

## How to Survive a Firestorm and Empower More Resilient Wildland Firefighters

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**Abstract:** *In recent years increasingly extreme, unpredictable fire behavior and longer catastrophic fire seasons in the western states, particularly California, have impacted not only communities but the wildland firefighters who live in and protect them. Long absences, physiological and psychological exhaustion, disrupted relationships, and even suicides are escalating as the “new normal” fire environment creates increasing wear and tear on wildland firefighters and their families (Agrawal, 2019). The psychological and physical health and welfare of firefighters is vital in order for them to protect their communities and themselves. Mental health services and peer support are essential in maintaining resistance and resilience in the “wildfire war”, but other components can be added to the arsenal: community involvement, improved access to health services, and wiser forest management.*

**Keywords:** *Wildland firefighters, resiliency, Carr Fire, Camp Fire, California Wildfires, Psychological First Aid*

### Introduction

The concept of Psychological First Aid (PFA) as a means to foster psychological resilience originated in the early 19<sup>th</sup> century. In 2007, the Johns Hopkins paradigm for building resistance, resilience, and recovery in disaster mental health services was presented. The model defines resistance as a form of psychological immunity to distress associated with critical incidents. Resilience refers to the rapid and effective ability to bounce back from psychological symptoms deriving from critical incidents and disasters (Kaminsky, McCabe, Langlieb, & Everly, 2007). The model incorporates realistic preparation, fostering group cohesion and social support, fostering positive cognitions, and building self-efficacy and hardiness as part of PFA to build resistance to adversity.

Everly and Kennedy (2019) note that PFA is virtually universally accepted as valuable in promoting psychological resilience after adverse events. They reviewed an expanded curriculum of the Johns Hopkins RAPID-PFA model which

incorporates: Reflective listening, Assessment, Psychological Triage, Intervention, and Disposition. They noted that the RAPID-PFA is unique in that it focuses not only on empathic listening, providing information, and connecting individuals in distress with resources, but on perspective taking, mitigation of acute distress, and fostering hope for the future. Paramount is acute, practical, compassionate support. The problem in providing psychological support to wildland firefighters at war with catastrophic fires is in itself a heroic task given the vast geographical areas involved, the frequent lack of resources, days and weeks wildland firefighters spend away from civilization, and unavailability of Mental Health Professionals (MHP)s who are culturally competent and willing to work in hazardous, dirty conditions (Schutz, 2019).

Hence, we are obliged to up our Psychological First Aid game to develop resiliency and promote recovery using innovative methods of stress and crisis management and novel approaches to providing PFA. Enhanced and ongoing education and communication about stress reduction techniques and a reliable means

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to quickly process critical incidents are essential as well as access to health services and the ability to take time to utilize them.

Support from the primary work group and families is primary in addition to community support, both in time of crisis and in public policy about how and when fires are fought, forests are managed, and firesafe communities are developed. When communities are willing to discuss and promote best practices for balancing the needs of society with the environment, everyone, including wildland firefighters, benefits. Californians and those living in areas with the threat of wildfires, are, in the long run, responsible for determining the health of our habitat and the firefighters who are dedicated to protecting it.

The following, based on observation and narrative, explains how we got into the current wildfire situation, offers a detailed description of the Carr and Camp Fires, delineates the unique challenges faced by the wildland firefighters who fought them, and outlines some novel measures taken to mitigate distress and increase resiliency.

## California Is Built to Burn

The 2018 California wildfire season was the most destructive and deadliest on record. More than 8,000 fires destroyed more than 1.8 million acres (Romero, 2019); Insurance Information Institute, 2019), 20,000 properties, and resulted in \$400 billion total economic loss to the state of California and cost CalFire \$1 billion in operations to fight the wildfires (Myers, 2019). California's wildfires are examples of the changing weather patterns and fire behaviors that are becoming the "new normal" in California (Bransford, Medina, & Del Real, 2018).

Not only are fires increasingly unpredictable and more likely to take sudden and deadly turns, they produce microclimates and weather systems that spew cinders for miles causing firestorms to double or more in size in a few hours. The causes are complex.

Much of California is a "fire-adapted landscape" characterized by coniferous forests, black oak, chaparral, and grasslands that evolved to regenerate after fire. The Mediterranean climate of the Sacramento Valley, the part of California's Central Valley north of Sacramento, is typified by mild, wet winters and hot summers with frequent drought. The steep California hillsides and the rugged inaccessible landscape factor in fire behavior, shaping both quickly how the fire travels and the ability to fight it.

Competing priorities have contributed to dangerous conditions, including the debate to suppress or prescribe fire. Native Americans used controlled fire for 14,000 years to take out dead vegetation and unhealthy trees in order to produce healthy and resilient

forests that supported diverse flora and fauna. At the beginning of the 20<sup>th</sup> century a cluster of fires in Idaho and Montana, burned over 2 million acres in 36 hours, killed 78 firefighters, and destroyed several towns before winter storms smothered it. The newly created Department of Forestry, charged with protecting water and timber, declared war on wildfire and decreed that it would be automatically and immediately suppressed. This practice continued along with the encouragement of the midcentury Smoky the Bear campaign and the influence of lumber industry that harvested fire-resistant old growth forests leaving highly flammable brush in its wake. Ironically the policy to suppress fire at all cost contributed to the unhealthy, diseased, overgrown forests that burn so ferociously today. (Fidler, Bohannon, & McVicar, 2019) In addition, clearing brush has not gained foothold as a priority. Governmental funds to clear land are lacking, agencies dispute the environmental policies about prescribed burns, and people living in the wildland-urban interface often cherish the privacy thick vegetation provides and refuse to clear or thin it. Considering the consequences, indifference to the threat of fire has been startling. (Schneider, 2018.)

