

El Dorado Incident – Organizational Learning Report

How can we use this tragic event to better design the system within which fire responders operate?

In his September 24, 2020 [testimony](#) before Congress, John Phipps, the Forest Service’s Deputy Chief of State and Private Forestry, stated “the system is not designed for this,” to illustrate the misalignment between the design of the wildland fire system and the reality that wildland fire responders routinely experience. The El Dorado Fatality provides an opportunity to reflect, learn, and redesign the system so it can better handle this new reality wildland fire responders are facing, and will continue to face into the future.

The Forest Service has identified itself as a learning organization committed to understanding and improving, but how do we fulfill the commitment to learning from this tragedy and move towards improvement? Throughout the Learning Review process, several reoccurring themes were identified that influenced the conditions leading to the death of Charlie Morton. The events surrounding Charlie’s death illustrate how these themes can play out on the ground, but these themes were not limited to this one event; the themes were further validated by focus groups to understand their role and impact on the larger wildland fire system. The purpose of naming these themes is not only to reduce the likelihood of another El Dorado type of fatality, but also to improve the overall system within which all wildland fire responders operate.

John Phipps’s comments echoed in every conversation and interview that the Learning Review Team conducted: “The system was not designed to handle this.” Charlie’s sacrifice provides an opportunity to make changes to the system. The Learning Review Team used the identified themes to develop recommendations to redesign the wildland fire system where all wildland fire responders work. The team proposed these recommendations to leaders of the Forest Service for further discussion.

Theme 1: Fire Behavior Training and Education

Our current fire behavior models make predictions based on a thin fire line; the El Dorado Fire burned as an area ignition. The effects of deep flaming zones created by long-burning fuels which have accumulated in many of our forests have been known to violate the assumptions of the line fire for decades but are not included in any fire behavior course curriculum. Our standard operational fire behavior models currently do not have the ability to predict this kind of fire behavior. None of our fire behavior analysts or long-term fire behavior analysts are trained to recognize [under what conditions counter rotating vortex pairs form](#). On this fire, counter rotating vortex pairs formed as a result of the burnout operation conducted in Division O. One of these vortices seems to have formed at the very moment Charlie was walking along the dozer line, at his exact location as he was walking there. Ember transport beyond the fireline and strong shifting surface winds caused by this localized airflow

circulation were key factors in creating the dangerous situation. This situation is kind of analogous to being struck by lightning, except that we know much more about the conditions necessary to create counter rotating vortex pair formation at a specific location than we do about lightning formation at a specific location.

How do we update our fire behavior training curriculum to ensure that our fire personnel understand the qualitative principles and employ the appropriate critical thinking skills to combine those principles with their observations to better predict potential fire behavior and/or be better equipped to recognize dangerous local conditions?

The answer is not in developing new technology. The El Dorado Fire is representative of the operating environment that fire managers face every day across the nation. Our models do not currently have the ability to predict this kind of fire behavior. That kind of modeling would depend upon highly localized and changing factors. It is not presently possible to know these factors well enough in advance to enter into a model. The answer instead, is to upgrade our training and education to ensure that line fire managers better understand fire behavior concepts that fire researchers know about but cannot model.

Better education with respect to current fire behavior conceptual knowledge and how to apply it to real-world situations may help wildland fire responders recognize and understand similar situations in the future.

It is worth noting that every experienced fire operator on this Learning Review Team concluded that the burnout operation happening in Division L seemed much more complex than the firing operation in Division O. Humans have a tendency to “anchor” to past situations when making current decisions. As Big Bear Interagency Hotshot Crew (IHC) left the burn operation in Division L, it is quite possible that they pushed to burn in Division O because it was seemingly a simpler burnout operation than where they just came from.¹ Resources who had been assigned to Division O for the entire shift were much more reluctant to conduct the burn in Division O. A continued emphasis on human factors should be included in this effort to upgrade our training and education program for fire behavior.

As a part of the El Dorado Fire Learning Review effort, a subset of the Learning Review team created a cutting-edge learning product geared toward helping trainees put themselves more fully in the shoes of the people involved in this incident. An example of this product can be found [here](#). The above link showcases a two-dimensional version of the product. A three-dimensional version is available also. The three-dimensional version is designed to be experienced within an immersive virtual reality context.

