

An Exploration of Warfighting and Firefighting Doctrine

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Abstract—Over the past two decades, wildland fire professionals have been confronted with worsening conditions and complex challenges that cry out for change and new ways of thinking. However, change requires a framework within which people reliably translate policy into timely, effective action. Doctrine, or a body of teachings, instructions, taught principles, or positions, may represent a framework within which land management agencies and rural fire services might change to confront their challenges. A good doctrine should:

- 1) establish a common purpose;
- 2) create a common language for expressing organizational strategy; and
- 3) institutionalize a common structure for action.

Some agencies have invested in doctrine, naturally turning to established experts—the military—for inspiration. However, while parallels between warfighting and firefighting seem obvious, the analogy breaks down quickly because firefighting is a civilian undertaking with no moral equivalence to war, and the mission is not paramount over the safety of individual firefighters. In short, firefighting is not warfighting. However, nine cognitive demands underlying United States Marine Corps doctrine and six principles of that doctrine appear relevant to wildland fire; and the authors of this paper explore how those nine demands and six principles might form the core of a fire operations doctrine.

Introduction

Over the past two decades, wildland fire professionals have confronted, and continue to confront, worsening conditions including the effects of climate change, severe fire behavior, escalating threats to communities, mounting costs, undesired fire effects, unacceptable threats to firefighter safety and survival, and considerable indiscriminate public scrutiny through media and post-crisis inquiries and litigation. These trends attest to the need for change and new ways of thinking to better address these rising and complex challenges. However, change requires a framework within which people reliably translate policy into timely, effective action.

Change also requires that we examine how we have done things in the past, and ask whether we have done those things as best we might. Because rural fire services and land management agencies with responsibilities for wildland fire share many of the dynamics contributing to military success on the battlefield, many of those agencies have adopted, over the past 20 years, methods that military organizations find effective in improving performance (DeGrosky and Parry, 2011.) However, much of that adoption occurred within the context of grassroots efforts to acquire promising solutions to pressing organizational needs through trial and error, rapidly prototyping them,

and seeing what worked; rather than achieving optimal performance (DeGrosky and Parry, 2011.) We propose that wildland fire agencies would be wise to re-examine their approaches to important tools such as after action review (AAR) and leader's intent to better address the rising, complex challenges they face, and that doctrine may provide both the opportunity and the framework within which they may do so.

Doctrine

Doctrine is a body of teachings, instructions, taught principles, or positions in a branch of knowledge or a belief system. In organizations, one might think of doctrine more directly as what the organization chooses to teach and an element of organizational culture. The world's militaries commonly use doctrine, both written and unwritten, to describe established procedures they apply to complex operations in warfare. Often, militaries transmit their doctrine through training.

It has been suggested that doctrine represents the framework within which land management agencies and rural fire services can adapt, in order to confront their 21st century wildland fire challenges (Bosworth, 2006, p. 15). A good doctrine meets three needs; establishing common purpose; creating a common language for expressing organizational strategy; and institutionalizing a structure for action. Some land management agencies with responsibilities for wildland fire have invested in doctrine, naturally turning to visible experts—the military—for inspiration. Doctrine is

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fundamental to war. As defined in *Warfighting*, the United States Marine Corps' handbook on strategy and operations, doctrine is "the fundamental beliefs of the Marine Corps on the subject of war, from its nature and theory to its preparation and conduct. Doctrine establishes a particular way of thinking about war and a way of fighting. It also provides a philosophy for leading Marines in combat, a mandate for professionalism, and a common language. In short, it establishes the way we practice our profession." (USMC, 1997, p. 56).

Limitations of the Analogy

While on the surface parallels between warfighting and firefighting may seem apparent, the analogy between warfighting and firefighting breaks down quickly. According to Marine Corps doctrine, "War is a violent clash of interests between or among organized groups characterized by the use of military force", and goes on to say, "The essence of war is a violent struggle between two hostile, independent, and irreconcilable wills, each trying to impose itself on the other" (USMC, 1997, p. 3). Considering this definition of war, no "war on fire" exists. There is no enemy. The human effort is directed at overpowering, not other humans, but a natural force that occurs in places, at times, and with intensities that we find socially, and as a matter of public policy, unacceptable. Under those circumstances, we choose to fight fire. However, only one will exists, that of humans to impose our preference upon the forces of nature. Because, in most countries, firefighting is a civilian undertaking with no moral equivalence to war, the mission is not paramount over the safety of individual firefighters.

