Public Response to Wildfire: Is the Australian "Stay and Defend or Leave Early" Approach an Option for Wildfire Management in the United States?

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ABSTRACT

In the United States, the increasing costs and negative impacts of wildfires are causing fire managers and policymakers to reexamine traditional approaches to fire management including whether mass evacuation of populations threatened by wildfire is always the most appropriate option. This article examines the Australian "stay and defend or leave early" (SDLE) approach (which is not inherently the same as shelter in place) and the contextual factors that may make it more or less appropriate in the United States. We first discuss what SDLE actually entails and then examine four contextual areas that could influence how appropriate the approach might be in the United States: nature of fire risk, agency roles and responsibilities, education and shared responsibility, and human dimensions and decision-making. Although some contextual differences may mean that there are US locations where the approach would be inappropriate, they are not systematic enough to mean that the approach would not be viable in many localities. However, significant groundwork would need to be laid to ensure success.

Keywords: evacuation, fire management, public response, wildfire

I n recent years, efforts to manage the nation's wildfires have grown in cost, size, and complexity. The 2007 wildfire season alone cost $1.8 billion to fight and burned over 9 million ac (Brookings Institution 2008). The percentage of the US Forest Service budget devoted to fire management has grown from 25% in 2000 to roughly 44% in 2008, a significant shift that leaves fewer resources for meeting nonfire forest management objectives (Peterson et al. 2008). As a result of these diverse negative wildfire impacts, more attention is being directed toward assessing alternatives to traditional fire management methods.

One area where alternatives are being discussed is the standard approach of mass evacuation of populations that are threatened by a wildfire. The growth of housing in the wildland–urban interface (WUI) has contributed to the current fire management challenge not only in terms of complicating the actual firefighting but also by increasing the values at risk, the number of people affected by wildfire, and the potential complexities of evacuation. For instance, the October 2007 Southern California fires alone resulted in the largest evacuation in California history (over 300,000 people) and the loss of 2,223 homes (Office of Emergency Service [OES] 2008). In many places fire personnel have begun to identify locales where practical and logistical issues mean that evacuation will not always be safe or

feasible. In addition, there is growing evidence that many homeowners do not intend to evacuate (Cohn et al. 2006, Alexander et al. 2007, Mozumder et al. 2008). These challenges have led to increased discussion of possible alternatives to evacuation such as shelter in place and the Australian strategy to "stay and defend or leave early" (SDLE) [1] (Welch 2007, Paveglio et al. 2008). Some fire departments, in areas as diverse as Painted Rocks, Montana, and Ventura County, California, have begun providing homeowners with information on what to do if they can not evacuate.

Given the increased attention being paid to evacuation alternatives, we think it is time to ask two pivotal questions: (1) What do these various alternatives encompass? and (2) Are they relevant and appropriate in the US context? This article will focus on answering these two questions in relation to the Australian SDLE approach. The approach is described in the Australasian Fire Authorities Council position paper, "Community Safety and Bushfire," which articulates "a national position that provides the doctrine and describes good practice in relation to creating and maintaining bushfire-safe communities throughout Australia" (AFAC 2005). Although in the United States shelter in place is often equated with SDLE, the two are not inherently the same. We believe that the Australian position is worthy of closer examination and that this examination needs to be systematic and any decisions about its relevance in the US context needs to be evidence based. We also believe that such an examination will identify a range of research issues that, if followed through, will benefit both countries by providing further insight into effective management of wildfire risk.

There are many widely recognized similarities between United States and Australian wildfire problems. Large areas of both countries are prone to wildfire and changing demographics and land-use patterns are exposing larger and new populations to the wildfire risk. Recently, both have experienced major destructive wildfires with significant losses of life and property. Climate change is likely to exacerbate the risk of fire in both countries or at least in particular regions of each country. The significance of wildfire events is reflected in increased attention from both countries' media, and growing political and community concern in each country has led to major inquiries, development of high-level strategies, and in-

creased research attention to wildfire-related issues (Ellis et al. 2004, Brookings Institution 2005).

Given these general similarities it is not surprising that an established practice in one country, such as the Australian SDLE approach, is likely to attract the attention of the other as a possible solution to some aspect(s) of the wildfire problem. However, along with similarities, there also are significant differences that could influence whether SDLE could be successfully adopted in the United States. Understanding these differences is a crucial part of evaluating whether an approach could be transferred from one context to another. Successful transfer of a strategy requires at least that

• The strategy is clearly understood in its entirety and complexity.

