

TWO MORE CHAINS

Spring 2024 ▲ Vol. 13 Issue 1 ▲ Produced and distributed quarterly by the Wildland Fire Lessons Learned Center



What Has Changed Since 1994?

By Kelly Woods, Director
Wildland Fire Lessons Learned Center

Over time, it's natural that people and the systems in which we exist evolve, grow, and change. Change is a part of continuous improvement and a healthy system, right?

But change is hard.

It's hard, whether it's forced upon us like adapting to a new policy, or it's a choice like deciding to leave a job that you love to pursue a new opportunity. In our world, we often see change result from tragedy. The phrase we use from a learning standpoint is: "*Honor Through Learning*". We intentionally focus on learning from unintended outcomes to improve our system and to honor those who were lost, or survived incredible circumstances, by seeking to prevent future occurrences.

The 1994 fire season, during which 34 wildland firefighters died in the line of duty, left our community shaken. As the wildland fire community began to pick up the pieces, opportunities for systematic improvement were revealed. Things that were happening at local, crew levels were recognized and supported for national implementation. Fire leaders and innovators at all levels pushed and pulled to develop and make many of the changes we take for granted today.

This issue of *Two More Chains* looks specifically at the changes that have occurred at an organizational and cultural level in the 30 years that have passed since the 1994 fire season.

In our feature story, Erik Apland takes us on a historical journey leading up to the 1994 fire season. He pieces together the nuggets he has uncovered to describe a perspective of how change unfolded, bringing our community through decades of innovation and improvement.

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In Ground Truths, Travis Dotson looks at the Standard Fire Orders. You don't have to agree with Travis, but his words are sure to get you talking.

In our One of Our Own feature, Mike DeGrosky offers his take on the wildland fire world prior to, during, and after 1994. This truly is an insider's view. Mike served as a key player in formal initiatives for change in the wildland fire culture, including the development of the Wildland Fire Lessons Learned Center. I thoroughly enjoyed talking to Mike and hope you also enjoy this history lesson as much as I did.

The intent behind this issue is to acknowledge some of the key changes the wildland fire community has experienced over the last 30 years, to study what inspired those changes, and to learn some lessons about how these changes were—and weren't—implemented. I think we can all agree that there is more work to be done.

Maybe this will inspire you!

Podcast: New Episode

30 Years of Growth: The Wildland Fire Service After 1994

<https://www.podbean.com/wlei/pb-wgxjb-163a7aa>

Kelly Woods visits with Larry Sutton, Jim Cook, and Chris Wilcox to capture their reflections on the 30 years that have passed since the watershed 1994 fire season.

How We Got to 1994

**By Erik Apland
Field Operations Specialist
Wildland Fire Lessons Learned Center**

Looking at what we might call the “modern” period of fire management—that is, the organizations, beliefs, and major fire events that are within our living memory—probably the biggest fork in our road was the 1994 fire season.

Like our own personal development, the people before and after 1994 were the same people, as were the organizations that went into and emerged from that fire season. Today, it’s important to remember that 1994 had a context that is lost when we think only of the gigantic trauma of that year, the [South Canyon Fire](#).

The occurrence of certain major unintended outcomes (fatal tree strikes, entrapments) on wildland fires throughout history generally tracks with the ebb and flow of fire season severity. Accounting before the last 50 years or so was often so poor or unavailable that we can only see the periods of very severe or frequent fire accidents, such as [1910](#), [1929](#), [1949](#), [1953](#), and so on. The years in between also saw fire accidents and fatalities, probably every year just like today. But only the hugely traumatic events have come down to us through collective memory. Understanding how wildland fire suppression was done in years so long past requires extensive research. However, we can access—much more directly—the 1980s and 1990s that led to 1994—and all that has come in its wake.



In heavy timber on the August 1985 Butte Fire on Idaho’s Salmon National Forest, a sudden high-intensity crown fire overruns and entraps 118 persons—including handcrews, fallers, dozer operators, and overhead. Seventy-three people are forced to deploy and enter their shelters—where they must remain for one and ½ hours. This photo shows some of these firefighters finally emerging from their shelters.

The Mid-1980s: Huge Entrapments

Starting in the mid-1980s, a period of extremely quiet fire seasons ended and a string of years with huge entrapments, the likes of which seem incredible in 2024, began.

These entrapments started with the 1985 Idaho fire season, when the [Butte Fire](#) and [Lake Mountain Fire](#) accounted for over 150 fire shelters deployed. In the years that followed, entrapments occurred again and again. Adding up the data in reports that reside in our Wildland Fire Lessons Learned Center’s Incident Review Database, entrapments from 1985 through 1989 resulted in the use of 586 fire shelters, 52 burn injuries, and four fatalities.

While this significant uptick in entrapments and shelter deployments was proceeding, interagency fire leadership responded primarily by stressing a refocus on the fundamentals of entrapment avoidance and fireline safety training.

What were those fundamentals? The Standard Fire Orders were a creation of the U.S. Forest Service’s Fire Task Force in 1957. The first version of the Downhill Line Checklist appeared following the [1966 Loop Fire](#). In 1980, another Task Force on Wildland Fire

Accidents was convened to respond to the persistent problem of entrapments, including fires like [Mack 2](#), [Battlement Creek](#), and [Cart Creek](#)—all Forest Service fatalities. This 1980 group put forward numerous recommendations, including a proposed list of eight “Fire Commandments” that would distill the “10 & 13.”

Standard Fire Orders

- F— Fight fire aggressively but provide for safety first.
 - I— Initiate all action based on current and expected fire behavior.
 - R— Recognize current weather conditions and obtain forecasts.
 - E— Ensure instructions are given and understood.
 - O— Obtain current information on fire status.
 - R— Remain in communication with crew members, your supervisor, and adjoining forces.
 - D— Determine safety zones and escape routes.
 - E— Establish lookouts in potentially hazardous situations.
 - R— Retain control at all times.
 - S— Stay alert, keep calm, think clearly, act decisively.
-

In the midst of numerous entrapments, in 1987 the 13 Watchout Situations were increased to 18, with the addition of Watchouts 1, 3, 5, 8 and 10. The Standard Fire Orders were re-ordered into the acrostic "FIRE ORDERS", beginning with "F – Fight fire aggressively but provide for safety first." A focus on leadership development, or on what we now would call "learning culture," was not prominent in the years before 1994.