Dangerous fire season conditions are marked by low humidity, high temperatures, dry fuel load, gusting winds and atmospheric instability created when cool air moving over the coastal mountains mixes with hot wind inland. The years 2012 through 2015 were the driest in 1200 years with the lowest snowpack in 500 years leaving dry brush and dead, diseased trees in much of California (Margolis, 2019). Rain in the winter and spring of 2017 increased vegetation, which dried in the summer heat creating a high load of flammable materials. In July 2018 the northern Sacramento Valley was 58% below normal in precipitation; the last rainfall had occurred in May, leaving June and July dry. Under these conditions, the National Weather Service transmits "red flag" warnings indicating high fire danger (Irfan, 2018).

Two of the most destructive wildfires of 2018 in terms of residences and structures destroyed and loss of human life occurred in the northern California counties of Shasta and Butte. In each case a spark quickly grew out of control into a flaming inferno. The effect of these apocalyptic fires had on civilians and firefighters is described to understand factors relevant to resilience and recovery.

## The Carr Fire: Redding, Shasta County

The Carr Fire, the 8<sup>th</sup> most destructive wildfire in California history, began on 23 July 2018 on State Route 299 in the Whiskeytown National Recreation Area. It started as a small wildland fire that transitioned into a large and dangerous plume driven

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not by fuel, but rather by the wind. Hot, fast, and ferocious, it created its own weather system and resulted in an apocalyptic fire tornado. It resulted in eight fatalities, including three fire fighters.

Redding is the largest California city north of Sacramento. It lies in the heart of Shasta County, which marks the north end of Sacramento Valley. Redding is bisected by the Sacramento River, surrounded by lakes and two volcanic mountains, Mt. Shasta to the north and Mt. Lassen to the east. Whiskeytown Lake lies west along Highway 299 leading to the Trinity Alps, and Shasta Lake, formed by Shasta Dam, graces the I-5 corridor to the north. The area offers hiking, biking, boating, fishing, hunting, and camping. Shasta County averages 249 sunny days per year and in 2017, 72 of those days were over 100 degrees.

Many residents of semi-rural Shasta County and other northern California counties spend fire season either preparing to protect themselves and their homes from wildfire or under siege fighting anything from small grass fires to extensive forest fires in the surrounding hills and mountains. As a result, summer air is frequently smoky and tension-filled, but few people living in the Redding city limits expected to be confronted with wildfire in their front yards.

Local fire departments fight both urban and wildland fires, including fires in the wildland-urban interface, those communities adjacent to and surrounded by wildlands. First responder agencies that fought the Carr Fire include: Redding Fire Department, California Department of Forestry and Fire Protection (Cal Fire) Shasta-Trinity Units, Shasta County volunteer fire departments—17 Administered by Cal Fire, Shasta Trinity National Forest (USDA Forest Service), National Park Service, California Highway Patrol, Shasta County Sheriff's Department, Redding Police Department, SHASCOM Communications Dispatch Agency, and California National Guard. Overall 164 in-state agencies, 76 national, and two international agencies fought the Carr Fire.

*Timeline of the Carr Fire* (National Park Service, 2018).

- On 23 July 2018 Redding residents were enjoying a typical hot summer day. That morning a broken trailer wheel sent sparks into the Whiskeytown Lake Recreational Area and ignited a fire approximately 15 miles west of the City of Redding on State Route 299 and Carr Powerhouse road. By 1:00 p.m., the National Park Service and US Forest Service responded. Initially the fire was contained within dozer lines, but soon multi-agency firefighting efforts were redirected to evacuating the community of French Gulch to the west of Carr Powerhouse.
- On 24 July, west winds pushed the fire over a large dozer line. It doubled in size in 24 hours and spread faster than firefighting resources, including ground and air attack, could respond. A park ranger commented that the normally composed air attack pilots sounded disconcertingly nervous (Krieger, 2018).
- On 25 July 2018, the Carr Fire exploded from 3,000 acres to 20,000 acres overnight. The news reported “extreme fire behavior,” fueled by erratic winds, low humidity, and ungodly heat. Dozens of boats moored at Oak Bottom on Whiskeytown Lake burned that night. The goal was to keep the fire away from the Redding city limits.
- On 26 July at midnight westerly winds pushed the fire eight miles in seven hours. During the day, the fire moderated under high pressure. The temperature rose to 113 degrees—the hottest day of the year in one of the most sweltering months recorded. The humidity was in the single digits. At 5:30 p.m., erratic west winds pushed the fire at 2.5 miles per hour expanding the perimeter on both sides of Highway 299. The direction of the blaze became impossible to predict as embers scattered in every direction up to a mile ahead of the front causing dozens of spot fires.
- An observer noted, “The sky was black, and it looked like pieces of the sun were landing on the mountain. They thought it would take hours to cross the lake. It took 15 minutes.”
- A fire whirl began near Keswick Dam. Soon the town of Keswick burned to ashes.
- At 5:44 p.m., 81-year-old dozer operator Don Smith was trapped and overcome. Attempts to reach him on foot were futile due to increasing fire activity. Finally, radio contact was established, and Smith indicated he was attempting to make it to a safety zone. He called for a water drop. Four helicopters dropped water as fire conditions worsened. After the smoke cleared at 7 p.m., Smith's body was located. He had not deployed a fire shelter. (Chapman, 2018.)
- At 6:43 p.m. fire personnel were advised that the fire was going to cross natural barrier of the Sacramento River into the Redding city limits.
- At 7:00 p.m., three firefighters from Marin County were burned while attempting to defend a house. They had to wait for the fire front to pass before receiving medical attention.
- In the evening of 26 July, residents gathered in the upscale Land Park and Stanford Hills neighborhoods on the bluff overlooking the Sacramento River to watch the fire a mile and a

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half away. At 7:23 p.m. a large rotating plume of smoke was observed near Land Park. Winds increased dramatically and embers were lofted in every direction. The plume intensified and grew into a fire tornado. Firefighters began an immediate frantic evacuation. Minutes later the fire advanced into the neighborhoods and by 7:35 p.m. homes were engulfed by fire.