Why a Warfighting Doctrine Can Serve as a Template for Firefighting Doctrine

Despite the previously discussed limits on comparing a warfighting doctrine to wildland firefighting doctrine, nine demands underlying United States Marine Corps doctrine (1997)—friction, uncertainty, fluidity, disorder, complexity, the human dimension, psychological and physical forces, evolution, and art and science—appear relevant to wildland fire. The United States Marine Corps (1997) refers to these as "moral, mental, and physical characteristics and demands" (p.3); though the authors of this paper conceive of them simply as cognitive demands. In addition, six principles embodied in Marine Corps doctrine (USMC 1997)—leadership, training, professional education, philosophy of command, decision-making, and commander's intent—have potential to form the core of a doctrine for wildland fire operations. The U.S. Marine Corps (1997) uses its theory of war as the foundation for the way they prepare for and wage war (p.23) and we propose that land management agencies and rural fire services can similarly

employ doctrine as their foundation for firefighting and other wildland fire operations.

Nine Underlying Cognitive Demands

Friction

Wildland fire personnel inevitably work in extremely dynamic environments in which they must make critical decisions while confronted by innumerable stresses both internal and external. Decisions in the wildland fire environment depend on complex variables such as weather, fire behavior, resource availability, and social and political forces. In this environment, decisions are necessarily situational and dependent on temporal elements which are hard to predict with a high level of confidence. Consequently, the wildland fire operating environment can often seem complex, highly variable and, perhaps, nearly unknowable.

Because of the countless dynamic factors that impinge on fire operations, those operations are often high risk, high stakes, and conducted at a high operating tempo. We may call these factors *friction*; be they internal (mental or physical), external, or self-induced. According to the U.S. Marine Corps (1997), "While we should attempt to minimize self-induced friction, the greater requirement is to *fight effectively* despite the existence of friction. One essential means to overcome friction is the will; we prevail over friction through persistent strength of mind and spirit" (p.6). From this perspective, one might argue that only through experience and consciously developed organizational capacity can fire personnel come to appreciate the complexity and friction they confront in their operating environment; develop and maintain a realistic appreciation, one might say wisdom, for both what is possible in fire operations and what is not; and summon the force of personal will necessary to overcome the friction that they can. Practically, while training should attempt to approximate the conditions of fire operations, we must realize it can never fully duplicate the level of friction of real fire operations. We have observed, in the most reliable and resilient of land management agencies and rural fire services, a growing recognition of the concept of friction; and a shift in workforce development efforts toward a focus on developing capacities for leadership, reliability, and resilience.

Uncertainty

The nature of fire and firefighting makes certainty impossible. Frequently, firefighting actions will be based on incomplete, inaccurate, and often contradictory information. All decisions are made based on assessment of what is possible and what is probable. A number of times, over the last twenty years, inquiries into firefighter accidents and fatalities have implied that events surrounding unwanted

outcomes had been assessed as improbable. However, those unexpected events have proven to be those with the greatest adverse impact. One could argue that, given that we are not opposing other humans, whose actions we can predict and whose intent we can attempt to understand, the firefighting environment may prove every bit as uncertain as war or maybe even more uncertain. Given that degree of uncertainty, wildland fire agencies would be wise to focus on preparing their personnel to consider alternative scenarios during operations.

The wildland fire operating environment, always uncertain, grows quickly and dramatically less predictable in the face of unprecedented change in biomass accumulation, climate change, persistent drought, and resulting fire behavior; population growth in the wildland-urban interface; larger fires and longer fire seasons; and hyper-politicized land management issues, among other factors. Consequently, wildland fire personnel must learn to fight fire in an environment of increasing uncertainty, which we can do by teaching fire personnel to develop simple, flexible plans. Such plans enable us to be purposefully alert to weak signals of failure, plan for contingencies, and evaluate progress against objectives, all of which may lead to adapting actions and fostering initiative among subordinates.

