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Organizing Response
to
Extreme Emergencies

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Organizing Response to Extreme Emergencies:

A Submission to the Victorian Bushfires Royal Commission

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I have been asked by the Royal Commission on the Victorian Bushfires of 2009 to provide guidance about what management theory, research, and experience collectively tell us about what forms of organization and organizational practices are effective in management in general, and which are most effective in dealing with emergency situations in particular. I am pleased to have the opportunity to contribute to this important work.

I want to begin by expressing my deep sadness about the events of the Victorian Bushfires in 2009, my condolences to those who lost loved ones and lost property and suffered damage to their communities as a result of those events, and my humility in the face of the thousands upon thousands of responders, neighbors, and survivors whose courageous actions on that terrible day kept the situation and results from being far worse – and saved uncounted lives and protected untold property in the process.

The horrific events of Black Saturday, culminating in the appalling and tragic loss of 173 lives, will long be remembered. A large and complex and tragic event of this sort clearly commands our attention and demands our consideration of what lessons can reasonably be drawn in the hope that tragedies like this can be avoided in future. Unfortunately, the scale and complexity of this event also imply that it will be difficult to extract the right lessons, because the precipitating causes of the event

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and its consequences are so numerous and so deeply intertwined. I am pleased to see that the Royal Commission appears to be moving carefully and cautiously through the highly-charged aftermath of the event, and I hope you will have success in identifying sound directions and recommendations that will improve public safety for generations to come. It is my privilege to try to provide assistance in this task.

In preparing the discussion, I have had access to a variety of materials provided by the Royal Commission, including papers outlining the structure of emergency services in Victoria and in other Australian states, together with statements by various participants in the 2009 bushfires and other relevant documents. While I have reviewed these materials and draw on them in what follows, I want to make it clear that I have not tried to form any judgment about the performance of any individuals or organizations involved in these events. Such judgments lie well beyond the scope of what I was asked to undertake, and forming such judgments would require a deep body of comparative evidence of performance in these events as contrasted with other reasonably similar events – and no such body of comparative data, to my knowledge, exists.

What researchers can do – and what I will try to do here – is to identify lessons and good practices from management in general and from emergency management in particular that may be important to consider in determining how to move forward in Victoria. To do this, I have tried to understand enough about the fire events that unfolded in Victoria in January and February of 2009 and enough about the structure and relationships among the major organizations that responded to these events to be able to identify which areas of general management and emergency management theory and experience may be most relevant to improving future performance against the day when extreme fire conditions again threaten the state, its citizens, and its communities. It is to these issues that I will now turn – first, by examining the historical evolution of wildland fire-fighting, and then by examining what management theory has to tell us about how to make emergency response in extreme situations more reliable and effective.

Decentralization and the history of fire-fighting

Fire-fighting in wildland areas has long tended to be a highly decentralized process, and it is not difficult to discern why this has been so. People in wildland areas are generally widely distributed at low density. Until very recently, communication among different locations in the bush was difficult and slow, and transport of resources between locations was expensive and tedious. As a result, especially during times of widespread trouble – where many different locations were simultaneously dealing with fire or high risk of fire – communities tended to be relatively isolated from one another and tended of necessity to have to deal with their own difficulties. Fire-fighting was a community-level service, with fire-fighters working largely on behalf of their neighbors in their own communities. The ability to help others was limited – if the others who needed help were far away, then it was difficult to find out in time and to get there; if they were close by, then it was likely that the responding community was also simultaneously experiencing similar difficulties and would therefore be unlikely to be able to spare resources. In either case, the ability to provide aid was significantly constrained – and, therefore, the

likelihood of receiving significant aid from others was remote. As a result, communities were – or at least tried to be – self-sufficient.

As a consequence, wildland fire-fighting grew up as a largely decentralized function, with self-reliance a key virtue and distributed capability and training a key (though not necessarily always present) performance requirement.