- A woman and her two great grandchildren were incinerated in their home while her husband frantically tried to reach them through closed roads. He listened to his grandson begging for rescue on the phone as fire overtook the family (Sandhu, 2018)

### *Fire in The Sky: The Fire Tornado*

- Hot air from the fire rose creating its own weather system, sucking oxygen and fueling its own flames. Around 7:20 p.m. two rotating vertical plumes exploded through an inversion layer and within 30 minutes reached the height of jetliners: 42,000 feet. The plumes rotated reaching a speed of 143 + mph, equivalent to EF3 tornado, the strongest tornado of any type recorded in California. It scoured the ground and lofted large steel power line support towers and a steel shipping container. It grew to 1,000 feet wide, the width of three football fields, and reached a temperature of 2,700 degrees, hot enough to melt an engine block. All vegetation less than 1" and dead biomass was completely consumed. The fire tornado defies description by the National Weather Service. (Cappucci, 2018)
- City of Redding firefighter Mike Loew described his experience: "The wind was amazingly strong and shifted continuously, coming from everywhere. It blew me to the ground several times. The smoke from burning structures and the vegetation was extremely thick and continuous. My eyes felt like they had chemical burns and were hard to keep open. Breathing was challenging. Visibility at times was down to about ten feet, making it difficult to drive and impossible to keep visual track of my coworkers. It seemed like exploding fireworks were being hurled at us. I tried status checks on my portable radio, but there was so much radio traffic from other resources, it was rare that I made contact with my crew even though they were only one hundred feet away. I was afraid that the engine might stall from the lack of oxygen and I might not be able to start it again. The engine seemed like the only safe place for much of the firefight. I believed if we lost the engine we would die. Suddenly deer, coyotes, skunks, raccoons, a bobcat ran into the subdivision for shelter. I

thought, 'If wild animals are coming into a burning subdivision for shelter, how bad is it outside and is this where I'm going to die?' Police officers ran from house to house checking for residents. I thought they were going to die and wanted to tell them to get in the engine but couldn't as they were too far, and the fire and winds were too loud. Whenever we tried to keep a structure from burning, the wind would shift, blowing fire at us causing us to retreat. It seemed like almost everything we tried did no good. I felt hopeless, frustrated, and guilty."

### *"There are no more resources."*

- The fire tornado spread in every direction faster than evacuation orders could reach neighborhoods. The first warning for many residents occurred when fire laden winds blew into their yards. The orange fire-sky was punctuated with thick black columns rising from burning houses. It was as loud as an oncoming train. Civilians tried to drive out, but the fire moved so fast many abandoned their cars and ran on foot to escape. "We were within seconds of death," one said. (Shulman, 2019)
- Fire fighters were the last defense, but City of Redding Fire Chief Cullen Kreider soon realized there were no more resources available to call on: "The fire is out of control. It's snowing ash in west Redding. The wind is blowing and it's still broiling hot. Man. We're in trouble."
- CalFire Regional Assistant Chief Michael Hebrard: "You look into the eyes of your guys and you see this isn't normal. They'd fought other historic blazes, but never anything like this. It's never burned anything like this. Gridlock could kill everyone."
- Redding Fire Department firefighter Mike Loew: "I felt like I was doomed, in the presence of pure evil. It was personal and it wanted to kill me. I wanted to call my wife to tell her goodbye."
- CalFire Captain Shawn Raley evacuated a family from a subdivision. Suddenly debris slammed into his vehicle, shaking it violently. The truck windows blew out and the wind pushed the truck off the road. Embers blew inside onto his passengers. "I've had some close calls," he says, "but I never before felt like it was the end." (Bashoor, 2018).
- Three dozers were violently impacted by flying rocks and debris that shattered windows causing injuries.
- At 7:35 p.m., City of Redding Fire Department Fire Protection Inspector Jeremy Stoke responded to Land Park. Earlier, he had returned to work from days off to conduct welfare checks and

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support other firefighters. At 7:38 p.m. a fire prevention captain observed the fire tornado near Stoke's location. At 7:40 p.m. Stoke radioed a mayday and stated he was in the middle of a road being burned over and needed a water drop. There was "mortal fear in his voice." Thereafter he did not respond to calls asking for his location. SHASCOM, the local 9-1-1 communications agency, pinged his cell phone (Fagen, 2018). At midnight Redding Fire Chief Kreider declared Stoke missing and a search was initiated. He had been caught in the fire tornado. It sucked him from his truck and flung him so far that his body wasn't found at 3:00 a.m. His truck was recognized only by a remaining tire.

- Mike Loew upon finding Jeremy's body: "I threw my helmet and cursed. I got on my knees and wrapped my arms around him and cried. I said I was sorry. The only burns were to his hands and torso where his Nomex had been pulled off when he'd been ejected from the truck. We rolled him over to see a massive open skull fracture that occurred when the fire tornado hurled his truck against several trees. I was relieved that he was killed quickly. I cried some more and said goodbye."

## *The Destruction*

- The fire tornado was on the ground for 80 minutes. During that time, it contorted and crushed huge transmission towers as easily as pipe cleaners, uprooted oak trees and tore off their bark, and wrapped steel poles around trees like twist ties.
- Everything had been sanded smooth; the earth was scoured and denuded of vegetation leaving hard baked clay.
- The night the fire exploded, 38,000 residents of the 92,000 residents from Redding and the surrounding towns evacuated. One thousand farm and domestic animals were given shelter.
- Amtrak Coast Starlight was shut down as well as Highway 299, the major road between Redding and communities west to the coast of California.
- Air quality was at dangerous levels for weeks and spread over the western states. Additionally, the fire directly impacted the water sources of Keswick Dam and Shasta Dam.
- The Carr Fire was finally contained on 30 August 2018. Before it burned itself out, it devoured more than 229,651 acres of wildland, an area larger than New York City, and obliterated more than 1,614 structures. It cost \$1.7 billion in damages and suppression.
- Nearly 4,800 fire and allied personnel were deployed.