Learning to fight fire in an environment of increasing uncertainty will require a certain acceptance of risk, but wildland fire personnel must clearly understand that the acceptance of risk does not equate to the imprudent willingness to gamble the welfare of people or the chance of success on a single improbable event.

Fluidity

Like friction and uncertainty, fluidity represents an inherent characteristic of the nature of fire operations. Many challenges confronted by wildland fire personnel result from unique combinations of circumstances, requiring original solutions. Each condition or circumstance merges with those preceding it and those that follow; shaping and being shaped by other forces. What results is a continuous, fluctuating fabric of opportunities and threats, punctuated by unexpected events. Success in a fluid situation depends in large part on the ability to adapt to a constantly changing situation.

Like the fluidity of the warfighting environment, fluidity in the firefighting environment requires a high operational tempo that, while necessary and advantageous, proves impossible to sustain indefinitely. Consequently, the tempo of firefighting operations fluctuates from intense activity to periods during which weather and fire activity allow firefighters to make gains toward fire containment, gather information, rest and rehabilitate, or redeploy. Success in the wildland fire operating environment requires both individual and organizational alertness; individual, team, and organizational situation awareness; emergent leadership; and responses to unexpected change that prove both timely and effective.

Disorder

As it does in war and crisis, disorder represents an inherent characteristic of firefighting; an inevitable characteristic of a dynamic situation. Like the U.S. Marines, wildland fire personnel strive to impose a framework of order over the disorder of the operating environment and strive to influence the situation by establishing a command structure and a flow of intended action, while acknowledging the limits of their control. The limits of control can prove particularly true during emerging fire incidents, particularly when significant numbers of resources respond to chaotic incidents in the wildland-urban interface.

Often, these situations require firefighting forces to improvise continuously, to engage in a sort of guerrilla firefighting that may push the limits of established policy and procedure, and can get firefighters in serious trouble; physically, organizationally, and politically. However, improvisational resilience and effectiveness, in the face of a disorderly environment, is something that wildland fire organizations value, admire, encourage, and, one might argue, even need. A responsible fire operations doctrine would take advantage of firefighters' native ability to improvise, while both preparing personnel to improvise sensibly and acknowledging the limits of such improvisation by establishing sideboards, within which, firefighters operate.

Though disorder represents a common characteristic of both warfare and firefighting, it also represents an area in which the two vocations diverge. Marine Corps (1997) doctrine says, "It is precisely this natural disorder which creates the conditions ripe for exploitation by an opportunistic will" (p.11.) However, this axiom holds little relevance for wildland fire personnel. Disorder is never the friend of, or an advantage for, wildland firefighters.

On a much more relevant note, *Warfighting*, the Marine Corps doctrine, (1997) states that, "As the situation changes continuously, we are forced to improvise again and again until finally our actions have little, if any, resemblance to the original scheme" (p. 11). Like warfighting, this statement aptly describes the life cycle of plans in the wildland fire operating environment. As civilian bureaucracies, fire agencies depend on plans and place a great deal of faith in plans. One might argue that to succeed in an inherently complex and disorderly operating environment, wildland fire organizations need incident action plans, and plans for decision support, communication, safety, and medical support; and that all have enormous value in readying an operation. However, plans also present a pitfall. Plans offer starting points that require constant re-evaluation. The problem with plans is that they shape what we actually see, set our expectations, and can lead to confirmation bias - the tendency to search for information that confirms our expectations, correct or otherwise. The inherent disorder, fluidity, and uncertainty of the wildland fire operating environment demand that planners of wildland fire operations acknowledge uncertainty and state, right up front, that their plan is a living document that will require adaptation to

changes arising during the shift; thereby provoking firefighters to think about what might change and how they might effectively respond.