In addition to these fire safety fundamentals, there had also been the systemic, wide-ranging changes that began in the 1950s and 60s.

Becoming a Truly Federated, Unified National Response System

In the 1980s the fire organization was still in the process of implementing these earlier changes, such as the transition from the old Large Fire Organization to the new Incident Command System (ICS).

The fire shelter was a relatively new piece of equipment for most firefighters and was not yet widely carried throughout the entire country. Even flame-resistant clothing had been a requirement for federal firefighters for less than a decade and was not universal in other agencies across the country.

Recommendations from previous fire tragedies were being adopted; firefighters were figuring out the role of new equipment. Important elements of interoperability during interagency fire response were recognized and actions had been taken to coordinate efforts, such as in the 1976 formation of the National Wildfire Coordinating Group (NWCG), which sought to standardize training, qualifications, policies and other critical areas across wildland fire entities. Significant challenges remained, illustrated in events such as the response to the Tunnel Fire or "[Oakland Hills](#)" Fire of 1991.

Two surveys of several hundred fire managers from federal and state agencies in 1988 and 1989 revealed that the top issues across the wildland fire community were: improved communications, Wildland Urban Interface (WUI) concerns, and further implementation of ICS.

Taking all of this into account, what in retrospect seems like a clear trajectory—huge entrapments in the 1980s leading to mass casualty incidents when our collective luck ran out—was likely a signal buried in considerable noise.

In the 1980s, the wildland fire response system in the United States was taking on a shape that we would now find very recognizable, integrating innovations and adaptations from the 1940s onward, becoming a truly federated, unified national response system for the first time in history. Taking all of this into account, what in retrospect seems like a clear trajectory—huge entrapments in the 1980s leading to mass casualty incidents when our collective luck ran out—was likely a signal buried in considerable noise.

For those of us who came to wildland fire in the aftermath of 1994 and the changes it wrought, it is important to remember that fire leaders at the end of the 20th Century had been in the business for decades. A firefighter initially employed and trained in the 1960s or 70s, for instance, would have entered into a rapidly changing culture, one coming out of an era where fireline fatalities and injuries were more common.

A clear improvement in the reduction of line of duty deaths in the previous decades was juxtaposed with the hundreds of burn injuries prevented only by flame-resistant clothing and the fire shelter in the 1980s and 1990s.

1990: Our Luck Runs Out

It was in 1990 that our luck seemed to run out.

Two major entrapments occurred on successive days. First, the [Dude Fire](#) on June 26, 1990. Then, the [California Fire](#) on June 27. Fighting fire in an oppressive heat that baked the Southwest and Southern California that week, two

handcrews, Perryville Crew 6 on Dude and Bautista Crew 3 on California, were entrapped and burned over—resulting in a combined eight fatalities and 20 burn injuries, some very severe. Both of these crews were staffed by people incarcerated in state prisons. On Dude, a prison guard was one of the fatalities.

Paul Gleason’s Zigzag Hotshot Crew was on the Dude Fire when the column collapse led to the entrapment of the Perryville Crew 6.

His experience that day inspired and convinced him to publicize a memory device he had developed for use on his crew in the years prior—LCES—which distilled pieces of the 10 & 18 into four fundamental concepts. (Say it with me: *Lookouts, Communications, Escape Routes, Safety Zones.*) Gleason’s article, “LCES—a Key to Safety in the Wildland Fire Environment”, was published in *Fire Management Notes* in late 1991.

After these fatal entrapments of the 1990 fire season, the following years see wildland firefighter fatalities drop back, according to the [NWCG Safety Gram](#) archives. There were eight wildland firefighters lost in 1993 to all causes. (By comparison, there were 13 wildland firefighter fatalities in 2023.)

This is where things stood 30 years ago, at the beginning of the 1994 fire season. The first documented shelter deployment of that year was April 1 on the [Sunset Fire](#) in Oklahoma. When the West started to burn, it became unrelenting—with [entrapments](#) in Arizona, New Mexico, California and Colorado on June 2nd, 3rd, 14th, 25th, 29th; July 2nd, and July 3rd. And then, of course, the South Canyon Fire on July 6th—with the entrapment of 49 firefighters, 10 fire shelters deployed and 14 lives lost.



Photo of the “safety zone” that is holding and protecting 180 entrapped firefighters from a major fire blow-up on the June 1990 Dude Fire on Arizona’s Tonto National Forest. Just down canyon, this blow-up takes the lives of six firefighters on Perryville Crew 6.



Paul Gleason’s license plate that he had on his private rig starting in the late 1980s.

The movement for leadership development, learning culture, and the study of human factors found its moment following the events of 1994. While this was a fork in the road, it was not a radical departure or rejection of all that came before.

Entrapments continued through the late summer. A handcrew and two engine crewmembers in Montana, eight firefighters in Nevada, a dozer in Georgia. By the end of 1994, 147 firefighters had been entrapped, 50 fire shelters were deployed, and 17 lives were lost in entrapments (half of the 34 total fatalities in 1994 from all causes).

The movement for leadership development, learning culture, and the study of human factors found its moment following the events of 1994. While this was a fork in the road, it was not a radical departure or rejection of all that came before.

Many of the recommendations from decades of meta-studies were still valid. Some were even dusted off and implemented for the first time in a systematic way. The 10 & 18 were a hard-won innovation of the Mid-20th Century, still critical in our understanding of risk-aware fire response. What came after 1994 were pieces that were crucial in our future development, but had never before gotten their due.

Your feedback is important to us.
Please share your input on this issue of *Two More Chains*: bit.ly/2mcfeedback



GROUND TRUTHS

By Travis Dotson
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Bent and Broken

“We Don’t Bend ‘Em, We Don’t Break ‘Em.”

