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# Using crime prevention to reduce deliberate bushfires in Australia

Damon A Muller

**AIC Reports**  
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# Foreword

Based on previous research undertaken by the Australian Institute of Criminology it seems that approximately half of all vegetation fires—some 20,000 to 30,000 each year—are deliberately lit, and that arson in all forms costs the Australian community \$1.6 billion annually. Although it can be very difficult to identify whether a fire is deliberately lit and even more challenging to identify who is responsible, there are still a range of strategies and interventions that may reduce the likelihood of bushfire arson occurring.

This report seeks to assist and inform fire-prevention policies and practices by examining what we know about the risk factors for arson and who commits it. Available evidence suggests that the risk of deliberate fires is higher during certain times of the year and week and that there are ‘hot spots’, most notably on the edge of urban areas. On known offenders there is limited research and it primarily relies on small samples of convicted arsonists. As a result situational and community crime prevention that addresses the local environment is most likely to have an impact, whilst offender based approaches have to focus on the treatment of known offenders, both adults and juveniles.

To assist the further development of preventative initiatives the report discusses the main crime prevention principles and approaches by linking them to examples of programs that target the environment, the community and known offenders. A wide range of measures are provided as examples, including those related to controlling access, fuel reduction, removing abandoned cars, and various community awareness campaigns that have targeted specific groups and/or communities. However, the report concludes that more investment is required in impact evaluation to ensure that the efficacy of discrete programs is better understood, and that, to be more collaborative and strategic, crime prevention approaches in the future will need to involve fire and other agencies, and local communities.

**Judy Putt**  
**General Manager, Research**  
**Australian Institute of Criminology**



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The data on the incidence of bushfires in Australia was sourced from all Australian fire agencies, the details of which are contained in Bryant (2008a). The collection and analysis of this data was undertaken by Colleen Bryant. Data on arson offenders in NSW was supplied by the NSW Bureau of Crime Statistics and Research.

The author would like to acknowledge that many of the ideas which formed the basis of this report evolved out of several forums and discussions with members of the Bushfire CRC, from both end users

and other researchers. Ralph Smith from the Western Australian Fire and Emergency Services Authority provided valuable information about arson prevention programs in operation in Western Australia. Warren Christensen's work on fires on forestry plantations in Queensland demonstrated that bushfire arson can be addressed with crime prevention approaches, and provided crucial inspiration for this report. And finally, thanks are due to the many people in the Australian fire services who answered questions or provided clarification on various issues.

This report does not represent the policy position of the Australian Government, the ACT Department of Justice and Community Safety, or the Australian fire agencies that contributed to the report.



# Acronyms and abbreviations

<b>AFAC</b>	The Australasian Fire Authorities Council
<b>AIC</b>	Australian Institute of Criminology
<b>AIRS</b>	Australian Incident Reporting System
<b>BOCSAR</b>	The New South Wales Bureau of Crime Statistics and Research
<b>BTE</b>	The Bureau of Transport Economics
<b>CALM</b>	Department of Conservation and Lands Management of Western Australia
<b>CBO</b>	Community-based order
<b>CCTV</b>	Closed Circuit Television
<b>CFA</b>	The Victorian Country Fire Authority
<b>CFU</b>	New South Wales Community Fire Units
<b>COAG</b>	Council of Australian Governments
<b>CLOC</b>	Model Criminal Code Officers Committee (Criminal Law Officers Committee)
<b>CPTED</b>	Crime prevention through environmental design
<b>DSE:</b>	The Victorian Department of Sustainability and Environment
<b>FESA</b>	The Fire and Emergency Service Authority of Western Australia
<b>FFF</b>	Fight Fire Fascination program (Queensland)
<b>IFAP</b>	Intervention and Fire Awareness Program (NSW)
<b>JAOP</b>	The Queensland Juvenile Arson Offenders Program
<b>JFAIP</b>	Juvenile Fire Awareness and Intervention Program (ACT, Victoria & NT)
<b>JFFQ</b>	Juvenile and Family Fire Awareness (Victoria)
<b>JFIP</b>	Juvenile Firefighters Intervention Program (SA)
<b>JFLIP</b>	Juvenile Fire Lighter Intervention Program (Tasmania)
<b>MFB</b>	The Victorian Metropolitan Fire and Emergency Services Board
<b>NSWFB</b>	The New South Wales Fire Brigade
<b>NTFRS</b>	Northern Territory Fire and Rescue Service
<b>QFRS</b>	Queensland Fire and Rescue Service
<b>RIP</b>	Reduced ignition propensity (cigarettes)
<b>RSF</b>	The New South Wales Rural Fire Service
<b>SACFS</b>	South Australian Country Fire Service
<b>SAMFS</b>	South Australian Metropolitan Fire Service
<b>TFS</b>	Tasmania Fire Service





# Introduction

Bushfires are an integral part of life in Australia and are a characteristic of the Australian landscape. Each summer, fire authorities respond to thousands of bushfires across the country, many resulting in substantial damage to vegetation and property and loss of life. Fire plays a valuable role in many of Australia's ecosystems, but these are adapted to particular fire regimes, and too much or too little fire, or fire that is too intense, can be harmful even to these fire-adapted environments (Ellis, Kanowski & Whelan 2004). Fire is also an essential tool for land management, but such use requires knowledge and care. As such, bushfire in certain settings is not inevitably bad.

Bushfires have always plagued rural and remote locations. Although Australia has a heavily urbanised population, life on the fringes of the urban sprawl, in close proximity to the bush, is becoming increasingly popular. Even those in the middle of Australia's cities, however, are acutely aware of the amount of damage that can result from bushfire. The smoke that shrouded Melbourne during the bushfires in late 2006 and early 2007, hundreds of kilometres distant, was a reminder of how bushfires can affect all Australians.

Typically thought of as natural, bushfires are commonly the result of human intervention. It is difficult to determine the causes of all bushfires,

but it is clear that natural bushfires are very much in the minority. Inappropriate use of fire for rubbish disposal or prescribed burning; heat or sparks from vehicles such as trains or motorbikes; and sparks from malfunctioning electrical equipment or welding may all result in bushfires. These, while human-caused and thus potentially preventable, are not deliberate. More concerning, however, are those bushfires that are deliberately lit.

## What is bushfire arson?

Arson is defined under Australian law on a jurisdiction-by-jurisdiction basis, but is essentially a serious indictable offence involving criminal damage to property such as structures, vehicles or vegetation by fire or explosives. As a criminal offence, arson is required to be deliberate and to have been committed either with the intention to cause damage or with disregard to the damage that might result. A more detailed discussion of the specifics of arson legislation in each Australian jurisdiction can be found in Willis (2004).

In terms of the forms of deliberate firesetting encountered by Australian fire agencies, the legal definition of arson is somewhat restrictive. Fires can be set by young children under the age of criminal responsibility, or by older children or adults who do

not have a good understanding of the damage they may cause. Alternatively, fires may be clearly deliberately set with the intent to cause damage, such as in the case of insurance fraud, but there may be no identified suspects or insufficient information to charge a suspect with arson.

The term 'bushfire' is similarly problematic. What most people understand to be bushfires are often referred to within the fire services as wildfires or landscape fires. Statistical data collection systems used in Australia tend to refer to 'vegetation' fires, which may encompass everything from a hedge to a suburban nature strip to a state forest. It is therefore often difficult to reconcile the data classification schemes used by the fire services with most common public conceptualisations of bushfires.

For the purposes of this report, the terms 'arson' and 'bushfire arson' are used according not to their strict legal definition but rather to a more commonsense one. Arson is used to represent any problematic deliberate firesetting, regardless of its legal status. Both those fires determined to be deliberate and those that are suspicious but not proved to be deliberate are considered in this report to constitute arson, including cases in which an offender has not been identified. Bushfire is used similarly broadly, and is intended to represent areas of vegetation, particularly those in close proximity to human habitation. These broad definitions of bushfire arson allow us to consider behaviour that is not technically bushfire arson, such as the burning of a stolen car or the act of a child too young to form criminal intent, as potentially susceptible to prevention.

## How common is bushfire arson?

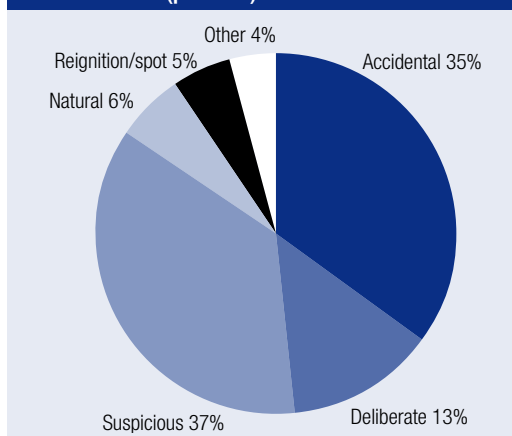
Arson is a relatively easy crime to commit and conceal. Many bushfires are not subject to an investigation to determine their cause, and of those that are investigated and concluded to be deliberate or suspicious, that conclusion is often due to the lack of any clear indication that the fire was natural: no lightning recorded in the area, and nothing else nearby that may have caused the ignition. It is rare

for firefighters to find some form of incendiary device that would unambiguously point to a deliberate fire. As such, it is very difficult to determine exactly how many bushfires people have lit and with what intent.

To complicate matters further, there are various inconsistencies in the ways in which fire agencies throughout Australia record data about fires they attend, and obtaining a consistent figure that represents the nature of deliberate lighting of bushfires in Australia can be difficult. Some agencies, for example, are more conservative than others in deciding the cause of a particular fire. This is not a matter of lack of competence, simply a consequence of data that are inherently complex and guidelines that cannot account for all possibilities.

The Australian Institute of Criminology has recently undertaken an analysis of approximately 280,000 fires recorded by Australian fire agencies in periods for which data were available (Bryant 2008a). The number of vegetation fires each agency analysed and the years each analysis covers are presented in Table 1. Analyses mainly focused on spatial and temporal trends in deliberate bushfires; that is, when and where deliberate bushfires were most likely to occur. The spatial analyses were performed at a broad regional level, but the results do give some indication of the occurrence of patterns in deliberate bushfires. This research will be referred to throughout the report.

**Figure 1: Cause of bushfires in Australia, based on agency and year-averaged data (percent)**



Source: Combined Australian fire agencies [computer data file]

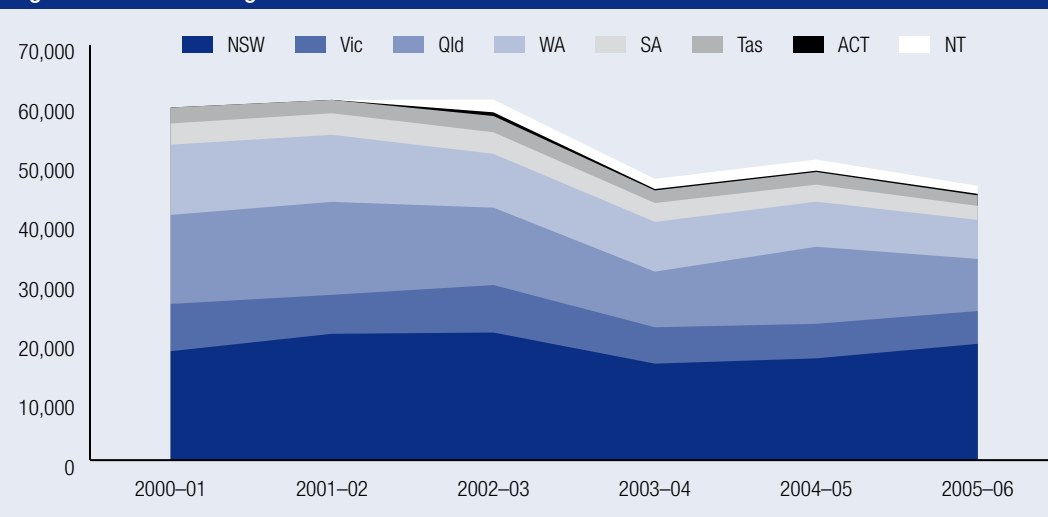
**Table 1: Vegetation fires recorded by Australian fire agencies**

Agency	State	Vegetation fires	Years covered	Area burned ('000 ha)	Percent deliberate
MMFB	Vic	9,543	1997–98 to 2001–02	5.8	23
CFA	Vic	25,693	1999–2000 to 2003–04	1,207	33
DSE	Vic	8,355	1991–92 to 2003–04	n.a.	32
NSWRFS	NSW	23,664	1999–2000 to 2003–04	1,173	19
NSWFB	NSW	55,730	1997–98 to 2001–02	n.a.	37
National Parks and Wildlife Service	NSW	3,275	1995–96 to 2003–04	3,500	41
State Forests	NSW	1,785	1997–98 to 1 Dec 2003	1,327	39
QFRS	Qld	45,525	1997–98 to 2001–02	2,167	45
Forestry Plantations Queensland	Qld	3,573	1975–76 to Oct 2004	1,580	36
Queensland Parks and Wildlife Service	Qld	409	1999–00 to 2003–04	6,000	39
SAMFS	SA	2,926	1997–98 to 2005–06	n.a.	n.a.
SACFS	SA	8,603	1997–98 to 2003–04	145	20
Department of Environment and Heritage	SA	1,534	1975–76 to 2003–04	n.a.	30
FESA	WA	61,446	2000–01 to 2006–07	n.a.	69
CALM	WA	2,511	1999–2000 to 2002–03	4,876	54
TFS	Tas	13,083	1999–2000 to 23 Nov 2004	190	36
NTFRS	NT	10,650	Jul 1999 to Nov 2004	1,069	27
ACT Parks Conservation and Lands	ACT	988	1975–76 to 2002–03	377	69

n.a. = not available

Source: Bryant 2008a

**Figure 2: Number of vegetation fires in Australian states and territories**



Source: Productivity Commission 2006

The analysis of data about vegetation fires from Australian fire agencies suggests that half of all vegetation fires are either deliberately lit or suspicious (Figure 1), although the figure varies depending on location. Australian fire agencies report that they attend approximately 45,000 to 60,000 landscape fires each year (Figure 2; Productivity Commission 2006). This suggests that around 20,000 to 30,000 fires are deliberately lit in Australia each year.

## What does arson cost?

The true cost of deliberately lit bushfires to the Australian community is difficult to quantify. It has been estimated that in all its forms arson costs Australia \$1.6 billion a year, although this figure is premised on a number of assumptions, many of which are anecdotal (Rollings 2008). Many deliberately lit fires are not recognised as arson, and even those fires subject to a more thorough investigation can be difficult to attribute responsibility for.

International estimates of the damage caused by arson are similarly high. In England and Wales, arson causes around 100 deaths a year and costs more than £2 billion a year (Arson Prevention Bureau 2003), and it is estimated that there were 113,700 malicious fires in 2001. In the United States it is estimated that arsonists set 1.5 million fires each year, causing more than \$US3 billion in damage and resulting in 500 fatalities (Prestemon & Butry 2005).

A review by the Bureau of Transport Economics (BTE 2001) of major disasters in Australia put the cumulative cost of all bushfires from 1967 to 1999 that caused more than \$10 million damage at \$2.5 billion. The BTE notes that Australia has on average one bushfire each year that results in damage worth more than \$10 million. Whilst bushfire is not the most expensive of the natural disasters that afflict Australia (floods, for example, costing \$10.4 billion in the same period), the regularity with which relatively small bushfires are reported in the media keeps the topic salient in the public eye, especially during bushfire season.

The BTE study did not distinguish between deliberately lit and naturally occurring bushfires,

but deliberately lit bushfires tend to be smaller and lit in more accessible areas than many natural bushfires, which often result from lightning strikes. The largest and most damaging of Australia's bushfires, such as the 2003 Canberra fire, which was estimated to have caused insured losses of \$250 million (Wiat & Maunder 2003), result from natural causes; but deliberately lit bushfires, though small, disproportionately tie up the resources of the fire services, especially because they are often lit near houses in the rural–urban interface. Each response to such fires costs the fire services a certain amount and reduces resources for responding to other emergencies. Actually quantifying these costs can be difficult, however, as many deliberately lit bushfires are responded to by volunteer fire services. It has been conservatively estimated that the economic value of the volunteer contribution to Victoria's Country Fire Authority was \$470 million in 2000–01 (Hourigan 2001).