Theme 2: Changing Mission Plus Validation of the Need for Professional Wildland Fire Responders, not Fighters — Clarifying Mission Parameters

The El Dorado Fire burned as an area ignition resulting from high accumulations of long-burning fuel materials present in the unhealthy forest conditions at the time of the fire. This type of fire behavior was

¹ Kahneman, D. (2011). *Thinking fast and slow*. New York, NY: Farrar, Straus, and Giroux

once rarely seen among our wildland fire responders but is becoming increasingly more common because of the current condition of our forests and the influences of climate change. Our current paradigm of treating fire as an enemy that must be defeated contributed to the condition of the forest at the time of the fire. Until we figure out a way to form a new, sustainable relationship with fire, we can expect forest conditions to continue to deteriorate. This deterioration will continue to make situations like this fatality event more probable into the future. We need to see fire's role on the landscape differently.

Viewing fire as the enemy also may have had an influence on local resources "trying to protect their home turf" against that enemy. We are trapped in the paradigm laid out by the philosopher William James's "Fire is the moral equivalent of War" essays of the early 20th century. Calling our fire employees "firefighters" only contributes to the metaphor of declaring war on an enemy. Perhaps a shift in language (to say...fire responders) may prove beneficial.

Fire ecology research has been telling us for decades that our current wildland fire paradigm is deeply flawed. We also know that climate change and social impacts have worsened the issues of this paradigm. Yet in some senses, both our fire program and our national response organization are still models developed initially as a response to the 1910 Big Burn, modified to reflect the organizational mobilization and command/control lessons of World War II. For example, the 2006 San Bernardino Forest Plan calls for suppression as the only appropriate fire response strategy. While a fire suppression strategy can take many forms, and does not need to only consist of full perimeter control, the language of the forest plan was reflected in the frustration of district fire management personnel who lamented the lack of a prescribed fire program for the forest.

Simply put, each National Forest must specify clear and definable objectives for wildland fire that sustains its ecosystems, and these should be reflected in the Desired Futures as outlined in the Forest Plan Revision process. Instead of prescribing policy that defines (or limits, as in the case with the San Bernardino Forest Plan) our actions, we should be prescribing policy that defines the end state for what we want fire to do on that land as it is applied.

Wildland areas are becoming less wild and more populated. We find ourselves, an agency created to protect the wildlands, committed to taking charge of protecting subdivisions. We found that we have entered into agreements with partners who are operating under legislative mandates to aggressively attack fire and to prevent loss of property. Organizationally, we are torn between the pressure to be good neighbors—to pitch in and help out—and the pressure to learn from our actions and the science that tells us fire is natural and necessary. There is a growing body of evidence that our efforts to be good stewards and join in the mode of aggressive attack has resulted in a degradation of the land we have stewardship over, which has created a series of goal conflicts that our field-going personnel must wade through at the point of work.

We continue to ask our wildland fire responders to save communities that are becoming increasingly unsavable. At what point do we declare communities without any semblance of defensible space not worth the risk of trying to save under extreme fire behavior conditions?

Ultimately, only by moving to a sustainable fire ecosystem will we be able to change outcomes to those communities in increasingly common “extreme” fire conditions. This is the direction the National Cohesive Strategy directs us towards. We need to implement the vision more aggressively for a sustainable landscape that is well articulated by the National Cohesive Strategy. This vision incorporates fire ecology for National Forest System lands as well as supports nearby communities to become fire adapted communities. The National Cohesive Strategy was developed in conjunction with a wide array of stakeholders—including the National Association of State Foresters (NASF). The problem is that while we have an agreed upon vision, the federal, state, and local agencies have not been incentivized to implement it; and we are still responding to fire too often as “an unforeseen” emergency—instead of the function of the landscape that it is. It is only by describing the desired end state of the land on which we know fire is going to occur that we can truly build objectives that guide us to a more sustainable fire management paradigm.

Theme 3: Reconsidering Talent Management/Concerns of Erosion of Trust of the Social Contract with Fire Personnel.