More recently – say, in the last 30 years or so – this situation has changed as a result of evolving technologies in communications and transportation. The ability to communicate quickly and accurately and visually now allows – or seems to allow – central authorities to monitor more systematically and accurately what is happening at remote locations. Improved transportation – better roads, and especially the availability of airlift – now permit more rapid deployment of additional resources from more remote locations that may be not already be involved in responding to a different part of the same event, and may therefore have available resources to offer. This has led to the growth of more centralized functions and organizations in firefighting, and to a tendency to imagine that even more centralized command and control would be even better. Frequently, in the aftermath of major fire events, there is criticism that there was too little coordination and command from the center. There is a sense that we should be able to build and operate a more or less omniscient central command structure that can understand what is happening in each location and direct the overall response and distribute resources appropriately. In effect, this assumes that the historical decentralization of fire-fighting was a compromise born of historical necessity, and is therefore a problem to be overcome, rather than being any sort of potential virtue.

The fact that we might be able to use new technologies to create centralized command and direction of extreme fire events does not, however, necessarily imply that it would be a good idea to do so. These technologies could just as easily be used to provide greater coordination and support – the ability to move needed backup resources into action, while leaving distributed local teams in charge of directing the responses in their areas of operation – rather than to create a central command process. Which of these – centralized command, on the one hand, or centralized coordination and distributed command, on the other – will work better will depend on the nature of extreme fire events ... that is, it will depend on the so-called “task environment” faced by fire-fighting teams and leadership groups.

When we examine the nature of wildland fire-fighting as a management domain, it turns out that it is much less obvious than it might appear that greater centralization would be a virtue. ***Instead of trying to “fix” the “problem” of decentralization, it may make more sense to embrace the necessity and reality of decentralization – and dedicate ourselves to the task of making decentralization work more effectively rather than to the task of reducing or overcoming it.***

To see this, we will first examine the lessons of general management, and then turn to the specific challenges of wildland fire.

General lessons from management and emergency management theory

The Royal Commission has posed a number of questions about best organizational designs and best practices for management in general and for emergency management in particular. Professor Paul 't Hart has ably summarized in his submission to the Royal Commission what is known from the general literature and what can reasonably be said in general on this subject, and I will not repeat what he has presented – because I think his summary of the general principles is one of the best and most succinct available. Instead, I will add a few observations about the nature of organizations and tasks and then relate this to the challenges of emergency management in extreme situations, and especially to the difficulties – and the virtues – of a multi-agency response.

First, as Professor 't Hart has observed, there is no one form of organization that is best in all settings – either in general management or in emergency management. We have many different kinds of tasks to manage, and correspondingly many different forms of organization and types of practices that are good at managing them. Non-hierarchical networked organizations handle complex software projects by operating in parallel while manufacturing organizations with established technologies produce efficiency through hierarchical command and control discipline – each is an effective form of organization (and bundle of associated practices) for a different kind of challenge or task.

What does it take for an organization to produce a good outcome? While there is no single answer to this question, we can identify the essential *elements* that must be in place to produce good performance:

- (1) *goals, values, and priorities – and motivation to achieve or advance them* (on the part of those involved in the decision-making and work of the organization);
- (2) *skills and resources* matched geographically and functionally to the *task* – that is, a capability, given the motivation, to carry out the task, located where the task needs to be performed;
- (3) *decision-making and authority* located together with *accurate information* about the situation, task, and alternatives – so that good decisions can be made and then carried out; and
- (4) *communication* between the point of decision-making and the point of action.

When general management is viewed in this way, it is clear that different forms of organization can (and do) assemble these elements in entirely different ways and produce good results. For example, could a highly-decentralized volunteer organization handle an event that varies dramatically across space? It could, if it has well-defined goals and members highly-motivated to serve them who have the skills to recognize and to cope with the situation where they are, and if those members are distributed geographically where the tasks need to be performed, and if they are given the authority and discretion to act on the basis of what they see and are able to receive such additional resources as they may need

to achieve the desired results. Alternatively, a highly-centralized organization could be effective in this same task environment if it is able to motivate its employees and is able to centrally assemble the information about the needed action in each distributed location and then communicate instructions and resources back to the point of action.