In addition to the economic costs of bushfire, there are also a number of social costs, including injuries and deaths, as well as the effects on the emotional and physical wellbeing of people who lose property to fire. Research into survivors of residential fires reports that high degrees of stress are still present six months after the fires (Keane et al. 2002). Given that \$188 million of the \$250 million of insured damage due to the 2003 Canberra bushfires was listed as domestic losses (Wiat & Maunder 2003), it is clear that bushfires can do extensive damage to property. Less tangible is the damage done by fire to systems such as water catchment areas and ecological damage, which can be considerable (Handmer & Proudley 2004).

When considering deliberate bushfires, the response of the criminal justice system—the cost of the fire- and police-service investigations, the cost of prosecution and the costs of sanctions such as imprisonment and community based orders—must also be considered. The costs of arson calculated by Rollings (2008) do not include the criminal justice response of arson (such costs were aggregated across all crimes), and it is difficult to put an estimate on these costs. Although available data suggest that prosecutions for bushfire arson offences are rare (see 'Programs targeting known offenders' section), many fire investigations do not result in charging of a suspect. Such investigations typically include the fire services and the police, but may also involve

land management agencies, energy authorities, insurance companies and the coroner. The costs of deliberate bushfires may also include the loss of confidence by the community in the institutions that are supposed to protect them.

## Preventing bushfire arson

Australian fire agencies have a long history of promoting community safety and running programs to reduce the incidence and potential damage of fire. Such programs aim to educate children and their parents, and have raised community consciousness of life-saving devices such as smoke alarms, including in culturally and linguistically diverse communities (Milat, Carroll & Taylor 2005). Education campaigns concerning bushfires have typically focused on making homeowners aware of how to prepare and defend their property and of the significance of days of high fire danger. Although there has been little formal evaluation of these education campaigns, they are considered to be an essential component of any community fire-safety strategy. Sixty different programs specifically for bushfires were identified by Gilbert (2007) as being in use by fire agencies throughout Australia, and more community education campaigns were recommended on a number of topics by the Council of Australian Governments (COAG) bushfire enquiry (Ellis, Kanowski & Whelan 2005).

Traditional bushfire prevention campaigns targeting the community have essentially been cause-agnostic and concerned more with protecting against a fire than with preventing fires from starting. A substantial proportion of bushfires that affect Australia are deliberately caused, however, and many of these may be preventable using knowledge that has traditionally been applied to other crime.

The COAG bushfire enquiry identified the prevention of arson as one important strategy for reducing the risk of bushfires in Australia. The enquiry noted:

Arson is one cause of fire that can be reduced through greater application of resources.

The Inquiry found, however, that the focus on arson varies significantly across the states and territories, depending on the perceived size of the problem, community concern and identification of arsonists (Ellis, Kanowski & Whelan 2005: 95).

The purpose of the current report is to consider ways in which crime prevention strategies can be used to reduce the incidence of deliberate bushfires. Although there are a number of existing innovative crime prevention approaches to preventing bushfire arson around Australia, these programs often have little exposure and are unknown beyond their own local area. This report brings together a number of such programs and puts them in the context of the principles of crime prevention, in the hope of placing Australian fire agencies in a better position to create, expand or evaluate their own programs for preventing bushfire arson.

Crime prevention approaches to preventing deliberate bushfires often require the cooperation of police, fire agencies, local and either state or territory governments, and policymakers in criminal justice and public safety, any of which will have trouble implementing such programs in isolation. This report, therefore, is intended to be of interest to all of these areas and assumes little specialist knowledge. As such, some sections may be of less interest to any given reader than others will, but some background into the practical and theoretical issues is provided for those who want more detail. It should be noted, however, that the treatment of each of these subjects is not intended to be exhaustive, and that readers who desire more information are encouraged to make use of the references provided.

# Risk factors for bushfires in Australia



Successful crime prevention tends to be individualised to a particular area and problem. An appropriate crime prevention response to bushfire arson requires an understanding of how arson is experienced by a particular community. Fire agencies routinely collect data on their operational performance that include a great deal of information regarding the fires they attend, but local knowledge by longstanding members of the police, the fire services, and the community may equally identify hot spots for bushfire arson.

This section considers a number of risk factors for natural and deliberate bushfires, derived from an analysis of fire service statistics that was reported in Bryant (2008a). These are broad, national trends, not necessarily representative of the patterns in deliberate bushfires in any particular area but serving to give some indication of how crime prevention resources can best be allocated. These risk factors do not focus on individuals (the subject of the 'Who commits bushfire arson?' section), but rather on characteristics of the times, locations and communities associated with high numbers of deliberate fires.

In some cases, the data provided are for all vegetation fires. The proportion of fires which are deliberate tends to increase, however, as the total number of fires increases. As such, where the total number of fires is comparatively high, it is likely that a large proportion of them are deliberate.

## Situational factors

The Australian environment is particularly susceptible to bushfires, but when deliberately lit bushfires are considered, not all environments are equally likely to experience bushfire arson. Contrary to expectation, deliberately lit bushfires are likely to occur in areas around major urban centres. Around two-thirds of all bushfires in Australia are attended by urban fire services, with rural or country fire services attending approximately one-third and land management agencies attending fewer than five percent.

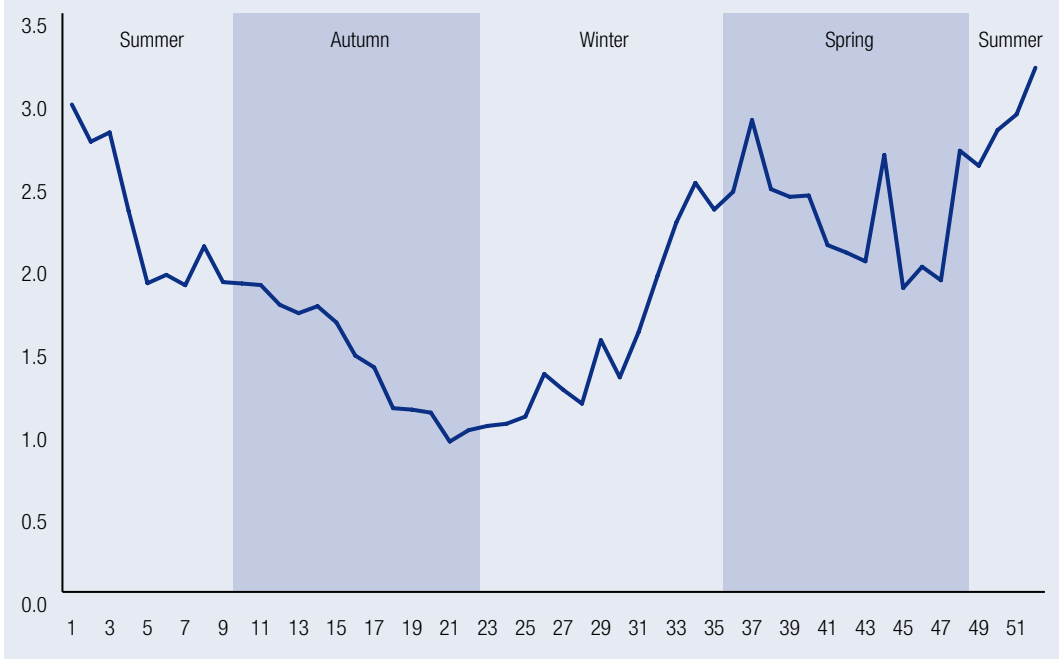
### *Weather*

Weather, including drought, the local vegetation, and the topography of an area, contributes to the risk of bushfire and is reflected in the fire danger index. Although the peak bushfire season varies somewhat between locations, in general most of Australia's bushfires occur during the summer months (Figure 3).

The chance of a severe bushfire season also varies from year to year. Particularly disastrous bushfire seasons (for all fires, not just deliberate fires), such as those in 1938–39, 1982–83, and 2002–03, are characterised by:



**Figure 3: Percentage of Australian fires occurring each week of the year, Australian average**



Source: Combined Australian fire agencies [computer data file], available data from 1997–98 to 2005–06

- severe drought
- lower than normal atmospheric humidity and cloudiness
- high daytime temperatures

(Australia. House of Representatives. Select Committee on the recent Australian bushfires 2003: 328).

Often heard in media reports about deliberate bushfires is that bushfire arsonists will be most likely to attack on the days of highest fire danger; but this is difficult to substantiate empirically. Available data on bushfires show that as the fire danger rating increases, recorded deliberate fires account for a smaller proportion of all bushfires. The increased risk of accidental and natural fires under more-adverse conditions and the difficulty in determining the cause of a fire mean that there is a lack of conclusive evidence to indicate a systematic increase in deliberate firesetting during these peak periods of risk. Research from the United States tends to find little evidence to support the theory that arsonists specifically concentrate on severe fire weather (Mees 1991).

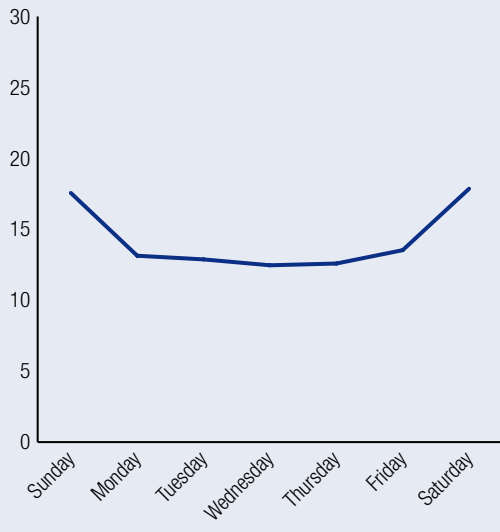
Certainly any deliberate bushfire started on days of high fire danger days has the potential to do more damage, but there is little evidence that arsonists specifically choose such conditions, and prevention strategies such as increased police presence are likely to be beneficial even in the absence of high fire danger weather (Mees 1991).

### *Time and day*

The environmental factors discussed above help predict when and where natural fires are likely to occur. But patterns of deliberate fires follow human behaviour. The motivations behind the lighting of deliberate bushfires vary, but at least some fires are thought to be started for entertainment or to create excitement (see the ‘Who commits bushfire arson?’ section). When looking at the distribution of deliberate fires over the week, such fires are clearly more common on weekends (Figure 4), lending support to the theory that fires are often lit for recreational purposes. Although this is true of an aggregation of all Australian fires, if this pattern were to hold for a particular string of fires that were believed to have

been set by the one arsonist, it might provide some insight into the behavioural patterns of the arsonist. For example it might indicate that the arsonist was employed during the week and therefore had less opportunity to light fires over the weekend. Such information could be used to narrow a search for suspects or to deploy prevention strategies more appropriate to that finding.

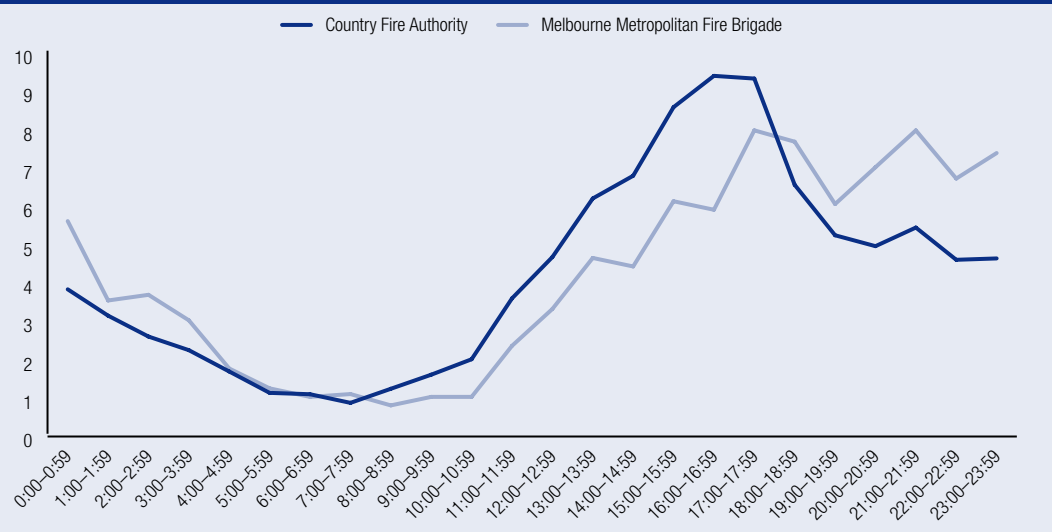
**Figure 4: Percentage of deliberate fires that occur in Australia on each weekday**



Source: Combined Australian fire agencies [computer data file], available data from 1997–98 to 2005–06

Similarly, information about the time of day at which deliberate bushfires are reported may provide insight into those who light them (data are not generally available on the time the fire is ignited, so it is necessary to use report time as a proxy). As would be expected, deliberate bushfires are least common in the early hours of the morning and peak in the late afternoon and remain high through the night (Figure 5). Although fire agency data do not include information on those who light the fires, it is possible that different groups of people are responsible for the fires in the afternoon and the fires reported late into the night. For example, children are often commuting through the afternoon; if many fires are occurring around the time that school finishes in a given area, and those fires are tending to occur close to schools or in suburbs with a high proportion of school-aged children, fire safety messages directed to school students may assist in reducing the number of deliberate fires. Though such conclusions are speculative, corroboration by eyewitnesses to ignitions or by local knowledge may be possible, and this may for the basis for preventive efforts. The use of such data to target crime prevention approaches is considered in more detail in the ‘Who commits bushfire arson?’ section.

**Figure 5: Percentage of deliberate fires reported at each hour of the day to Victorian fire agencies**



Source: Victoria Country Fire Authority and Melbourne Metropolitan Fire Brigade data from 1997–98 to 2005–06

## Community factors

An understanding of when and where deliberate bushfires occur provides some insight into who is lighting them, even in the absence of identifying particular offenders. In turn, knowledge of demographic factors associated with fires allows resources to be directed to particular communities that may be at risk. Such knowledge can be particularly important when planning emergency-service coverage for new or changing communities.

### *The rural–urban interface*

The rural–urban interface is essentially where the bush meets the suburbs, although specific definitions of what exactly constitutes an interface area vary considerably. In the context of bushfires, Cottrell (2005: 110) notes that these areas include suburbs around urban centres that abut the rural hinterland; regional urban centres; and areas on the periphery of large cities. The vast majority of vegetation fires in Australia are caused by people, either intentionally or accidentally, with only around six percent started by natural causes (see Figure 1), and as such bushfires are strongly associated with human habitation. It thus follows that the urban interface, where human habitation sits alongside areas of vegetation, is at high risk of human-caused bushfires. Given the expansion of Australia's urban centres and the 'tree-change' movement from the suburbs to semi-rural areas, fire control and prevention along the interface has become increasingly important.

A variety of research suggests that high numbers of bushfires, particularly deliberate bushfires, tend to occur in interface areas. McRae (1995) reports that most human-caused fires in the ACT occur in interface areas, and that fires decline with distance from the Canberra suburbs. An analysis of fires in the Sydney basin also determined that fires were more common within ten kilometres of the urban interface than beyond (Davidson 2006). Interestingly, American research has identified that the increased use of interface areas has led to an increase not only in arson but also in many other forms of crime, such that rural law enforcement is becoming little different from urban law enforcement (Chavez & Tynon 2000).

The encroaching urban populations of Brisbane and the Gold Coast, resulting in an urban presence expanding into the Beerburum district in Queensland, contribute to the high rate of deliberate bushfires in the area, according to Christensen (2006). Many of the people moving into this area are from a traditionally urban background, and have little of the bushfire awareness found in more-rural communities. The high proportion of young people in this interface population (Nicolopoulos 1997, Bryant 2008b) compounds the issue, as they may be unaware of the consequences of lighting a fire in bushland (Ellis, Kanowski & Whelan 2004).

