

"UNITING OUR GLOBAL WILDFIRE COMMUNITY"  
FEBRUARY 2019 - VOLUME 28.1

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– *Motivated by our work, working the furlough*



An official publication of the **International Association of Wildland Fire**



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*Burn out operations in Arizona (cover) and prescribed burns (above) play a key role in building fire resilience, the theme of this issue of Wildfire.*

*Cover: Northside burnout, Pinal Fire (Arizona). Article - pg 14. Photo by Mary Lata.*

*Above: Prescribed burn training in Florida, photo by Danny Fairchild. More on pg 32.*

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# WE'RE MOTIVATED BY OUR WORK

**Are we supported in the work we do?  
A response to the US federal government shutdown.**



*By Alen Slijepcevic*

By the time this article is published, the federal shutdown in the USA will have been resolved – and we hope the issues are well and truly resolved and this sort of shutdown won't recur. In its aftermath, I would like to acknowledge the period of uncertainty and stress that it caused to the US fire

community. Although many of our members are not directly affected, we are a community — US federal fire employees and projects are integrally connected with efforts by state, county, and local fire managers. The science that was slowed down, and the contract work, have global implications.

For a long time, wildfire management has been something we do (and do well) in part because it is based in a physical process, and people involved in wildland fire management are professional in what they do and how they approach their work.

The IAWF has issued the following statement regarding the shutdown:

“The IAWF mission is to promote a better understanding of wildland fire in the belief that an understanding of this dynamic natural force is vital

for natural resource management, for firefighter safety, and for harmonious interaction between people and their environment. Our Association supports all the vital work that the federal government of the United States is responsible for consistent with our mission, and we hope that the government remains open for the good of all.”

The impact on the wildland fire community is of great

concern to us. We acknowledge these following impacts on the US fire community, knowing that there are likely more:

- Delays in firefighter hiring as this is the time of year when federal agencies are in the process of hiring seasonal firefighters and other workers.
- Lack of preparedness work as federal employees are not attending essential pre-fire season meetings
- Constraints on professional development because of federal employees not being able to attend conferences, workshops and similar events.
- Consequences for succession planning due to people being unable to attend training courses in order to progress to higher level fire management positions, defined in the National Interagency Incident Management System (NIIMS). We are aware of issues with the succession planning without having these extra complications added to it.
- Impacts on fuel mitigation projects, including planned

prescribed burns that have been postponed, and which are essential to diminishing the threat of such fires.

As an international association we would like to reiterate that fire management is a long-term business and any short-term decisions can negatively impact our capability and capacity in the long term. Any

decisions to freeze hiring, prevent fuel mitigation, inhibit preparedness work and defer professional development (including training, fuel mitigations and research work) will have far-reaching consequences.

Hiring freezes, even for a period of a month or less, have adverse effects with succession planning; this impact is felt decades later when people are required to

“We are motivated by the challenges of our work and this motivation marks our profession’s unique service and leadership role. But such motivation asks that our work be valued.”



step into middle and high-level organizational positions.

As our business is already under considerable pressure due to main drivers such as climate change, stronger media presence and government and community scrutiny, these short-term government decisions impact heavily on people's motivation and passion for the fire management. Our people are highly skilled in risk management, leadership and working under considerable pressure; their skills are very transferable to other industries and as such they are highly sought after. The role of government is to instill confidence in its workforce, which is repaid by above-normal commitment to the job with a high degree of passion. Because of the nature of the jobs we do, many in the fire community make sacrifices when it comes to work-life balance.

In the end, an overwhelming majority of people in the wildland fire business are not motivated by money, but by the passion and love for the work they do. However, every person has a limit when it comes to job certainty and security. We are motivated by the challenges of our work and this motivation marks our profession's unique service and leadership role. But such motivation asks that our work be valued. While we know our work is respected, it's a challenge to believe this when the good work we do is not supported, or (in the case of the US federal government) is actually shut down. There's essential work we need to do, regardless of the agency or country we live and work in. And it's time to ask everyone – we as professional colleagues, as well as those we serve – to support our work so we can focus on the fire challenges we face in the days and years ahead.

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## BUILDING FIRE RESILIENCE

### One method: helping our neighbors

Resilience has been on our minds, and that's not new. In 2011, then IAWF president Chuck Bushey focused his President's Desk column on "Resiliency and Recovery," reminding us that ...

*... we need to continue to improve upon our regional and international safety net of disaster assistance, including wildland fire, while realizing that priorities will need to be established in allocating assistance. It is a matter of planning, implementation and helping our neighbors when they become overwhelmed.*

His words resonate, and this issue focuses where he was leading us. Around the world, our writers help us see resilience being built on the ground.