• A comparison of the contexts is undertaken to ensure that the critical factors in the original context are relevant and achievable in the new environment.

• Issues and lessons learned from the implementation of the strategy in one context are understood so that problems are not imported along with the proposed solution.

What follows is not meant to be a detailed assessment of the SDLE approach, but is rather an attempt to identify key areas that need to be considered in assessing its relevance in the United States. In the following sections we will first describe the Australian approach and then examine more specific contextual factors that influence how relevant and appropriate the approach might be in the United States.

What Is the Australian SDLE Approach?

In Australia, large-scale evacuations in response to wildfire have not been widely used (Gledhill 2003). Instead, fire management agencies, increasingly in cooperation with other emergency services such as police, encourage residents to accept responsibility for how they will respond to the threat of wildfire. The SDLE position advocates that residents decide well before a fire occurs whether they will *choose* to leave when a fire threatens but is not yet in the area, or stay and actively defend their property—and to make appropriate preparations in advance for either option.

The SDLE strategy is well supported by extensive research on how houses ignite and are destroyed in wildfire and the circum-

stances in which civilians die in wildfires (Handmer and Tibbits 2005). Various investigations of fatalities in major Australian fires have highlighted the problems of evacuation and have found that civilian deaths most often occur while people are trying to flee at the last minute with the cause of the majority of fatalities either radiant heat exposure when people were caught in the open or, less frequently, vehicular accidents that occurred while people were driving through smoke and flames (Lazarus and Elley 1984, Miller and Carter 1984, Krusel and Petris 1992). In the United States, less attention has been paid to the causes of civilian death in wildfires. However, a recent analysis of the 2003 Cedar Fire in Southern California found that almost all the 22 civilian deaths occurred while individuals were evacuating at the last minute (Mutch 2007). This is consistent with findings in Australia where 78% of 327 civilian wildfire fatalities over the past 100 years occurred while people were fleeing fires on foot or in vehicles or were engaged in activities outside structures, such as dealing with livestock. An additional 10% of the people who died were passively sheltering, 6% were inside but their actions were unknown, 4% were in an unknown location, and less than 2% died while actively defending their property against the fire (Tibbits et al. 2008).

Australian research also shows that most houses are destroyed by fires igniting from embers entering or landing on the house either before, during, or over a long period after the fire front has passed. Postfire studies indicate that when someone is present and actively defending the property, there is a greatly increased chance that the house will survive (Ramsay 1985, Wilson and Ferguson 1985, Blanchi et al. 2006). Research in the United States has also found that embers play an important role in house loss and that characteristics of the house itself and its immediate surroundings are the primary elements to consider in home ignitability (Foote 1996, Cohen 2000). Anecdotal stories from homeowners who refuse to evacuate suggest that they often save both their homes and those of neighbors by extinguishing embers and spot fires (Pool 2007).

These two elements are the foundation of the Australian view that staying and defending a prepared property can be a logical and safe option: "people protect houses and houses protect people." Residents who stay are advised to retreat inside if the radiant heat of the fire front is too great, continue to

actively patrol inside for embers that may have entered the dwelling, and return outside after the relatively short time it takes for the fire front to pass to extinguish spot fires and monitor for further fires started by falling embers. Not doing these things—i.e., passively sheltering—is seen as dangerous for residents. An inquiry into three deaths during a 1997 short-duration wildfire event in an interface area on the outskirts of Melbourne highlighted the dangers of passive sheltering: three adults retreated to a basement and died from carbon monoxide poisoning and fire exposure after the house ignited and they were trapped (Handmer and Tibbits 2005).

SDLE is fundamentally about residents making an informed choice in advance about how they intend to respond to the threat of wildfire. Under this approach, fire authorities have a responsibility to ensure that residents understand the choice they are making and to ensure that other fire management strategies complement this approach. Residents are encouraged to develop a plan before the fire season about whether they will stay and defend or leave early if a fire occurs. The plan should also take into account how they will cope with unexpected events. Some residents who choose to stay plan to relocate to a nearby structure that is better protected and return to their own property once the immediate threat has passed. Residents who decide to leave are told that they need to leave early, well before the fire is in the immediate area and travel on roads becomes dangerous. If they plan to stay, they are advised to prepare their property in advance with a range of measures including fuels management and structural protection. They are also advised to make sure that they have necessary resources such as proper clothing and equipment, and the physical and psychological capacity to stay throughout the fire and actively defend the property.