It’s curious that this popular saying about how we should interact with the Standard Fire Orders is declarative—insinuating that bending and breaking DOES NOT happen. Most accident reports from this saying’s heyday often focused almost entirely on broken Fire Orders. This list of broken Fire Orders was used as both the explanation of why the incident occurred as well as the primary lesson, often feeling more like a warning: *“Do not break the Fire Orders!”*

So...contrary to this aspirational mantra, we do bend them, and we do break them. We have many reports that tell us so. It’s more accurate to say the Fire Orders are bent and broken.

Who’s We?

Wildland fire is one big family and we must accept the behavior of all our siblings. So “we” is “Us”—which includes you. I know it’s easy to say: “Well, good crews follow the Fire Orders.” But that’s not the saying. The saying is: “WE don’t bend ‘em, WE don’t break ‘em.” You don’t get to choose when to be inclusive. Everyone is WE all the time, whether you like it or not. We certainly don’t shy away claiming fire kinship in our “Never Forget” and “RIP” social media posts. We is ALL of us, ALL the time. Fire Orders get broken. Not by *bad* firefighters, by firefighters. By us, the royal WE.

When we admit that Fire Orders are routinely bent and broken, does it signal a need to double down on telling our workforce to “stop doing that”? Or, does it illuminate unachievable standards?

In this instance, the answer to the question is irrelevant, because my point here is that questioning the supremacy of the Fire Orders is no longer blasphemy. In fact, it’s rather innocuous.

Because we change.

Serious Self-Reflection

I don’t know what the pre-1994 fire world was like because I didn’t live it. I am a product of the immediate aftermath. I came into a fire world still steeped in dogmatic “Thou Shalt” rigidity (shut up and dig). That approach has shifted noticeably. Good or bad? Your call, but it is certainly cultural change.

Compared to other high-risk occupations, we have some pretty amazing cultural norms—many of them predating the inflection point of 1994. I believe our hard scrabble, handle-it, find a way ingenuity enables us to move mountains. And sometimes, the mountain is us.

We value adaptation and innovation—look at the tools we invent. This value is fertile ground for the fruits of introspection. 1994 kicked off a serious season of growth.

Brooding without change is rumination. Good thing we have a bias for action. The key to “adapt and overcome” is change. We have always valued change, but we took some major steps to institutionalize and foster continuous adaptation post ‘94. Making AARs mainstream is the most obvious example. Openly sharing our mishaps and resulting lessons is another one.

On a foundation of spilt blood, we have built a community that embraces the full range of input—difficult dialogue in the midst of uncertainty. A community unfazed by open questioning of sacred standards. More bending equals less breaking.

Continuous improvement is a difficult charge. Most days I believe a lesson is learned when we change our behavior. Humility, Dialogue, Action—these things matter.

Make It Happen, Toolswingers

*“A tree that won’t bend,
easily breaks in storms.”*
Lao Tzu



One of Our Own

Mike DeGrosky

Can you describe your impression of the learning culture in wildland fire prior to 1994?

What cultural shifts would you trace back to intentional efforts following the 1994 fire season?

What is better about being a wildland firefighter today than it was prior to 1994?

As you will see, these are just a few of the key questions Kelly Woods, Director of the Wildland Fire Lessons Learned Center, poses to Mike DeGrosky in this informative and illuminating “One of Our Own” conversation. Mike has a unique insider’s perspective on how—in the aftermath of our devastating and pivotal 1994 fire season—the wildland fire service attempted to transition from a training culture to a learning culture. As a Senior Consultant on the TriData Study’s Consulting Team, Mike knows, firsthand, the struggles and challenges that faced this epic undertaking



Mike DeGrosky (right) served as the Lead Facilitator on the 2008 West Overlook Prescribed Fire Escape Staff Ride, held on the Albany Pine Bush Preserve in upstate New York. This staff ride was sponsored by the Wildland Fire Lessons Learned Center, The Nature Conservancy, and New York State’s Albany Pine Bush Commission.

An Insider’s Perspective on How the 1994 Fire Season Triggered Efforts to Change Our Wildland Fire Culture

Kelly: Tell us briefly about your career and background and then talk about what job you were doing in 1994.

Mike: I started out as a volunteer firefighter when I was still in high school and went away to attend the University of Montana where I studied forestry and fire science. I started working for the U.S. Forest Service as a seasonal while I was in college. After a season on a district, I was a hotshot for two seasons, one as a crew

member, one as a squad boss. I stopped hotshotting because I was offered a permanent job in private industry. I graduated, with student loans, into a really terrible job market. Therefore, landing a permanent position was really important to me.

How would you describe the mood and focus of the wildland fire service after the 1994 season?

It was bad. It was dark. I mean, first of all, people were just burnt . . . It was the first season that I can recall where we pretty much broke the system. We were out, just literally ran out of resources, but still just kept getting more fires. It was long; it was hard. People were fried. Then, of course, South Canyon just loomed over everything. I think there was collective trauma.



Mike during his hotshot days in the early 1980s. "I was a hotshot—Bighorn IR/Wyoming IHC—for just two seasons. One as a crewmember and one as a squad boss," Mike says. "But I consider those two seasons to be foundational for me, as a fire professional, as a leader, and as a person."

That job came to an end and I did a little intermittent work for the National Park Service in Grand Teton National Park while my wife did an internship there. Then I was offered a position called "Rural Fire Forester" with the Montana Department of State Lands. For the next 13 years, I worked in a series of progressively responsible fire positions with that agency, which actually brings us up to 1994.

In 1994, I was a Regional Fire Program Manager. I think the best analogy to make these days would be that this position was like a Forest FMO.

I was also an Operations Section Chief on one of the Northern Rockies Type 2 Incident Management Teams in '94. In 1995, I resigned my position with the Department of State Lands. The primary purpose for doing so was to facilitate my wife's National Park Service career. It was in an era when you couldn't move up without moving around, and she wanted to move up.