Complexity

Like war, firefighting represents a complex undertaking, often engaged in a complex operating environment, and requiring a compound organizational structure in which each organizational element must adapt to local conditions and requirements while working cooperatively with other elements to accomplish common goals and a cohesive effort. In addition, a complex firefighting operation involves many independent but interrelated decisions and actions being undertaken simultaneously throughout the organization. Like military operations, efforts to fully centralize command, control and decision-making prove impractical in an operating environment in which events, and response to events, are inherently complex and distributed. Consequently, a command culture that distributes decision-making to people within the organization who share leader's intent, mission clarity, and comfort with their assigned tasks, seems most appropriate. In this inherently complex environment, wildland fire personnel often find that they confront added complexity brought about by conflict over competing fire suppression, land management, and ecological objectives that are not easily resolved; as well as conflicting social wants and needs and frequent difficulty communicating with, and engaging, citizens during the decision-making process.

Historically, land management agencies and rural fire services became very efficient and effective at suppressing fire in a number of fire adapted ecosystems worldwide; inadvertently creating long-term ecological and biodiversity issues. Given the accumulating biomass in fire adapted ecosystems, coupled with climate change, where the natural role of fire has been disrupted, wildland fire personnel increasingly confront severe fire behavior exceeding what they had traditionally considered initial attack thresholds. More escaped, unwanted fires present the potential for more damage—to property, infrastructure and the environment—increased water yield and degraded water quality, as well as negative impacts on biodiversity.

The Human Dimension

Just as in warfare, the effort, danger, fear, and exhaustion have a great impact on people who fight fire. While individual stress tolerance determines to what extent individuals are affected, human factors, including communication, workplace safety, human error, human capability, human behavior, and human perception significantly shape human performance and organizational effectiveness in the wildland fire operating environment. Because fire operations are a human undertaking, the human dimension proves centrally important to success and effectiveness in fire operations; it is the human dimension that infuses fire operations with intangible psychological and emotional friction. Fire operations are shaped by human nature and are subject to the complexities,

inconsistencies, and peculiarities which characterize human behavior. Despite this fact, most fire management agencies invest much more heavily in technology and equipment than they do in workforce development, including improving their capacities for leadership.

Psychological and Physical Forces

Like warfighting, firefighting is characterized by the interaction of both psychological and physical forces. The physical characteristics of firefighting are generally easily seen and understood; the psychological characteristics less so. However, one might argue that psychological and emotional forces may, on occasion, exert greater influence on the nature and outcome of fire operations than do physical forces. While wildland fire agencies rarely systematically prepare their personnel for the psychological and emotional impact of their decisions and actions, wildland fire personnel are frequently thrust into complex social situations, for example, winning the hearts and minds of people being impacted by a fire, deciding what they can and cannot save, choosing one community over another, confronting line of duty deaths, and making choices about competing resource values. While the U.S. Marine Corps doctrine treats physical and psychological forces of warfighting as a characteristic or demand of warfighting separate from the human dimension, we regard the psychological characteristics of firefighting as integral to the human dimension and vice versa.

Evolution

The challenges of wildland fire are both timeless and ever changing. One need only examine the changing nature of fire management in Victoria, Australia, to understand both the timeless and rapidly transforming nature of both wildland fire and firefighting.

In Victoria, large, damaging bushfires and changing social values have transformed the fire management approach. Following devastating fires in 1939, many independent fire brigades merged into a single agency to facilitate fire coordinated suppression. It was at this time that Australia initiated its robust program of forest and fire research, emerging as a leader in planned burning. Again, following a series of severe fires in 1983, the State of Victoria turned its attention to better organized extended attack, importing the Incident Command System, and adapting it to the Australian context. Coincidentally, it was around this time that Victoria's citizens began to show increased concern about rare and threatened species, leading to reductions in the size of many planned burn units. In combination, less burning and more effective suppression have allowed a significantly increased fuel load across the Victorian landscape. The resulting fuel load, combined with rising average temperatures and decadal drought have created conditions facilitating landscape scale fires that land management agencies and rural fire services have witnessed in Victoria since 2000, including the devastating and traumatic Black Saturday events of 2009. In response,

separate fire services and land management agencies with fire responsibilities have moved, not only toward stronger cooperation and interoperability on fire suppression, but toward more holistic, integrated planning and action including a return to employing fire in land management activities. In addition, both land management agencies and rural fire services recognize that communities in and around fire-adapted landscapes represent an integral part of any effective solution to wildland fire problems and must be genuinely consulted and engaged in, rather than simply informed of, fire management planning.