## **The Camp Fire: Paradise, Butte County**

The Camp Fire is the deadliest and most destructive fire in California history, and sixth in the United States (George, 2018).

Paradise California lies high atop a ridge formed between the Feather River Canyon and Butte Creek in Butte County in the Sierra Nevada foothills, 85 miles north of Sacramento. Chico, the hub of Butte County, lies ten miles to the east and is accessible by car along Skyway, a narrow undivided four-lane highway which runs along the ridge where it turns into a two-lane road at the west end of town on the way to small communities beyond. Before Paradise was destroyed in the Camp Fire in November 2018, residents included 26,800 people; twenty-five percent were 65 or older. Paradise was also the home to a number of individuals who lived "off the grid" and had no listed address or phone.

The topography and climate are similar to other communities in the northern Sacramento Valley. In addition, the Feather River channels hot winds up the steep inaccessible canyons that form the ridge. Other fires have ravaged the area and thousands were evacuated, but none were as fast moving or close as the Camp Fire.

The adequacy of evacuation routes and safety plans have been an issue for years in Paradise. Paradise is in the highest risk population-to-evacuation-route areas, the top 1%, with more than 1,000 people for every lane of traffic (Wyloge, 2019). CalTrans reported that on the day of the Camp Fire the three roads leading away from Paradise and other ridge communities had significant capacity limitations including sharp curves, inadequate shoulders, and steep slopes—useless in a large evacuation. Multiple safety warnings were also given in past decades by Cal Fire, but in the past the Butte County Board of Supervisors rejected plans for a moratorium on home building and fire prevention measures. The houses were packed close together and the land had not been sufficiently cleared. In 2011 a fee was imposed to provide for fire prevention, but it was unpopular and repealed in 2017. Furthermore, high risk areas were not included in evacuation plans.

## *Timeline for Camp Fire*

- On November 6, the National Weather Service issued a red-flag warning for Butte County—the highest fire alert. Pacific Gas & Electric powerlines are known to fail in high winds. P. G. & E. chose not to shut down powerlines. Ultimately, P. G. & E. admitted culpability for the Camp Fire. The cause? Power line failure.

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- At 6:33 a.m. on Thursday, November 8, 2018 a fire was reported along the Feather River. Weather conditions were similar to those of the Carr Fire: High temperatures, low humidity, a large dry fuel load, and raging winds. Ground crews couldn't access the area and the high winds precluded air attack.
- The residents of Paradise were largely unprepared, and many didn't believe they were in danger. Some refused to leave their homes even when warned. Tragically, 25 to 94% of residents didn't receive evacuation orders. Cell towers were inoperative, and a large number of people had not enrolled in reverse 9-1-1.
- By 8:00 a.m. the fire had jumped the scenic Feather River and reached the town of Paradise. The fire quickly became a rapidly moving, ember driven conflagration with 50 MPH winds. CalFire spokesperson Scott McClean said, "This fire is moving football-field lengths within seconds." Firefighters abandoned fighting fire and focused on rescuing civilians.
- Orderly evacuation plans went to hell. Twenty thousand people attempted to evacuate at the same time along the single road out of Paradise which had become clogged with fallen trees and power lines and burning vehicles. People caught in the gridlock were burned alive in their cars while trying to escape. (Kaplan, Yi., & Sadaf, 2018).
- Dispatchers were overwhelmed by calls from civilians who were surrounded by fire, asking when firefighters were coming to rescue them. One dispatcher told a family to run if they were able, but they were trapped in their home and certainly died in the flames.
- The towns of Paradise and Concow were obliterated within six hours in an urban firestorm the intensity of which compared to the one that consumed Hamburg, Germany in WWII.
- Fire resources were stretched beyond limits. Firefighters tried to evacuate the elderly and immobile, and ultimately 52,000 people were evacuated in spite of delayed warnings. At least eighty-five civilians were killed, mostly elderly, many in their homes unable to get out.
- One desperate couple, apparently believing they were trapped, shot themselves. Dozens survived by jumping into a reservoir. One father saved his frantic young son by driving their smoldering car over a barrier and heading the wrong way down the highway to safety. Two fire captains, a firefighter, and two prison inmate firefighters were injured.

- The Camp Fire exploded from 20,000 acres on November 8 to almost 100,000 acres on 9 November.

### *The Destruction*

- Containment of the Camp Fire occurred on November 25. Over 18,800 buildings were destroyed, including the hospital and schools, and 153,336 acres burned. The fire burned so hot that even fire chimneys crumbled.
- Body recovery took weeks with the help of cadaver dogs. This was a particularly gruesome task as the heat of the firestorm was so ravaging to human flesh and bone and frequently only small- sized remains, such as a tooth, could be uncovered rather than recognizable body parts. Those incinerated in their cars were unrecognizable. Daily updates were given as new victims were uncovered and those missing but still alive were located. (Kaplan et al., 2018).
- An unknown number of victims may never be found because so many people lived in isolation or off the grid.
- The entire town of Paradise was left virtually uninhabitable. Power lines were nonfunctional. Environmental contaminants rendered the land uninhabitable. Water lines were contaminated with benzene from melted plastics. The land was contaminated with millions of tons of contaminated debris requiring more than 3.6 million tons of waste being transferred to landfills and recycling centers, more than was removed from the World Trade Center after 9/11. (Cart, 2019)
- Evacuees found extreme difficulty in finding shelter and were shifted from place to place as the rainy season began and temperatures fell. Heavy rains delayed recovery and cleanup efforts. Norovirus spread throughout rescue camps.
- Smoke could be seen from space. It blanketed the San Francisco Bay Area and was reported as far away as New York City.
- Nonetheless, cleanup continues and higher standards for construction, infrastructure, evacuation capacity, and emergency vehicle access are planned, including underground utilities (Hagerty, 2019).