- In Arizona, we learn of a planning process that identifies fire control blocks in advance, so that communities can agree on priorities before the fire burns.
- In California, we visit Modoc County (north of where the Camp Fire burned) to see a community working to

unite around their fire and forest planning.

- In New South Wales, we learn how post-fire research helps us improve our emergency response messages.
- In the coastal plains of southeast US, we study how to expand our burning, to support our natural and human communities, and witness training crews who burn even when the US government shuts down.
- In our continuing coverage of Diversity in Fire, we learn to build resilience, in ourselves and our profession, by relying on and merging our masculine and feminine firefighting frames.

Elsewhere, our writers and photographers, including current IAWF president Alen Slijepcevic and Leadership columnist Mike DeGrosky, reflect on ways to lead toward resilience in our profession, even when our work is shut down or we're otherwise challenged by leadership hurdles.

Eight years later, join us as we carry forward Chuck's focus on a core principle of resilience: "Helping our neighbors."



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# Leading Through Events Beyond Our Control

**Leadership in a situation beyond our control — like an extended government shutdown — can prove particularly challenging when, barred from work, it's tough to even know how people are doing and what they may need. So what's a leader to do?**

As I write, here in the U.S. we are in the fifth week of a partial shutdown of our federal government, putting approximately 800,000 government employees out of work and turning the important winter work that fuels our fire management system on its head. Here in the Northern Rockies, the shutdown is disrupting critical training; important coordination meetings; projects on the ground; and, most importantly, the lives of employees who do not deserve to be used as political pawns.

And while there's news the shutdown has just temporarily lifted (as of January 25), the threat remains of future shutdowns.

Our interagency training center is housed in a U.S. Forest Service facility, managed by a Forest Service employee, and staffed by course coordinators who work for federal agencies. Many instructors who serve on cadres and the majority of course participants at our training center come from five federal agencies. Consequently, with facilities, cadre, and participants unavailable due to the shutdown, we are canceling critical training sessions that will prove extremely difficult to re-schedule; including those that prepare our personnel to step into command and general staff roles on our incident management teams; the teams that manage our most

complex incidents; and the teams that already face severe recruitment, retention, and succession problems. As the shutdown drags on, it will disrupt training, like annual safety refreshers, affecting our readiness for the coming fire year.

Due to the shutdown, we are forced to cancel coordination meetings, symposia and conferences that power the interagency system on which we have come to depend. We continue to hear reports of important hazardous fuels reduction projects, projects that protect communities and restore forest health, going dormant.

Most importantly, the shutdown is disrupting lives as federal personnel are either barred from doing their jobs or are working without compensation -- something that, honestly, I cannot understand the legality of. Doing what I do, many of my friends and acquaintances work for federal natural resource agencies, both in and out of fire. Having missed multiple paychecks, I have friends who have talked of dipping heavily into their savings in order to pay the bills; and most of my friends are mid-career or beyond, with higher level jobs and salaries. I think every day about all the early career, administrative support, and operational people I know, people who likely do not have the financial reserves of some of my closer friends. How will they fare if they miss a third or fourth paycheck?

“People always value interaction and communication with their leaders, and this proves particularly true in troubled times.”



I have been around for other government shutdowns, but never before, have I heard so many seasoned federal employees say they are seeking employment elsewhere. Unsurprisingly, I encounter federal employees who are emotionally and psychologically struggling with, not only the immediate personal financial impacts of the shutdown, but their forced inability to carry out their mission and serve both their citizens and the people they lead.

## Leadership when we're shut down ...

Leading well in this situation can look daunting, particularly when the shutdown seems so simultaneously cynical, ineffective, and largely pointless. Leadership in a situation like this can prove particularly challenging when, barred from work, it's tough to even know how people are doing and what they may need. But these sorts of situations don't just occur during shutdowns. Think of those busy fire seasons when no one's in their offices or duty stations for weeks. So, what's a leader to do? For my brothers and sisters wildland fire organizations, I have five suggestions.