It is likely that there are a number of other areas in Australia that similarly fit this pattern of population spread into what have been traditionally rural areas. Between 1991 and 1996, areas surrounding metropolitan areas showed amongst the highest rate of population growth in Australia, and country towns are growing more quickly than large cities. This trend is expected to continue into the future (Hugo 2002). According to Cottrell (2005), however, there is considerable diversity of residents in interface areas, not all of which will necessarily be associated with increases in deliberate fires. The interaction between geographical factors, such as interface areas; socio-demographic factors, such as socioeconomic status and age distributions; and the risk of deliberate bushfires is not well understood, and should be the subject of future research.

### *Socioeconomic factors*

Research has indicated that there is a link between socioeconomic status and the risk of fire. Socioeconomic factors are believed to be related to risk of fire-related injury or death through a number of direct and indirect factors, with social deprivation related to increased risk of unintentional fires. Some of the more direct factors discussed in the literature include poor standards of heating and electrical equipment and inability to afford smoke detectors (Arson Control Forum 2004a). Research in the United Kingdom found that poor levels of health and education in an area increased both the number of fires and the probability of injuries' resulting from the fires. Similarly a high level of housing deprivation led to a higher number of fires. In England the most

deprived areas have more than twice as many fires as the least deprived areas, as well as substantially more injuries and deaths from fires (Arson Control Forum, 2004a).

Although these findings are concerned only with accidental fires, similar findings have been reported for deliberate fires. International research also supports the association between low socioeconomic status and bushfire arson. A study in Florida found that deliberate fires increased with increased poverty and decreased wages (Prestemon & Butry 2005). The study suggested, without detailed examination, that those who commit some deliberate fires might have economic motives, such as illegal land-clearing for agriculture.

An analysis of data from the NSW Fire Brigades found a relationship between a number of socioeconomic factors and fires in Sydney (Nicolopoulos 1997). The research suggested that areas of lower socioeconomic status were likely to have more fires in total and more arson fires. The research did not explicitly look into the socioeconomic characteristics of those who lit the fires, only those of the suburbs in which the fires occurred.

The characteristics found to be associated with postcodes that experienced high numbers of fires include:

- a high proportion of children from five to 15 years of age
- early school-leaving age and no educational qualifications
- manual-labour work as opposed to professional or managerial roles
- unemployment
- lower income
- rental accommodation as opposed to home ownership.

The research noted that the number of fatalities from fires in Sydney was also strongly related to socioeconomic status, with many fatalities amongst the unemployed and those on pensions. The results supported the conclusion that fire agencies need to be aware of areas of greatest need in order to most appropriately target their resources, such as public education and fire safety programs, and may need

to collaborate more closely with welfare groups in order to target areas of greatest need, as traditional public education campaigns may not effectively reach these audiences.

## Understanding risk

The risk factors presented in this section are not intended to be exhaustive, but rather to give an indication of some of the factors associated with a high risk of deliberate fires. It is likely that these vary considerably when data are examined at a more local level. For example, divergence in trends in the timing of non-deliberate and deliberate fires may be likely to increase in particularly hot environments, where natural fires are likely to occur in the heat of the day and deliberate fires to occur at night, when the cooler weather allows more human activity. Similarly, vegetation patterns and their proximity to human activity will also affect fire patterns.

An understanding of the risk features of deliberate bushfires allows fire agencies to more effectively address the times, areas and populations most at risk, even in the absence of information about specific offenders to seek. Research from the United States suggests that directing law enforcement resources to times and locations associated with arson is an effective prevention strategy (Prestemon & Butry 2005). An area of vegetation close to a school that experiences regular fires in the afternoon, for example, clearly warrants prevention strategies. It is likely that a fire safety program delivered to that school might be a more effective means of reducing fires in that vegetation than collecting evidence to prosecute an individual responsible for some of the fires. This is essentially the approach taken by a Western Australian program described in the 'Primary prevention' section. However the mere presence of visible fire suppression activity in an area may in itself be enough to discourage opportunistic firesetting.

It is likely that much of the intelligence about high-risk areas that is obtainable from operational databases is considered common knowledge by operational staff responsible for an area. In concisely pinpointing a spatial and temporal pattern in deliberate bushfires, a firefighter from a regional

town commented to the author that 'the 4 pm grassfire is almost a tradition for some early teenage kids going home' in his area. Unfortunately such local knowledge is often transient, undocumented, and lost through generational change in the area. If not documented and supported with evidence, it is difficult for local wisdom to inform policy, particularly in relation to the distribution of resources that are centrally controlled by a government or fire agency.

An understanding of risk, and a good understanding of local risk factors in directing intervention strategies, requires accurate data collection by fire agencies. Although they are responsible for filling out the reports of fires, many operational staff may see little immediate personal benefit from the operational data they are required to collect. As a result, there may be little incentive to ensure that these data are as accurate as possible. Having some way for agencies to feed back trends in an easily understandable form to local brigades may help the brigades to plan and guide suppression and prevention efforts and to recognise the usefulness of accuracy in their data.



# Who commits bushfire arson?

In order to direct crime prevention programs to best prevent bushfire arson, it is useful to identify the characteristics of those who commit arson. For example, one arson prevention strategy may be more appropriate than another, depending on whether juvenile or adult arsonists are being targeted. Similarly, serial arsonists may require different responses from those who light fires more opportunistically. But the low detection rate of arson renders knowledge about potential offenders probably of less use in prevention of bushfire arson than knowledge about the fires they are lighting, making it only one component of a successful arson prevention strategy.

The discrepancy between the number of fires reported and the number of offenders prosecuted for arson, particularly bushfire arson, makes apparent that it is a crime that is rarely detected and even more rarely prosecuted. Lighting a bushfire requires no real expertise, and can be accomplished with easily obtained materials such as cigarette lighters or matches. Although some arsonists may use incendiary devices or delayed ignition devices in order to ignite a fire once they have fled the scene, such preparation is the exception rather than the rule. The ease of lighting a fire and the difficulty of linking a particular fire to a particular individual, particularly to the extent that it satisfies the burden of proof of a criminal court, mean that few arsonists are successfully prosecuted.

What knowledge we have of the characteristics of arson offenders is based only on a selective sample—those who have been caught—and we must be careful assuming that what we know about convicted arsonists is representative of all arsonists. It is likely, for example, that the most proficient arsonists are the best at eluding capture. Furthermore, it is reported that approximately 20 percent of deliberate bushfires are lit by children (Dadds & Fraser 2006), of whom very few will appear in criminal justice statistics. Children aged under 10 are not criminally liable for their behaviour, and those aged 10 to 14 in most jurisdictions are assumed by the courts to not be responsible for their behaviour, the onus being on the prosecution to prove that they are. In addition, the legislation governing juvenile justice offers in most jurisdictions a number of alternatives to processing by the formal criminal justice system for young people who have committed a crime. For a more detailed discussion of the criminal justice responses to young arsonists, see the section ‘Programs targeting known offenders’.

## Profiles of arsonists

Arson is a behaviour that is still poorly understood. Although there have been various attempts to create a profile of a typical arsonist, it is likely that there is

actually no such thing as a *typical* arsonist, as arson is a complex and multifaceted behaviour. Davis and Lauber (1999), however, have constructed the following profile by summarizing the published literature, almost all of which comes out of the United States.

**Table 2: Summary of published literature's profile of arsonists**

**Characteristics of arsonists**

Average age 25–30 years, although covering a wide age range, with women tending to be older
Predominantly racially white
The majority are male
A background of large families and broken homes, and from a lower socioeconomic status
Extensive criminal history, with many crimes that were not identified or prosecuted
Low academic performance
Poor social skills
Unemployed, or working in unskilled jobs
May have a history of alcohol abuse

Source: Davis & Lauber 1999

This profile is consistent with earlier work on profiling of arsonists (Rider 1980). Such a profile, however, is reasonably non-specific, and shares features with many other types of offenders. Research that has compared arsonists with other offenders has also reported similarities between them. One study, for example, found that arsonists were similar to violent offenders in terms of age, IQ, depression, alcohol abuse and attempted suicides, although this was on the basis of a small sample (Jackson, Hope & Glass 1987).

Also linking arson and violent crime, the literature surrounding serial and sexual killers often refers to the so-called MacDonald triad of bed-wetting (enuresis), firesetting, and cruelty to animals as being a predictor of violence in later life. Hellman and Blackman (1966) found support for the triad in a small study of patients in a psychiatric treatment centre, with 23 of 31 aggressive patients exhibiting all three components, compared with seven of the 53 non-aggressive patients. Examining 1,935 case reports prepared for criminal trials, Heller, Ehrlick and Lester (1984) failed to replicate the association of the

three elements, but did find that defendants charged with a violent crime were more likely to exhibit cruelty to animals. A more recent Canadian study found that firesetting and animal cruelty were more commonly found in sexual killers than in other sex offenders (Langevin 2003).

Although the link between violence and bed-wetting appears to be tenuous, there appears to be more support for the association between firesetting and cruelty to animals in childhood. Sakheim, Osborn and Abrams (1991), for example, found that high-risk firesetting (defined as deliberate, planned, persistent behaviour) was associated with cruelty to animals, but also with a number of other variables associated with poor impulse control. Slavkin (2001) also found that cruelty to animals, but not enuresis, was associated with recidivist firesetting. It is likely, however, that firesetting is not necessarily predictive of later violence, but rather that firesetting and cruelty to animals are examples of behaviour engaged in by some antisocial individuals (see AIC 2006 for further details).

Profiles of arsonists often characterise arson as being a sexual behaviour, and arsonists as having sexual dysfunction (e.g. Hellman & Blackman 1966). Although the literature on the topic is far from conclusive, it is likely that this belief is more a result of much of the early theorising on arson coming from a Freudian psychodynamic model of behaviour, in which urination and fire are sexualised symbols (Slavkin 2001).

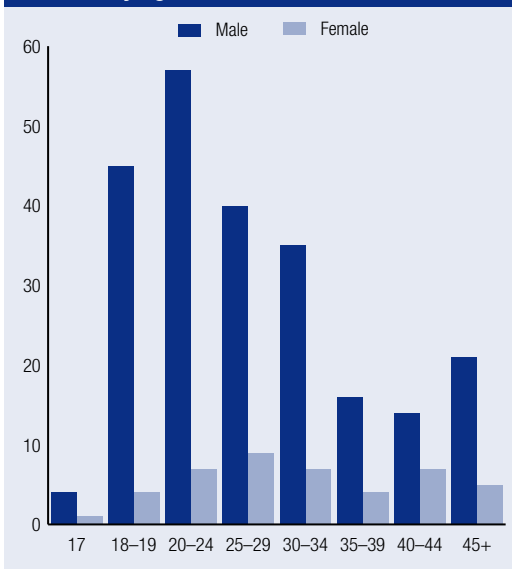
It should be noted that none of these profiles are specific to bushfire arsonists, and that in general there has been little research on profiles of bushfire arsonists, either in Australia or internationally. Shea (2002) discusses the application of what is known about arson to bushfire arsonists, but does not explicitly state where profiles of bushfire arsonists should be expected to diverge from profiles of other arsonists. Rather, he argues, each fire should be treated as a distinct act, with its own causes, some of which may never be identified.

Although it suffers from the same problems of possibly unrepresentative sampling of arsonists based on a small sample of extreme cases, a small amount of empirical information is available on the characteristics of arsonists in Australia. The information pertains only to those arsonists who

have been charged in a criminal court, and thus is likely biased toward arsons that are more serious.

A limited amount of information is available on the 276 people sentenced in Victorian higher courts from 2001–02 to 2005–06, which is presented in Figure 6 (Turner 2007). Males comprised approximately 90 percent of offenders, and female arsonists were on average older than male arsonists (31 years 11 months, compared with 28 years two months for males), but males were more likely to receive a prison sentence, suggesting that their crimes were more serious (or that they had more extensive criminal backgrounds).

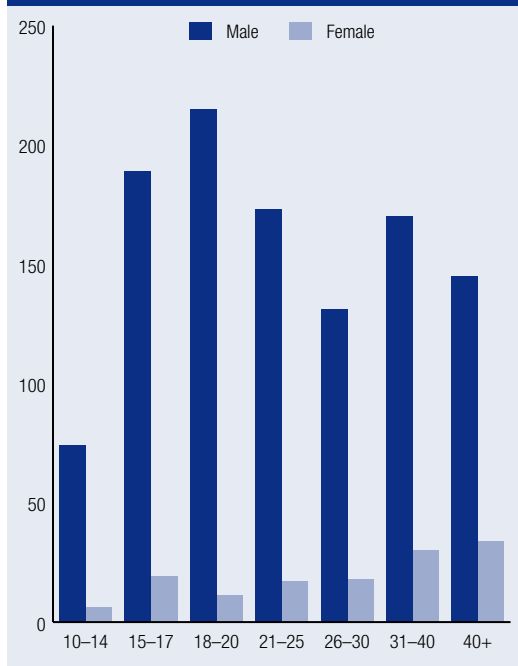
**Figure 6: Number of arsonists sentenced in Victoria, from 2001–02 to 2005–06, by age and sex**



Source: Turner 2007; n = 276

Recent AIC research examined data relating to 1,099 arson and 133 bushfire arson defendants (n = 1,232) in NSW courts. The data were provided by the NSW Bureau of Crime Statistics and Research (BOCSAR) and included all individuals who had appeared in a NSW court for arson in the period 2001 to 2006. The typical NSW firesetter was male (89%), non-Indigenous (71%) and young (mean age 27 years). Twenty-two percent of arson offenders and 31 percent of bushfire arson offenders were aged under 18 at the time of the offence (Figure 7, Muller 2008).

**Figure 7: Number of NSW arson and bushfire-arson defendants, by age and sex**



Source: BOCSAR unpublished data; n = 1,232

The overall findings that arsonists are predominantly young men does little to distinguish them from other sorts of offenders, who also tend to be young men. However it is important not to focus too heavily on the profile of the ‘typical’ arsonists and ignore the considerable range of characteristics. The oldest male in the NSW sample was 76; the oldest female was 65; and a quarter of the female arsonists were over the age of 40. Unfortunately the NSW data do not provide any information as to the nature of the fire the defendant is charged with having started, so there is no way of knowing whether, for example, middle-aged women tend to light different sorts of fires from those that teenage males do. There is limited research on female arsonists in the literature, though a Japanese study that examined female Japanese serial arsonists reported that they were typically middle aged and employed doing home duties, with little history of criminality or mental illness (Wachi et al. 2007). Further research is needed on the characteristics and motivations of those arsonists who do not fit the typical profile.



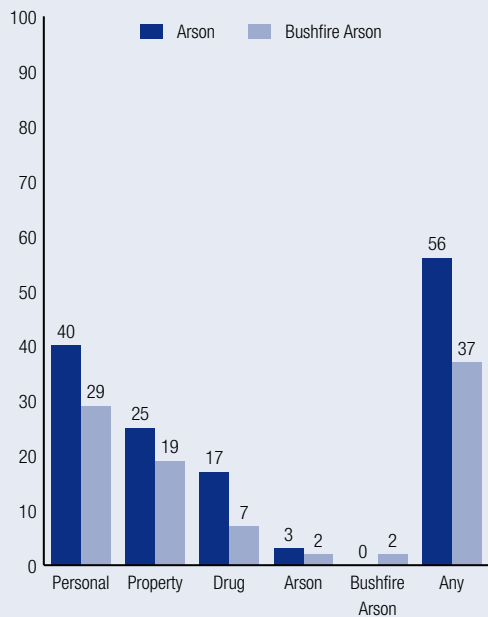
## Prior offending history

Although there has been little prior research about the offending and reoffending history of arsonists in Australia, a number of international studies have looked at arsonists' prior offending. These studies have included incarcerated arsonists and clinical samples, such as those known to forensic mental health services. Given the selective samples used in much of the research, the conclusions are not necessarily representative of all arsonists (Soothill, Ackerley & Francis 2004). For example, in those arsonists undergoing mental-health treatment, there may be a relationship between their mental disorder and their arson, and their tendency to reoffend may be different from that in those for whom arson is an opportunistic crime. Similarly, arsonists may be more likely to receive a custodial sentence if they have a history of prior offending, and as such the reoffending, or *recidivism*, rate of these incarcerated arsonists may be higher than that of less serious offenders. Despite this, such studies provide some indication as to how likely arsonists are to reoffend, or to have a prior criminal history.