The events of the '94 fire season also played a role. It had been a long slog and, after almost 20 years of doing it, I was not sure I wanted to be in fire anymore. I resigned my position and started a consulting firm that focused on using facilitation and strategic planning skills that I had developed and indulging my interest in not-for-profit organizations, primarily to give me a portable job. That began a 20-year adventure of us moving around to national parks.

When I started my company, I actually thought, other than joining my local volunteer fire department, I was getting out of fire. Obviously, that didn't happen. I

was super fortunate that, along the way, Park Service FMOs were very accommodating in hosting me and taking care of my Red Card—as were some state people.

That enabled me to continue to do fire while I was doing my consulting work to maintain my Red Card qualifications.

Ultimately, I went whole-hog back into fire, focusing my consultancy on the human and organizational aspects of the fire and emergency services.

With the exception of a brief stint as a fire department training officer, consulting was my main occupation for 20 years. Also, during that period, I went back to school late in life and got a Master's and a PhD. In addition, during that time, on the side, I started teaching graduate students about leadership.

In 2015, my former employer, known today as the Department of Natural Resources and Conservation, DNRC, was a consulting client. Their Chief of Fire and Aviation Management had retired. The State Forester recruited me to put in for that position. I did. And I got it.

I spent the next five and a half years as what they now call the Chief of the Fire Protection Bureau for the Montana DNRC. I retired in June 2021. I still do an occasional consulting thing, a little bit of training, and I mentor some people. Other than that, I spend most of my time doing fun, retired-guy stuff.

Kelly: That's awesome. Just as a quick follow up, what's your Master's and PhD in? Is it leadership?

Mike: My Master's is specifically in organizational leadership. My PhD is in business administration, but in an organizational-leadership specialization.

Kelly: Very cool.



Mike (front row, kneeling far left) when he was a squad boss on the Wyoming IHC in 1981.

Mike: Just a fun fact, I used L-380 as the context of my PhD research into the transfer of leadership development training.

Kelly: Oh, nice.

Mike: Yeah. In fact, when I went back and was looking at the folks featured in the “One of Our Own” in previous issues of *Two More Chains*, I was like, "Hey, that's one of my research participants. Hey, that's another one of my research participants."

Kelly: That's cool.

Mike: Really cool. It's great to see where they've gone in their careers.

Mike: Anyway, that's 40 some years in a nutshell.

Kelly: Awesome. How would you describe the mood and focus of the wildland fire service after the 1994 season?

Mike: It was bad. It was dark. I mean, first of all, people were just burnt. My perspective was primarily here in the Northern Rockies and as member of a Northern Rockies IMT. It was the first season that I can recall where we pretty much broke the system. We were out, just literally ran out of resources, but still just kept getting more fires. It was long; it was hard. People were fried. Then, of course, South Canyon just loomed over everything. I think there was collective trauma. Even people that didn't know anybody directly affected, they really felt it. So the mood was dark, it was bad times. That's my lasting impression.

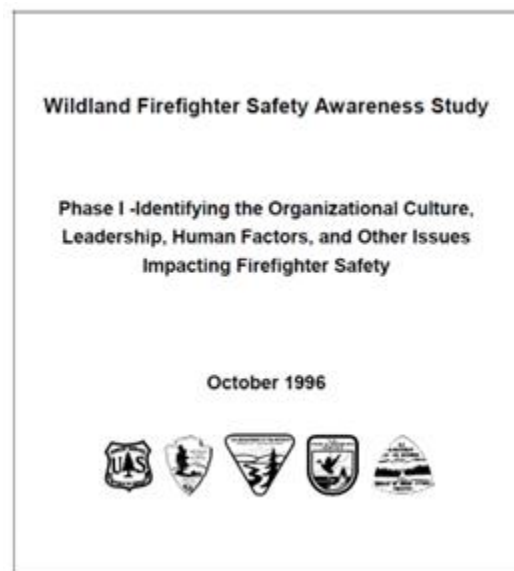
Kelly: Yeah, I was so young in my career. I looked around at the folks who'd been around a long time and noted their response. I didn't have as much perspective. That was the best way for me to measure the gravity of it all. Even though I didn't have many seasons under my belt with which to compare it—it felt very heavy.

Mike: Yes, “heavy” is a good description. I probably have a very skewed perspective because I knew people directly affected by South Canyon, people who were close to folks who died, were injured, or barely escaped. And, so, I had friends who were hit quite hard by it.

Kelly: And the total number of wildland fire fatalities recorded in 1994 was 34, with 14 of those at South Canyon.

Mike: That's a good point. And it's one that gets lost a lot because of South Canyon being such a big deal and such a tragedy. We forget that it was also a bad year in general for both injuries and fatalities.

Kelly: What's your memory of what happened after the season with the secretaries of Agriculture and the Interior focusing on wildland fire and directing agency leaders to look at the safety culture in their collective programs? I'm also curious about how the states were reacting?



Mike: Well, it was interesting from a state perspective, because here in Montana, it was uncomfortable. We all were, of course, very sympathetic. But I also remember this vibe in the states of, "Well, that's the U.S. Forest Service. That's not us. That's not going to happen to us because we do it right." There was some of that.

The Wildland Firefighter Safety Awareness Study, or what became known as the TriData Study, kind of came from the middle of the federal agencies. The origin story behind the TriData Study was literally a few people drawing on a bar napkin.

There was this groundswell of people that just said, "Oh, this is insane. We've got to do something, right? There are things that are broken, and we don't even really know what's broken."

There was definitely that feeling out there of people who were all thinking, "We've got to do something about this." I guess the only sort of official thing that I can really recall clearly was the Human Factors

Workshop. But I think that largely came about in a similar way, through relatively informal local initiative. My perception is that it wasn't a thing that somebody high up said, "Hey, we need to do this Humans Factors Workshop." It was people in the bowels of the Forest Service. It was Ted Putnam and people he recruited who said, "We've got to bring in some of these principles that we're aware of from outside of wildland fire and start teaching people about them."