Which of these approaches will be better depends on the relative costs of training and communication in the specific environment in question. If it is very expensive to train people to recognize what actions are necessary to accomplish a given task, and it is inexpensive to transfer accurate information to the center and detailed instructions back to the scene of action, and if the central decision-making group can quickly make a large number of decisions about different circumstances in different locations, then the centralized model will be preferable. If, by contrast, it is relatively easy to train many different people to recognize tasks and how to accomplish them, and expensive to develop and transmit accurate information to the center and instructions back to the points of action, or difficult for the central group to make customized decisions fast enough to stay ahead of the flow of demands for guidance from the distributed workers, then the decentralized organization will be more efficient.

What this emphasizes is that instead of searching for general lessons that will apply broadly, we need to look in more detail at the nature of the task environment for the relevant events, and design organizations and procedures with specific reference to the key features of the challenge. It is to this that we turn next – with reference to the nature of extreme emergencies.

Response to extreme emergency events

Fire conditions in Victoria in January and February 2009 – and especially during the days running up to the Black Saturday events – were significantly beyond the worst previously experienced in modern Australian history. The central question relevant to the Royal Commission’s work with regard to organizational form and procedures, then, is that of how to construct organizations capable of coping with extreme events – events beyond the range of our routine experience.

The distinction between routine events and extreme events is crucially important and *operational* – that is, it implies that we need to organize and operate in different ways in routine events as contrasted with extreme events. Extreme events are not simply overgrown routine events; they are different in kind, and they will respond favorably only to a materially different form of approach. This distinction is discussed in detail in Leonard and Howitt [2009] and in Leonard and Howitt [2007]. The central observation is that for routine events we can build organizations that have the expertise, equipment, and procedures necessary to accomplish the task. For routine events, the main task is to execute solutions already designed and trained into the organization; a hierarchical command-and-control structure and centralized authority-driven leadership structure can be efficient at supporting the work of execution. By contrast, in extreme events (referred to by Leonard and Howitt as “true crisis” emergencies), the defining characteristic is the necessity for *improvisation*. By definition, extreme events exceed ordinary capabilities and routines – that is what makes them “extreme.” Effective

leadership in such situations will require creative improvised actions to cope as well as is reasonably possible with an event for which there is no full precedent, and for which there is therefore no fully developed action script.

What kind of organizational structure, then, is likely to be most effective in an extreme fire event? Should we rely on centralized organizations (as we do, for the most part, in routine events)? Or is decentralization more promising? ***While there is no completely definitive answer, decentralization tends to offer significant advantages in such situations.***

To see why, we need to examine the nature of extreme events more closely. Extreme events are generally highly variable – that is, their intensity varies greatly from one location to another. This implies that a high degree of customization is necessary in the response. But how should that customization, that variety in execution, be accurately gauged and carried out?

A centralized response works on the many and distributed challenges through a central decision-making individual or group to whom information from the distributed task sites is communicated. The information is then processed, decisions are made about what the response should be, and this is communicated back to the point of action, where the differing instructions in each location are carried out. Centralization offers the advantage that fewer decision-makers need to be thoroughly trained in assessment, analysis, and decision-making – the great expertise of the few is shared across the many disparate action sites. If this expertise is difficult and expensive to build, then the ability to concentrate it in a few people that can drive the whole organization is a virtue of a centralized system. But making a centralized system work well puts major burdens on the central assessment, analysis, and decision-making group and on the internal communications systems. Effective work through a centralized organization relies on the ability to transmit large volumes of accurate information to the central group, on the ability of that group rapidly to assess the different situations in each location, conduct the necessary analysis, and choose the appropriate action for each site, and then on the ability to communicate those rapid decisions back to each of the decentralized locations about what to do. In routine events, these conditions are often met – the system is designed to transmit information and instructions, and the central group is large enough and skilled enough to keep up with the flow of issues – so when the system is operating below its designed load it should be able to function effectively. Information flows effectively to and from the central decision-making group (so long as they are able to keep up with the pace and flow of decision demands communicated to them from the field – which they should be able to do when the flow is below the load for which the routine system has been designed).