One of the major themes the Learning Review Team heard was the loss of fireline experience and potential leaders from the Forest Service. New entities are entering the wildland fire community, for example, Pacific Gas and Electric (PG&E). These more nimble entities are able to offer better pay and schedules that are much more conducive to achieving a healthy work-life balance (e.g., CAL FIRE, municipal departments). Increasingly, experienced federal wildland fire responders are being enticed to leave. In some states, GS-5 wildland fire responders are making about the same as minimum wage (in most cases, a wildland fire responder had to have several seasons of fire experience under their belt to get a GS-5 position). We are commonly seeing top leaders and high potential fire personnel leave the Forest Service for better pay and the opportunity for a better work-life balance. This inequity, along with supervisory and applicant frustration with delays and limits of our temporary hiring process, are just two factors that are robbing the agency of its pool of qualified wildland fire responders.

Another concern is the growing sense of frustration among wildland fire responders of the futility of their efforts in the operational wildfire paradigm we are in (see Theme 2). The Learning Review Team heard through interviews, repeated frustrations of saving a local ranch from a fire in the same area several months before—only to see it lost in the El Dorado Fire. Two common refrains were heard: “Why am I risking my life and losing time with my family for such futility?” and “The things we did ten years ago are no longer working.” Wildland fire responders feel increasingly isolated and misunderstood, with the expectations from the agency and society to “save the unsavable” while “managing risk.” This coupled with the pay, work-life balance, and hiring issues is eroding the trust and the implicit social contract among wildland fire responders, the Forest Service, and American society. This is another other factor that is quickly resulting in a lack of qualified (or any) applicants and the growing vacancies in fire response crews. On the El Dorado fire, due to a lack of resources, there were four Interagency Hotshot Crews on an incident that would normally have ten. Some of the resources that were available on Division O the night of the fatality were there only because of the personal connections of various

fireline supervisors on the fire, who notified their local fire departments to provide help. It was simple chance assignments that allowed this help to materialize, not strategy or planning. This is a symptom of the breakdown in the larger wildland fire responder availability system due to an ever-increasing need for fire response resources.

The wildland fire culture has developed in such a way as to defer to the expertise of IHC crews above most other resources on a fire. If the hotshots like the plan, then it must be a good plan...or so the thinking goes. While this heuristic has treated the fire service well in the past; it becomes more problematic if deference is given mistakenly to a resource without the level of expertise that is assumed. Over the course of the last several years, the experience levels of hotshot crews have become diluted. Long-tenured Interagency Hotshot Crew Superintendents seem to be becoming a thing of the past. The Big Bear Interagency Hotshot Crew (IHC), due to a lack of available experienced personnel and coupled by issues with the temporary hiring process, were staffed by a significant number of Administratively Determined (AD) hires, formerly unheard of for an Interagency Hotshot Crew.

In addition, as demonstrated in the El Dorado Incident, the culture has shifted from acknowledging the Safety Officer's role as the "gatekeeper" for ensuring an operational action is safe to a position that is not given the same deference as IHC overhead personnel. As our IHC expertise becomes diluted, and the Safety Officer role is not fully respected; a vacuum of truly understanding the risk and exposure balance in fireline actions emerges.

As federal Interagency Hotshot Crews continue to train and then lose the next generation of leaders, the question must be asked: "At what point will our hotshot crews' experience levels thin out too much to fill the role we have traditionally asked of them?" And once that occurs, how should we fill that void?

The same concerns exist for Incident Management Teams (IMT). With the reduction of 39 percent of the Forest Service's non-fire workforce since 2000, the "militia" available to assist in IMT duties is rapidly being reduced to a mythical entity, often spoken of but rarely seen. The 2020 fire year was simply the latest in a long string of years where we did not have enough IMTs, let alone general resources, to address suppressing fire in our current paradigm. On the El Dorado Fire, Region 5 took a creative approach to ensure Type 1 oversight by grafting a Type 1 incident commander onto a Type 2 team, when no Type 1 teams were available. While this met the need and policy requirements, one cannot help but wonder what the difference really is between a Type 1 and Type 2 team. Why not just create one national team typing system, and why not ensure that it is staffed to a holistic fire management response (see Theme 2) and not just a direct perimeter control response.