I think right after the 1994 fire season, it seemed like people were just generally stunned. I can tell you from meetings I was in later on during the TriData Study, that some of the people fairly high up in agencies were thinking: "We need to shift to a zero defect mentality so that this never happens again." That was a prevalent feeling. Unrealistic, but prevalent.

Kelly: Can you describe your impression of the learning culture in wildland fire prior to 1994?

Mike: I've given that a lot of thought. I keep coming back to this: "Was there a learning culture prior to 1994?" There was a training culture. But I'm not really sure we had much of a learning culture. I mean, it's not completely fair to say that because we have the 10 and the 13, and they originally came out of Carl Wilson's paper *Fatal and Near-Fatal Forest Fires: The Common Denominators*. [Wilson was Chief of Forest Fire Research at the U.S. Forest Service's Pacific Southwest Forest and Range Experiment Station.] And there are, of course, other examples. I think we've always had people who look at tragedy fires and we made adjustments, but it was all very episodic. Crisis, reaction, crisis, reaction, crisis, reaction . . . Somebody did some research: reaction. Yes, it was very episodic.

I'm not really even sure you could call it a "learning" culture. It was more like learning moments. I can't really say if there was truly a learning culture as we know it today.

I don't want to make it sound like everything was a result of the TriData Study. Because a lot of the Tri-Data Study was not original thinking. Some of it was grabbing things that were going on in little pockets in the organizations, or outside of wildland fire, and pulling them together, highlighting them and getting some energy put behind them.

Kelly: What was your role in implementing change after the 1994 fire season?

Mike: As I mentioned, when I started my company, I actually thought I was getting out of fire, but didn't. Part of the reason was the TriData Study. My wife had gotten a job down in Grand Teton National Park and we moved there. One day I was sitting there in my office and the phone rings. It's some guy from Arlington, Virginia who I've never heard of before from a company that I've never heard of before. He says, "My company is submitting a proposal for a big federal study. A member of our team suggested I call you."

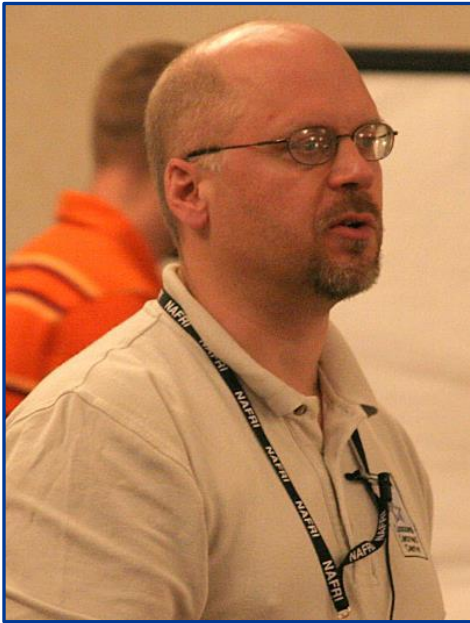
Next thing I know, I'm on the TriData Consulting Team. By the time it was done, I was a Senior Consultant on this team and I'd gotten to be part of something big and important. In answer to your question, that was my role in implementing change after the 1994 fire season. It kept me from escaping, and it also changed my life.

While I think that the results have been far from perfect—or even nearly complete—it gives me an enormous sense of pride to have been involved in that effort. I really do feel like we gave people important stuff, they grabbed it and they ran with some of it. Some of it has been really, really important. The Lessons Learned Center has been really, really important. The Leadership Development Program has been really, really important.

Kelly: After the events of 1994—the 34 fatalities; South Canyon—what was the conversation like when it was suggested that we needed to establish a center for learning in the wildland fire service?

Mike: I'll just start by saying I'm super biased about what kicked things off. And I don't want to make it sound like everything was a result of the TriData Study. Because a lot of the Tri-Data Study was not original thinking. Some of it was grabbing things that were going on in little pockets in the organizations, or outside of wildland fire, and pulling them together, highlighting them and getting some energy put behind them.

One of those ideas was the Wildland Fire Lessons Learned Center. We pulled the idea of a lessons learned center primarily from the military, but also from the commercial aviation industry, and it resonated with a lot of wildland fire



When Mike had his consulting company, he became a key contractor helping with the Wildland Fire Lessons Learned Center's efforts and events during the Center's initial years.

people. The shock of the South Canyon tragedy provided an opening to promote a lessons-learned approach, and people paid attention.

Kelly: Do you remember any resistance to establishing a Wildland Fire Lessons Learned Center or shifting focus to learning in the wildland fire service?

Mike: There were, of course, people who struggled with the idea of shifting from an authoritarian-punitive culture to a learning culture. They just couldn't wrap their heads around that. But, I guess, where I saw the most skepticism was when it came to who was going to pay for it, and who the manager was going to work for. Those conversations showed some weaknesses of interagency cooperation in that it wasn't really so much the idea of having a Lessons Learned Center that was controversial, but more of how you're going to pay for it, who people were going to work for, whose agency it was going to belong to.

As I think about it now, there was also some real resistance to the idea of independence and autonomy from the chain-of-command. That was a big issue. There were people who were like, "Oh, hang on, they have to work for some agency. That agency's got to have a lot of control over what they do." And the people who were advocating for a Lessons Learned Center were like, "No, that will kind of defeat the purpose of having a Lessons Learned Center if all it's doing is sending out agency-approved propaganda."

Kelly: We still really struggle with that autonomy. It's uncomfortable in our world to have an organization that has any autonomy. But the organic nature of learning dictates the necessity of that, right?

Mike: Right. I was wondering if that was still the environment because, as we have talked about before, I did a bunch of work for the Lessons Learned Center when I had my consulting company, and there was this constant desire from up the food chain to have more control over the products of the Lessons Learned Center.

Kelly: I think it's better now than it was then, for sure. But our autonomy still makes people uncomfortable because of the important dialogue that gets going, that's often not sanitized or heavily vetted. It's organic and it's based on people's experience and lessons. Dialogue is one of our pillars of learning. We want to feed that. It doesn't mean we all have to agree, but let's talk about it. There's so much learning there. And, at the same time, this can be uncomfortable for some people.