One meta-analysis of recidivism rates of arsonists found that between four and 60 percent of arsonists went on to set another fire, based on studies of criminal records and hospital files (Brett 2004). Such a wide range of results suggests that there is no accepted rate of recidivism. The study concluded that there were numerous methodological problems with much of the prior research, and that the empirical research did not support an unequivocal position on whether arsonists were dangerous recidivist criminals.

Perhaps the most comprehensive single study on the reoffending of arsonists comes from the United Kingdom. The researchers examined three separate cohorts of arsonists, convicted in 1951 ( $n = 74$ ), 1963–65 ( $n = 1,352$ ) and 1980–81 ( $n = 5,584$ ), each for a minimum of 20 years (Soothill, Ackerley & Francis 2004). The study found convincing evidence that the amount of arson recidivism had increased in the United Kingdom over that period, with 4.5 percent of the 1951 series, 7.8 percent in the 1963–65 series and 10.7 percent in the 1980–81 series having subsequent convictions for arson in the follow-up period. In the most recent cohort, around two-thirds of the arsonists had subsequent convictions for some crime, and around one-third had a prior conviction for a violent offence.

**Figure 8: Percentage of arsonists and of bushfire arsonists with a previous criminal conviction**



Source: Muller 2008; arsonists  $n = 141$ , bushfire arsonists  $n = 96$

The AIC research on arson defendants in NSW described above also examined the prior offending history of the firesetters in the seven years before their court appearance for arson or bushfire arson. It was found that slightly more than half of all arson defendants and one-third of bushfire arson defendants had a prior conviction (see Figure 8). In both groups, violent offences were most common, followed by property offences, but very few firesetters had a previous conviction for any arson offence. Of those with any previous criminal history, arsonists had an average of 3.6 previous convictions in the prior seven years, and bushfire arsonists had an average of 2.8 prior convictions (Muller 2008). These data suggest that most arsonists are not exclusively arsonists, and have a diverse offending background. It should be noted, however, that, due to the low detection and conviction rate for arson, these conclusions relate only to detected and prosecuted offences, and it is possible that these arsonists have a range of offences that were not available from the data. As such it is likely that these data underestimate the true extent of prior offending amongst arsonists.

There is a widely held perception that arsonists are compulsive offenders, unable to resist the temptation to set fires. Such offenders, *pyromaniacs*, are likely to be rare (Doley 2003), and are certainly not responsible for the majority of deliberate fires. The research suggests that in reality, most arsonists are not purely arsonists, and that most arsonists will not have a previous recorded history of arson. Rather, the picture painted of arsonists is that many of them have an extensive criminal history characterised by violent and property offences. It is likely that many firesetters are general offenders who happen to light fires, rather than dedicated arsonists.

The offending history of arsonists has implications for the crime prevention programs that target known offenders, which are discussed in more detail in the section 'Programs targeting known offenders'. In addition, it has implications for the prevention of a very specific form of arson—fires that are lit by fire agency personnel. One of the main strategies that Australian fire agencies have adopted to prevent potential arsonists joining their ranks is to require new recruits to undergo a criminal history check. The research suggests that such checks should not necessarily be limited to prior arson offences, and in most cases they would not be. Given the low detection rate for arson, it is possible that those who have set deliberate fires and have not been caught or prosecuted will successfully pass these criminal history checks if they join the fire service. It should be noted, however, that most fire agencies have procedures in addition to criminal history checks, and that the NSW research cited above was limited to seven years and to a subset of all offences (Muller 2008).

## Motivations of arsonists

It is difficult for many people to comprehend why someone would deliberately light a fire that potentially puts property and lives at risk. Some attention has been paid to the topic of the motivations of arsonists in the international literature, but little of this has focused explicitly on bushfire arson.

A number of different profiles of arsonists are discussed by Willis (2004), most of which are drawn from a psychiatric or psychological perspective. In general such profiles are based on relatively small

samples and are not empirically verified in any meaningful way, but they provide one way of understanding a behaviour that many people appear to assume is motiveless. Without going into the specific profiles in general, the following categories were relatively common across the different approaches:

- arson for financial gain or profit (such as insurance fraud)
- arson motivated by revenge
- arson to conceal another crime (theft, murder, etc.)
- arson fires set to generate excitement or relieve boredom
- arson as vandalism
- arson related to the effects of mental illness
- arson with no apparent motive.

Some of the profiles treat fires lit by children as being distinct from those lit by adults, although many fires lit by children will probably fall into the vandalism, excitement, or no-apparent-motive categories. Australian research found that interest in fire is relatively common in children, with almost one-third of boys aged four to six showing fire interest, although only five percent engaged in match play (Dadds & Fraser 2006). Children who engaged in fire play exhibited high levels of other forms of antisocial behaviour, hyperactivity, and thrill-seeking behaviour. The research suggests that firesetting amongst children is one form of antisocial behaviour exhibited by children with a host of social problems and family stress. It is likely that many fires lit by young people will appear essentially motiveless without an understanding of the social context of the young people and their broader behaviour.

When considering deliberately lit bushfires, many of the motives ascribed to structural arsonists do not apply. Rarely is a bushfire going to result in any financial gain, conceal a crime, or allow an arsonist to exact revenge, for example. Therefore, a unique typology may be required for bushfire arsonists. Although it has not been subject to further research, Willis (2004: 96–7) proposed the following typology.

1. bushfires lit to create excitement or relieve boredom:
  - vandalism—by individuals or groups.

- stimulation—the firesetter seeks the excitement and stimulation of seeing the fire crews, and possibly the media, arrive
- activity—fires are lit by firefighters or others in order to generate activity and relieve the boredom or tension arising from waiting for a naturally occurring fire to break out.

#### 2. bushfires lit for recognition or attention:

- heroism—fires are lit to create the possibility that the firesetter will gain positive recognition and rewards.
- self-esteem/impress others—fires are lit in response to feelings of inadequacy... [to gain] a feeling of power and control, and to demonstrate these qualities to others.
- pleading—fires are lit as a ‘cry for help’.

#### 3. bushfires lit for a specific purpose or gain:

- anger—fire is lit to secure revenge or as an expression of anger or protest.
- pragmatic—fires are lit for purposes other means of obtaining which are impractical or illegal, such as land clearing.
- material—fires are lit for material gain, such as by firefighters seeking overtime or other payments.
- altruistic—the fire is lit to achieve an aim the firesetter believes will benefit others

#### 4. bushfires lit without motive:

- psychiatric—fires are lit on the basis of psychological or psychiatric impulses derived from mental disabilities.
- children—fires are lit as a form of play or experimentation but without any form of malicious intent or belief that the fire will spread.

#### 5. bushfires lit with mixed motives:

- multiple—fires are lit on the basis of several of the above motives arising at one time.
- incidental—bushfires result from the spread of a fire that was lit with malicious intent but without an expectation of a bushfire’s occurring.

Although the above typology specifically allows for the possibility that fires may be lit for more than one motive, or that the motive may not be apparent, it is worth emphasising that even a relatively broad typology is unlikely to encompass all possible

motivations. Some bushfire arsonists may not have any mental defect, but not be able to articulate why they started a fire, nor may there be any obvious reason why they have done so. It has been argued that due to the inherent complexity of the motivations for bushfire arson, a simple typology may in fact be misleading, as it tends to place the focus on a single factor rather than on the interaction of multiple factors that is more likely the cause (Shea 2002).

Any typology by itself is likely to be of limited use to anyone other than academic researchers unless there is some way in which it can be applied to either solving or preventing the crimes in question. In the case of arson, ideally, an understanding of the characteristics of the arsonist may give some insight into the motivations of the arsonist, which may in turn reveal something about the person who committed the crime. At present, however, knowledge about motivations of arsonists does not translate into any particular knowledge about the offender, and is of little practical use to investigators.

Knowledge about the possible motivations of potential arsonists may be of some assistance in preparing prevention. For example, if an area is experiencing fires that do not appear to have any particular purpose or to generate any particular gain, it may be that the fires are simply to create excitement or relieve boredom. This would suggest that an effective prevention method would be to ensure that likely offenders, such as bored young people, have more prosocial activities available to them, particularly on days of high fire danger, when the effects of these fires will be greatest.

Furthermore, such a typology allows activities that are not typically conceived of as being arson to be targeted. Though possibly not as damaging as other forms of deliberate firesetting, ‘pragmatic’ or ‘altruistic’ firesetting, such as illegal land clearing or fuel reduction, are legitimate targets for arson prevention. Such fires can have environmental or ecological impact and be at odds with longer-term land management plans. If fire services are seeing substantial numbers of fires that appear to fit into these categories, it might indicate a need for more community education or more transparency in land management planning. Given that few such fires typically result in criminal charges, appropriate responses will have to come locally from fire and land management agencies.

# What is crime prevention?

Crime prevention works on the principle that ‘prevention is better than cure’ in relation to criminal behaviour, and aims to stop crime before it happens. It has become an increasingly important tool in society’s response to crime, and is an approach that recognises that solving the problem of crime is not simply the domain of the criminal justice system but encompasses a whole-of-community approach.

The aim of this report is to illustrate how the principles of crime prevention can be applied to the specific problem of bushfire arson. This section begins with the theoretical framework underlying various approaches to crime prevention, with examples to illustrate the principles. Although a detailed understanding of crime prevention is not necessary, some understanding of the principles and the ways in which they can be applied may be helpful to those considering using crime prevention approaches. The final part of the section will discuss existing applications of crime prevention to arson and bushfire arson.

## Crime prevention approaches

A full examination of the broad subject of crime prevention is beyond the scope of this report, but

knowledge of a number of the principles underlying crime prevention is useful in understanding their application. Although there are a number of ways to approach a discussion of crime prevention, one useful approach is to classify crime prevention approaches into three broad stages: primary, secondary and tertiary.

- Primary crime prevention is concerned with preventing the crime before it actually happens. Such strategies can focus on situational factors (preventing crime by targeting the environment) or social factors (preventing crime by targeting the community).
- Secondary crime prevention focuses on individuals who are at high risk of engaging in crime, and can include intervention programs targeted at those who have displayed warning signs or problematic behaviours.
- Tertiary crime prevention operates at the level of the criminal justice system and is concerned with preventing repeat offending through some form of intervention such as family group conferences, or through deterrence through sanctions.

The present report is concerned mostly with primary crime prevention: with reducing the opportunities for crime. Some strategies that arise out of a secondary or tertiary crime prevention approach discussed in the section ‘Programs targeting known offenders’.

## Situational crime prevention

Situational crime prevention involves preventing crime by changing some aspect of the physical world to make crime more difficult, and hence less likely. The approach arose from a recognition that—contrary to previous pessimism that nothing actually worked to reduce crime—simple modifications, often at a local level, could be effective in reducing crime. These techniques did not involve punishment or rehabilitation but rather operated at a primary prevention level to dissuade people from committing crime. This might be as simple as increasing the lighting in an area so that there are no longer any shadows for muggers to hide in, which might in turn increase foot traffic in the area as pedestrians perceive it to have become safer.

The techniques of situational crime prevention have been broken into five general categories by Cornish & Clarke (2003):

- Increase the effort required to commit the crime (target hardening, controlling access and exits).
- Increase the perceived risks of detection (extend guardianship and surveillance).
- Reduce the rewards of crime (conceal or remove targets).
- Reduce provocation (discourage imitation and reduce peer pressure).
- Remove excuses (set rules, post instructions and assist compliance).

As an example, consider how these five categories of approaches can be applied to the crime of driving in excess of the speed limit. Installing speed humps on certain roads may increase the effort required in order to drive too fast, as may modifying cars to be unable to travel faster than the speed limit. Speed cameras placed in areas in which many motorists speed act to increase the risk of detection, even if not all cameras are in operation at all times.

Modifying roads so that they aren't flat and straight may reduce the perceived rewards of speeding, as drivers are unable to reach the highest speeds on winding roads. Campaigns to change community attitudes that consider speeding to be acceptable may reduce peer pressure for drivers to speed, thus reducing provocation. Finally, signs clearly marked

with the legal speed, and signs warning drivers of speed cameras and the penalties for speeding, may serve to remove excuses for speeding. Although not all of these proposed crime prevention solutions are equally practical, effective, or financially reasonable, they serve to illustrate the various ways in which crime prevention can be approached for a particular problem.

One possible limitation of situational crime prevention is that, because it targets specific behaviour rather than the root causes of crime (although there is little agreement as to what exactly the root causes are), it may not be so much preventing crime as simply moving, or displacing, it. That is, while installing an alarm in your own car may make it less likely to be stolen, it may simply encourage the car thief to move on to the next car in the car park that does not have an alarm. Preventing your own car being stolen obviously has benefits for you individually, but does nothing to lower the overall rate of car theft in your community, which may then be reflected in insurance premiums for your car. Likewise, crime prevention efforts in a particular community may simply result in the crime's relocation to another community. Although this may be used as the basis of an argument that crime prevention should become widespread, so that there are no areas into which crime can be displaced, it is something that should be considered when implementing some forms of crime prevention.

Situational crime prevention is more akin to a general philosophy of applying practical solutions to crime at a local level than to a coherent theoretical model. That is, there is no particular underlying idea about the cause of crime that informs all crime prevention approaches. There are, though, a number of theories of criminal behaviour that have been used to guide or explain crime prevention, such as routine activities theory, rational choice theory, and crime prevention through environmental design (CPTED). These approaches form the basis of most crime prevention strategies, and are covered briefly below (See Crawford 2007 for further details).

### *Routine activities theory*

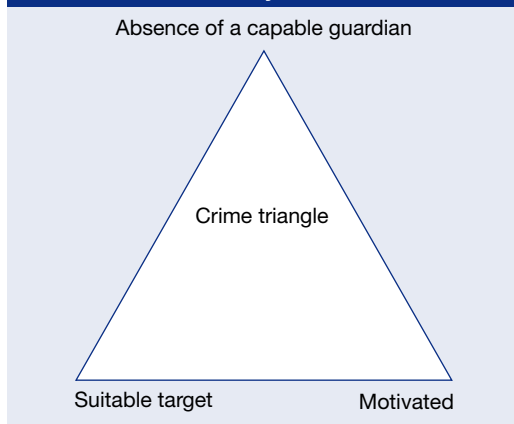
Routine activities theory does not try to define why an offender might be interested in committing a crime, but rather proposes that certain conditions

are required in order for a crime to occur. Specifically, crime is likely to occur only in the presence of the following three components:

- a motivated offender
- a suitable target
- the absence of a capable guardian.

These three components are often referred to as the 'crime triangle' (Figure 9).

**Figure 9: The 'crime triangle' model of routine-activities theory**



Such a model gives a simple and pragmatic recipe for approaching crime prevention by identifying how those three components relate to the crime in question and removing one or more of them (or at least preventing them from coming together at the same place and time).

According to routine-activities theory, likely offenders could be just about anyone, and what they might want to get out of committing the crime is not considered relevant. When particular forms of crime are considered, however, it becomes apparent that some groups of people are more likely to be offenders than other groups, allowing prevention efforts to be more targeted. For example, a corner store may find that shoplifting occurs most frequently when school children are in the shop. Selective targeting of the likely offender may therefore take the form of preventing more than a limited number of school children from being in the shop at any one time, or requiring that they leave their school bags outside.

Addressing the suitable-target component of the triad often involves 'target hardening', or identifying the target at risk and making it less suitable. Electronic or dye tagging of store merchandise may make the target less appealing to the likely offender. Security screens in banks, locks on doors, and even a big dog in the back yard of an otherwise unoccupied house all serve to remove the target from the grasp of the potential offender.

Popular approaches to reinforcing guardianship include closed circuit television (CCTV) and visible police patrols. The obvious presence of CCTV cameras, even if unmonitored or fake, may result in the perception of guardianship. There are also less formal examples of guardianship, and a potential target's being in a very public area in which many people were constantly passing would result in a higher level of apparent guardianship than its being in an area that was usually deserted. Popular neighbourhood-watch programs are also an example of a less formal form of guardianship.

