated rapidly on the night of 10 February and burnt out 330,000 hectares of heath and mallee bushland, resulting in a loss of fencing and stock and numerous beehives.
- Numerous rural fires managed by local bushfire brigades and FESA resulting from lightning strikes threatened several townships including Toodyay, Gingin, Lancelin and Two Rocks.

The Lancelin fire on 26 January 2003 resulted in the fatality of a local bushfire volunteer during a vehicle accident in heavy smoke conditions. Apart from this unfortunate incident, there were very few other injuries and vehicle losses despite the long and hectic fire season.

Term of Reference (b): The causes of and risk factors contributing to the impacts and severity of the bushfires, including land management practices and policies in national parks, state forests, other Crown lands and private property.

Wildfire Causes and Risk Factors

The bushfire hazard in the southern parts of Western Australia is arguably one of the most severe in the world. This is because there is a climate which produces every year a 5 to 7 month drought with periods of high temperature, low humidity and strong winds. The

summer drought is also a period of unstable weather caused by deep coastal troughs, with frequent thunderstorms and lightning activity, and strong land and sea breezes.

The south-west of WA is the only region in the world that has extensive tall forests, which shed tonnes of highly flammable material each year, and a Mediterranean climate.

The south-west is also an area containing well-populated regional centres, towns, and rural communities. There is a great deal of human activity in the south-west with a resultant high incidence of human-caused fires either from deliberate (arson) lightings or accidents. In most years human-caused fires represent about 90 percent of all fires. Occasionally natural (lightning-caused) fires can increase to 30 percent of all fire starts as was the case in the most recent fire season (2002/03).

Escapes from prescribed burns are a minor contributor to the total fire starts, and in 2002/03, the escapes from DCLM burns totalled six fires, or one percent of the total number of fires attended by DCLM. These “escaped-burn” fires burned through 18,500 hectares or approximately 2.5 percent of the total wildfire area. Two of these fires were in the proposed Walpole Wilderness Area in November 2002 when extremely hot and dry conditions, combined with strong, gusting winds, caused re-ignitions in unburnt pockets inside burns that had been carried out several days earlier.

Table 1 (see previously) shows the number of wildfires and areas attributed to the main causes of fires for the south-west forest regions in 2002/03 fire season.

Prescribed Burning

The severity and impacts of bushfires on natural values and societal assets is strongly related to the accumulations of flammable vegetation and ground fuels in relation to the location of the fire vulnerable values.

In areas close to human occupation the major cause of bushfires appears to be human activity. These regular fires are affecting bushland biodiversity, particularly in the remnant bush areas near major towns and cities. These fires on the fringe of private property are displacing native vegetation with introduced weeds.

Fire behaviour research within WA forests including the “Project Vesta” studies undertaken in collaboration with CSIRO have demonstrated that fire spread and intensity are directly related to fuel quantity and structure, which in turn are related to the period since the last fire. Heavy, dry fuels contribute significantly to fire intensity, and can lead to the development of uncontrollable crown fires.

Fires burning in light fuels, resulting from prescribed burning, have lower fire intensities and reduced spotting potential, and therefore improve the ease of wildfire control. Where the primary objective of prescribed burns is to provide protection to designated values, there is a need to regularly reduce fuel loads once a critical level of re-accumulation has been reached. In south-west forest ecosystems this critical level takes five to eight years depending on the rainfall and productivity of each site.

A prescribed burning program plan, called the Master Burn Plan, incorporates burns that are required for three primary purposes, which are not necessarily mutually exclusive:

- (a) To reduce the occurrence and impacts of large, intensive wildfires.
- (b) To protect and conserve the biodiversity values and community assets;
- (c) To regenerate and protect forest ecosystems following logging and other disturbances;

The location, size, priority and frequency of prescribed fire is largely determined through a decision-support tool called the Wildfire Threat Analysis (WTA) which takes account of the location of natural and community assets; the likely source of fires; the potential fire behaviour; and the capacity to suppress the fires rapidly and effectively. In addition to this systematic risk analysis, it is necessary to incorporate fire regimes that optimise fire-induced diversity at a landscape scale in order to achieve conservation objectives.