What cultural shifts would you trace back to intentional efforts following the 1994 fire season?

Mike: I think the two things that were critically important were the Human Factors Workshop and the TriData Study. The TriData Study grabbed ahold of the findings of the Human Factors Workshop and said: "This is a big bunch of what you need to do right here. You need to be preparing leaders. You need to be learning from your tragic events, embrace high reliability organizing [HRO], focus on decision-making, practice CRM [Crew Resource Management], purposefully build your culture. You need to do all these things—bring together these human factors concepts and incorporate them into the wildland fire world."

Like I said, we, the TriData Consulting Team, didn't invent the idea of having a leadership development program that was happening out there. That effort was happening in a small, tight-knit group. We didn't create human factors. Ted Putnam and company had already had this Human Factors Workshop, bringing all these big brains in.

They learned about High Reliability Organizations, and they learned about safety culture and learning culture and all these things. TriData gathered some of those great efforts up and put a spotlight on them. I think those two precipitating events—the TriData Study and the Human Factors Workshop—placed the wildland fire community on a very different path.

Kelly: I was looking at some of the other things that were mentioned in TriData including IFPM [Interagency Fire Program Management], agency administrator training, pay incentives, asking questions, and maybe refusing an assignment kind of thing.

Mike: Being able to refuse an assignment. That's an example of things that people just take for granted now. Yes, that was in the study. We do that. It's routine now. But, back then, that wasn't a thing.

Kelly: And really professionalizing briefings was also hidden there. The performance-based qualification system tied to task books was, too. And, as you said, some of these things were all moving along beforehand, but this sort of formalized it into one spot. TriData provides some interesting reading. That's part of why we wanted to look at this in this issue of *Two More Chains*.

Some of these are things that we take for granted. It's nice to see that we made something out of a really horrible fire season.

Mike: The beauty of the design of the TriData Study was that it pulled so much from the ground up. We were going out and asking people what they thought needed to be fixed, what they were aware of that we could promote to fix problems. It was a very inductive process. I think that was part of its beauty, success, and impact.

Kelly: It's pretty amazing.

What cultural shifts would you trace back to intentional efforts following the 1994 fire season? We've kind of hit on some of those, are there any others?

Mike: I may be wrong, but I don't think prior to 1994 that people in wildland fire knew the words "human factors", knew the words "learning culture", or knew the words "safety culture". I call what happened post-1994 "the Human Factors Movement." So much in the wildland fire world shifted by us being aware of things that we hadn't been aware of previously. While there are some systems things, so much of it is based around understanding the human factor.

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Kelly: As you see it, what are the major ingredients needed to affect a large-scale perspective shift leading to actual adjustments in everyday practices?

Mike: That's a very complex question. I'd say we can look at it through three different lenses.

We can look at it through the behavioral change lens. We can look at it through a cultural change lens. Or, we can look at it through an organizational change lens. While all of those have similarities, they also all look at that question from different perspectives.

I think at the scale that we're talking about nationally, at many different agencies at all levels of government—fire often being a subculture within agencies and subcultures within fire programs—you have to use all three of these lenses.

You have to use the organizational lens because you're talking about organizations. You've got to use the cultural lens, because you want cultural change. But it all starts with human behavior, individually and collectively.

I think the things that those three theoretical perspectives share is that if you want to change people's behavior—or you want people to change their behavior—they've got to have the following three things: motivation, capability, and opportunity. The motivation part is critically important. People need to see a need to change, they need to feel a sense of urgency about making that change—or they're not going to do it.

When it comes right down to it, if people don't want to change—don't feel a need, don't feel that it's urgent—they're not going to change regardless of what their employer tries to compel them to do. It'll look like movement, but you're not going to achieve real sustainable change.

There's a whole area of theory that says changes in culture don't occur by top-down directive. They occur because of movements. That you have a nucleus, a big enough nucleus of people who have seen a need to change, acknowledged that need to change, and are willing to act and feel some sense of urgency about acting. Then if you apply the organizational change lens, you can also see where movements in government and movements in bureaucracies can only be so effective if they don't have management support and political support.

My go-to organizational change guru is John Kotter [Professor of Leadership, Emeritus, at the [Harvard Business School](#), bestselling author, and the founder of Kotter International, a [management consulting](#) firm]. Kotter would tell us that we have to have both top-down change and bottom-up change. But, most importantly, that you must have a coalition.

I think we've seen in the fire world some amazing bottom-up change. But it had a ceiling because it didn't have enough management or political support. So, that's another ingredient. You have to have a coalition of people, then you have to have leadership. I don't mean just leadership from the chief of the agency kind of leadership. You've got to have people throughout the organization who are willing to communicate behavioral intent—to have the vision and communicate it to people in ways that make them want to act.

Those are some thoughts on ingredients.

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Kelly: That's a great answer. We talked a little bit about resistance to the idea of the Lessons Learned Center. What was the bigger picture resistance to change? Were people advocating for a different path altogether than what we ended up doing?

Mike: Yes. I participated in some of the most interesting meetings I have ever attended in my whole life. Especially because I was not expected to talk or do anything—unless somebody asked me a question. The TriData Team would just sit with the assembled agency fire directors as they deliberated. And it was clear that they often were not on the same page, sometimes not even close.

Directors, and their agencies, had differing priorities when it came to what was important out of the TriData Study and that influenced what they, as a group, latched onto and what they just immediately gravitated to.

What they chose to pursue was often a result of compromise. As those compromises were reached, we'd run into situations where one person supported a goal or strategy and another person was adamantly opposed. Therefore, some paths forward met with a lot of resistance. For example, there was serious conversation about finding ways to compensate firefighters that would do away with overtime. But those kinds of big ideas often died because someone just would not budge.

Kelly: It's interesting that those conversations were happening at that level back in the 90s.

Mike: Yes, because it was very clear to us that people were putting themselves in situations that they shouldn't be in. They're working hours and days and tours that they shouldn't be working. They're completely thrashed. But it's financially critical to those people to work as much overtime as possible. These days I hear hotshot crews talking about how much overtime they work and how many miles they drive and I'm like, "Are you kidding me?"