### **Wildland Firefighters Can't Go Home at Night**

Firefighting is arguably one of the most stressful jobs, and wildland firefighters face unique challenges including battling rugged terrain, dry conditions, overgrown landscape, brutal heat, falling trees, and dangerous wildlife. Firefighting resources are often

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strained to the max, and, their pay is relatively low. They are highly dedicated “tactical athletes.” (Bush, 2015)

- Fire season used to stretch from May to November, giving wildland firefighters a respite in the winter months. Fire season now can last all year long and there is no rest between seasons. One said, “I can never relax. We are deployed on an incident for 21 days, then we cover the station for 50 to 80 days. We go 56 hours without sleep during initial attack which leads to not only fatigue, but paranoia. I used to sleep on the line, but now if you sleep, your crew might die.”
- Firefighters have to be ready to go to a fire on short notice. They can’t let their guard down and enjoy life even when off duty.
- Wildfire does not take a break, and neither can firefighters. Wildland firefighters are fatigued and sleep deprived. (Vincent et al., 2018). Under these conditions, firefighters may show reduced executive function leading to potentially catastrophic mistakes in the line of duty. They may become more vulnerable to post traumatic stress injuries, leading to depression and even suicide.
- A growing body of evidence suggests that long working hours are associated with an increased risk of cardiovascular problems, physical and emotional fatigue, suicide, addictive behavior, higher injury rates, and overall mortality. (Ali, D. 2018). In spite of increasing anxiety and fear, they feel they must keep a “game face” because complaining and showing weakness are culturally unacceptable. One said, “Fatigue and lack of sleep is like being drunk. We are not robots. Something has to give.”
- During the Carr and Camp Fires and other California fires, many of the first responders lost their own homes as they were trying to save the homes of others. Perhaps most disturbing, some feared for their families and couldn’t contact them to make sure they were safe.
- Alarming, the rate of wildland firefighter suicide is likely underreported and rising. Wildland firefighters may be more likely to die by suicide than in the line of duty. (Fischer, 2018). One firefighter away from home for several weeks confessed, “I felt so alone even though there were people all around. I stopped caring what happened to me.”

### *Those Who Wait at Home*

The actual calls are not always the cause of stress. In addition to dealing with the expected stressors of bad calls, technical problems, inadequately trained crews,

poor leadership, inconsistent policies, and annoying co-workers, wildland firefighters are gone from home week upon week, which causes undue strain on health and family life.

- The maximum 21-day deployment is a thing of the past; many are much longer. Contact with family members is limited to infrequent locations that have cell phone coverage. One firefighter said, “Your family has to pray you’re okay, and the only way to know is if they don’t hear from you.” In other words, no news is good news.
- Family members complain about prolonged low-level anxiety during fire season. A spouse may feel like a single parent and become overwhelmed with family responsibilities. The resulting resentment, anger, and fear can fracture family relationships and lead to infidelity, addictive behavior, and other self-destructive methods of coping that may alleviate stress short term, but in the long term destroys families. Children may feel abandoned and become frightened that the firefighter parent may be hurt, which negatively impacts school and social activities.
- Long term absence leads to emotional isolation and breakdown of communication between family members. Once the firefighter returns home, he or she is too exhausted or irritable to cope with the normal demands of family life and unmotivated to re-adjust to everyday responsibilities. For seasonal firefighters there is the loss of a paycheck, a support system, and feeling purposeful during time off duty.

## **Resistance, Resilience, and Recovery**

### *Pre-Incident Preparation:*

- There was virtually nothing that could prepare wildland firefighters or the communities of Redding or Paradise for the rapidity and destruction of the fires. Resources were quickly overrun, the disorienting speed and massive destructiveness of the fires had not been experienced by first responders or civilians, and the depth of terror was a shock to many. Needless to say, firefighters and the north state communities have been knocked out of denial and experienced heightened alert as the 2019 fire season approached.
- Pre-incident education is essential, beginning in the academy, about the kind of stressors wildland firefighters will encounter and the need for self-care.
- Organized peer support is essential. In the case of CalFire, employee support services (ESS) has been in existence since 1998. It began with one coordinator. By 2021 there will be 25

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coordinators. In addition, getting seasoned veterans on board will help spread the word most effectively.

## Stress Reduction During and Recovery After the Fire:

- Firefighters are unable to leave a fire and take time off to attend a therapy session. Support services provided trained peers in the field and MHPs embedded in the CalFire command centers and were extremely helpful during the Carr and Camp Fires. They provided acute, practical, compassionate, mitigation of acute distress, and fostered hope for the future.
- To mitigate stress on wildland firefighters, MHPs who work with them should be well trained in treating the risk-taker personality and be thoroughly familiar with the specific physical, social, and environmental demands placed on firefighters in order to help them handle not only immediate and crisis needs, but to assist them and their families in coping with ongoing stressors. Additional research on wildland firefighter personality and risk factors is suggested. MHPs who are overly disturbed by the horrors wildland firefighters confront need not apply.
- In recent years there has been a paradigm shift in younger firefighters possibly attributed to social media. There is more of a personal touch and the perception that they can reach out for help and not be labelled. The culture has become more socially accepting.
- Firefighters can be taught positive stress reduction skills that can be utilized during deployment, such as breathing techniques, exercise, and taking a tactical pause to reconsider attack strategies before initiating action. After they stand down, practices including yoga, massage, and other body centered techniques are effective and portable stress reducers. Yoga for First Responders offers videos ad trainings.
- Programs such as the First Responders Resiliency, Inc. in Santa Rosa California help first responders and their families learn about the psychological, neurological, physical, emotional, and relational changes that affect first responders as a result of their repeated traumatic exposure and stress.
- Intensive residential treatment programs such as First Responders Support Network ([www.frsn2001.org](http://www.frsn2001.org)) in Marin County, California and On-Site Academy ([www.onsiteacademy.org](http://www.onsiteacademy.org)) in Massachusetts promote education, training, and recovery from stress and critical incidents for both first responders and their families.