Consider what happens, however, in an extreme event. Highly variable conditions in the field must be communicated swiftly and accurately to the central staff, processed quickly into decisions, and quite variable and specific instructions have to be communicated back out and delivered correctly to the distributed action locations. The central team is vulnerable to being buried under the flow of variable problems coming to it for resolution, and may not be able to engage in the full range of customization that is called for. A system built on centralization is thus vulnerable to system overload when confronted by a larger-than-normal, highly variable event that is outside of its normal operating range.

It is potentially subject to breakdown as circuits overload, central decision-makers are overwhelmed with analytical and communications tasks, and errors in data transmission (both inbound and outbound) rise.

In such an environment, a **decentralized** response structure may offer considerable advantages. Assuming that it is possible to train a larger number of individuals or teams to make good assessments and decisions in the face of a task in their (distributed) areas of operation and that it is also possible to distribute the other necessary resources for action, distributing the assessment, analysis, and decision-making tasks multiplies the number of eyes and brains working on the myriad challenges to match resources and actions to the highly variable tasks that arise in an extreme event. Communication lines are shorter, information is not lost or confused in transmission, and the organization can move both more quickly and more accurately.

Accordingly, effective fire-fighting organizations (and military organizations, which face a similarly highly variable and rapidly evolving battlefield situation) tend to **decentralize** knowledge and resources, operating through decentralized teams that are supported, coordinated, and resourced through a centralized oversight organization. (In military circles, this is described as sending “power to the edge [of battle].”²)

Making decentralization work: the theory of emergence

As we have observed, decentralization in wildland fire-fighting may offer considerable virtues as compared to a more centralized system. Extreme fire events, by their nature, begin as highly decentralized and variable phenomena. Responding to them on a centralized basis requires overcoming the difficult challenge of assembling a vast array of data, processing it into understanding of a myriad of different individual situations, figuring out how to respond to each sub-event, and distributing the instructions accurately to the respective action locations. This is a recipe for overloading central authorities and experiencing breakdowns in the ability to respond quickly and to customize effectively. The question, then, is not **whether** to have a decentralized response – more or less by their nature, extreme fire events will almost surely and necessarily be responded to in significant part on a decentralized basis. Instead, we might ask this question: **given that decentralization will be the reality and is in most cases also the best alternative, how do we structure fire-fighting organizations so that decentralization will be most effective?**

There are several keys to effective performance of decentralized organizations. First, we must be able to train local leaders and teams to recognize the situations they are in and to respond effectively

² Intriguingly, the idea of a centralized command process for emergency management is often referred to as the “military model.” This is a misinterpretation of the military approach. Effective military organizations do not operate on the basis of detailed centralized commands – they operate instead through decentralizing discretion and authority to permit more nimble decision-making and action. What is centralized is coordination and resourcing of field units. Military organizations that are highly centralized are regularly defeated by those that operate on a decentralized basis.

to them without having to transmit information and await guidance from their oversight organizations – that is, they must have and be willing and trusted to operate on their own discretion. Second, we must build centralized structures through which we can coordinate, support, and resource the actions of these distributed teams.

There has recently been a good deal of interest in the general management literature on decentralized approaches to problem solving, or to problem solving in a “network” environment with distributed agents operating in separate domains but in communication with one another. The fundamental concept is that results “emerge” from the distributed action of independent agents rather than being “engineered” by a central command and control entity. The theory of emergence outlines the concept of “decentralized intelligent adaptation” – the idea that independent agents, each intelligent and reacting to the conditions that they encounter “locally” (that is, near where they are located) will, through their “adaptation” to the conditions as they see them, produce good results that “emerge” from their independent work (Johnson [2001]).