When I was a hotshot, if you got 300 or 400 hours a season, that was an OK season.

Kelly: Now it seems like it's closer to 1,200 hours and that's within the context of rules like 16-hour duty day limitations and mandatory days off. That that says a lot, huh?

Mike: Yes, I know. And you see people who are walking zombies because of it. So, there was all kinds of resistance at every level. Here's one of the ones that's kind of funny. This one still amuses me. I even remember what TriData recommendation number it is. It was Recommendation 26 in the TriData Study. It's about using drones and other technology.

I was the TriData Consulting Team's liaison to the Field Team. One of the final steps was to assemble this group of movers and shakers who actually were boots on the ground, to ground truth recommendations with them. That recommendation got sent to the very bottom of the list. It became known as the "Star Wars" recommendation, literally. People would just laugh in my face, "Are you guys kidding?" Now look at where things have gone. Today, it's all about drones.

Kelly: Yes, drones are doing firing operations, recons, infrared. I mean, you name it, right?

Mike: Right! We were just 30 years ahead of time.

Kelly: Were there any folks who thought, "We should do none of this, we just need to do something else"?

Mike: Not that I ever heard. The biggest resistance was to cost. Cost and time. That all came from the highest level down to the mid-manager level. You know, "How could we possibly do this stuff?"

Kelly: It so often comes down to cost. I feel like we tend to make a partial investment and expect the results of the whole investment. We can be really bad at that in the government. We're going to do this thing, but we're only going to do it part way. You need a champion with money and power to pull things off. That can be hard to find with all the competing priorities.

Mike: That's what I was saying earlier when I indicated that we've been far from perfect or far from complete. I've had numerous people approach me over the years who said, "You worked on the TriData Study?" I say, "Yep." And they're like, "How come we didn't do this stuff?" "I don't know," I tell them, "I don't run your agencies."

It's interesting. I can remember a meeting with the fire directors in which they had a facilitator who was kind of an organizational change expert who literally told them: "There's a lot of low-hanging fruit here. Get started by picking that low-hanging fruit." The idea was to start with that easy stuff, get some quick wins.

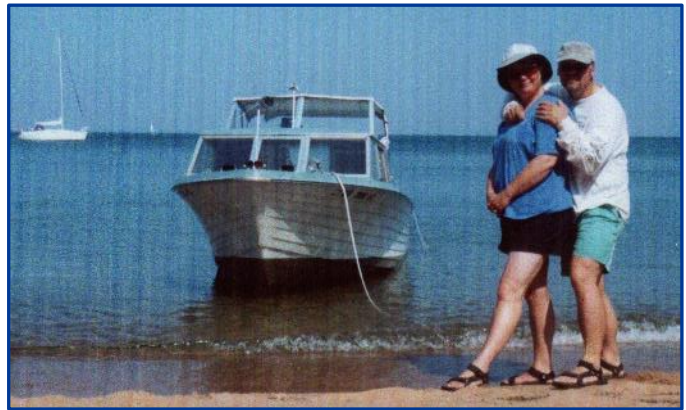
Good advice. But what happened afterwards is they didn't go to the next limb and the next limb—to the hard stuff. Some of the important but hard stuff didn't happen. And, consequently, some of the biggest problems still exist today and are even worse today. Collectively, the agencies did exactly what you just described. They harvested the low-hanging fruit and then stopped and left the job partially completed.

When I think about how much we accomplished out of it, I'm pretty amazed. When I think of all the things we could have accomplished, I can get disappointed.

Kelly: That's a good segue into this question: What is better about being a wildland firefighter today than it was prior to 1994?

Mike: So many things. You ticked off a good list earlier from your review of the study. Then I would say even at the nuts-and-bolts level: the food, equipment, PPE, and career opportunity. So many things are better today, including so many more career positions in fire and fuels and enhanced retirement.

Honestly, I don't talk to young firefighters about some of this because I just end up sounding like a total geezer. "Back in my day, we ate C-rats . . ." But so many things are actually better. And while I'm glad people don't have to eat C-rats



In their retirement, Mike says that he and his wife, Tami, love to travel and visit this country's national parks. One of their favorites is Apostle Islands National Lakeshore, located at the northern tip of Wisconsin on Lake Superior.

anymore, I think the important things are: career opportunity, career paths, training, and a focus on leadership. Although I think that focus on leadership could be much deeper, broader and more comprehensive.

The fact that we do have a safety culture. We have a learning culture. We have intentionally created those things. Yes, so much is better. But there's a lot more work to be done, and the list keeps getting longer instead of shorter.

One thing that is better is that now we at least acknowledge firefighter wellness. That people in fire now understand things like nutrition and exercise as well as mental health. Do we have a comprehensive wellness model? No. But at least we have some knowledge of those things, and people have picked up that knowledge and done things with it. I think that's really good. That's a place where there's still a lot of need, especially around mental health. At least we're acknowledging it now and talking about it.

A thing that didn't improve coming out of TriData is that we still don't have much of a grasp on what the problems are and their extent—whether that's injury and accident or mental health. There's no common database where you can say, "Hey, look, this thing here is going up. The trend is up. This thing, here, that we're worried about, maybe that's endemic because it's flat, or it's even going down."

It really troubles me that our knowledge of firefighter mental health is largely being based on anecdotal evidence. Like, "Oh yeah, the suicide rate among wildland firefighters is four times the national average." You ask people, "Really? Where'd you get that number?" Their answer: "You know, I pieced together this, and I pieced together that." My response: "You should not have to piece those things together." That's an area where we're still really weak. If you want to solve problems, that lack of statistical knowledge is really critical.

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Kelly: Yes. For sure. It's tough to address the issue if you don't understand the occurrence or scope of it.

Mike: You're right. And, honestly, I think there are things that we are worrying about and acting on that are probably not the problems that we think they are. There are things that I think are probably gigantic problems that we're not acting on. That's why I think that having that sort of statistical data knowledge is critically important.