### *Rational-choice theory*

Unlike routine-activities theory, rational-choice theory is particularly interested in why a person commits crime, and assumes that crime is the result of a rational calculation carried out by the offender, who weighs the benefits of the crime against the risks. This suggests that the most effective way to reduce crime is to affect one side of the cost-benefit equation, to either increase the cost of committing the crime or reduce the potential rewards of the criminal behaviour. Thus, provided that the rewards are substantial enough, almost any person would be capable of crime.

Such a theory is very simplistic and does not take into account the complexity of human behaviour and motivation, but it is relatively simple to apply, in most situations, to crime prevention. Viewed broadly, rational-choice theory argues for strategies such as increasing punishment for crime (raising the cost); but for the purposes of situational crime prevention, it is more useful to consider the more immediate costs and benefits to the individuals. If something desirable but of low value is behind a lock, then the costs of bypassing the lock may outweigh the benefits of obtaining the item. Similarly, the presence of police, or CCTV, making the offender more likely



to be identified and caught, may prove to be a disincentive to that behaviour at that particular time. In practice, many established crime prevention techniques, such as car alarms, restrictions on the availability of weapons, and penalties for tax fraud implicitly assume criminals are rational actors.

### *Crime prevention through environmental design*

Crime prevention through environmental design (CPTED) aims to prevent crime through designing environments to be more resistant to crime. That is, CPTED attempts to incorporate situational crime prevention principles into the design of an environment. It has proven to be a popular application of crime prevention, and recommendations about applying CPTED principles are published by many Australian municipal planning authorities. In addition to reducing the amount of crime, design can also act to reduce the fear of crime. For example, people tend to feel safer in brightly lit areas with good visibility, where they can see other people.

There are three main strategies of CPTED:

- surveillance: By maximising visibility, the behaviour of individuals can be observed and monitored by other people who move through the space.
- territorial reinforcement: A sense of community ownership over a space makes it more likely to be used, which discourages crime.
- access control: Physical or symbolic barriers can make clear which space is public and which is private, and channel the movement of people.

For the most part, the practical outcomes of CPTED are much the same as those of other forms of crime prevention. Lighting and open spaces for visibility are encouraged, as is having people take responsibility for, and look out for, public spaces in which they have an investment. What is significant is that, being implemented as part of the design process for a space, there is an early investment, by those concerned, in preventing crime. That is, for local councils designing shopping areas or parks, or for residents or developers designing homes, crime prevention is not an afterthought, but something that is incorporated from the beginning into the design process.

## Identification of crime hot spots

Given that crime is not equally likely in all areas, crime prevention generally takes a highly targeted approach. Analysis of patterns of crime reveals that crime is more likely to occur in certain areas, or 'hot spots', and that certain people are more likely to be victims. If these hot spots can be identified, then crime prevention strategies can be tailored appropriately, reducing the costs of the intervention and potentially increasing its effectiveness.

There is no one way to easily identify a crime hot spot, but administrative data collected about the location and details of crime and Geographic Information Systems (GIS) approaches, combined with increasing computing power, can form the basis of this spatial analysis (Ratcliffe 2004). As a simple example of this approach, police could use software programs to plot information that they routinely collect on a certain crime, such as burglary, onto a map. In addition to spatial information, information about the times at which the crimes occurred (temporal data) may also be factored in, although, due to time lags between when crimes occur, when they are reported, and when police attend, such temporal data may not be helpful (Ratcliffe 2004). This may show, for example, that certain neighbourhoods have a high frequency of burglary on some days of the week but not others. Information from sources such as the Australian Bureau of Statistics (ABS) on demographic factors, such as the average income, unemployment rate, or rental rate of an area, may also be factored into the analysis in order to determine whether there are particular demographic characteristics associated with the neighbourhoods in which the crime occurs. Given that these administrative data have long been collected, doing this geographic analysis may seem obvious; but it is only in the last few years that computing resources to do such analysis have become common, and effective use of the software packages still requires a certain amount of expertise.

An analysis of the spatial and temporal patterns of the crime may reveal that most crime happens at a very specific place and time or in a larger, more diffuse area over a longer period. The particular crime patterns will influence the most effective

response. Considering the topic of assaults at licensed venues (pubs or clubs), if the crime hot spot seems focused on a particular spatial location, it may be that one particular venue is attracting an antisocial clientele and may need to look into obtaining better security staff or not serving patrons who are already very intoxicated. If the pattern is spatially dispersed but occurs at a certain time primarily, it may be that the area is insufficiently served by transportation near closing time, leaving intoxicated patrons loitering in the area, and that adding a taxi rank or providing late-night bus services may help.

In many cases, those who are required to respond to crime (police and other emergency service personnel such as ambulance paramedics and firefighters) have a good understanding of the crime hot spots in their district. They know that certain venues are likely to require attention on payday, for example. Such local knowledge can be very effective in targeting crime but difficult to quantify. That the night shift knows that it's likely to be called out to a certain area at a certain time may not change policy unless there is some way to formally convey that information to those who make the policy. Conversely, when it comes to the distribution of resources, it is difficult for planners and policymakers to argue with an analysis that says that, for example, three-quarters of car thefts in a district for the past two years have come from a certain shopping-centre car park. This communication of information is important because in many cases, those who have the local knowledge of crime hot spots will not be responsible for allocating resources to them.

## Applying crime prevention to arson

The idea of applying crime prevention techniques to the problem of arson is not a new one. Christensen (2006), for example, explored it in relation to bushfires in Queensland forestry areas, proposing various crime prevention strategies based on an analysis of why and how arson occurs in those areas. McLean (2000) has also considered a number of crime prevention strategies for reducing deliberate fires in the Dandenong Ranges in Victoria. The Arson

Control Forum (2004c) has been funding programs in the United Kingdom based on principles of crime prevention since 2002. By 2004 it had invested £2.25 million on piloting local arson-reduction schemes. Whilst the United Kingdom scheme is focused on arson in urban environments and operates within a British legislative and government context, its findings and reports offer insights that can be applied to the problem of preventing or reducing bushfire arson.

The British government has produced an online Crime Reduction Toolkit on arson, which brings together knowledge on arson and crime prevention (Tackling arson: evaluated options n.d.). The toolkit emphasises understanding the nature of the local problem and creating a community partnership to tackle the problem. Programs that it lists as having been implemented include juvenile-arson intervention programs (described in more detail in the section 'Programs targeting known offenders'), removing combustible rubbish and abandoned cars, securing abandoned buildings, targeting hoax calls to the fire services, and establishing an arson task force between police and fire agencies. In addition, it discusses specifics concerning reducing arson in specific locations, such as schools and places of worship. Although the toolkit does not report on the effectiveness of most of these programs, and the programs are generally not applicable to the topic of bushfire arson, it does provide some evidence that crime prevention techniques can be used to prevent deliberate fires.

Although there is still a lot that we do not know about bushfire arson, there is no reason to believe that crime prevention techniques will not be successful. Given that many arson offenders go undetected, and that it is difficult to prosecute those who are detected, primary prevention strategies whereby potential offenders are prevented from lighting fires by some characteristics of the environment seem to be the most promising. Secondary and tertiary prevention strategies, which target potential and repeat offenders, are effective only when the offenders are known. As such, strategies for prevention of bushfire arson should attempt to increase the risks involved in lighting a fire in comparison with the benefits received by the arsonists, or remove one of the triad of offender, suitable target, and lack of a guardian.



Crime prevention techniques can be successfully applied to the problem of deliberate bushfire lighting, but rarely will a one-size-fits-all approach be appropriate. Applying crime prevention to bushfire arson requires an understanding of why such fires are occurring, where they are occurring, and who is responsible. Operational data collected by fire agencies and police, or local knowledge, can be used to identify arson hot spots. Due to the low detection rate of bushfire arson offenders, knowledge of convictions is unlikely to be particularly helpful in determining who is responsible for the fires, but again local knowledge may provide some insights. Fires may frequently occur in areas of land adjoining schools, for example, suggesting that school children may be responsible. Fires lit late at night, in contrast, are unlikely to be lit by very young children, but may coincide with the closing time of a local pub. Once an understanding of the features of the fires are established, appropriate crime prevention techniques can be applied in order to reduce opportunities for setting bushfires.

# Primary prevention

## Programs targeting the environment

One approach to crime prevention is to change the physical environment in which crime occurs to reduce the opportunity for it. Specifically designing the environment to be resistant to crime is generally referred to as crime prevention through environmental design (CPTED). In terms of deliberate firesetting, these and other strategies may aim to increase the effort required to set a bushfire or reduce the rewards to the arsonist of doing so.

### *Controlling access and reinforcing guardianship*

An obvious approach to crime prevention is to prevent the potential criminal from getting access to the area in which the crime is to be committed. When considering schools as targets of an arsonist, fences and locks serve to control access (see below), but it is impractical to fence all areas of vegetation in which a bushfire may be lit. A more sensible approach is to gain an understanding of how arsonists are gaining access to high-risk areas and to prevent them from doing so.

Many parts of Australia offer little challenge to potential bushfire arsonists, as they are sparsely

populated and rarely used, offering a low risk of being caught in the act of setting a fire. In terms of the models of crime prevention discussed in the section 'What is crime prevention?', there is little cost in relation to the possible benefits, and there is the absence of a capable guardian. The most common example of crime prevention through reinforcing guardianship is through the use of CCTV, but this is unlikely to be practical in the settings in which bushfire arson tends to occur. In outer urban-interface areas and in bushland communities, the idea of guardianship is already employed as a response to bushfire arson. Media reports about deliberate bushfires typically include the advice to report any suspicious behaviour in the area to Crime Stoppers, calls that typically come in an environment of increased vigilance.

According to Christensen (2006), some of the features of the Beerburum forestry district that contribute to its high level of deliberate bushfires are high levels of access and low levels of guardianship. The district is located in an area of encroaching urban expansion and is easily accessed through major roads. Acknowledging that it is important to allow recreational users access to the area, Christensen suggests limiting the number of potential access points through the use of locked gates, and varying access during times of high fire danger. Creating specific recreational areas may also

provide something of a sense of ownership by recreational users, which may increase reporting of fires and suspicious behaviour. He also notes that the department responsible for the area has joined the Crime Stoppers program and encourages forestry workers and recreational users to report suspicious behaviour.

Unlike most environments in which the principles of crime prevention are applied, there is no simple way to control access or reinforce guardianship in many of the environments in which deliberate bushfires occur. The principles are still sound, but their application requires a good understanding of the nature of the environment and the ways in which arson is most likely to occur.

### *Fuel reduction and prescribed burning*

Prescribed burning involves using controlled fire in specific environmental conditions in order to carry out resource management (Bennetton et al. 1998). Fuel reduction by prescribed burning reduces the amount of easily combustible material available to a bushfire, although grazing, mulching and pruning can also obtain the same effect. The controlled use of fire burns the dry undergrowth and debris on the forest floor, without damaging the primary flora in the area. Increased and appropriate use of fuel reduction was central to many of the key recommendations of the A Nation Charred report (House of Representatives Select Committee 2003).

From a crime prevention perspective, fuel reduction can both reduce the rewards of arson and increase its risks (Christensen 2006). Areas subject to a fuel-management regime will have less dry vegetation that can easily be set alight, increasing the effort and time required to start the fire and increasing the likelihood that the arsonist will be discovered in the process of doing so. The requirement to bring an accelerant to ignite a reduced-fuel area will also deter opportunistic firesetting. If the objective of the arsonist is to create a large fire, either to do damage or to provoke a fire service response, less combustible material that can catch from the resulting fire will result in a smaller, and possibly therefore less satisfying, bushfire. Research from the United States supports these

conclusions, having found that bushfire arson was less likely following prescribed burns (Prestemon & Butry 2005).

Fuel reduction can take the form of a general preventative strategy, or may be more specific following the identification of a problem area. In an example of the latter cases, Western Australia's Fire and Emergency Service Authority (FESA) identified a specific problem relating to the balga (*Xanthorrhoea*) grass tree in the Rockingham area. Balga burn with a high flame and are very easy to ignite, even in winter, and when burnt can easily ignite other vegetation, resulting in a bushfire. FESA liaised with the local government and ran a community awareness campaign before carrying out a prescribed burn to remove the hazard. The resulting community feedback was very positive, and the balgas flowered in the spring following the burning, providing an aesthetic result.

Similarly, the Victoria Department of Sustainability and Environment (DSE) uses deliberate fires in its fuel-reduction strategies. In Bendigo, DSE staff have used mapping software to display fire report data to indicate areas that experience high frequencies of deliberate fires. Although ideally all potential bushfire arson areas should be subject to fuel reduction, availability of resources or the presence of historical sites means that knowledge of deliberate ignitions allows fuel reduction to be more specific and effective. Anecdotal evidence suggests that this strategy of reducing fuel at arson hot spots has been successful in reducing the number of deliberate fires in the area. In instances in which the arsonists move on to sites that have not been subject to fuel reduction, data analysis can suggest new sites for fuel reduction, but the DSE has found that when arsonists move out of their 'comfort zone', they are more likely to be identified through investigation. Fuel reduction is seen not as being a cure for bushfire arson, therefore, but as a tool in the repertoire of fire agencies that is most effective when used in conjunction with traditional approaches, such as fire investigations.

Prescribed burning in Australia is not without controversy. Even in ideal conditions, fire can be difficult to control, and prescribed burns that escape containment can lead to bushfires that may damage private property, causing liability concerns. Ideal

conditions, are moreover, becoming increasingly rare in certain areas of Australia, and drought and adverse fire conditions can make safe prescribed burns impossible in certain areas. Prescribed burns may also be opposed by communities as charred trees reduce the aesthetic aspect of bush areas. This can cause a tension given that where the bush abuts residential areas is at most risk of bushfire, but is also where opposition to prescribed burning may be most entrenched.

## *Abandoned cars*

Abandoned cars that are set alight are a source of ignition of a number of bushfires, but also account for hundreds of millions of dollars' worth of damage to the vehicle themselves annually in Australia (Ransom 2007). Christensen (2006) reports that burnt stolen cars account for almost one third of all intentionally lit bushfires within the Beerburum district of Queensland. Internationally, it is estimated that 45 percent of vehicle arson cases in England and Wales are the result of criminal motivation (Arson Prevention Bureau 2003), and Ransom (2007) reports that 8.6 percent of vehicles stolen in South Australia, and 11 percent of those stolen in Sydney, were recovered after having been burnt.

Due to the nature of the Australian Incident Reporting System (AIRS) database, the standard used to record information about fires in Australia, it is often difficult to determine whether a bushfire resulted from the burning of a vehicle (Bryant 2008a). The Arson Control Forum (2004b) has identified similar difficulties in accurately determining the rate of vehicle fires in the United Kingdom.

As an example of the extent of vehicle fires in Australia, the NSW Fire Brigade attended almost 29,000 vehicle fires from 1997–98 to 2001–02, of which 55.7 percent were either incendiary or suspicious in nature (it attended 55,730 wildfires during the same interval). Approximately 62 percent of deliberate vehicle fires occurred along roads, although the extent of vegetation in the area is not known. A further nine percent (approximately 1,500 fires in five years) occurred in parks, forests, and reserves, and 11 percent occurred on unused property or crown land. A higher proportion of vehicle fires that occurred in 'parks, forests, reserves' or on 'unused property / crown land' were deliberate

than of mobile property fires along road complexes. Although it can be supposed that some of these vehicle fires spread to the surrounding vegetation, the currently available data do not reveal the extent of the problem (Bryant 2008a).

There are two different crime prevention strategies that can be used to reduce the number of bushfires caused by the burning of abandoned cars. The first is to prevent cars from being abandoned in the first place; the second is to remove them before they can be set alight.

Ransom (2007) suggests that the arson of stolen vehicles occurs shortly after their theft, mostly within 24 hours, either as a way of removing potential forensic evidence or as a source of entertainment in itself. As such, one potential strategy for prevention of vehicle arson would be to reduce the number of vehicles stolen. All new cars sold in Australia from July 2001 are required to be fitted with an engine immobiliser, which has been shown to be effective in reducing vehicle theft, but has probably also led to some increase in the theft of more-easily stolen older vehicles (Kriven & Ziersch 2007). A more detailed discussion of the prevention of vehicle theft is beyond the scope of the current report, but it is noted that, particularly in areas close to sparsely populated bush or forestry areas, reducing the theft of cars may lead to a substantial decrease in bushfires.