In order to meet the abovementioned objectives, the DCLM Master Burn Plan provides for an annual prescribed burning program in the south-west forest region around 200,000 to 240,000 hectares, of which around 20,000 hectares is primarily for silvicultural purposes associated with logging activity. This annual burn target represents approximately 8-10 percent of the Department-managed lands in the south-west forest region.

DCLM's ability to achieve this annual burn target has been affected greatly by the reduction in the number of suitable and safe burning days as a result of the prolonged droughts in the past five years.

Other burning constraints that have impacted on the burn achievements include:

- The need to limit burns to days when smoke from prescribed burns is not likely to impact Perth and other major residential areas; and
- The complexity of burns that are surrounded by heavy fuels or fire-vulnerable values such as young forest regrowth and special fauna habitats.

Smoke Management during Prescribed Burning

The weather conditions that are normally suitable for safe fuel reduction burning in the south-west forests are frequently the same conditions that lead to smoke being blown by southerly winds into the Perth metropolitan area. This smoke can be trapped under the commonly occurring inversion layer for several hours.

DCLM, in conjunction with the Bureau of Meteorology and FESA and the Department of Environmental Protection (DEP) has developed and applied a decision support system that assists in forecasting the way in which smoke may impact on residential areas. The smoke trajectory prediction relies heavily on accurate weather forecasts for up to four days ahead.

The incidence of smoke haze from prescribed fires has reduced significantly over the last decade, and there are generally only one or two incidents each year where the smoke particulate (PM10) standards are exceeded.

The smoke management constraints on planned burning have become more severe in recent years due to increasing demands for “zero tolerance” of haze in Perth. These constraints have had a significant impact on the burning program achieved by reducing the number of days available to burn safely and effectively.

Since the onset of the recent drought years (ie. since 1998/99) the annual DCLM burn program actually achieved has ranged from 35 to 70 percent of the planned target.

So far in 2002/03, DCLM has achieved 110,000 hectares of its annual planned burn program of 200,000 hectares. The first part of the program in spring 2002 was successfully carried out under difficult and dry conditions. The autumn program has recently commenced but the amount of burning completed is subject to favourable weather before winter rains end the planned burning season. Appendix 11 is a map showing the proposed Annual Prescribed Burning Program in the south-west for the 2002 spring season.

The Western Australian Government strongly supports the use of prescribed burning to achieve biodiversity and protection outcomes, and has provided additional funds to ensure that there are sufficient Departmental resources to achieve the planned burning programs.

The Minister for the Environment and Heritage, Hon Dr Judy Edwards MLA publicly announced on 12 November 2002 that she strongly supported the Department’s prescribed burning program, and urged that it take all practical steps to complete as much of the proposed burning program as possible in November and December 2002. The Minister recognised that whilst the Department was expected to continue to incorporate smoke management guidelines into its prescribed burning operations, the public should expect that there may be periods when smoke or haze could have some impact on the metropolitan area. The Minister had asked that the Department monitor the burning program closely and provide advance warning to the public in the event of smoke impacts. The Minister’s public announcement is at Appendix 8.

An increasing number of local government authorities in the Perth metropolitan area are now imposing a no burning policy within their jurisdiction. In some municipalities frequent arson-caused fires are keeping much of the bush areas to a low fuel level that allows reasonable fire suppression success. FESA is making a significant effort to reduce the number of arson related bushfires. Should FESA succeed in reducing these arson fires, the subsequent fuel build-up will inevitably lead to intense, uncontrollable fires. The removal of the opportunity to conduct hazard reduction burning to reduce fuel loads is likely to exacerbate the fire suppression difficulties into the future.

Term of Reference (c): The adequacy and economic and environmental impact of hazard reduction and other strategies for bushfire prevention, suppression and control.