## *Social and Community Support*

Social support is well documented as a factor in resilience in firefighters, both in the workplace and at home. A strong community component, in addition to agency services, can also be a factor in morale building and feeling valuable and needed. Those firefighters at the Carr and Camp Fires benefitted from additional support in the following ways.

### *The Carr Fire*

- Numerous agencies and individuals responded to help not only to civilians, but also first responders and their families. Local MHPs and chaplains provided assessment of need, stress management, and psychological first aid to members of the community.
- While the Carr Fire raged, a group of first responders organized a meeting and invited community MHPs to attend. Many did. Mutually, the group discussed methods of coping, how to utilize appropriate stress reduction techniques, and what resources were available.
- The loss of a beloved City of Redding firefighter from the fire tornado was devastating to all allied agencies and the civilian community. A stand down event was organized to include employees from all responding departments. The event offered a respite and allowed grieving and recovery.
- After the first fatality was announced CalFire organized Crisis Management Briefings (CMB), one on ones, defusings, and debriefings. MHPs from the West Coast Posttrauma Retreat in Napa, and Butte, El Dorado County, and Sacramento Counties arrived at CalFire command center to do one-on-ones with firefighters. Rapid stress reduction techniques including Brainspotting were used effectively.
- The staff of the local Redding Record Searchlight worked around the clock, without power, to keep the community informed of the rapidly changing fire news even though many employees were evacuated and some lost homes in the fire (Ortiz, 2018).
- Overall, the gratitude expressed by the community to firefighters and other first responders was extraordinary as evidenced by hundreds of professionally and homemade signs thanking the first responders sprouted up on fences, telephone posts, and the sides of buildings. One fire fighter said, “A sign on a fence post that says, ‘Thank you’ has more impact than anything else out there right now.” (Cremen, 2018)



# HOW TO SURVIVE A FIRESTORM AND EMPOWER MORE RESILIENT WILDLAND FIREFIGHTERS

## *The Camp Fire*

- Experiences during the Carr Fire enhanced practices during the Camp Fire. Rather than waiting for a call for CISM, CalFire commanders and ESS contacted trained peers and culturally competent MHPs to be available immediately as soon as the scope of the fire was realized.
- Services were made available 24/7 for the first 28 days. This allowed one-on-ones as needed to keep responders functioning during weeks-long operations. After operations were over, CISM services were provided as needed for as long as necessary.
- As the magnitude of fighting fire and body recovery on first responders became obvious, CalFire invited peers from allied agencies to respond in the field. Teams of multi-agency peers went into the field for emotional support and to supply food and liquids to hungry and fatigued personnel. This provided acute practical empathic support from peers who were able to connect on a basic, compassionate level and offer hope. In one case, an exhausted law enforcement responder was on the verge of tears when offered food.
- As firefighters came off two-week deployments Rest Information Transition Services were made available. (Schutz, 2019)
- Sierra Nevada, a local brewery in Chico, created Sierra Nevada Resilience Ale and raised \$15 million for Camp Fire victims.

## **Conclusions**

Recent devastating California and western US fires have demonstrated the necessity for communities, civilians, first responders, and government agencies to work together to take action to protect our homes and lives. This paper, although not comprehensive, has delineated some of the concepts and proposed projects needed to build resiliency in our wildland firefighters and communities.

Better access to mental health services and the ability to utilize them are paramount. California Governor Gavin Newsome recently signed a package of bills to add peer support and PTSD treatment to qualify first responders for workers compensation benefits. (Ruiz-Grossman, 2019). Cal Fire is in the process of expanding PFA services provided both in the field and long term to wildland firefighters. Trained peers and MHPs who can offer immediate support and hope has been shown to be useful. MHPs and peers who understand the perspective of wildland firefighters are being trained. Also, stress reduction techniques that can be used on duty are becoming more popular.

Recent fires have initiated a tipping point in changing decades old policy that is at best ineffective and at worst extremely dangerous. This will be complicated and difficult and involve diverse opinions and policies, but in order to protect our land and communities we need to grow healthy, sustainable, well managed forests through the use of prescribed burns and clearing.

Programs such as the Strategic Fire Plan for California provide “a vision for a natural environment that is more fire resilient; buildings and infrastructure that are more fire resistant; and a society that is more aware of and responsive to the benefits and threats of wildland fire; all achieved through local, state, federal, tribal, and private partnerships.”

Communities, like Paradise and Redding, in the urban-wildland interface need to be designed with wildfire in mind and include workable escape routes and better communication infrastructure. Nonprofit Fire Safe Councils provide education about fire safety and encourage proactive clearing of space between trees and vegetation and homes to slow or even stop fire. Redding is one of four communities the US chosen for Community Planning Assistance for Wildfire funded by the US Forest service and private foundations. (Chapman, 2019). Educational programs that provide information about fire resistant homes are also gaining popularity.

The CalFire Forest Health program provides grants to promote healthy, resilient forests (Legislative Analyst’s Office, 2018). Goals include: Defining what needs to be done before a fire starts, reducing fire-fighting costs and property loss, increasing firefighter safety, contributing to ecosystem health, and preventing and mitigating wildfires using: prescribed fires, fuel breaks, defensible space, forest management, fire safe landscaping, reducing hazardous fuel loads, and reforestation (California Department of Forestry and Fire Protection, 2019).

Ultimately resiliency is not unilateral, but multifaceted. Developing resiliency to the new normal in wildland fire fighting requires the entire community to be involved: First responders, mental health providers, individual land and homeowners, governmental agencies, regulators, environmentalists, land managers, native peoples, and anyone interested in preserving and protecting where we live. Through consumer education, preplanning, and cooperation between agencies and civilians, the damage produced by wildfires on personnel and property as well as the psychological costs to civilians and firefighters, can be mitigated. The ability to adapt and cooperate is essential to our survival.