And now we've come full circle on pay, benefits, recruitment and retention. It's an absolute crisis. I'm going to use a convenient analogy here. I realize that not many people that we deal with want to work at Wendy's. But the reality is they can make the same base wage working at Wendy's. That's insane. Even though we know this is a problem, I don't see much happening on this front. I'm very grateful that, through the urging and hard work of Grassroots Wildland Firefighters and others, President Biden gave firefighters a pay bump. But that's just not enough, it's barely first aid.

Kelly: There's not a permanent decision on what is going to happen with the pay bump either. Where do we go from here?

Mike: We slapped band-aids on things for a year or two. But the underlying problems that are causing people to flood out of this business—taking vast amounts of knowledge and experience with them—are not fixed with a bonus or a moderate rise in base wage. It's not all about how much you make per hour.

I just read something the other day. I don't remember who said it. They were talking about Canada and British Columbia particularly. But the same is true here. We have to give people solid jobs that pay them commensurate with what we expect from them, whether in terms of knowledge or what we expect from them in terms of doing a job that requires deprivations that most Americans cannot even relate to.

There's a staffing issue. I mean, part of the reason people are getting ground down physically, mentally and emotionally is because staffing is too low to allow people to step away without the work stopping. There's got to be enough people that the work can continue to carry on while folks take time off.

I am also getting a little worried that people in this business are really passionate about one solution or another. We're in this mode where we're advocating for one solution versus another. "We've got to get out of suppression so that we can get into prescribed fire." I'm like, "No, we need balance. We need all three legs of the 'Cohesive Strategy'. They're there for a reason. We need to invest in all three of them, expand the pie, not further divide the pie—whether we're dividing it up financially or philosophically."

I mean, we have to do everything. I get worried that people are sort of setting themselves up in polarized advocacy positions.

Kelly: I can understand that concern.

In our "One of Our Own" interviews, we like to end on a fun note. Can you share a funny story about something that happened during any point in your career?

Mike: I'll try. I think this is funny because I'm really familiar with it. My friends and I have gotten lots of laughs from it over the years. Also, I've received approval for telling this story—as long as I don't name names.

When I was a hotshot squad boss, my hotshot crew hadn't yet had its first female member. We had guys, who were stalwarts on the crew, who had been on the crew for years, who actually jokingly referred to themselves as members of the "He-Man Women Haters Club".

We were on a fire on the Payette National Forest in a remote area. We were hiking directly out of camp onto the line. My squad included one of the He-Man Women Haters Club guys. This was before we had Division Supervisors, and our crew had a smokejumper, who was a runner for a Sector Boss, who just really wanted to outmatch the hotshot crew that he had assigned to him. We basically had a foot race in and out of camp every day to see who could hike the fastest.

During this fire assignment, two members of the crew suddenly decided, "We're done with this. I know we told you we'd stay till the end of the season, but we have to go back to college." So, they just got themselves off the crew and off the fire. Word came down that if our Forest didn't come up with two replacements, the Region and NIFC were going to make us go home and take us off the board. After a bunch of work by our crew boss and the Forest, we got the word that the Forest had found two replacements.

Everybody was all excited about who the replacements might be, particularly since there were former crew members who still lived in town that people really liked. So, the next day, we were going to come back on our foot race from the line and find out who the replacements were.

Kelly: I see where this is going.

Mike: As we're speed-hiking back into camp, all the talk is about who the replacements are going to be, as it had been all day. We can see these two people standing in our sleeping area, which was up on a little hill. "Who is it? Who is it? Hey, that's Bob. That's Buffalo Bob. Yay, Bob! But . . . who's that other guy? I don't know. I can't tell who the other guy is." We hike closer and closer and closer.

Turns out it's not a guy. I won't even repeat what people said. There were hardhats taken off and thrown against trees, tools tossed-about—right there in front of this person. Words were spoken that would result in instant termination today. Not a very good welcome. Not a good way to bring the first female member onto your hotshot crew.

Turns out, the woman in question was a friend of mine from school. Our crew boss and the squad bosses had this discussion about whether we needed to reconfigure the crew and whose squad she was going to be on. Another squad boss and I both said, "We'll take her". Ultimately, the crew boss put her on my squad where I have this guy who is throwing a hissy fit about a woman being on the crew.

My solution? The next day, we'd be mopping-up in two person teams and she and he would be working together. Long story short, she's a hard worker and she worked his ass off. Word spread. Next thing I know, my guy and another



"I still get to put on my PPE and smell smoke once or twice a year," Mike says, "helping a couple of crazy old friends of mine burn their Firewise neighbors' properties."

he-man woman hater, who had also had a meltdown because of her presence, were obviously vying for this hard-working woman firefighter's attention. Everybody else got a chuckle.

We got demobilized after just a couple of days and ended-up staged at NIFC for several days, just killing time. The whole time those guys are in full-on, open competition to have this woman's attention, following her around, as she says, "like puppy dogs."

I have to say, it was one of the quickest and most remarkable changes in people's behavior that I've ever seen. The funny part is that she and the he-man-woman-hater from my squad, actually one of my dearest friends, have been married for 40 years now.

Kelly: That is hilarious. I can really appreciate that. What year would that have been?

Mike: 1981.

Kelly: That's very cool. That's a great story in the context of this issue too, because talk about another big cultural change.

Mike: She loves to tell that story. Of course, she tells it differently than me.

That crew was kind of a last holdout. It was a crew that had not yet had a female member when most crews probably had. And that was just not the way to make it happen. People's reactions just seemed insane.

Kelly: Well, she must be a pretty strong woman to walk into that, too.

Mike: Yes. She ended up working an entire career in U.S. Forest Service fire. Her welcome was far from pleasant. I mean, literally people four feet away from you throwing stuff around, using every kind of slur of the day. I cannot imagine what it must have been like. She handled it by kicking ass.

Kelly: Awesome.

I have enjoyed this conversation a ton, Mike. It's been fun to hear your perspectives.

Mike: Thank you, Kelly. Thanks for asking.

Kelly: You bet. I really appreciate it.