The fire management system applied in the South-West Land Division consists of four major components:

- (1) Preparedness
 - Response plans, fire control working plans
 - Provision of fire equipment, communications
 - Fire training; fitness programs
 - Maintenance of firebreaks, access, water supplies; control points; etc
 - Standby orders for fire control personnel, equipment, contractors
 - Fire weather and fire danger forecasting

- (2) Prevention
 - Public education, consultation, fire awareness training programs, warning signs
 - Hazard reduction (prescribed burning, mechanical, pruning, etc)
 - Fire detection and reconnaissance (towers, aircraft, ground)
 - Patrol, policing, fences, etc

- (3) Fire Suppression
 - Initial attack and despatch
 - Incident Control System application
 - Aerial suppression (water bombers)
 - Joint arrangements between DCLM, FESA, Local Brigades, Local Government Authorities and other organisations

- (4) Recovery
 - Fire investigations
 - Rehabilitation of firelines
 - Repair of damaged structure, equipment
 - Post incident analysis and follow-up actions

The balanced application of the fire management policy and practices over many years through cooperative arrangements with Local Government Bushfire Brigades and FESA has resulted in a relatively low impact of wildfires in the south-west of WA. Annual areas of wildfires in the south-west forest region have been generally small, and in the past 25 years the total area averaged about 15,000 hectares. Prior to the 2002/03 fire season the largest area burnt in a year during that period was 38,000 hectares in 1997/98. The total area burnt in 2002/03 fire season to date is 133,000 hectares.

Prior to the 2002/03 fire season, there had been few major forest fires since 1961 in the jarrah forest, where a prescribed burning program was expanded following the Dwellingup fire, or since 1969 in the southern karri forests where the fuel reduction policy became effective in the late 1960's. During this time there have been no losses of life of civilians living in or near the forest zone.

The beneficial contribution of prescribed burning to fire control has been demonstrated on numerous occasions and has been documented in a paper by Underwood, et al (Appendix 12). One notable example of the contribution of recently-burnt areas to wildfire control was provided by the Mount Cooke fire on 9 January 2003 which burnt 18,000 hectares of "heavy" fuels before being contained within areas of low fuels resulting from prescribed burns undertaken in the past four years. A satellite image of the Mount Cooke fire showing the surrounding fuel ages is at Appendix 10.

Analysis of the fuel-age of areas burnt by the 2002/03 wildfires in the south-west forest regions shows that 87 percent of the areas burnt were within fuel ages of six years or more,

and 48 percent within fuel ages of 11 years or more. About 13 percent of wildfire areas occurred in fuel ages that were five years or less indicating that fires burning in these lighter fuels are easy to contain to small sizes.

The areas of 2002/03 wildfires within fuel age categories for Department-managed lands in the south-west forest region are shown below:

Fuel Age	Area (ha)	Percentage
5 years or less	11,931	13
6-10 years	36,838	39
11-20 years	44,060	46
Greater than 20 years	2,371	2

Total	95,199
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Term of Reference (d): Appropriate land management policies and practices to mitigate the damage caused by bushfires to the environment, property, community facilities and infrastructure and the potential environmental impact of such policies and practices.

Most of the matters relevant to this term of reference have already been covered in the previous Terms of Reference's. Copies of the current and the draft revised DCLM Fire Management Policy are attached (Appendix 5 and 6).

There have been a number of significant reviews of fire policy and practices in Western Australia. The Royal Commission following the 1961 Dwellingup fires resulted in changes to fire policy, particularly the widespread application of prescribed burning for preventing large bushfires. In 1994 a Fire Review Panel established by the Minister for Conservation and Land Management conducted a review of prescribed burning policy and practices and the Wildfire Threat Analysis of DCLM. The Report by the Panel contained 36 recommendations (see Appendix 11) which were largely adopted.

DCLM initiated a review in 2001 of the Department's fire management operations in the south-west in the context of the change of the Department's statutory functions and the creation of the Forest Products Commission in November 2000, as well as for the Department's own purposes of review of a significant component of the Department's operations.

The review undertaken by Mr Chris Muller (henceforth referred to as the Muller Fire Review) addressed thirteen terms of reference and made 43 recommendations on key aspects of fire management.

The Department's Corporate Executive has accepted or conditionally accepted all but one of these recommendations and an Implementation Plan has been initiated.

A copy of the Muller Fire Review Report is attached (Appendix 1), as well as a copy of the Department's Response to the Muller Review and the Implementation Plan (Appendix 2).