Christensen (2006) reports anecdotal evidence that many of the abandoned cars in the Queensland forestry area he studied had been stolen and often had sat idle for several days before being set alight. The vehicles are often reported as being stolen, and are identified by forestry workers, in that period. Their prompt removal could possibly prevent a number of bushfires from occurring. He also notes that the continued presence of abandoned vehicles may suggest to other offenders that the location is a 'safe' place to dump stolen cars, thus encouraging the activity to continue.

The Arson Control Forum (2004b) outlines a number of vehicle-removal schemes in operation in the United Kingdom, including schemes to prevent vehicles from becoming abandoned, removing vehicles that have been abandoned, and removing burnt-out vehicles. Preventing vehicles from becoming abandoned generally involves limiting

the supply of low-value vehicles that may be abandoned, such as by offering free scrapping of low-value vehicles or securing the agreement of car dealerships to reduce the number of low-value vehicles being sold into the communities. Ransom (2007), however, found that vehicles set alight in South Australia and New South Wales were more likely than other stolen vehicles to be between six and 10 years old, and suggests that many were instances of fraud, as the vehicles were no longer covered by warranty but still valuable enough to repair rather than discard. As such, focusing on only low value vehicles may not be appropriate in an Australian context.

In areas where there is a high risk of vehicles being set on fire, vehicles should be removed promptly. Vehicle removal schemes, however, require both legislative support and the cooperation between different agencies, such as the police, fire services, local councils and vehicle removal contractors. The Forum acknowledges that such schemes are resource-intensive, and require evaluation in order to reassure concerned parties that they are good value for money.

### *Arson in schools*

If media reports about arson, particularly young people and arson, are any gauge of public interest in the topic, arson in schools is a topic of concern to many people. Throughout Australia, media reports of deliberate fires at schools appear nearly weekly. Research in the United Kingdom claims that fires in schools in 1996 cost £55 million, and that 75 percent of them were thought to have been started deliberately (Arson Prevention Bureau, 1998). Although the present report is primarily concerned with bushfires, the presence of vegetation in and around many schools makes them sensible targets for crime prevention approaches.

The United Kingdom Arson Prevention Bureau (1998) proposes a 'five-point plan' for reducing arson within schools.

- Deter unauthorised entry onto the site, using for instance regular security patrols, good lighting, and signs clearly delineating the school property.

- Prevent unauthorised entry into buildings, by ensuring that doors and windows are difficult to break and are fitted with appropriate locks. Also neighbourhood-watch programs and CCTV can deter break-ins.
- Reduce opportunity for an offender to start a fire, by ensuring that burnable rubbish (such as paper and cardboard) is at least eight metres from buildings.
- Reduce the scope for potential fire damage, by designing buildings to confine fire to a limited area, and by storing high-value equipment, such as audiovisual equipment, in protected and out-of-sight areas. Automatic fire detection systems and sprinklers will also limit fire damage.
- Reduce subsequent losses and disruption from a fire, by ensuring adequate water supplies for firefighting, having appropriate fire extinguishers and training staff in how to use them, and making a recovery plan.

A recent report in the South Australian media reported that the state government had committed \$5 million for preventing arson and vandalism at schools. The plan includes fences 2.1m high, upgraded alarms, video surveillance and lighting (Kleinig 2007). Provided that these high fences did not detract from the potential for passersby to observe trespassers or smoke from a fire, such plans are consistent with this crime prevention approach and demonstrate that crime prevention approaches are already being used in protecting schools.

## Programs targeting the community

Programs focusing on the community are primarily concerned with educating the community and raising awareness about the dangers of deliberate fires. They are generally targeted at a particular component of the community, either those likely to set fires or those who are in a position to prevent them. Whilst presented as distinct, community- and environment-focused programs are likely to be complementary, and should not be regarded as mutually exclusive.

## *FESA arson intervention program*

The Fire and Emergency Services Authority (FESA) of Western Australia commenced its arson reduction program in December of 2001 as a community-centred, multi-agency approach to deliberate bushfires in Western Australia (Smith 2004). It is premised on the recognition that many deliberately lit bushfires are lit by children and young people who may have no particular malicious intent but a poor understanding of the consequences of their behaviour. Rather than identifying and targeting individuals, the program focuses on the community as a whole in an effort to raise awareness and thereby reduce deliberate firesetting.

The program can be broken up into three phases: identification, implementation and evaluation.

In the identification phase, the FESA Bush Fire and Environment Protection Branch (BF&EPB) staff analyses data on bushfires attended by firefighters in Western Australia on a monthly basis. Areas experiencing elevated levels of fires (not necessarily only deliberate fires) are identified at the suburb and street level, and local FESA managers are consulted to confirm that there is a problem that needs to be addressed. With the agreement of the local managers, a meeting of local partners is convened to discuss objectives and strategies. Partner agencies can include FESA, the Western Australian Police Service (particularly the Arson Investigation Unit and local General Duties police), the Department of Education and Training, Catholic Education, local government, and community volunteers.

The implementation phase of the program involves undertaking a short, intensive awareness campaign, particularly focusing on children and families in the area. The awareness campaign runs for a single day, and typically comprises the following components operating simultaneously:

- *Primary school presentations.* A trained, non-uniformed FESA officer attends primary schools in the area, preferably accompanied by uniformed police officers and a uniformed FESA volunteer. The FESA officer delivers a predetermined presentation to a whole school assembly, focusing on the inappropriateness of arson bushfires and

the social and environmental consequences of these fires. The students are given school rulers with appropriate messages to reinforce the presentation.

- *Shopping centre display.* Where possible, a static poster display is constructed in local shopping centres as a tool to raise community awareness, manned by a FESA officer, a uniformed police officer and a firefighter. Fridge magnets, flyers, and shopping bags with related messages are also distributed to shoppers.
- *Door knock.* In order to provide the widest possible distribution of the awareness message, FESA officers undertake a door knock of the area in conjunction with uniformed police. An information flyer and a fridge magnet are either provided to home owners or (when a house is not occupied) left in letter boxes. Those spoken to are encouraged to report any suspicious information to Crime Stoppers.

FESA reports that the intensive approach is effective at getting broad coverage of the community, and that residents will often encounter more than one of the components.

Monitoring the rate of bushfires in the area where the intervention has occurred is required in the evaluation phase. Smith (2004) reports that in all instances arson bushfire numbers have declined following the intervention. He notes, however, that it has so far been used primarily in town and suburban environments, and has not been tested on more-isolated communities.

Although developed specifically for Western Australian communities, the program has a number of elements that can easily be used by other communities and agencies in the development of similar programs. Some of the key elements include:

- an awareness of arson 'hot spots'. With such an intensive intervention, communities must be carefully targeted. Furthermore, anecdotal evidence suggests that the intervention is unlikely to have any effect if the community and local firefighters are not aware of a problem in their area and hence see no reason to attend to the message.

- high levels of consultation with the community. The cooperation of the community, such as the involvement of shopping-centre managers, school teachers and principals, and fire service volunteers, is integral to the success of the program.
- a coordinated response between the fire service and the police. The presence of uniformed police and fire service personnel serves to reinforce the message that arson is a criminal act and will be responded to as such.
- blanket coverage of a community. The program does not seek to identify and prosecute individuals, but to reduce arson by changing community attitudes toward it. So as many people in the targeted group in the community as possible must be made aware of the message.
- a consistent message. The elements of the program present a consistent message in a number of different modalities, in a manner appropriate to the respective audiences. This requires the use of staff with appropriate skills and experience.
- an evaluation framework. Given that the intervention is usually triggered by an unusual surge in fires, which may possibly decline again to normal levels regardless of the intervention, evaluation of factors other than sheer number of fires is recommended.

### *Reducing cigarette-caused bushfires*

It is difficult to determine exactly how many bushfires in Australia are caused by cigarettes, but one oft-quoted figure attributes around seven percent of bushfires to cigarettes, with cigarettes also being the leading cause of residential fire deaths (Chapman 2004). In Victoria from 1972–73 to 2003–04, cigarettes were responsible for 5.8 percent of all fires on national parks and public lands administered by the Department of Sustainability and Environment (DSE), resulting in 4.1 million hectares of burnt land (Chapman & Balmain 2004). In Western Australia it is estimated that discarded cigarettes cause 1,000 bushfires each year, all of which are preventable (FESA 2005).

The situations in which discarded cigarettes are likely to cause a bushfire have not been extensively researched, but there is some empirical evidence that bushfires can result from certain circumstances. Research undertaken in NSW found that, on a 27°C dry day, four percent of the cigarettes dropped into grass started a fire. In laboratory trials a cigarette was found to set fire to hay in one third of cases. Wind speed, drier fuel and increased contact between the burning part of the cigarette and the fuel were found to increase the chance of combustion (Dainer 2003).

It is likely that many people would not consider fires caused by discarded cigarettes to constitute arson; but according to the model criminal code bushfire arson legislation, all that is required to be proved is that a person started a fire and is 'reckless as to causing a fire and... reckless as to the spread of the fire to vegetation on property belonging to another' (CLOC 2001: 46). As such, it is conceivable that a bushfire that resulted from a carelessly discarded cigarette could result in a charge of arson, and Drabsch (2003) reports on a campaign to have drivers who are observed throwing cigarettes out of their car window reported to Crimestoppers, rather than to the Environmental Protection Agency. No known examples of arson cases resulting from discarded cigarettes currently exist. The topic is considered deserving of consideration in the current report because of a number of both legislative and community campaigns focused on reducing cigarette-caused bushfires.

In terms of crime prevention, two separate community approaches have been taken to preventing cigarette-related bushfires: public education campaigns, and campaigns to modify cigarettes to make them less likely to cause a bushfire when discarded. In addition, in Western Australia a bushfire prevention program focusing on environmental design has been undertaken by FESA encouraging local councils, in conjunction with a more general public awareness campaign, not to leave mulched green waste, which becomes highly combustible between January and March, on road verges (Figure 10).



Figure 10: Educational pamphlet addressing motorists who discard cigarettes



## Discarded Cigarettes – A Fire Risk

The City of Canning is using mulch from the Canning Vale Regional Resource Recovery Centre to beautify the streetscape and help conserve water. This mulch, the end product of local household green waste, is an excellent example of cost-effective recycling.

Unfortunately, thoughtless drivers discarding cigarettes from their vehicles are causing small fires in the mulch along verges and median strips.

Our fire fighters are called to put out these roadside fires and working adjacent to a main road can place fire fighters in a life-threatening situation.

It is also a waste of resources because while fire fighters are putting these fires out they are not available to protect your home or property.

**There's also a hip pocket reason.  
DISCARDING CIGARETTES CAN EARN YOU A  
FINE OF UP TO \$5,000!**

Help protect our environment and ensure our fire fighters aren't placed in danger unnecessarily.

Don't throw butts out the window.





In January 2004, the NSW Fire Brigade and Rural Fire Service introduced a community-education campaign to prevent drivers from discarding cigarettes. The 'Don't be a firebug' campaign was based on a previous NSW anti-littering campaign, 'Don't be a tosser', which addressed cigarette butts as well as other litter. The campaign involved a media campaign and the distribution of red stickers, showing a hand dropping a cigarette from a car, which were distributed and attached to fire trucks and cars (Can cigarette butts start bushfires? n.d.). The campaign continued into the 2004–05 season.

Given that cigarette smoking is already widely construed as an antisocial behaviour, Chapman (1999) argues that appeals to civic-mindedness on the part of smokers are unlikely to be effective. Reduced ignition propensity (RIP) or 'fire safe' cigarettes, when discarded or left unattended, will extinguish automatically, reducing the chance that they will ignite other materials. Such cigarettes reduce the reliance on people doing the 'right thing', but there has been little pressure on cigarette manufacturers to modify their cigarettes to be fire-safe (McGuire 1999).

Research into fire-safe cigarettes has been under way in the United States since the 1960s, and by the 1980s American cigarette companies had demonstrated that it was possible to produce a cigarette with a reduced propensity to ignite fires (McGuire 1999). Factors that relate to the combustibility of a cigarette include the density of tobacco in the cigarette and the porosity and citrate (a burn accelerant) component of the paper (Chapman 1999). Both the state of New York in the United States, and Canada, now have legislation requiring that all cigarettes sold be fire-safe (Chapman & Balmain 2004). Following the lobbying of Australian fire agencies, Standards Australia published standard AS4830-2007, relating to determining the extinction propensity of cigarettes, which may eventually form the basis of Australian legislation requiring fire-safe cigarettes (Standard for self extinguishing cigarettes 2007).

Although discarded cigarettes contribute to only a small percentage of all bushfires, all of these are preventable. Given that such an extensive public-education campaign has been waged in Australia targeting smoking and its health consequences, it would be expected that some decrease in smoking,

and therefore in cigarette-related fires, will eventually occur. But campaigns focused on changing the behaviour of smokers, changing the environment so that it is less likely to be set alight by discarded cigarettes, and potentially changing the cigarettes themselves should further reduce the numbers of fires caused by cigarettes.

### *Targeting arson-prone communities*

When data on the incidence of fire are analysed in detail, it is usually apparent that the overall arson rate in a region is driven by the arson rate in one particular part of that region. That is, a small area might be responsible for most of the deliberate bushfires in a town or region. Fires, and deliberate fires in particular, are heterogeneously distributed on both large and small scales. For example, a greater frequency of fires and a higher proportion of deliberate fires is evident in large urban areas than in regional or rural districts. There is also an uneven distribution within metropolitan and urban centres themselves. If a particular arson-prone community can be identified, targeting interventions specifically at that community can decrease the cost of the intervention without necessarily decreasing its effectiveness.

As an example drawn from unpublished fire agency data analysed by the AIC, four particular suburbs surrounding Hobart accounted for 35 percent of deliberate and 13 percent of all fires attended by the Tasmanian Fire Service from 1999–2000 to 2003–04. There are a number of similarities in the patterns of fires observed in these suburbs:

- Fires occurred within two neighbouring suburbs (the distance separating the two suburbs is approximately 0.5 km).
- Public land, open space, or naturally vegetated areas surround both suburbs.
- Most years experienced a period of intensive fires, characterised by:
  - fires on most days of the week
  - multiple fires on the same day
  - multiple fires in both suburbs on the same day
  - similarities in the times of increase and of decrease in number of fires.

- There was a strong correlation with bushfire weather.
- Some overlap is evident with school holidays. To a certain extent, this appears to reflect the confluence of low rainfall falling in December and January.

Two of these are neighbouring suburbs, within walking distance (several kilometres) and separated by a river, that collectively account for roughly 95 percent of fires that occurred in that particular postcode. These two suburbs collectively recorded an average of 217 deliberately lit vegetation fires in each of the three seasons 2000–01 to 2002–03 (actual incidence varying from a minimum of 164, in 2000–01, to a maximum of 297, in 2002–03). The most intense period of fires in 2000–01 occurred early in the New Year. Five or more fires were lit on seven out of the first 10 weeks in 2001. There were 23 occasions on which fires were lit in both suburbs on the same day, and 29 occasions when two or more fires were lit in the same suburb on the same day. At its most intense, 30 fires were lit in these two suburbs in one week, and 10 fires were lit on the same day.

In these two suburbs:

- There was a clear escalation in fires over a three-year period, peaking in 2002–03. The numbers have subsequently dropped.
- Fires were extremely frequent during the most intense periods.
- There is no noticeable temporal pattern to the fires.

The pattern of firelighting was consistent with serial arson. Fire patterns suggest that a small number of firesetters may have been responsible for the large number of bushfires in these regions. This is consistent with anecdotal evidence regarding other antisocial behaviours in the area.

There was a considerable decrease in the numbers of fires in the area after 2002–03. During 2000–01 to 2002–03, 18–26 percent of all deliberate lightings recorded in the Tasmanian data occurred in the area; but in 2003–04 and June to November 2004, only 10 percent of deliberate lightings occurred in that region. It is unclear whether this dramatic decrease was the product of the active efforts by the local

community and government programs to bring about positive changes in that community, of changes in the methods employed by police and fire agencies, or of other factors.