The Australian approach clearly differs from many descriptions of shelter in place in asking people to choose ahead of time which option they will follow and in encouraging their active defense of property. In the United States, sheltering in place is often treated as more of a backup measure, if evacuation is not possible where homeowners are assumed to play a passive role while the fire front passes. The key to the Australian approach is its emphasis on active homeowner involvement, both in choosing their re-

sponse and in defending their property for the entire time it is under threat.

Comparison of Australian and US Contexts

By examining the context in which the Australian SDLE strategy is implemented we can begin to identify how it may or may not be applicable in the United States. The following discussion attempts to identify some of the contextual factors shaping the development and implementation of SDLE in Australia. This discussion is exploratory; most of what can be said comes from the Australian experience and, even then, substantial research on the implementation issues facing Australian fire managers has only been undertaken since the creation of the Bushfire Cooperative Research Centre in 2003.

Despite the preliminary nature of the discussion, we believe that it provides a way to identify where similarities and differences may make SDLE more or less appropriate in the United States and it will help identify areas that warrant further investigation. The discussion is based around four key aspects of the SDLE approach in Australia:

- Nature of the fire risk.
- Agency roles and responsibilities.
- Education and shared responsibility.
- Human dimensions and decision-making.

Nature of the Fire Risk. The prevalence of large and damaging fires in both Australia and the United States reflects the existence of a range of similar high fire risk environments. However, it is not the physical environment and fire behavior that are the key factors in understanding the fire risk in these two countries. As with any natural hazard, the physical event is not a major problem in itself [2], except in terms of how it impacts the built environment and the social system (Mileti 1999). It is not until the physical event starts to have a significant impact on things that humans value that efforts are made to either modify the hazard or reduce its impact by changing human behavior. The nature and impact of a wildfire is ultimately determined by how the risk is managed before, during, and after a wildfire.

Handmer and Tibbits (2005) trace the evolution of SDLE as it gradually emerged from investigations into major wildfires in Australia, particularly the 1983 Ash Wednesday fires in Victoria. Nearly two-thirds of the houses destroyed in major wild-

fires in Australia since 1939 have been in the state of Victoria (Blanchi et al. 2006), where extreme fire weather conditions and fire adapted vegetation combine to create a high fire risk environment. About one-quarter of the area of the state (27 million ha) containing 132,000 residences is classified as wildfire interface area. In addition, 50% of the state is classified as farming and rural living areas, much of which is fire prone (J. Kennedy, CFA GIS Department, pers. commun., Jan. 31, 2008). There also is a tradition of residents in rural areas belonging to local volunteer fire departments and a strong culture of self-reliance in relation to property protection. Other states in southeastern Australia such as Tasmania and New South Wales also have long histories of supporting the SDLE position. However, SDLE only received national endorsement in 2005 and some states where disaster fires have been much less frequent have only recently begun to promote it.

One lesson from this evolution is that SDLE is most relevant and most likely to find a receptive response where the risk is higher and where there is a perception that wildfire poses a major threat to communities. The severity of the risk may be more important in driving adoption of SDLE than legislation. Although different legislative arrangements exist in various states in Australia, these have not provided a barrier to endorsement of the national position by all member agencies across all Australian states and territories.

The Australian position recognizes that risk is variable and acknowledges that in some situations properties may not be defendable and residents may be best advised to leave. Although there are similarities, specific Australian and US fire environments differ in terms of vegetation types, weather patterns, and the location of settlements in relation to vegetation, all of which could result in significantly different fire behavior and impact. In addition, while the WUI in both countries is a mix of older housing and newer construction built to more fire-resistant standards, the built environment can be substantially different in the two countries with respect to land use and development patterns, common building materials, and construction styles. How these factors combine will affect how defendable is an individual property.

One obvious difference between the two countries is the prevalence of wood shingle roofs on many houses in wildfire

prone areas in the United States, whereas iron roofs are far more typical in Australia. In addition, although Australia has extensive interface communities, patterns of development in the United States have, in many places, led to more densely developed WUI areas. These more densely developed areas might argue for adoption of SDLE due to the potential difficulties of evacuating large numbers of people on limited access routes. But dense developments may also discourage consideration of SDLE policies due to the greater possibility of house-to-house ignition (Cova 2005)—although this may or may not make staying and defending inappropriate. A postfire assessment of the 2003 interface fire in Canberra, the Australian national capital, provides some insight. The SDLE strategy was not officially implemented in Canberra; most residents evacuated voluntarily or under direction from police, although some still stayed. Over 516 homes were lost and an assessment of one neighborhood found that losses were attributed to both ember attack and house-to-house ignition. However, the assessment also identified several cases where houses were saved by homeowners who stayed and defended even though structures next door were lost due to house-to-house ignition (Blanchi and Leonard 2005).