In our work at the Program on Crisis Leadership, we have termed the application of this general approach “Fast and Light.” The idea is for response organizations to consist of distributed units, each capable of and authorized to conduct local response, with some standardization of approach, and for the central authority to act as a coordinator of and in support of (rather than as the command director of) these distributed units. We refer to this as “fast and light” to emphasize that response is likely to be more nimble if it is mobilized in more numerous and smaller pre-deployed units. This model applies quite directly to community-based wildland fire-fighting, as this approach draws on the historical realities in which fire-fighting units have been small, widely dispersed, and self-directed.

Embracing the decentralization of “fast and light” involves a shift in philosophy. Instead of extolling the virtues of centralized command and control, we value instead the virtues of a decentralized structure – its ability to respond more quickly and nimbly and with greater customization to a highly variable and complex event, without the need to arrange for capacity at the center to do all of the “knowing and telling” for units distributed across the entire event landscape. Instead, we rely on decentralized agents to intelligently assess and respond to the events local to them ... and, out of their collective work, the overall response that emerges can then be highly customized and effective.

Shifting to this philosophy brings with it a substantially larger burden for training. Where in a centralized organization a few well-trained and highly experienced people at the center were supposed to be able to provide direction, an organization that is relying on decentralized agents must insure that the training and experience levels of those distributed agents is appropriate to the tasks they will confront. This may – and, indeed, should – produce better and more reliable results ... but the training requirements necessitated by this shift should not be underestimated.

The reliance on decentralized action also does not imply that there is no longer a role for the central organization and oversight structure – its work is transformed, but by no means eliminated. Instead of trying to understand the myriad of different sub-events that are taking place in the field and command resources into action against them, in a decentralized model the role of the center is to

coordinate the actions of distributed agents and, as much as is reasonably possible, to provide the additional resources necessary for them to do their work effectively. The center shifts, in short, from being a command and control process to being a coordination and support process. It must still seek to understand the nature of events in the field (so that it can make decisions about resourcing them, for example) – but it does not require the detailed knowledge that would be required to direct operations effectively from afar.

Multi-agency response “organizations”

In addition to the intrinsic decentralization of response, extreme wildland fire events share another important feature: response to them is of necessity a multi-agency effort, often including not only agencies from different disciplines (fire, police, public works, health, ...) but also agencies from different jurisdictions (adjoining towns or states) and different levels of government. Moreover, response (and, especially, recovery) will often involve non-governmental organizations (like the Red Cross and Salvation Army). As a consequence, extreme events involve complex coordination and communication challenges. Moreover, since each event, and especially each extreme event, will have its own idiosyncrasies, the combination of agencies that will need to work together cannot be precisely specified in advance. The “team” – actually, generally, a collection of teams – that will be involved in managing and responding to an extreme event will generally be what has been referred to as a “hastily-formed network” (Denning [2006]). Such groups are drawn together by the event (generally as a result of what is known in the early going about the event); they form suddenly, and often must be augmented as more comes to be known about the event that requires additional groups to join.

How can we best arrange for such groups to function effectively? They begin as teams in name only, since they do not generally have the opportunity to develop the infrastructure and conditions that make teams effective – though they will generally perform better if they take time at the outset to develop some of those conditions (mutual knowledge about the capabilities represented, establishment of goals, and so on) (Hackman [2002]). Here, research and experience do have a set of best practices to suggest.

First, it is essential, if these disparate groups are going to be able to work together (in direction and planning, and in the field carrying out their respective work), that they be organized along similar lines. If organizations are set up with different structures or different terminology describing their organizational structures, they will naturally find it enormously difficult to coordinate seamlessly, especially during a rapidly-evolving, high-stress event. There are many possible general structures that could be used as the basis for the needed harmonization, but by far the most commonly used, widespread, and effective way to do this is through application of the Incident Management System (IMS), which provides a structure and set of procedures for assessing and addressing evolving events that is scalable and practical. To its credit, Australia was one of the early adopters of this general approach, and has been one of the ongoing developers of the system as it has been updated and improved over time (Australian Fire Authorities Council [2005]). The system has been used repeatedly

and to good effect in fire-fighting and in other emergency circumstances in Australia (including, for example, the response to Cyclone Larry).