What the example demonstrates is that some communities contribute disproportionately to the overall number of deliberate bushfires. A similar finding was observed by Nicolopoulos (1997), who reports that a cluster of nine postcodes in Sydney account for nearly a quarter of all fires in the Sydney region. Though these communities can (and should) be identified by an analysis of data routinely collected by fire agencies, local knowledge from experienced local fire service personnel and police will also be invaluable in identifying these ‘hot spots’ of arson. Such hot spots will be likely to have higher overall crime rates and greater socioeconomic disadvantage, and there may be little for young people to do. As such, it is possible that these communities are already the focus of some form of crime prevention program with which the fire services may become involved.

### *Other community awareness campaigns*

In terms of crime prevention, community awareness campaigns primarily act to reinforce guardianship in areas prone to bushfire arson (see ‘Controlling access and reinforcing guardianship’, above). When people are aware of the possibility of deliberately lit bushfires, they will be more likely to keep watch for, and report, suspicious behaviour.

Although they were not designed as part of a bushfire-arson prevention strategy, it is instructive to consider the effects of the Community Fire Units (CFUs) set up by the New South Wales Fire Brigades (NSWFB). A CFU consists of a team of six to 12 volunteer local residents who are trained and equipped by the NSWFB to safeguard their homes during a bushfire until the emergency services can arrive. Recent research undertaken on the CFUs suggests that they create a sense of empowerment and community resilience, along with greater awareness about bushfires, in communities at the rural–urban interface (Bushfire CRC 2007).

Bushfires are not a regular event in most communities, but developments like the CFU act to keep a community alert to the possibility of fire from season to season. In addition, in an explicit partnership between the fire service and the community, members of the community become engaged in the process of protecting their own community.

In addition to this general approach, there are a number of other awareness campaigns that may reduce deliberate firesetting. As part of AIC research looking into the existence of arson intervention programs (described in more detail in the section 'Programs targeting known offenders'), fire services around Australia were asked about any arson awareness or education programs they ran.

The Victorian Metropolitan Fire Brigades runs a Juvenile Justice Fire and Hazard Safety Education (JJ'ed) program, which aims to deliver fire awareness to young people in custody in Victoria's juvenile justice facilities. This is a general education program in that it is delivered to all juvenile justice clients, regardless of their crime, rather than only to those who are known to be firesetters. According to a program representative responding to an AIC survey on juvenile-arson intervention programs:

One of the main reasons JJ'ed was set up was to combat the large number of false calls initiated by clients of the juvenile detention centres. In raising the client awareness to general fire hazards and safety we not only combat inappropriate fire behaviours majority of these clients have but we also reduced the number of false calls initiated from the clients of the centres

(unpublished AIC data).

The South Australian Metropolitan Fire Service offers a 'Bushfire and Housefire Teaching Package'. The package consists of teaching notes, lesson plans and resource materials and is made available to teachers to deliver to school students. The resource materials are used in the general promotion of fire safety messages to children and the broader community, and cover arson and its consequences.

In addition to having these specific programs, Australian fire agencies have community safety and education sections that aim to promote fire safety and awareness. Whilst these may not explicitly

target arson, their efforts may reduce the deliberate fires lit by children playing with fire, and should be regarded as an essential component of any arson reduction methods. Further research is warranted as to how an arson prevention message might be most effectively incorporated into these existing initiatives.

## Future directions

Primary prevention techniques to reduce deliberate bushfires rely on an understanding of the situations in which such fires occur, and on changing something about the environment or the community in order to prevent its happening in the future. Many such programs have adapted approaches originally designed to target other crimes, such as littering or car theft, or have used tools that already exist in the fire manager's repertoire, such as prescribed burning, but with the specific objective of reducing deliberate fires. It is therefore likely that future bushfire arson prevention strategies will build on existing techniques from other areas, adapting them to target deliberate bushfires.

In terms of environmental strategies, house planning and building guidelines to ensure that houses are as resistant as possible to succumbing to the effects of bushfires are now commonplace throughout Australia. In addition, many local councils now publish guidelines on how to design structures and buildings taking into account CPTED principles. As yet, however, there does not appear to be any systematic effort to encourage design to discourage or reduce deliberate bushfires.

McRae (1995) suggests that urban planning in interface areas should consider strategies such as ensuring that any vegetation next to developing areas is of a form that is more resistant to burning, and that a buffer zone of at least 200m would substantially reduce interface fires. There is also considerable information available that can inform house design to make it more resilient in the face of a bushfire (see, for example, Gill 2005). Although such factors are unlikely to prevent deliberate ignitions, they can significantly reduce the damage that they cause.

Where situational crime prevention is applied to bushfire arson in Australia, it tends to be on

a case-by-case basis, and there appears to be little exposure or promotion of potentially successful programs. The limited amount of formal evaluation of situational crime prevention of bushfire arson, however, makes it difficult to recommend any particular approach. It must also be recognised that not all approaches are appropriate for all areas: that tailoring to meet the particular requirements of an area may be necessary.

Future community education strategies may be directed toward sectors of the community that are identified as being at risk of being involved in deliberate bushfires, either as offenders or victims. The 'Don't be a tosser' campaign is an example of a strategy that focused on a specific demographic—smokers who discard their cigarettes out of their car window as they drive—but that did so in a fairly non-specific manner. Likewise the FESA arson intervention program attempts to include all young people in a small community, but may potentially gain in efficiency and effectiveness by identifying which of them contribute most to deliberate fires.

Due to the very specific nature of bushfire arson, it is likely that arson prevention programs will require some lateral and creative thinking, informed by the principles of crime prevention, by those with a good understanding of the local problem. Many of the approaches recommended by the United Kingdom's Arson Crime Prevention Toolkit, such as increased CCTV coverage, improved lighting, and targeting known offenders (Tackling arson: evaluated options n.d.), are not directly applicable when considering bushfire arson; but the existence of a number of existing programs in Australia that are generally consistent with the principles of crime prevention suggests that there is sufficient interest in the sector to generate additional innovative approaches along these lines.

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# Programs targeting known offenders

The programs that have been discussed so far in this report are all examples of primary crime prevention, and aim to prevent crime from occurring in the first place. Unfortunately, it is unlikely that all arson can be prevented; and even if arson is successfully prevented, there is a chance that those who have set fires in the past will again attempt to do so in the future. International research suggests that between four and 60 percent of arsonists are recidivists—that is, that they will go on to set further illegal fires (Brett 2004).

Police crime statistics from NSW suggest that the number and rate of reported arson incidents is increasing, from 5,448 (81.5 per 100,000 of the population per year) in 2003 to 6,226 (92.5 per 100,000 per year) in 2004 and 6,443 (95.7 per 100,000 per year) in 2005 (Moffatt, Goh & Poynton 2006). Over the same period, the clearance rate has remained relatively stable, with 5.9 percent cleared within 90 days in 2003, 5.6 percent in 2004 and 5.5 percent in 2005. Police will generally consider a crime to be 'cleared' when an offender has been identified and charged. In Victoria, the arson rate per 100,000 of the population per year has increased from 55.7 in 2004–05 to 57.9 in 2005–06, with 16.1 percent of arsons being recorded by police as being cleared in 2005–06 (Victoria Police 2006).

These figures suggest that only a small proportion of those who light deliberate fires are identified and charged with arson.

An increase in the number of arson cases has also been observed in the United Kingdom, according to the Arson Prevention Bureau (2003), but the percentage resulting in a charge has dropped from 16 percent in 1997 to eight percent in 2001–02. Of that eight percent, proceedings began against a little over half, although the proceedings were withdrawn or dismissed in 31 percent of cases. Nearly 80 percent of those brought to trial were found guilty. Thus, of the arson offences reported in 2001–02, the conviction rate was 2.5 percent, compared with 6.5 percent of all other crimes in the United Kingdom. In comparison, of the 72,000 arson incidents in the United States in 1999, 17 percent resulted in an arrest, but the conviction rate of two percent was lower than that in the United Kingdom.

Once an arsonist has been identified and it is decided that action should be taken, there are two possible paths on which the case will proceed: treatment or a sentence. In theory, these options need not be mutually exclusive (someone could undergo treatment while serving a custodial sentence in a prison, for example), however in practice in Australia they tend not to overlap.

# Secondary crime prevention—treatment and early intervention

## *Juvenile-arson intervention programs*

Treatment programs for juvenile firesetters have been in operation internationally, particularly in the United States and the United Kingdom, for a number of years. These programs tend to operate through either education of individuals about the dangers of fire or behaviour-change programs using a psychosocial approach to target firesetting (Palmer, Caulfield & Hollin 2005). Similar programs have been in operation in Australia since at least 1989, and are now run by fire services in all Australian jurisdictions (see Table 3).

There are many similarities amongst the Australian programs, having been informed by the same general principles, but also due to an amount of cross-pollination between the programs. The programs take participants as young as three to five and up to 15 to 18; are administered by trained facilitators from the fire service; and generally take place in the home of the young person, with the involvement of the parents (Muller & Stebbins 2007).

The programs are designed along principles of secondary crime prevention, in that they target young people who have demonstrated that they are at risk of more-serious offending by their inappropriate use of fire. Of the two approaches

described above that such programs could take, most of the Australian programs operate along a more educational approach, although some programs, such as the Queensland JAOP program, have some behaviour-change components.

There is a recognition that firesetting behaviour amongst young people generally does not happen in a vacuum, and that it is often a symptom of deeper psychological problems (see, for example, Dadds & Fraser 2006). These problems involve the wider social circumstances of the young person, including their family and schooling, which are often beyond the skills of the fire service personnel to address. As such, it is important that these programs have linkages with specialist services, such as social and mental-health services, that can be brought in to address such issues, and protocols in place to identify when referrals are necessary.

At present there is little that can be said about the effectiveness of Australian juvenile-arson intervention programs as a form of secondary crime prevention, as few of them have been subject to any formal evaluation, particularly in regard to reoffending. There is always a danger that the amount of attention from the fire services that young people in the program receive is in itself a reinforcement of the firesetting behaviour and will encourage further firesetting. The programs appear to be consistent with the international literature (Muller & Stebbins 2007), but the extent to which they prevent future arson and are a cost-effective solution is not yet known.

**Table 3: Programs intervening in juvenile firesetting**

Program name	Jurisdiction	Operating agency
Juvenile Fire Awareness and Intervention Program (JFAIP)	ACT	Australian Capital Territory Fire Brigade
Intervention and Fire Awareness Program (IFAP)	NSW	New South Wales Fire Brigades
Juvenile Fire Awareness and Intervention Program (JFAIP)	NT	Northern Territory Fire and Rescue Service
Fight Fire Fascination (FFF)	Qld	Queensland Fire and Rescue Service
Juvenile Arson Offenders Program (JAOP)	Qld	Queensland Fire and Rescue Service
Juvenile Firefighters Intervention Program (JFIP)	SA	South Australia Metropolitan Fire Service
Juvenile Fire Lighter Intervention Program (JFLIP)	Tas	Tasmania Fire Service
Juvenile Fire Awareness and Intervention Program (JFAIP)	Vic	Metropolitan Fire Brigade (and Country Fire Authority)
Juvenile and Family Fire Awareness (JFFQ)	WA	Fire and Emergency Services Authority of WA

Source: Muller & Stebbins 2007

## *Programs for adult arsonists*

Although arson intervention programs for young people have made considerable inroads in Australia, the same cannot be said of intervention programs for adults. As part of the AIC's research into juvenile intervention programs (Muller & Stebbins 2007), enquiries were made as to the existence of any programs for adults, either within or outside the corrections system. None became apparent. A recent report from the United Kingdom also found little evidence of arson intervention programs focusing on adults, so Australia is not alone in this deficiency (Palmer, Caulfield & Hollin 2005).

Although not a formalised program, Forensicare, Victoria's forensic mental-health service, does provide outpatient treatment to individuals who display a propensity for inappropriate firesetting. The Forensicare approach treats firesetting as a problem behaviour and applies cognitive-behavioural approaches similar to those used in treating some sexual offending. This is not to imply that the intervention assumes that firesetting is sexual in nature, but that the behaviour can be understood and treated using similar approaches.

One possible reason for the absence of adult arson programs is that few adult arsonists are exclusively arsonists (Muller 2008). For that reason, programs that only address firesetting may be of use to very few adult offenders, and more general programs addressing a variety of antisocial behaviours may be appropriate for most arsonists. Even so, such general intervention programs are rarely apparent in the Australian criminal justice system, with the exception of highly specialised programs targeting sexual offending. If deliberate firesetting, especially bushfires, is psychologically motivated, then unless that psychological need is met in some other way it is likely that the firesetting behaviour will continue. Clearly arson intervention programs for adults are one area in which further research and development are needed in Australia.

## Tertiary prevention

Tertiary prevention primarily concerns criminal justice interventions, including sentencing, and their deterrent effect.

### *Sentencing arsonists*

The crime of arson is regarded as a serious indictable offence in all jurisdictions in Australia, and although there is a model criminal code addressing both arson generally and bushfire arson specifically, the detail of the legislation varies depending on jurisdiction (Willis 2004). Typically the maximum sentence for arson is around 15 years' imprisonment, although in some jurisdictions life imprisonment is available. Deliberately lighting a vegetation fire is usually sufficient for an individual to be prosecuted under the crime of arson, but in the case of bushfire it can be difficult to establish that the person was malicious or reckless as to the use of fire—that the person intended, or should have foreseen, that the fire would do damage.

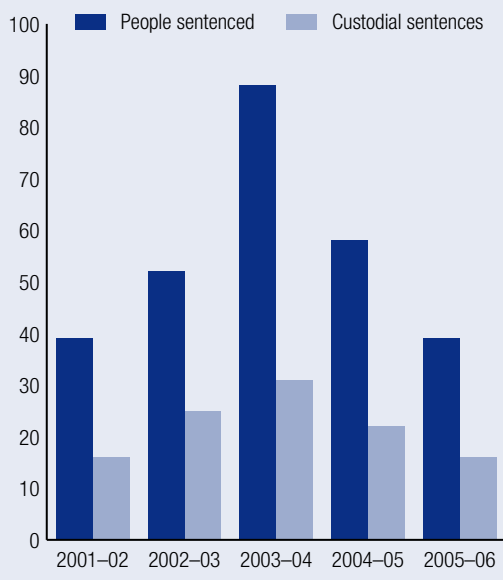
In recent years, most Australian jurisdictions have also adopted laws specifically relating to the deliberate lighting of bushfires, with sentences of up to 15–20 years' imprisonment. Following the model criminal code, the firesetter generally need not have knowingly endangered life, but should have been aware that the fire could spread. As the bushfire arson laws are relatively new, there is not yet much known about how effective they are in punishing or deterring arsonists.

There is little public information available on the sentencing of arsonists in Australian courts, but it is apparent that few of those who are charged by police with arson will end up being found guilty and receiving a sentence. Available data from NSW and Victoria suggest that those sentenced often do not receive a custodial sentence and that those imprisoned do not receive the maximum available sentence.



Over a five-year period in Victoria, 276 individuals were sentenced for a principal offence of arson. Though arson in Victoria carries a maximum penalty of 15 years imprisonment, only around one-third of those sentenced received a term of imprisonment (see Figure 11). The most common term of imprisonment in the sample was one year, and terms ranged from three months to eight years. Twenty-three percent received a wholly suspended sentence, and 24 percent received a community-based order. Other penalties, including fines (1% of individuals), were received by the remaining 21 percent of sentenced offenders (Turner 2007).