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## References

- Agrawal, N. (2019, March 1). Firefighter suicides reflect toll of longer fire seasons and increased stress. *The Los Angeles Times*. Retrieved from <https://www.latimes.com/local/lanow/la-me-ln-firefighter-suicides-20190302-story.html>
- Ali, D. (2018, April 9). The firefighter's firefighter. *Fire Rescue*. Retrieved from <https://www.firerescuemagazine.com/articles/print/volume-13/issue-3/departments/wildland-urban-interface/hotshots.html>
- Bashoor, M. (2018, August 21). On the line: First-hand accounts of the devastating summer of 2018 wildfires. *Fire Chief*. Retrieved from <https://www.firechief.com/disaster-management/articles/on-the-line-first-hand-accounts-of-the-devastating-summer-of-2018-wildfires-g84113BBHuYnj0V/>
- Bransford, S., Medina, J., & Del Real, J. (2018, July 27). As Carr fire kills 2 in California, firefighters reflect on a job now 'Twice as Violent.' *The New York Times*. Retrieved from <https://www.nytimes.com/2018/07/27/us/california-wildfire-redding-carr.html?action=click&module=RelatedCoverage&pgtype=Article&region=Footer>
- Bush, E. (2015, August 21). Type of person drawn to wildland firefighting might be called a tactical athlete. *The Seattle Times*. Retrieved from <https://www.seattletimes.com/seattle-news/northwest/type-of-person-drawn-to-wildland-firefighting-might-be-called-a-tactical-athlete/>
- California Department of Forestry and Fire Protection. (2019, March 27). CAL FIRE funds to restore health and resiliency of California's forests. Contact Scott McLean, Deputy Chief of Communications, @CALFIRE\_PIO.
- Cappucci, M. (2018, November 14). California's Carr fire spawned a true fire tornado. *Science News For Students*. Retrieved from <https://www.sciencenewsforstudents.org/article/californias-carr-fire-spawned-true-fire-tornado>
- Cart, J. (2019, October 9). Cleaning up Paradise and grim anniversary nears. CalMatters.org. Retrieved from <https://calmatters.org/environment/2019/10/paradise-california-camp-fire-anniversary-cleanup/>
- Chapman, M. (2018, August 15). Carr fire report: Stoke dies while trapped in fire tornado. *Record Searchlight*. Retrieved from <https://www.redding.com/story/news/2018/08/15/firefighter-died-while-trapped-carr-fire-tornado-report-says/1002748002/>
- Chapman, M. (2019, February 19). Redding receiving free advice on how to reduce the risk of future wildfires. *Record Searchlight*. Retrieved from <https://www.redding.com/story/news/2019/02/19/after-carr-fire-redding-gets-free-advice-reduce-future-wildfire-risk/2915362002/>
- Cremen, A. (2018, July 28). Carr fire: Cal fire asks for thank you signs instead of food, water donations. KXTV-TV. Retrieved from <https://www.abc10.com/article/news/carr-fire-cal-fire-asks-for-thank-you-signs-instead-of-food-water-donations/578326891>
- Everly, G. S., & Kennedy, C. (2019). Content validation of the Johns Hopkins model of psychological first aid (RAPID-PFA) *Expanded Curriculum*. *Crisis, stress, and human resilience: An international journal*. 1, 6-14.
- Fagen, K. (2018, August 16). Report: Massive Carr fire tornado trapped, killed Calif. firefighter. *San Francisco Chronicle*. Retrieved from <https://www.sfchronicle.com/california-wildfires/article/Massive-Carr-Fire-tornado-trapped-killed-Redding-13159898.php>
- Fidler, M., Bohannon, S., & McVicar, G., (producers). (2019). California burning: Solutions to California's wildfire problem. *North State Public Radio* podcast.
- Fischer, N. (2018, August 23). More firefighters committed suicide in 2017 than died in the line of duty. *Forbes*. Retrieved from <https://www.forbes.com/sites/nicolefisher/2018/08/23/haunted-heroes-more-firemen-committed-suicide-in-2017-than-died-in-line-of-duty/#339674bf2a24>
- George, K. (2018). The cost of California wildfire damage is astronomical—and it could keep climbing. *Bustle*. Retrieved from <https://www.bustle.com/p/the-cost-of-california-wildfire-damage-in-2019-is-astronomical-it-could-keep-climbing-15519504>
- Hagerty, C. (2019, October 23). The survivors. *The Highlight by Vox*. Retrieved from <https://www.vox.com/the-highlight/2019/10/16/20908291/camp-fire-wildfire-california-paradise-survivors>
- Insurance Information Institute. (2019). Retrieved from <https://www.iii.org/fact-statistic/facts-statistics-wildfires>
- Irfan, U. (2018). Why the Carr fire in Northern California is so severe. *Vox*. Retrieved from <https://www.vox.com/energy-and-environment/2018/8/1/17637026/carr-fire-california-heat-wildfire-deaths>
- Legislative Analyst's Office: How CalFire is Spending Recent Forest Health Funds. *The California Legislature's Nonpartisan Fiscal and*