As part of ongoing efforts in respect of public education, awareness and involvement, DCLM hosted a Fire Symposium on 16 to 18 April 2002. The Symposium involved a range of international, national and state speakers including research scientists, policy makers and fire management practitioners. The presentations covered the latest research findings on fire history, fire ecology, fire policy, fire control and management in respect of south-west Western Australia. The scientific papers presented at this Fire Symposium have recently been published in a book titled "Fire in ecosystems of south-west Western Australia: impacts and management, Volume 1 – Scientific Papers" (Editors Ian Abbott and Neil Burrows) (Appendix 3) and unrefered papers presented by community members have been published in a second volume (see Appendix 4).

Term of Reference (e): Any alternative or developmental bushfire mitigation and prevention approaches, and the appropriate direction of research into bushfire mitigation.

FESA is very proactive in developing a range of techniques in relation to bushfire mitigation and prevention. Many of these are addressed through initiatives incorporated with the Arson Task Force Strategic Plan. A copy of some of the relevant principal publications developed by FESA on prevention is attached as Appendix 14. FESA has adopted education and enforcement processes for developing its prevention and mitigation strategies.

An example of the type of bushfire prevention work that FESA has developed is the award winning Community fire safety program (highly commended in the 2002 Safer Community Awards) where after analysing bushfire trends, a combined FESA – Community Safety Division and Fires Services, local brigades, Police - Arson Investigations Unit and General Duties, and local school arson reduction activity is implemented in the local community. This activity has resulted in significant reductions in arson bushfires for the next 15 months (possibly longer but this is the extent of the timeframe available for analysis at this time).

Another example is the work with the Keep Australia Beautiful Council, local government and Main Roads Department where FESA is seeking cooperation to reduce the 550 mulch fires caused by discarded cigarettes.

Throughout the last four decades DCLM (and formerly the Forests Department) has shown a strong commitment to applied fire research, and effective collaboration with national and international research groups. The development of scientific understanding of fire behaviour, fire ecology and fire management practices has been both driven and facilitated by the practical need to use fire in State forests, plantations and conservation reserves. This knowledge and practical application of fire have placed Western Australian scientists and managers in the vanguard of bushfire science and management.

An outstanding example of this commitment to research is demonstrated through the collaborative project (Project Vesta) between DCLM and CSIRO, which commenced in 1995, and is planned to be finalised by late 2003. This \$6 million project, which was part funded by FESA and other fire and land management agencies throughout Australia (under the auspices of the Australasian Fire Authorities Council – AFAC), was designed to quantify the changes in fire behaviour in dry forests as fuels develop with age, and to revise the prediction algorithms describing the relationships between fire behaviour, wind speed and fuel characteristics

DCLM and FESA are key partners with 32 other agencies and research institutions through Australia in the national Bushfire Cooperative Research Centre (CRC) which is to extend for seven years commencing in July 2003. The Bushfire CRC is a large, complex CRC, which will cost \$113 million and involve 28 related fire research projects at 20 research institutions. The main objectives of the CRC are to coordinate Australian research in order to improve the effectiveness of fire management by agencies, and increase community self-sufficiency in managing the bushfire risk.

DCLM and FESA have a strong commitment to developing new and improved approaches and practices in areas of bushfire prevention, control and fire management. The following are some of the key areas of applied research undertaken in recent years:

- Strategies to improve community awareness of fire and community self-sufficiency;
- Extension of the DCLM Wildfire Threat Analysis approach from Department-managed lands to private lands and other Crown lands;
- Improving GIS systems and remote sensing tools for planning, implementation and monitoring of fire control and fire management programs;
- Equipment development, specifically for aerial ignition; aerial suppression; and fire tanker designs;
- Joint fire response plans for metropolitan bushland areas and rural-urban interface areas;
- Smoke movement prediction and smoke management systems;
- Development of planning guidelines for prescribed burning to achieve biodiversity outcomes;
- Development and evaluation of aerial suppression systems and aircraft types suitable for a range of fire control situations;
- Planning guidelines for application of bushfire protection measures within new rural and urban subdivisions; and
- Planning guidelines for fire protection in plantations.