We propose that given changes in climate, society, and fire-scale, this evolutionary arc will continue, not only into the foreseeable future, but over increasingly large swaths of the world. Consequently, wildland fire professionals, and the agencies they serve, will continue to confront worsening conditions including climate change, severe fire behavior, ever-increasing threats to communities, swelling costs, undesired fire effects, intolerable threats to firefighter safety and survival as well as often indiscriminate public scrutiny through both media and post crisis inquiries and litigation. The envisioned trends attest to the need for significant changes to thinking and approaches, both institutional and individual that have served wildland fire agencies for decades. Change of the magnitude envisioned requires a framework within which people can reliably translate policy into timely, effective action; and the authors of this paper contend that doctrine represents the framework within which land management agencies and rural fire services can bring about the change necessary to confront their modern wildland fire challenges.

Art and Science

Like waging war, fighting fire represents a blend of both *art*, a skill acquired by experience, study, or observation and an occupation requiring knowledge or skill; and *science*, a body of knowledge that can be rationally explained and reliably applied. The science of firefighting includes topics such as understanding fire behavior and meteorology or the use of technology. However, science cannot describe the totality of firefighting, given the human element and the mysteries of human performance as well as the many unpredictable environmental factors that wildland fire personnel confront. For example, historians credit the ancient Chinese military general, strategist and philosopher Sun Tzu as saying, “Invincibility lies in the defense; the possibility of victory in the attack. One defends when his strength is inadequate; he attacks when it is abundant” (as translated by Cleary, 1988, p. 86); a lesson, perhaps, that the global wildland fire community still must learn and apply, both as a matter of policy and individual behavior. No amount of science can tell a firefighter either to engage the fire or disengage from it; this is a matter of professional judgement and wisdom. Marine Corps (1989) doctrine states that, “Our theory of war will in turn be the foundation for the way we prepare for and wage war.” The authors contend that a theory of fire operations (doctrine)

must also serve as the foundation for preparation to fight fire as well as the conduct of firefighting. Such a doctrine might include the idea that firefighting does not exist for its own sake, but as an extension of policy with the aim that all fire operations must serve policy.

Six Principles of Marine Corps Doctrine Relevant to Wildland Fire

Leadership

Marine Corps doctrine (1997) demands professional competence among its leaders. According to that doctrine, “As military professionals charged with the defense of the nation, Marine leaders must be true experts in the conduct of war” (p. 56). Similarly, we contend that an effective wildland firefighting doctrine must rest, first and foremost, on a foundation of both technical and leadership competence born of effective workforce development. As Marines represent a corps of professionals charged with national defense, wildland fire personnel serve people, communities, and nations. People expect wildland firefighters to protect them, their property and their natural resources from the ravages of unwanted wildfire; and, in today’s operating environment, achieving those expectations requires mastery of a suite of complex technical, conceptual, and human relations skills.

Land management agencies and rural fire services routinely invest significant resources to develop the technical skills of their personnel. However, they often invest far less on promoting development of skills associated with leadership, teamwork, adaptiveness, and resilience. Leadership development in a wildland fire agency too often means voluntary participation in limited, often highly competitive, development opportunities. An agency desiring to adapt to the challenges of 21st century fire, must possess a capacity for systematic and widespread leadership development with a focus on performance reliability and both individual and organizational resilience, particularly in high-risk operating environments. Success will require substantial and sustained investment in leadership development that reaches broadly and deeply into workforces, emphasizing leadership development interventions that rest on a credible research foundation.