Agency Roles and Responsibilities. A key difference that needs consideration is the institutional structure of fire management in the United States and Australia. In the United States, wildland fire management is handled by a wide array of organizations including federal and state agencies and numerous county, municipal, and volunteer fire departments. Although there is a clear method for coordinating efforts between these diverse organizations during a wildfire, coordination of programs and policy before a fire is much less consistent. In comparison, in Australia, firefighting organizations are more limited in number and primarily are state based, the federal government has only a limited role, and local fire brigades are centrally coordinated at the state level. Although the basic structure varies, all Australian states have central administrations that help provide a consistent minimum level of resources and training for all the volunteer fire departments across the state. This allows for greater policy consistency as new approaches are introduced.

Another important difference is that not all key agencies in the United States have a primary focus on fire management. The

five federal agencies that have fire management responsibilities are predominantly land-management agencies that over time have devoted an increasing portion of their substantial wildland firefighting resources to protecting structures. State agencies generally operate from a land-management perspective and can have extensive or very limited wildland firefighting resources. Local fire agencies tend to operate from an emergency management perspective with a traditional emphasis on structural rather than wildland fire protection. In Australia, land management and fire management are primarily handled by separate agencies at the state level. Although the land-management agencies are responsible for fire management on public land, the responsibility of protecting houses from structural fire or wildfire belongs to a separate agency that operates from an emergency management perspective.

These institutional differences are not minor. One apparent byproduct of the emergency preparedness focus in Australia is that fire management is discussed with the public largely in the context of fire safety and risk reduction; as such, there is clear discussion about the role of radiant heat and of embers in causing fire risk to people and houses. In the United States, although these topics may be part of the conversation, the focus tends to be on vegetation management around a property.

Education and Shared Responsibility. The success of SDLE depends on fire authorities sharing responsibility with the community for dealing with fire risk rather than having fire authorities mandate and enforce particular forms of community response. In Australia, the SDLE approach evolved primarily from the work of state fire agencies involved in community protection. These agencies are mostly large-scale volunteer-based organizations with strong local community links. In many respects SDLE emerged in rural communities with active local volunteer fire brigades and has gradually evolved and been applied in expanding interface areas and was later adopted across state and then national jurisdictions. Many of the public education and outreach programs promoting the SDLE message are delivered by or in conjunction with these local, community-based fire services that draw on their local credibility and networks to spread the message.

The Australian approach places great emphasis on residents taking responsibility

for their own safety and that of their property. It is important to understand that this is not driven by the possible economic benefits of saving property, but rather by the evidence relating to human survival and how property is lost during wildfire (Rhodes and Handmer 2008). Hence, Australian public education programs focus on explaining the strategy and the evidence underpinning it. Understanding the basic elements–how houses burn and how people die from fire–enables individuals to understand how staying can be a viable option. The limitations of fire management agencies are often made explicit with statements such as "do not expect a fire truck to come to your property" and "you may not get an official warning." Along with emphasis on why the approach can work, education programs highlight the need for planning what residents will do if a fire occurs, and the need for property preparation, personal protection, psychological readiness, and so on.

Ensuring that people understand what is required in deciding whether they should stay and defend or leave early is a complex task. In Australia, fire authorities, local government, and the media make extensive efforts to advise residents about the implications of the choices they face and to assist residents in developing their plans. Because most Australian fire agencies are statewide organizations, educational programs are often large scale and consistent throughout jurisdictions. These programs include publications, web sites, statewide media campaigns, telephone information lines, and face-to-face local meetings. In Victoria, the state fire services and the land-management agency conduct a joint program called "Fire Ready Victoria" that uses a multifaceted approach to delivering safety messages (Brennan et al. 2007). Significant resources are devoted to these outreach efforts. For instance, in a 4-month period before the 2006/2007 fire season in Victoria, over 27,000 people attended more than 1,200 public meetings held throughout wildfire prone areas of the state to encourage people to plan and prepare for the threat. Later, during the fire season, over 30,000 people attended 300 meetings that were held to inform threatened communities of what was happening and to provide advice on how to respond. In addition, the Australian state public radio broadcaster provides extensive media coverage in the form of interviews and promotional activities. It is also the official emergency services broadcaster, providing up-to-date

warning information, interviews with incident controllers, and public call-in shows during significant fires.