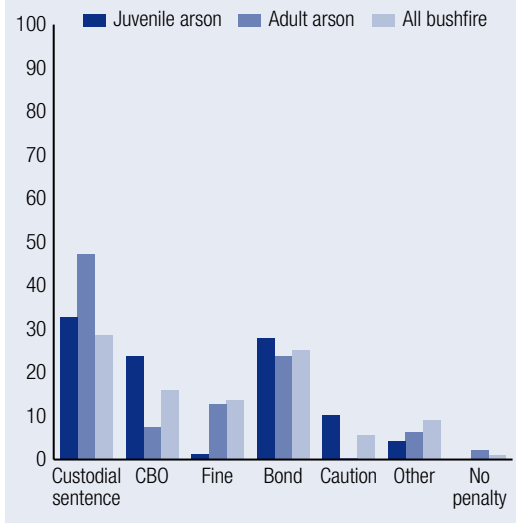
**Figure 11: Number of all, and custodial, sentences of arson offenders in Victoria (number)**



Source: Turner 2007

Research by the AIC (Muller 2008) examined data from the NSW Bureau of Crime Statistics and Research (BOCSAR) on the 1,099 arson and 133 bushfire-arson defendants who appeared in NSW courts between 2001 and 2006. Around two-thirds of the defendants were found to be guilty, and a period of imprisonment was the most common sentence for adult arson offenders (see Figure 12). Custodial sentences ranged from one week to 45 months, with an average of 11 months. Fines were received by 88 firesetters and ranged from \$50 to \$1500, with an average of \$441.

**Figure 12: Sentences received by arson offenders in NSW, from 2001 to 2006 (percent crime type)**



Source: Muller 2008

Statistics such as those presented above do not do justice to the various considerations that courts factor into sentencing decisions, so it would be overly simplistic to claim that sentences for arson are lenient. Many arsons that result in court appearances may be relatively minor, with more serious sentences delivered to the most serious offences and persistent reoffenders, and the most prolific arsonists may also be those who are best at not being caught. Still, it is clear that the full range of custodial sentences available to the courts is rarely used.

The question of whether the possibility of a harsh custodial sentence is likely to deter criminals is a complex one. Deterrence may be either specific (to deter the individual offender from reoffending) or general (a general message of deterrence directed at the population of potential offenders) in nature, and the specific and general deterrence effects of a given sentence may differ. It is likely that many firesetters, especially young people who set bushfires, do not consider the consequences of their actions, and are therefore unlikely to consider their possible punishments. Adult firesetters are rarely successfully prosecuted, and as such it would not be surprising if they did not consider the potential sentence to be a deterrent. Given that by the time an arsonist appears in court the damage



has been done, and that there are few intervention prospects for adult arsonists, it is likely that primary or secondary prevention may be worthier of further development than would tougher sentencing guidelines.

## *Sentencing young people*

Although deliberate fires started by young people can be as damaging as those started by adult arsonists, young offenders are generally treated differently by the criminal justice system. Throughout Australia, young people are tried in specialist youth or children's courts, and most jurisdictions have programs to divert young offenders from the traditional justice system. In addition, the legislation governing the sentencing of juveniles in most Australian jurisdictions requires that imprisonment be used only as a last resort, meaning that only serious or recidivist young offenders receive a custodial sentence. This principle can be seen in operation in Figure 12, which shows juvenile arsonists receiving fewer custodial sentences and more non-custodial sentences (community-based orders, bonds and cautions) than adult arsonists. Note however that informal cautions (warnings) and formal cautions referred by police (as opposed to the courts, who can also refer a young person to a formal caution) are not captured in these court statistics, and hence the true number of young people receiving cautions is likely to be much higher.

Two main forms of diversion—cautions and family group conferences—operate throughout Australia for young people, though the specific details vary from jurisdiction to jurisdiction (Polk et al. 2003). Although both forms of diversion can result from a court appearance, typically the decision to divert is made by the arresting police member. For first-time offenders, or minor crimes, a young person may receive a formal police caution, delivered by a senior police officer, usually in the presence of a parent (police in most states and territories may also elect to deliver an informal caution or warning, which does not necessarily require attendance at a police station). At the completion of the cautioning, the young person is free to go and does not acquire a criminal record. In some jurisdictions, a caution may also require that the young person pay a small amount of restitution; perform some undertaking, such as a small amount of community service; or make an apology.

A family group conference, in contrast to a caution, is a more formal affair. The conference will generally involve the young person and supporters from his or her family; a police representative; an independent facilitator; the victim and his or her supporters; and any other professionals who may be able to assist. The purpose of the conference is to hold the young person accountable for his or her criminal behaviour; to encourage the young person to understand the effect of that behaviour on the victim; to provide an opportunity to apologise and make restitution; and to identify services that may assist him or her to cease offending, in a setting outside the formal criminal justice system. In the case of arson, a conference may involve the victim, if personal property is burned, or a representative of a land management agency, if public land is burned, and also representatives from the fire service.

Both cautions and family group conferences can be employed with firesetters, particularly in those cases deemed not to be serious enough to warrant a court appearance. For example Drabsch (2003: 28) reports that the forty juveniles implicated in the 2001 Christmas bushfires in NSW received outcomes including 'summons, court attendance notice, caution, conference, warning or infringement notice'. In South Australia, of all police apprehensions of juveniles for arson in 2005 (55 individuals, the disposition of three of whom was not known), 22 received a formal caution, 12 were referred to a family group conference, and 18 were transferred to the Youth Court (Office of Crime Statistics and Research 2006). In other jurisdictions, information on the extent of use of these diversions with young firesetters is not generally available, due to lack of detail in the relevant police statistical reporting.

The intervention programs for young arsonists discussed above may take referrals from the criminal justice system, but they are not designed as a sentencing option and do not require participants to have committed a crime. The one exception is Queensland's Juvenile Arson Offenders Program (JAOP), which takes only young people who have been referred by the courts or police and is considerably more intensive in nature. All such programs, however, may be a required outcome of a family group conference or formal caution.

# Implications

Although little has been written in the past about applying crime prevention techniques to bushfire arson, many of the approaches examined in the current report are already being used in some form in different areas. In general, however, agencies employing these techniques have lacked a common vocabulary to explain what they are doing, particularly to potential funding bodies, and they have not been subject to any formal evaluation of effectiveness. The current report is intended to inform them of potential approaches that might be applicable to their situation. It is hoped that knowledge of the principles that underlie crime prevention, along with examples of how these principles have been applied in certain situations, might inspire creative crime prevention approaches that will work for a particular agency in a specific location.

## Successful crime prevention

Though a relatively new approach to tackling crime, crime prevention has been subject to a considerable amount of discussion in both the criminological literature and the policy arena. Not all crime prevention approaches are equally effective. In an analysis of crime prevention in Australia, Homel (2005: 365) observed the following problems:

- lack of clear and coherent leadership
- an emphasis on short-term goals and outcomes
- regularly shifting but low levels of funding
- repeated changes in direction.

He notes that there is a lack of research and evaluation processes built into crime prevention programs, which results in a loss of direction for the programs. Most such programs also suffer from a lack of police involvement. Homel believes that the best chance that crime prevention in Australia has is to be part of a whole-of-government approach, rather than an isolated effort. Although there is interest in bushfire arson from all levels of government in Australia, there does not yet appear to be any cohesive whole-of-government approach to its prevention.

In its report on implementing arson reduction projects in the United Kingdom, the Arson Control Forum (2004c) noted that programs that were quickly and successfully implemented tended to:

- be clearly focused
- have a clear understanding of the nature of the problem
- understand the target audience
- employ staff with knowledge of the fire service and how it works

- employ staff with good local area knowledge
- have staff with good contacts within key partner agencies
- have the cooperation of partners
- have project processes that worked well (Arson Control Forum 2004c: 7).

Although all of these components present their own challenges, Australian fire agencies are well equipped in terms of understanding the nature of bushfire arson. In addition to the considerable local knowledge of those designated to respond to fires in their local community, all Australian fire agencies collect operational data, many using the Australasian Fire Authorities Council's (AFAC) AIRS database. Although AIRS does have limitations (for example, fires can be recorded as being intentional, or lit by children, but not both) and some fire agencies may not have sufficient in-house expertise to make the most of the data it contains, it does provide a valuable insight into the nature of fires, deliberate and otherwise, in an area. These data can be used to determine the features of deliberate bushfires in an area in order to most appropriately direct arson interventions. Potentially, data from other agencies, such as police or community-service or welfare agencies, may also be used in conjunction with fire service data. Such data may provide information about where other forms of crime or areas of socioeconomic stress intersect with high numbers of deliberate bushfires, providing guidance as to the most appropriate forms of intervention.

As important as the factors that lead to successful programs are those that have been found to inhibit programs. The following factors were identified by the Arson Control Forum (Brown et al. 2005: 31):

- time taken to bid for funds
- lack of 'working capital'
- time taken to recruit staff
- lack of interest among partner agencies
- partners with overly bureaucratic procedures
- scepticism from colleagues in the fire service
- large and sparsely populated project areas
- staff absences.

Unsurprisingly, most of these inhibiting factors relate to funding and staffing. If a small number of specialist staff are retained or trained specifically for an arson

reduction program, the program may not be able to operate in their absence. If staff are recruited from outside the fire service, then operational fire service personnel may not consider the programs to be relevant to their work. Such issues may possibly be reduced by building arson reduction programs into the core business of the fire service and using operational personnel so that they feel they have an investment in the success of a program. Building programs into the existing community safety work of the fire service may be easier than obtaining dedicated funding for the programs. The FESA program reported in the 'Primary prevention' section, for example, imposes relatively few costs on the participating organisations, as they use existing staff in their existing role. Most of the additional costs come from travel, due to the distances to cover remote communities that are part of FESA's jurisdiction.

Such analyses suggest that crime prevention approaches, including those focusing on deliberate bushfires, need to be carefully planned and implemented. Crime prevention strategies tend to be most successful when they combine an understanding of the specific nature of crime in an area with a community effort to address the problem. It is likely that crime prevention programs targeting bushfire arson will require a collaboration between fire agencies, land management agencies, local police and state governments. Due to the community-centric work already engaged in by fire agencies, such collaborations should be relatively straightforward to implement, and it would be expected that fire agencies are particularly well-placed to form these networks.

## Program evaluation

Some form of evaluation should be considered to be an integral part of any crime prevention program, rather than something to be undertaken only when evidence of program effectiveness is needed in order to obtain continuing funding. Evaluation should be incorporated as part of the budget of the program from its inception, including the possibility of external evaluation if in-house expertise in such matters is limited.

A description of what was actually done as part of the crime prevention program does not in itself constitute an evaluation of the worth of the program. Such 'process' evaluations (as opposed to 'impact' evaluations) do not offer any evidence as to whether the program is effective in preventing bushfire arson (Sherman et al. 1998). In general, impact evaluations are considerably rarer than process evaluations. Data collected regarding the juvenile-arson intervention programs described above provided no real evidence that impact evaluations had been completed, although some were apparently under way at the time (Muller & Stebbins 2007).

It is not always straightforward to determine whether crime prevention has been successful. As few arsonists are charged in respect to the fires they start, it is difficult to quantify the results of behaviour change by individuals. Looking at the overall level of fires experienced by the community may be one way to measure change, as has been used by the Western Australian program described in the section on primary prevention, and in fact is a more useful approach to an environmental program not targeting individuals. Such an analysis is essentially a calculation of the number of fires experienced after the program compared with the number that would have occurred had the program not been in place (see, for example, Johnson et al. 2004).

More difficult is determining whether the change was due simply to random variations in the recorded fire rate as opposed to changes resulting from the interaction. Factors such as temperature and weather, the fire danger index, the effects of recent fires in reducing available combustible materials, the time of the year (including whether it is the school holidays) and increased media attention or police presence in the area may all affect the rate of fire, and would ideally be taken into account when making claims of reductions in fires. For example, if an intervention is implemented at the beginning of the fire season, it is possible that it could still be effective even though the number of fires increased after the intervention. In such cases, it would be important to establish that that increase was less than it would have been had the program not been run.

If some form of change is demonstrable, this may allow a cost-benefit analysis to be conducted of the program. Fire suppression, even when using

volunteer firefighters, is a relatively expensive business, especially when factoring in costs of training and specialist equipment such as for aerial suppression. As such, even intensive intervention programs may result in a cost saving when reducing the numbers of fires only moderately. What may be more difficult is obtaining organisational recognition that arson prevention is core business for a fire agency, along with suppression operations, and that the cost saving is therefore a genuine one.

An analysis of British programs by Brown et al. (2005) found that programs that had undergone a detailed cost-benefit analysis saved an estimated £2.40 to £33.20 for every £1 invested. It was found that the start-up costs of the programs were a relatively small component of the overall costs, and that the largest costs were related to employing staff. Cost savings such as these resulted in a recommendation that the Arson Control Forum continue to fund new initiatives on the basis that the programs were an effective way to prevent arson.

Although some arson prevention programs will be specific to a particular community or environment, it is likely that many may have the potential to be adapted to other areas. There is therefore an advantage in ensuring that programs and their evaluations are well documented, so that they may be taken up by other agencies. The juvenile-arson intervention programs described in the section 'Programs targeting known offenders' are an example of an approach with fairly broad application, and there is evidence of a considerable degree of cross-fertilisation of the programs, both within Australia and from overseas.

## The role of fire agencies in crime prevention

Although the primary function of a fire agency is to extinguish fires, it would be inaccurate to characterise fire agencies as purely reactive organisations. Australian fire agencies play an important role in promoting community safety both through community education campaigns and through preventative efforts such as prescribed burns and working with stakeholders to develop fire prevention plans. When considering deliberate fires, in addition to suppression, fire agencies provide

expertise in investigating fires and in collaborating with police in order to prosecute offenders, as well as assisting in coronial investigations. It appears, though, that the role of fire agencies in preventing deliberate bushfires is underdeveloped.

There are numerous examples of fire agencies applying crime prevention principles that have been illustrated in the current report, even if these strategies have not been developed with a specific knowledge of crime prevention. The use of deliberate ignition patterns to inform fuel reduction by Victoria's Department of Sustainability and Environment, for example, was not directly informed by a knowledge of crime prevention, although it is consistent with crime prevention practice. In contrast, the FESA arson prevention program was designed as a crime prevention program, and was integrated into the work of the agency as part of its overall response to deliberate ignitions.

Although there are in place in Australian fire agencies a number of crime prevention strategies to reduce deliberate bushfires, there is little by way of comprehensive plans to tackle the problem. Such programs should be tailored specifically to the problems of the local community, but they should also be funded and supported by the fire agency. By incorporating crime prevention strategies into the regular activities of the fire service and employing the expertise and resources of the service, such programs will gain more-widespread application. The involvement of fire service personnel, including volunteers, will reinforce that prevention of deliberate fire is part of the core business of the fire service and allow personnel to feel a sense of ownership over the programs.

Crime prevention programs are usually focused very locally and involve partnerships between community stakeholders, and deliberate bushfire prevention should be no exception. Fire agencies are particularly well-placed to be involved in community-based responses to deliberate bushfires, having regular contact with key parties such as local governments, police, land management agencies, local landholders, and citizens of the community. This is particularly true in rural and regional areas serviced by volunteer firefighters.

If fire agencies are to make the most of crime prevention strategies, they will need to provide support, in funding and training, for these strategies.

Areas staffed primarily by volunteers, who do not have the agencies' capacity or their broad operational perspective on fires in their area, will be unable to institute crime prevention strategies without this support.

Although Australia does not have a central funding body like the United Kingdom's Arson Prevention Bureau, various sources of funding are available from all levels of Australian governments for crime prevention programs. Fire agencies that are unable to fund programs out of their core funding may be able to obtain additional funds from these sources. These grants may possibly be used in order to conduct and properly evaluate pilot programs, and this evidence can then be used to seek continuing funding for the programs.

## Conclusion

At the beginning of this report, statistics were presented that showed that approximately half of all vegetation fires throughout Australia are the result of deliberate ignitions. Deliberate bushfires constitute a considerable proportion of the fire suppression activities of Australian fire agencies. Although these deliberate bushfires tend to be smaller and more accessible than natural fires, they tend to be lit in areas in which they can do considerable damage, such as interface zones, requiring a prompt suppression response. In addition to the potential damage to life and property by deliberate fires, responding to these unnecessary fires can monopolise the resources of fire agencies.

Legal responses to deliberate bushfires should not be ignored, but in many cases there is insufficient evidence to prosecute any individual for lighting them. Preventing the fire before it actually occurs should be the preferred option where possible, avoiding the potential damage that the fire would have caused and freeing up the resources of the fire services for suppression of other fires. Prevention is neither incompatible with criminal justice sanctions for bushfire arson, nor a 'soft option' alternative to punishment, but rather another valuable tool to reduce deliberate bushfires in Australia.

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