Leadership is a relationship: a phenomenon that occurs between people and an act in which people engage together. Consequently, the ability to foster and maintain effective working relationships represents a key skill of leadership. Leaders generate leadership, and leaders in the wildland fire agencies must teach their protégés the importance that trusting interpersonal relationships play in effective wildland fire operations. Such relationships are more important than written agreements and contracts. For example, during the 2006/2007 and 2009 fire seasons in Victoria, Australia, both interstate and international agencies provided substantial support based on trust relationships, even absent current agreements.

According to t'Hart (2010) achieving fully developed collaboration and partnership can prove difficult in emergency management, and not enough emphasis is given to collaboration. Traditionally, wildland fire agencies rely on joint exercises to foster collaboration, but neglect other avenues of network development that may, ultimately, prove more effective in nurturing interpersonal trust between key representatives of cooperating agencies. According to t'Hart (2010) such trust represents a crucial asset during major emergencies, providing "short cuts" and informal coordination mechanisms. However, it is inherently vulnerable because it relies on key individuals. To overcome these shortcomings, t'Hart (2010) proposes the following:

- The articulation of a *set of common purposes*, based on a deep-rooted awareness of interdependency among the parties involved;
- An *inclusive membership* relative to the purposes or tasks at hand;
- An agreed upon *authoritative decision-making and conflict resolution structure* at the level of the network as a whole;
- Ways of *allocating resources that provide incentives to organizations to take collaboration seriously*, by defining, funding and evaluating network-level projects and outcomes to supplement and partly replace existing funding/accountability streams of individual organizations; and
- A *self-sustaining culture of collaboration* by means of network-level venues for dialogue, socialisation and training, staff exchanges, symbols/artefacts and external 'branding' of the network.

Training (Learning and Development)

Marine Corps doctrine (1989) regards the purpose of all training to be the development of forces that can win in combat, and training as the key to combat effectiveness. Consequently, training represents the focus of Marine Corps effort in peacetime. According to their doctrine, basic, individual, and common skills provide an essential foundation of Marine Corps effectiveness, but unit skills and combined effort, of course, prove extremely important. Similarly, faced with the challenges of fire in the 21st century, both civilian rural fire services and land management agencies with fire responsibilities must invest significantly in workforce development in order to succeed in the current operating environment, as well as in the future operating environment that the authors of this paper envision.

For many land management agencies and rural fire services, workforce development means training, but for many wildland fire agencies it is past time that they transform their training. It is not uncommon to hear agency personnel openly disparage their standard courses in the most unflattering terms. This is particularly true of training participants from the Generation Y, or Millennials. These personnel, in their early 20s to mid-30s, are digital natives

who have been interacting with digital technology since an early age. In 2014, wildland fire personnel are attending lecture-and-workbook training while their counterparts in private industry benefit from state-of-the-art gamification out of the reach of many fire agencies who face grim fiscal realities—budget cuts, travel caps, and staffing reductions that are crippling existing training systems.

However, we cannot stop developing our workforces. The questions are:

- How do we effectively prepare people for dangerous work, in high-risk environments where leadership, decision-making, and risk management reign supreme?
- How do we do that when it will just keep getting harder and harder to get people to quality training and other development opportunities?

People responsible for training and workforce development in civilian land management agencies and rural fire services should carefully consider four elements of the Marine Corps training ethos:

- Individual managers in the organization must allot subordinates sufficient time and freedom necessary to conduct the training necessary for both individuals and the unit to achieve proficiency; and that higher level demands do not deny subordinates adequate opportunity for training.
- Over-centralization and over-supervision do not deny autonomous training that allows leaders the opportunity to train their people as they see fit. Senior management establish goals and standards, communicate intent, and establish focus, but do not dictate the mechanisms for delivering training.
- Training should reflect practical, challenging, and progressive goals beginning with individual and small unit skills and culminating in comprehensive exercises involving actual resources and approximating mission conditions as much as possible.
- All effective training must conclude with a high quality after-action-review (AAR) focused on why participants made the decisions and took the actions that they did, and the outcomes of those decisions and actions.