Term of Reference (f): The appropriateness of existing planning and building codes, particularly with respect to urban design and land use planning, in protecting life and property from bushfires.

FESA with the Department for Planning and Infrastructure (DPI) have developed a manual "Planning for Bush Fire Protection" to assist land developers with what performance criteria and acceptable solutions need to be developed to ensure adequate bushfire protection. Planning for Bush Fire Protection ties into the AS 3959 – Construction of Buildings in bushfire-prone areas (currently under review). Planning for Bush Fire Protection also ties into the WA Planning Commission Policy No 3.7 – Fire Planning.

"Planning for Bush Fire Protection" was distributed in December 2001 and is currently under review (copy at Appendix 15).

There have been a number of industry meetings and forums where "Planning for Bush Fire Protection" was discussed and worked through so that the industry representatives had a better understanding of the new formalised process.

Where possible FESA and DPI have tried to mirror the arrangements of the other States after taking into consideration the uniqueness of the Western Australian situation.

Term of Reference (g): The adequacy of current response arrangements for firefighting.

Response Plans and Arrangements

FESA, DCLM and Local Government Authorities have developed appropriate fire response arrangements that deal with State, regional and local emergencies.

The State Emergency Management Committee (SEMC) has responsibilities for determining policy and planning guidelines to achieve an effective response to disaster or emergency situations. As Western Australia does not have emergency management legislation, the emergency arrangements are detailed in a series of SEMC policy statements’.

- SEMC Policy 7 titled “WA Emergency Management Arrangements” outlines the emergency response and recovery responsibilities, structures and strategies needed to deal with all types of emergencies, not just fires (see Appendix 16). The SEMC Policy outlines the coordination structure and responsibilities for the Hazard Management Agencies, Combat and Coordination Agencies, and Support Agencies.
- “WESTPLAN Wildfires” is the annual emergency management plan that deals specifically with the emergency management arrangements for wildfire operations that include prevention, preparedness planning, response and recovery activities (copy at Appendix 17). The WESTPLAN Wildfires Plan applies to all areas in the State for which FESA Fire Services, DCLM and local government have responsibilities under the Bushfires Act, the Fire Brigades Act and CALM Act. The WESTPLAN Wildfires Plan is reviewed annually by FESA and DCLM for approval by the SEMC.
- “WESTPLAN – Urban Fire” is the emergency management plan dealing with urban fire emergencies. It includes prevention, preparedness planning, response and recovery activities within gazetted fire districts of Perth and regional centres.
- Arrangements at local/district level are outlined in Local Emergency Management Plans, which are administered by local emergency committees maintained within each local government area.

FESA maintains response plans for each of the significant natural environment areas within the Perth and many of the major country town fire districts. These plans cover the areas of social, economic and environmental significance to ensure optimum protection is afforded to the community.

DCLM maintains Preparedness and Response Plans (known as Fire Control Working Plans) for each of its Districts. These plans cover the standing orders and contact details for the provision of rapid and effective response to wildfires in the relevant District.

DCLM and FESA use the Australian Incident Control System (ICS) as the operational management structure at wildfires and other emergencies. The ICS system has proven to be highly effective in ensuring that all agencies use consistent command, communications and management procedures to accomplish agreed fire suppression objectives.

The response arrangements outlined in each of the abovementioned plans and systems have proven to be adequate and effective in dealing with the numerous large wildfires that have occurred in the 2002/03 fire season in Western Australia. However the response arrangements have not yet been tested under the major disaster scenario such as that which occurred during the Canberra fires of January 2003.

The possibility of a similar extreme fire event occurring in the outer-metropolitan areas of Perth (particularly in the Hills suburbs) has been recognised. As a consequence of the recognition of this likelihood, FESA and DCLM staff have initiated a review of arrangements which will include a review of the WESTPLAN Wildfires Plan, as well as a joint exercise in November 2003 involving Local Government Authorities and Volunteer Bushfire Brigades, and Emergency Support agencies.