## HOW TO SURVIVE A FIRESTORM AND EMPOWER MORE RESILIENT WILDLAND FIREFIGHTERS

- Policy Advisor*. (2018, November 15). Retrieved from <https://lao.ca.gov/Publications/Report/3902>
- Kaminsky, M., McCabe, O. L., Langlieb, A., & Everly, G. S., (2007). An evidence-informed model of human resistance, resilience, and recovery: The Johns Hopkins' outcome-driven paradigm for disaster mental health services. *Brief Treatment and Crisis Intervention*, 7, 1-10.
- Kaplan, S., Yi, J., & Sadaf, K. D. (2018, November 12). Caught in the inferno: How the Camp fire overwhelmed Paradise. *The Washington Post* Retrieved from <https://www.washingtonpost.com/graphics/2018/national/amp-stories/how-the-camp-fire-overwhelmed-paradise/?noredirect=on>.
- Krieger, L. (2018, July 31). Why planes can't fight Shasta's deadly Carr fire: An inversion layer creates dangerous conditions. *Mercury News*. Retrieved from <https://www.mercurynews.com/2018/07/30/why-planes-cant-fight-shastas-deadly-carr-fire/>
- Margolis, J., (2019 July 1). Climate change is ruining your trips to the mountains. *LAist*. Retrieved from [https://laist.com/2019/07/01/california\\_forests\\_dead\\_trees\\_climate\\_change.php](https://laist.com/2019/07/01/california_forests_dead_trees_climate_change.php)
- Myers, J. (2019, July 8). AccuWeather predicts 2018 wildfires will cost California economic losses of \$400 billion. Retrieved from <https://www.accuweather.com/en/weather-news/accuweather-predicts-2018-wildfires-will-cost-california-total-economic-losses-of-400-billion/70006691>
- National Park Service (2018, August 30). Timeline of the Carr fire. Whiskeytown. Retrieved from <https://www.nps.gov/whis/carr-fire-timeline.htm>
- Ortiz, J. (2018, July 30). Amid apocalyptic Carr fire, local newspaper informs Redding community. *USA Today*. Retrieved from <https://www.usatoday.com/story/news/2018/07/30/redding-newspaper-coverage-shines-amid-apocalyptic-carr-fire-record-searchlight/867803002/>
- Romero, D. (2019) California had nation's worst fire season in 2018. *NBC News*. Retrieved from <https://www.nbcnews.com/news/us-news/california-had-nation-s-worst-fire-season-2018-n981431>
- Ruiz-Grossman, S. (2019, October 1) California Governor signs bills boosting mental health support for firefighters. *Huff Post*. Retrieved from [https://www.huffpost.com/entry/california-firefighters-mental-health-wildfires\\_n\\_5d93cecbe4b0e9e760548fb4](https://www.huffpost.com/entry/california-firefighters-mental-health-wildfires_n_5d93cecbe4b0e9e760548fb4)
- Sandhu, A. (July 28, 2018). 'She's my squirrel: Husband mourns living wife, great grandkids who dies in Carr Fire. Redding Record Searchlight. Retrieved from <https://www.redding.com/story/news/local/2018/07/28/husband-remembers-loving-wife-great-grandkids-who-died-carr-fire/857931002/>
- Schneider, K. (2018, December 18). California knew the Carr Could happen. It failed to prevent it. ProPublica. Retrieved from <https://www.propublica.org/article/california-carr-wildfire-failed-to-prevent-it>
- Schutz, N. CalFire. (2019, August 24). Personal Communication.
- Shulman, A. (2019, January 26). Six months later, Carr fire survivors share tales of horror and hope. *Redding Record Searchlight*. Retrieved from <https://www.redding.com/story/news/local/2019/01/26/carr-fire-survivor-stories-california-wildfire/2537895002/>
- Vincent, G., Aisbett, B., Wolkow, A., Jay, S., Ridgers, N., & Ferguson, S. (2018, February 22). Sleep in wildland firefighters: What do we know and why does it matter? *International Journal of Wildland Fire*. Retrieved from <https://www.publish.csiro.au/wf/wf17109>
- Wyloge, E. (2019, April 25). Deadly traffic: How we evaluated California's wildfire evacuation routes. *Palm Springs Desert Sun*. Retrieved from <https://www.desertsun.com/story/news/environment/2019/04/25/california-wildfire-evacuation-road-capacity-traffic-analysis-methodology-camp-fire/3514552002/>
- Yoga for First Responders. (n.d.). Retrieved from: <https://www.yogaforfirstresponders.org>

### Additional Reading

- Arthur, D. (2018, July 31). Carr fire forces Whiskeytown to close for this summer. *Redding Record Searchlight*. Retrieved from <https://www.redding.com/story/news/2018/07/31/carr-fire-damage-forces-whiskeytown-close-summer/875368002/>
- Cooper, J. (2018, August 1). Closest thing to war: Bulldozer drivers face fire dangers. *Business Insider*. Retrieved from <https://www.businessinsider.com/ap-closest-thing-to-war-bulldozer-drivers-face-fire-dangers-2018-8>
- Elias, P. (2019, March 14). Group questions how effective the use of dozers was in fighting the Carr fire. *Redding Record Searchlight*. Retrieved from

## HOW TO SURVIVE A FIRESTORM AND EMPOWER MORE RESILIENT WILDLAND FIREFIGHTERS

- <https://www.redding.com/story/news/2019/03/14/flying-embers-driving-carr-fire-made-dozers-ineffective-group-says/3169424002/>
- Gecker, J. & Rodriguez, O. (2018, August 17). Record-breaking fire tornado killed California firefighter. Fox News. Retrieved from <https://www.foxnews.com/us/record-breaking-fire-tornado-killed-california-firefighter>.
- Kasler, D., & Reese, P. (2019, April 15). Why parts of California burn—and others don't. *Sacramento Bee*. Retrieved from <https://www.mercurynews.com/2019/04/14/why-parts-of-california-burn-and-others-dont/>
- Kreider, C. (2018, August 22). Firefighters recall worst moments of the Carr fire. *KRCR News*. Retrieved from <https://krcrtv.com/weather/wildfires/firefighters-recall-worst-moments-of-the-carr-fire>.
- Kreider, C. (2019, January 23). Six months after the Carr Fire hit, stories of heroism continue to be told. *KRCR News*. Retrieved from <https://krcrtv.com/news/shasta-county/6-months-after-the-carr-fire-hit-redding-stories-of-heroism-continue-to-unveil>.
- Phillips, C. (2018). The Toll: Wildland firefighters share stories from the job. *Independent Lens. PBS.org*. Retrieved from: <http://www.pbs.org/independentlens/blog/the-toll-wildland-firefighters-share-stories-from-the-job/>
- Planning Committee on Workforce Resiliency Programs; Board on Health Sciences Policy; Institute of Medicine. Building a resilient workforce: Opportunities for the department of homeland security: Workshop Summary. Washington DC. (2012 Apr 9. 5). *National Academies Press* (US); Resilience Programs and Interventions. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK201566/>