While Marine Corps doctrine (1997) focuses on training, the authors suggest that training alone will not deliver appropriate results. For example, the Victorian fire agencies have adopted the 10:20:70 model for capability development (Lombardo, M. M. and Eichinger 1987; Slijepcevic and others, 2012.) The 70:20:10 model described by Lombardo and Eichinger (1987) explained the learning process as:

- 10% is being learned from courses that provide for example an underpinning knowledge and tools for a leadership toolbox;
- 20% is being learned from others which includes peer feedback, coaching, mentoring and lessons learned; and
- 70% is being learned on the job through practice which also includes exercises (problem solving).



Figure 1—Victorian Model for Capability Development.

Professional Education

By Marine Corps doctrine, the intent of a professional military education is to develop creative and thoughtful leaders in a continuous process of development in which, at each stage of a person's career, they prepare for the next stage (Warfighting, 1997, p. 64). According to U.S. Marine Corps doctrine (1989), "A leader's career, from the initial stages of leadership training, should be viewed as a continuous, progressive process of development" (p. 64). Similarly, the effective 21st century wildland fire agency will invest heavily in the professional education of its career leaders. The U.S. Marine Corps (1997) envisions its professional development responsibilities residing in three organizational tiers: the education establishment, the commander, and the individual. The authors envision a similar three-tiered approach to the professional development of fire career personnel. In the first tier, the education establishment includes schools, both agency run and otherwise, providing formal education in the art and science of fire management. In the second tier, an effective fire management agency would foster an organizational culture in which individual leaders accepted the professional development of their subordinates as a primary responsibility of their own leadership. Finally, in the third tier, individuals must take responsibility for, and actively pursue, their own professional development.

Philosophy of Command

Marine Corps doctrine maintains that their philosophy of command must support the way in which the Marine Corps fights. For the Marine Corps, that means decentralized command, given their desired operating tempo, and their need to cope with the uncertainty, disorder, and fluidity of combat. Given the aforementioned relevance of operating

tempo, uncertainty, disorder and fluidity to the wildland fire operating environment, the authors contend that a similar decentralized command philosophy, one that emphasizes individual initiative and accountability and enables subordinate leaders, present at or near the point of decision, to make decisions on their own initiative given established clear leader's intent, has merit in the wildland fire operating environment. By doing so, a wildland fire agency capitalizes on the professional competence among its informal leaders, generates leadership and accountability within the organization, and fosters a high level of collaborative teamwork. In addition, decentralized decision-making enables emergent leadership; enabling timely and effective responses to unexpected changes by competent, well-prepared and trustworthy personnel. In the final analysis, deference to expertise, leadership development, accountability, and teamwork facilitate performance by the organization that proves both reliable and resilient. One might argue that ICS and AIMS currently offer such a command philosophy, but neither takes full advantage of command decentralization in their application.

Like warfighting, firefighting constitutes a human undertaking, one in which no degree of technology can diminish the human dimension of command and, like the U.S. Marine Corps' philosophy of command, an effective philosophy of command in wildland firefighting must focus on human factors rather than either equipment or procedures. While communications technology and well developed team procedures can enhance the quality of fireground command, the authors contend that agencies must not attempt to use or to replace elements of human interaction in command relationships. In fact, the authors contend that not only must fireground command accommodate the human element, but that commanders in the modern wildland fire operating environment produce reliable performance and organizational

resilience when they encourage, foster, and model effective two-way communication, interpersonal interaction, and interdependence, as well as deference to expertise (Black and McBride, 2014). Clear leaders' intent and unity of command must remain at the heart of the wildland fire command philosophy.

Decision-Making

Decision-making, both good and bad, affects every aspect of our lives, but is especially true for leaders, and vital for leaders in the fire service. Good decisions can make the difference between success and failure of an organization. Moreover, poor decisions can lead to all sorts of negative consequences; and in high-risk environments, those negative consequences include injury, death and dramatic property loss. Given the gravity of decision-making in the wildland fire operating environment, rural fire services and land management agencies with fire responsibilities have an obligation to prepare their personnel, both as individuals and as teams of people, to make sound and timely decisions. Wildland fire agencies can best prepare their personnel for decision-making by developing their capacities to understand decision-making processes and to develop both the skill and the confidence to effectively engage those processes.