The adequacy of the response arrangements by the WA fire agencies was severely tested during the 2002/03 fire season, given the high numbers and large size of fires. The majority of fires attended by DCLM were controlled rapidly despite the very high fire danger conditions. As indicated on Table 2 (page 7 of this submission), 78 percent of DCLM fires in the south-west forest region were contained to less than 10 hectares. Nearly all of the larger fires occurred either within long-unburnt, highly flammable fuels, or in areas where access for fire fighters was difficult.

FESA understands that whilst the current human response arrangements for fire fighting are adequate, this situation may not last long if there is a continuing shift of people from the small country towns to the larger country towns and cities. The loss of town people and the aging population makes replacement by young fit bushfire fighters more difficult.

The levels of volunteers in the very isolated areas such as the pastoral areas in the Kimberley, Pilbara and Goldfields regions, are currently deemed to be at the lowest acceptable minimal level. If the fire suppression requirements change for environmental or other reasons then it is highly likely that there will not be adequate resources to meet suppression needs in some of these remote areas. In an endeavour to partly address this problem, the State Government has passed legislation to establish FESA Units in affected towns such as Halls Creek and Wyndham. These are volunteer units which are combined units undertaking the roles of the fire services and the State Emergency Services. At present there are seven of these established throughout the State. Numbers within these FESA units vary from ten active volunteers in the community to over thirty.

Aerial Suppression

Prior to the 2002/03 fire season, WA fire agencies contracted four fixed-wing Dromader aircraft for aerial suppression operations in urban-rural interface and forested lands near Perth and Bunbury. These aircraft have proven to be effective in restricting small or initiating wildfires and in asset protection. However there were multiple wildfire situations where there were insufficient aircraft to deal with fires in the south-west and within the bushland areas in the metropolitan area. It was recognized, given the forecast drought and high fire danger that would prevail for the 2002/03 fire season, that additional aerial suppression capability was required to deal with fires in the rest of the south-west forests, as well as in the metropolitan area. To meet these needs, it was proposed to increase the fleet by two fixed-wing aircraft to be based at Manjimup, and two helitankers for asset protection in the metropolitan area.

The cost of the two helitankers and two fixed-wing aircraft was estimated to be \$1.5 million for the 2002/03 season. It was expected that the Commonwealth would contribute \$900,000 towards this total as part of the National Aerial Fire Fighting Strategy developed for the Federal Department of Department of Transport and Regional Services by the Australasian Fire Authorities Council (AFAC). The Commonwealth eventually agreed to provide a once-off payment of \$300,000 for the helitankers, so that the State Government and its agencies were required to provide \$1.2 million.

The six fixed-wing (Dromader) water bombers managed by DCLM out of Perth (2), Bunbury (2) and Manjimup (2) proved yet again to be of major benefit in supporting ground forces in containing small fires in 2002/03. These aircraft were particularly effective in restricting the spread of initiating wildfires within forest and heathland fuels. A report on the Aerial Water Bombing Operations for the previous fire season (ie. 2001/02 when there were four fixed-wing water bombers in use) is at Appendix 18. This report identified that the fixed-wing water bombers contributed towards a saving of approximately \$33.8 million in the value of assets and suppression costs.

The FESA managed helitankers based at Perth were in great demand and used extensively for house/asset protection on fire in the bushland-urban interface in and near Perth during the 2002/03 fire season. Despite the large number of bushfires that impinged on residential communities, there were no houses lost to bushfires, although numerous sheds, out-buildings and fences were damaged by the fires.

Early indications are that the savings in assets and suppression costs that have resulted from the operations of the six fixed-wing aircraft and two helitankers for the 2002/03 fire season will exceed \$40 million.

Term of Reference (h): The adequacy of deployment of firefighting resources, including an examination of the efficiency and effectiveness of resource sharing between agencies and jurisdictions.

Resource sharing arrangements between FESA, DCLM and Local Government Authorities are determined on the basis of the predetermined wildfire response plans and mutual-aid agreements. WESTPLAN Wildfires 2003 (Appendix 17) outlines the resource sharing arrangements and agency responsibilities at fires that involve more than one fire agency. These arrangements are regularly tested, reviewed and modified in the light of experience and recommendations from post incident analysis of multi-agency fires.