The net effect of these outreach programs is that the issue of wildfire safety has a high public profile. The salience of the issue is a necessary precursor to residents' receptiveness to outreach and education messages and to their adoption of appropriate protective measures.

The United States also has extensive outreach efforts, albeit not always as centrally coordinated. The growing emphasis on restoring fire-adapted ecosystems and providing community assistance has contributed to the development of a variety of national, state, and local educational programs, such as Firewise and Fire Safe Councils. These programs work to inform homeowners and communities about fire risk and what can be done *before* a fire to mitigate potential impacts. Recent research shows that there is good awareness of fire risk and that a majority of homeowners in many WUI communities take some sort of fire mitigation action on their property (McCaffrey 2006). There is increasing interest in broadening these education efforts to promote not just restoration of fire-adapted ecosystems but creation of fire-adapted communities (Brookings Institution 2005).

Human Dimensions and Decisionmaking. How those responsible for dealing with a wildfire perceive and perform their roles and how the people at the individual, household, and wider community levels perceive and respond to the risk are critical to understanding how well an approach works. The optimal response when faced with an emergency situation may be overridden by common reactions to uncertain situations such as denial of the risk, optimism bias, oversimplification, and so on (Slovic et al. 1987, 1990). Even the decision to leave early involves complex and difficult decisions, sometimes at relatively short notice, as well as the capacity to adapt to unexpected circumstances such as not being able to leave.

The Australian experience provides examples of the individual, social, and situational factors that influence successful implementation of the SDLE approach. Although recent Australian national and state inquiries into major fires and wildfire fatalities have consistently endorsed SDLE, there has not been uniform acceptance and adoption. Recent studies after major fires and surveys of communities in high wildfire risk areas indicate there is considerable variation both within and between communities in the extent to which they have embraced the SDLE approach. In a study of mainly rural communities affected by a large, long-duration (6 weeks) wildfire, over 80% of households had someone present protecting the property while it was under threat (Strahan and Rhodes 2007). In another study of a rural area affected by a severe short-duration wildfire, nearly 50% of households in the affected area had someone to stay to defend the property (Rhodes 2005). However, in a recent survey of interface households, only 20–40% of residents, depending on the locality, said that they intended to stay and defend their property if it was threatened by wildfire (Strahan 2007).

Research also suggests that residents' adoption of advice in terms of preparation of properties and intended protective action during a fire reflects a complex array of factors. One study of attitudes of interface residents toward the SDLE options showed that most people thought that staying would help protect the property, but that leaving was the best way to protect life (Rhodes 2007). However, many people also thought that staying for a while to "do what you could" or "to see what happens," but then leaving "if it gets dangerous" was a viable and logical way to respond. By not understanding that most houses ignite from embers after the fire front has passed and not recognizing the dangers of being caught in the open by the advancing fire, these people intend to take action that is opposite to that recommended by fire services. Beliefs such as these mean that fire services face great challenges in ensuring that residents understand the options and are making informed choices that are appropriate to the situation and their capacities.

Sociodemographic factors may account for some of the differences in response to wildfire risk. Australian studies have found that rural and farm residents appear to have higher levels of fire preparation and are more likely to stay and defend than people living in the WUI (McGee and Russell 2003). Other studies have shown that household arrangements in terms of gender and the presence of children are also associated with different patterns of response (Goodman and Proudley 2008).

Even those who have made a decision about what to do if a fire threatens their property can encounter implementation challenges. A study of householders' responses during a severe, rapid-spread fire in a rural area in South Australia in 2005 found that many who had intended to stay and defend could not as the fire spread unexpectedly while they were at work and they were unable to return to the property (Rhodes 2005). Most people did not receive a warning of the approaching fire and some residents who intended to leave were trapped and unprepared to defend while others fled at the last minute. Of the nine people who died during that fire, six were fleeing in vehicles as the fire approached their homes (Schapel 2007).