The key features of IMS are (1) an organizational structure and accompanying terminology that is agreed by agencies that will (or may) come together in an event; (2) a set of procedures for identifying challenges and priorities and for organizing planning and response to them; and (3) repeated practice in using the structure and processes, so that using them in an emergency situation will not seem like a new and different set of organizational routines. The main elements of the system are its division of activity into three main functions, each with its own “chief:” the “operations chief” controls the current operations; the “plans chief” sees to planning for the next operational period; and the “logistics chief” organizes logistics functions to support current and anticipated operations. (A fourth section is generally established to track resource use and costs for purposes of after-action administration, but is less central to the operations themselves.) Overseeing this work is an “incident commander” supported by a command staff that includes a safety officer and a public information function. One could argue about the structure – for example, military organizations (on which incident management is based) generally have operations and planning more closely tied together – but the most essential benefits come not from the precise elements of the system and how they are defined or labeled, but instead from the fact that that all agencies are using the same system, and can therefore interface with one another quickly and seamlessly.

Second, the presence of multiple agencies, jurisdictions, and levels of government – not to mention civil society organizations – in managing the response and recovery necessitates some form of integrated oversight process so that actions by disparate organizations can be coordinated effectively. This is challenging, because generally many of the agencies involved cannot legally subordinate themselves to a suddenly-invented or imposed command structure. Police units, for example, report and must receive their authorization through the police command structure. It is neither a good idea, nor generally legally sustainable, to take police, fire, or emergency health system units and put them under the direction of commanders not deeply versed in their modes of operation and critical legal constraints and obligations. Thus, forming a “unitary” command – appointing a single commander who has authority to direct all of the relevant units, across disciplines and jurisdictions and levels of government – is generally neither possible nor wise ... and this is made all the more true when non-governmental organizations need to be part of the mix.

Fortunately, IMS has a prescription for this, known as “unified command.” The basic approach is to form a committee of command-level people from each of the organizations importantly involved in the event. Each discipline continues to work under the authority and direction of its own command structure, but those structures are brought together around a table so that the relevant commanders can jointly consider the best course of action. Once this is agreed, orders and directions flow back down to the field through the separate disciplinary channels of direction and authorization. Commonly, the leader of one of the disciplines represented in the unified command will be the “primus inter pares” (first among equals), and others in the structure will defer to his or her decisions ... but this operates more as a voluntary consortium than by any form of legal authority, because of the legal bars to subordination just described.

This structure – incident management, including the device of unified command – works surprisingly well even in large and complex events. For example, in the firestorm in southern California in October 2003, units from the California Department of Forestry, the United States Forest Service, the California Office of Emergency Services, state, local and county law enforcement organizations, and a host of other federal, state, and local agencies jointly responded to over 900 fires, about a dozen of which became major fires, quickly and relatively efficiently. When the fires first began, the “organization” that formed to respond do them went from having no one in the field to coordinating the work of 15,000 firefighters and other personnel in the space of a week. There were many imperfections in this event, including loss of over 20 lives and over 3000 homes – but the big picture was that a reasonably effective large-scale response was mobilized quickly in the face of extreme threats to life and property, and we do not have a better or more reliable approach to offer.