Leader's Intent

In a complex and dynamic operating environment in which command is decentralized, leaders in closest proximity to a problem or decision point must adapt plans and exercise initiative in order to accomplish desired objectives in the absence of direction from superiors; particularly when events render planned actions invalid. In both authors' countries, wildland fire agencies have adopted the concept of leader's intent, often described as a clear, concise statement of task, purpose, and desired end-state. For example, in the U.S., the publication *Leading in the Wildland Fire Service* (NWCG, 2007) declares that "translating vision into clear leader's intent is at the heart of our command philosophy" (p. 15). This conception of leader's intent derives from an element of military command philosophy called commander's intent. In fact, Ziegler and DeGrosky (2008) described a clear U.S. Marine Corps influence in this conception of leader's intent.

Unfortunately, reflecting on its military origins, and an interesting historical bending of the original commander's intent concept by the U.S. Military (Ziegler and DeGrosky, 2008), the practice of leader's intent in wildland fire agencies tends to translate into an individual state and a one-way, transmission model of communication. As Shattuck (2000) pointed out 'there is no discussion of social norms, expectations, trust, or intimate personal knowledge of subordinates' in the US army's uptake of the concept (p. 67). Instead, the primary emphasis is on 'structure and content', or communicating the ends to be achieved, without recognizing the importance of creating what the Germans called 'imparting presence' (p. 71). By privileging commander's intent, the army lopped off this equally important concept (Shattuck,

2000). Shattuck interpreted this concept as commanders imparting to subordinates 'a sense of them' (p. 71) by establishing a firm yet just command climate and by explaining the reasoning process they used to arrive at their decisions. On the latter point, he explained that 'frequent interaction—formal and informal, professional and social—will provide subordinates additional opportunities to learn how their commanders think' (p. 72).

Shattuck (2000) criticized the tendency of the army to primarily emphasize the initial message. He explained that when the battlefield situation changes, the context in which the 'intent' statement was originally interpreted also changes, and therefore the intent message itself must also be reinterpreted. But, he complained, soldiers tend to receive too little training and coaching in interpreting and implementing intent. Wildland fire personnel, like Shattuck's soldiers, receive too little training and coaching on how to implement their leader's intent, and too many leaders in wildland fire agencies are currently entrenched in a less-than-effective model of leader's intent. We propose an immediate exploration of an alternate concept of leader's intent that prepares emerging leaders in wildland fire agencies to understand the subordinate's critical role in constructing the meaning of intent.

Conclusion

Change requires a framework within which people reliably translate policy into timely, effective action. We contend that a just, ethical, and effective doctrine for wildland firefighting would stress that firefighting is a civilian undertaking with no moral equivalence to war, and that the mission is not paramount over the safety of individual firefighters.

However, despite limits on drawing analogies between a warfighting doctrine and a wildland firefighting doctrine, the nine cognitive demands described in this paper—friction, uncertainty, fluidity, disorder, complexity, the human dimension, psychological and physical forces, evolution, and art and science—underlying United States Marine Corps doctrine prove as relevant to the wildland firefighting environment as they do to the warfighting environment. Like war, firefighting represents a complex undertaking, typically engaged in a complex operating environment, and requiring a compound organizational structure in which each organizational element must adapt to local conditions and requirements while working cooperatively with other elements to accomplish common goals and a cohesive effort. In addition, a complex firefighting operation involves many independent but interrelated decisions and actions being undertaken simultaneously throughout the organization. Consequently, when contextualized to the wildland fire operating environment, six principles embodied in Marine Corps doctrine, leadership, training, professional education, philosophy of command, decision-making, and commander's intent provide a template that rural fire services and land management agencies with responsibilities for wildland fire can use to form the core of a wildland fire operations doctrine.

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