Factors that influence decisionmaking will reflect not only individual characteristics but also social, cultural, and political influences that are likely to vary within and between Australia and the United States. Although at a general level we think that cultural differences between the two countries are not dramatic and that many differences could be addressed through educational programs, we will briefly touch on some areas that have been suggested as potentially problematic. A key element of SDLE is the willingness of residents to accept significant responsibility for their own safety and protection of their property. Some have suggested that this would be an issue in the United States because most people who live in the WUI expect to be protected by firefighters. However, some research indicates that this is not as universal an expectation as is often thought (McCaffrey 2006). In addition, there is growing evidence that some US homeowners are already choosing to stay and defend their property, citing frustration with the evacuation process, recognition of the limits of fire protection agencies, and belief that it is their responsibility (Cohn 2006, Gonzalez 2008, Kuruvila 2008). A recent New Mexico study by Mozumder et al. (2008) highlights the variability in intention to evacuate and suggests a range of factors that might lead people to not evacuate, including risk perception, gender, and ownership of animals. It is also worth noting that similar concerns about expectations of fire protection and homeowner sense of responsibility have been raised in Australia. In fact, studies show that in some communities significant portions of the populations continue to expect fire service assistance (Odgers and Rhodes 2002, CFA 2003). However, as the SDLE strategy has evolved, these concerns have not turned out to be as problematic as anticipated.

Other reasons US authorities provide for their preference that all individuals evac-

uate include a desire to control access to the fire area, possible disruption in utilities and water supply, and concerns about potential liability. These are all areas that merit further investigation. However, in terms of liability it is worth noting that in the United States, actual legal authority to force people to leave under mandatory evacuation is quite limited, which means that in practice, authorities allow competent adults to stay and only force the infirm or young to evacuate (Tuttle 2003). Such inconsistency around authority to evacuate is not dissimilar to Australia where some states, such as Victoria, have legislation that protects the right of residents to stay with their property when they have a financial interest while other states provide police with powers to evacuate (Tibbits et al. 2008).

Conclusion

One can understand the appeal of mass evacuation during wildfires. At least on the surface, it provides a straightforward and simple solution to what threatened populations should do: "leave when we tell you to if not sooner." Allowing homeowners to make their own decisions about staying or leaving may seem both unwise and likely to add unnecessary complications. However, in many cases, evacuation is not as simple a solution as it appears. As was demonstrated during the 2007 Southern California fires, individuals who wait until official notification to leave are often risking their lives by driving through flames. As more people move into fire-prone areas, this is only likely to get worse. In addition, an increasing number of homeowners appear to be choosing to stay or to "sneak back in." Without adequate preparation, their lives are at more risk than is necessary. Finally, the question arises as to how well mass evacuation fits with the concept of fire-adapted communities.

Because more and more people are living in fire-prone areas where fire is a natural part of the ecology, future communities that want to be truly fire adapted will need to consider the merits of SDLE. Just as fire managers and policymakers have recognized that wildland firefighting needs to use a wider range of options than the traditional focus on full suppression, it may be time to consider alternatives to mass evacuation, including the notion that homeowners can be partners throughout the firefighting process and not just before fires. This is best accomplished through a systematic assessment of alternative approaches that involves not only

understanding the context of the alternative but also the necessary conditions for its success.

Differences between the United States and Australia mean that there are likely to be locations in the United States where it would be unwise for homeowners to stay and defend their property, but the differences are not systemic enough to mean that such an approach would not be a viable option in many US localities. However, careful groundwork would need to be laid. Where local communities seek to adopt an alternative to evacuation, such as SDLE, there will be a need for widespread understanding of and agreement about the alternative and its potential benefits. This requires an effective partnership between communities and fire management agencies, agency structures and processes that support the policy, substantial education and outreach programs to ensure that both fire personnel and residents fully understand the risks and choices involved, and individuals and communities willing to accept responsibility for their own safety.

We have considered four key contextual areas and highlighted issues within each that could affect adoption and implementation of SDLE in the United States. No policy or program is likely to be equally effective for everyone or in all circumstances. Thus, a useful step would be to develop research that examines and follows implementation of the SDLE program in Australia and the United States. Such research would provide insights into when and where SDLE may be a viable alternative approach in the United States and would also inform the implementation of the approach in Australia. In addition, it would extend the growing cooperation between the countries beyond traditional fire incident management into collaborative research and learning about the human dimensions of managing fire risk.

Endnotes

[1] Different Australian jurisdictions refer to the position by different labels. This article will use "SDLE" to describe the approach because it provides the shortest but still clear description of the general options.

[2] We do not mean by this statement to discount the environmental impacts of fire but are simply recognizing that the need to manage fire at all only exists because of the presence of humans and the effect wildfire can have on the diverse (and ever changing) mix of resources that humans value, including ecological health.

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