Ex-ante structure versus post-hoc criticism

To be ready to confront whatever routine and extreme events lie before us, our societies must make judgments about what structures and approaches will best serve our needs and then build and prepare those structures in advance. This creates the “ex-ante” reality of how we will be organized in our response to the next event. For the most part, well-trained professional fire-fighting organizations – including those in Australia – are already organized to respond to extreme events through some version of incident management and unified command. Some observers will, however, judge how they performed in the glare of 20/20 hindsight. Extreme events always involve significant disruption and turmoil, and it often seems, after the fact, that a more centralized response might have been able to produce a better outcome. We have a dangerous tendency to imagine the upside of more central command and control (greater precision in execution, for example) and to forget the likely downside (the inability of a centralized command staff to stay ahead of the overwhelming burden of detail flowing from myriad distributed events, and the inevitable delays and errors in providing direction that would result). This tendency is visible in some commentaries about the Victorian fires of 2009, and it is prominent in discussions about the response to the Haitian earthquake earlier this year.

Extreme events are, by their nature, not pretty, and no response structure that we have yet invented will make them so. But it is largely a fantasy that trying to manage them with a more centralized command structure would be a conspicuous improvement. A forward-leaning organizational structure with authorization to operate locally but with the ability to request resources and assistance from a central oversight organization appears on average to be a much more effective approach – and is comparatively more effective the larger and more complex and more varied is the event.

An even more decentralized system: Stay and Defend or Leave Early

I have not been asked to provide a review of the policy concerning whether citizens should evacuate in the face of a fire event (the so-called “Stay and Defend or Leave Early” policy). Accordingly, I

have not reviewed this policy and do not have a judgment about how it has functioned or whether it is the best approach. As a policy that has to operate on a highly decentralized basis (essentially, at the scale of individual households), however, there are aspects of this policy that are related to the discussion here about decentralized and coordinated action, and it may be helpful to explore briefly what those links suggest about how the Royal Commission might wish to review this policy.

First, and most obviously, it is important to think of this policy not as its common reference (“stay or go”) suggests, but under its more complete description (“stay and defend or leave early”). As the Royal Commission describes in some detail in its interim report, both parts of the complete policy are complex and difficult to execute. Under “stay and defend,” a household generally has to make significant preparations long in advance to create a defensible space (building or retrofitting with fire-resistant construction and materials, removing brush and other flammable materials from around buildings that will be defended, providing means to suppress spot fires, constructing a safe refuge, and so on). This requires significant resources and knowledge of best practices – and a great deal of effort. In the event, this approach then often also requires active defense – that is, the physical mobilization of fighting spot fires, wetting flammable surfaces, and so on. “Stay” is actively dangerous without the addition of “and defend.” “Go early” also requires substantial knowledge and awareness, so that the action of leaving can be taken before evacuation routes are either severed or endangered or clogged.

Viewed as a decentralized process, making “stay and defend or leave early” work effectively thus involves considerable knowledge, resources, and mobilization by individual households – in the absence of which the policy will not work well and will in fact be an active invitation to disaster. As with any decentralized process, its effectiveness will depend on the capabilities and actions of the decentralized agents – in this case, households beyond the reach, for the most part, of the application of formal government authority. We may be able to enforce some ordinances (brush removal and building codes, for example), but it will be difficult to force compliance with the full suite of actions households must undertake in order to make this policy effective and safe.

The ultimate test of the “stay and defend or leave early” policy is not in its theory, but in its consequences. From a moral perspective, it is not enough to say that under this policy it is up to households to inform themselves and take the necessary actions, and that if they do not do so the negative outcomes are self-inflicted, and on their own account and not society’s. If, given the reasonable efforts of society to help households to master the challenges of this policy, before and during active fire events, they will not (or many of them will not) be both willing and able to master the skills and undertake the required actions – and/or if they do not in fact accomplish the required actions – then the policy cannot be defended by claiming that it would work in theory if everyone cooperated. The policy needs to be evaluated in the context of the empirical compliance with what is required for it to operate effectively and without endangering the households and communities operating under the policy.