Theme 4: Use of Technology

Scouting fire lines has proven to be a dangerous task. What barriers prevent federal crews from being able to deploy drones to do the preliminary scouting, rather than having a person do it? How do we overcome those barriers? Note: CAL FIRE crews owned and operated drones on the very same piece of line during the search and rescue operation undertaken to find Charlie.

In addition to drones, there are opportunities for the use of technology such as Virtual Reality (VR), and most recently Augmented Reality (AR). In contrast to VR where the real world is completely replaced, AR alters the real world, so a wildland fire responder can look at the same piece of ground and run a couple of different fire behavior scenarios before making a decision.

We have the technology to comply with the Dingell Act, shouldn't the Forest Service mandate, just like we do eight-inch-high leather boots or Nomex, that wildland fire personnel have on a personal tracking device while on the fire line?

Theme 5: Knowing Where Your People Are

What is the protocol to determine that a wildland fire responder is missing? What is the protocol to find a missing wildland fire responder? Should there be a national standard to follow to reduce confusion?

Theme 6: Fallen Wildland Fire Responder Protocols

What is the protocol to obtain notification information for our employees? What is the protocol for notifying fallen employees' next of kin? Should there be a national standard to follow to minimize confusion and disorganization?

CAL FIRE and many other organizations have standard and required emergency notification forms that are available electronically to select individuals. Our "You Will Not Stand Alone" training provides notification training, but this course is not required.

Considering what we have heard, what do we do to learn, grow, and improve?

A public official is there to serve the public and not to run them.

Pinchot's first Maxim eloquently charges us as the Forest Service – and really all public agencies – to reflect the values and demands of the public we serve. While these six themes grew out of expansive interviews after the El Dorado Fire, in broader context, they are threads of conversations that have been discussed for years, or in some cases decades.

The Forest Service, and the broader wildland fire community, is a large and complex system; we cannot mend every issue at one time. Yet, we are morally obligated to pause, reflect, and correct on a continual basis; especially when one of our employees is seriously injured or killed. This is exactly what we have done when we posited to become a Learning Organization; in doing so we have made palpable changes.

El Dorado Coordinated Response Protocol Team:

William Avey, Coordinated Response Protocol (CRP) Team Lead, Forest Supervisor, Helena-Lewis and Clark NF, R1

Jason Kuiken, CRP Team Lead Shadow, Forest Supervisor, Stanislaus NF, R5

Joe Harris, Learning Review (LR) Team Lead, Fire Program Specialist, RMRS

Jess Asmussen, LR Team Lead Shadow, Safety Officer, Payette NF, R4

Paul Cerda, LR Human Performance SME, Assistant Regional FMO, USNPS, Rocky Mountain Region

Tony Petrilli, LR Equipment SME, Fire Shelter Specialist, NDTP, WO

John Byas, LEI Team Lead, Regional Special Agent, R6

William Knudson, LR Hotshot SME, Hotshot Superintendent, Helena-Lewis and Clark NF, R1

Jason Darelius, Documentation Unit Leader, FOIA Coordinator, RO, R1

Theodore Adams, LR Writer Editor, Wildland Fire Module Leader, Deschutes NF, R6

Josh Janssen, LR CAL FIRE Representative, Battalion Captain, CAL FIRE

Imani Lester, CRP Team PAO, Office of Communication, WO

Kurt Kause, CRP Team OSHA Specialist, Safety Officer, Lolo NF, R1

Ken Henson, LR Hotshot SME, USFS (retired)

Dr. Mark Finney, LR Fire Behavior Specialist, Fire Research, RMRS

Helen Smith, LR Technology Specialist, Forester, RMRS

Charles McHugh, LR Fire Behavior Specialist, Fire Research, RMRS

Kristel Johnson, CAP Liaison, WO

Douglas Valentine, NFFE Rep, R8

Matt Gibson, Training SME, Field Learning Product Creator

Mark Pieper, Field Learning Product Creator

Samantha Orient, 3D illustrator, video editor

Andrew Keske, GIS Specialist