In recent years, teams of Western Australian fire control staff and fire crews have been called on to assist in incident management and fireline suppression roles on large wildfires in New South Wales (1994, 2001 and 2003), Victoria (2003) and the United States of America (2000 and 2002).

These deployments have been effective due to the commonality of the incident management systems (ICS) and the fire training competency standards and training programs that allow interstate and international fire personnel to readily adapt to the local fire control situations and requirements. The competencies and professionalism of the Western Australian fire team

leaders have been acknowledged by the USA federal fire agencies and the NSW Rural Fire Services.

Term of Reference (i): Liability, insurance coverage and related matters.

There are no issues of concern for WA.

Term of Reference (j): The roles and contributions of volunteers, including current management practices and future trends, taking into account changing social and economic factors.

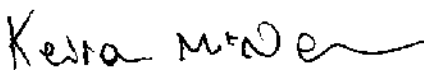
The bushfire management system in Western Australia could not operate if the volunteer was removed from the system. There are over 20,000 volunteer bushfire fighters in WA. The current management of the bushfire volunteer is through the Local Government Authority, and supported by specialist bushfire managers from FESA. In the gazetted fire districts (major towns and cities), bushfires are managed by FESA Fire Services career staff and volunteers.

The likely future trend will be for an increasing difficulty recruiting and retaining fit volunteer fire fighters. This is already occurring in some of the smaller country towns and shires where there has been a general population trend away from the country to larger towns and the city. This may necessitate more innovative ways to attract people to become volunteers and reward volunteers (such as tax concessions). As a last resort, it may be necessary to introduce permanent career firefighters within smaller country towns, or increase the flexibility of permanent staff movements during bushfires. In either event more paid staff would be required.

The contact officer for any further information is Mr Alan Walker, DCLM's Director of Regional Services, who can be contacted on (08) 9442 0328.

Officers of State Government agencies would be pleased to appear before the Select Committee to elaborate on this submission as required.

Yours faithfully



Keiran McNamara
A/EXECUTIVE DIRECTOR

16 May 2003

Attachment: Appendices 1-18

LIST OF APPENDICES

Appendix 1	Review of Fire Operations in Forest Regions managed by DCLM (C Muller, September 2001)
Appendix 2	Response by the DCLM to the Internal Review of Fire Management, and the Implementation Plan.
Appendix 3	“Fire in Ecosystems of South-west Western Australia – impacts and management” (Abbott and Burrows, 2002/03). Volume 1
Appendix 4	“Fire ecosystems of south-west Western Australia: impacts and management” - Community Perspective about fire. Volume 2
Appendix 5	Current DCLM Fire Management Policy
Appendix 6	Proposed DCLM Fire Management Policy
Appendix 7	Map of Distribution of Fuel Age Categories within south-west WA
Appendix 8	Media Statement by Minister for the Environment & Heritage of 12 November 2002. “Forest fire management a priority: Minister”
Appendix 9	Map of Large Wildfires for the 2002/03 fire season in the South-west Land Division
Appendix 10	Satellite Image of Mount Cooke Wildfire (13 January 2003)
Appendix 11	The Annual Prescribed Burn Program in the Southwest Forest Regions for Spring 2002
Appendix 12	Underwood, R.J., Sneeuwjagt, R., and Styles, H.G., (1985) – “Contribution of Prescribed Burning to Forest Fire Control in Western Australia” in “Fire Ecology and Management in Western Australian Ecosystems”. Proceedings of a symposium 1985. WAIT Environmental Studies Group Report No.14 edited by Julian R. Ford.
Appendix 13	Report of the Fire Review Panel – A Ministerial Review of the CALM Prescribed Burning Policy and Practices and Wildfire Threat Analysis (1994)
Appendix 14	FESA Bush Fire Prevention Activities
Appendix 15	Planning for Bushfire Protection – December 2001
Appendix 16	SEMC Policy 7 “WA Emergency Management Arrangements”
Appendix 17	WESTPLAN Wildfire 2002/03
Appendix 18	Aerial Water Bomber Report for 2001/02