“Stay and defend or leave early” is an emergence-based policy. If it works, what will emerge from the policy is fire-adapted and resilient communities in which households make good investments in protection and good decisions about when to defend and when to leave – and this, of course, is the

ideal on which the policy is based and the hope on which it rests. But hope is not a policy ... and if this policy does not work – if it does not actually succeed in mobilizing citizens competently to take the actions they need to take to protect themselves – then it will actively contribute to endangering households who leave too late or who stay to defend thinking they were prepared but who did not in fact understand or properly execute the preparations in advance or the defensive actions in the moment.

What this suggests is that in examining the “stay and defend or leave early” policy, the Royal Commission should examine it as an emergence-based policy and should focus on the empirical realities of (a) what households need to know and do in advance and in the moment to make it work; and compare these to (b) what households seem reasonably willing and able to do, given the appropriate informative and persuasive efforts that can and will be made by governments utilizing this policy.

Conclusions

This discussion has a number of implications for how the Royal Commission may want to examine the events of January and February 2009 and for how it may wish to formulate its recommendations going forward. As we have observed, there is no one right organizational form for all situations or even for all emergency situations – but, empirically, the incident management system and unified command is a generally used and useful and flexible approach that works well in many situations, and it probably makes more sense to harmonize on and practice making this system work than it does to try to redesign or improve upon it. We have also observed that extreme fire events call for customization and improvisation – and that this is probably most easily supported through a system that embraces decentralization – which, in turn, is one of the design features and strengths of the incident management process.

Making such a process work as well as it reasonably can in the face of extreme events, however, creates a series of imperatives for the Royal Commission to help Victorian fire-fighting and related agencies to achieve:

- continued development of the process for central coordination and allocation of resources;
- continued investments to address the significant needs for widely distributed training (because a system that works through reliance on the decentralized intelligent adaptation of units in the field must correspondingly address the needs for training for those distributed units, and the more it relies on decentralized discretion the more the need will be for training and experience in the local teams);
- continued support for and efforts to achieve integration and harmonization around the concepts and practices and structures of the incident management system; and
- continued efforts to practice unified command in exercises and in smaller events so that the practices are familiar and available in larger and more threatening events.

The central questions before the Royal Commission about the events of Black Saturday with regard to the organization of firefighting for extreme fire events in Victoria thus appear to be:

- (1) whether the circumstances of such events will more closely resemble the conditions for effective performance by a centralized organization, or instead will more closely mirror the circumstances under which a decentralized organization that relies on the judgment, discretion, and capabilities of decentralized units will be more effective;
- (2) whether the training and capabilities of the distributed firefighting units in Victoria and the coordination and resourcing capabilities of their oversight structures are appropriate to providing the requisite level of excellence in task performance given the extreme situations that they will on occasion need to face;
- (3) whether the appropriate degree of harmonization around, and training about, the use of the Incident Management System has been achieved; and
- (4) whether the concept of unified command has been developed and trained and exercised sufficiently to permit multiple agencies to come together as effectively as they reasonably can in the face of extreme events.

References

Australasian Fire Authorities Council, "The Australasian Inter-Service Incident Management System: A Management System for any Emergency," Australasian Fire Authorities Council 2005.

Denning, Peter J., "Hastily Formed Networks: Collaboration in the Absence of Authority," *Reflections* (Journal of the Society for Organizational Learning), Volume 7, Number 1, 2006.

Hackman, J. Richard , **Leading Teams: Setting the Stage for Great Performances**, Cambridge, MA: Harvard Business Press 2002.

Johnson, Steven, **Emergence: The Connected Lives of Ants, Brains, Cities, and Software**. NY: Touchstone 2001.

Leonard, Herman B. and Arnold M. Howitt, "Against Desperate Peril: High Performance in Emergency Preparation and Response," in Deborah E. Gibbons, ed., **Communicable Crises: Prevention, Response, and Recovery in the Global Arena**, Information Age Publishing 2007.

Leonard, Herman B. and Arnold M. Howitt, **Managing Crises: Responses to Large-Scale Emergencies** (co-editor and co-author with Arnold M. Howitt) Washington, DC: CQ Press 2009.