1. Reach out. Get in touch. Pick up the phone. Ask people how they are doing. Let them know you miss seeing them every day. Get together for coffee. Maintain the social fabric that work and co-workers provide for people.
2. Build and maintain trust. By focusing on the importance of understanding and supporting one another, showing compassion and support, and communicating, leaders demonstrate character and build trust. Study after study has shown that trust may represent the single biggest predictor of both effective leadership and employee satisfaction. We know that people find it much easier to trust a leader who treats them individually, shows them compassion, and takes an interest in them as a person.
3. Understand people's state of mind, show compassion, and support them. Uncertain times are emotional times; so remember that leadership is personal. Effective leaders make effort to understand the needs of their employees and how employees view their work, the connection between their work and their lives, their tolerance for the circumstances, and the stress they are under. People always value interaction and communication with their leaders, and this proves particularly true in troubled times. People want to know that their leaders remain committed, care about the people in the organization, value their employees, and will make sincere efforts to both build and maintain meaningful relationships with those they lead.

4. Remain keenly aware of your emotional and social impact. I have observed that most people in assigned leadership roles really underestimate the influence they have on other people. When you are the Crew Boss, Chief, Program Manager, or Fire Management Officer, people watch your every move and take their cues from you. Effective leaders maintain an intense awareness of themselves and how people interpret their behavior. Effective leaders must remember that the shutdown affects each person differently; it's an individual and personal experience. One employee may use the shutdown as an opportunity to take a vacation break while another may struggle to feed the kids. However, while it may seem odd, even the guy who just spent 30 days on the ski hill may be struggling. Create a climate in which people can see how they can adapt, show their resilience, support one another and see the path forward.

5. Remind people of their available resources. Financial hardship, stress at home, separation from friends, loss of social network; these are all things that weigh on people emotionally and psychologically. If an employee is struggling, encourage them to reach out to mental health services when they are in trouble. Encourage employees and colleagues to take advantage of the agency's employee assistance program if needed.

## ... And when we return

Focus people when they get back to work. The shutdown lies outside the influence of nearly every Wildfire reader. When people return to work, do not spend your attention or energy or allow your people to spend their attention and energy on factors beyond your or their control. Doing so wastes time, distracts people from what is important, and drags morale down. Whether you are responsible for two people or 2,000, focus on the part of organization for which you have stewardship. As you get back to work, get people together and revisit your mission, vision, core values, and priorities and refocus them. Concentrate on the mission-critical. It is in times like these when those elements of a solid strategy prove invaluable as guideposts.

**Mike DeGrosky** is Chief of the Fire and Aviation Management Bureau for the Montana Department of Natural Resources and Conservation, Division of Forestry.

He taught for the Department of Leadership Studies at Fort Hays State University for 10 years. Follow Mike on Twitter @guidegroup or via LinkedIn.



## IAWF welcomes four new Board Members in 2019



**Sara McAllister**  
Missoula Fire Sciences  
Laboratory, Rocky Mountain  
Research Station, USDA  
Forest Service, Missoula MT.

Dr. McAllister has been a Research Mechanical Engineer with the U.S. Forest Service at the Missoula Fire Sciences Laboratory in Missoula, Montana since 2009.

As part of the National Fire Decision Support Center, her research focuses on the underlying physics that governs wildland fire spread. Specifically, her research includes understanding the critical conditions for solid fuel ignition, flammability of live forest fuels, ignition due to convective heating, and fuel bed property effects on burning rate. She has authored a textbook on combustion fundamentals and over 70 peer-reviewed publications and conference papers. In addition to IAWF, she is an active member of the International Association of Fire Safety Science (IAFSS) and the Combustion Institute. Dr. McAllister earned her Ph.D. and M.S. in mechanical engineering at the University of California, Berkeley and her B.S. in mechanical engineering from the University of Nevada, Reno.



**Kelly Martin, Chief of Fire and Aviation, Yosemite National Park, National Park Service, Pacific West Region, Yosemite California.**

Kelly graduated from Northland College, Ashland WI with a bachelor's degree in Outdoor Education in 1986 and completing Technical Fire

Management in 1996. Kelly began her federal career as a GS-3 with the Apostle Island National Lakeshore in 1984 while attending college and has worked her way up through the wildland fire ranks for the last 34 years. Her federal wildland fire career spans the National Park Service and the US Forest Service working in 6 different states. She has worked on helicopter modules as an assistant foreman and manager; Redding Hotshot crew in 1991; fuels and prescribed fire crews as a Type 1 Complex Burn Boss, Fire Behavior Analyst on Type 1 and Type 2 teams since 2006; Operations Section Chief and Operations Branch Director since 2014; and held several career

leadership positions as a Fire Management Officer (Moab, UT; Carson City, NV; Placerville, CA; Yosemite, CA) on complex fire units since 1996. Kelly is the past chair of two National Wildfire Coordinating Group (NWCG) programs: Fire Environment Committee (FENC) and the National Fire Management Leadership (M-582) course.

Kelly Martin maintains a highly diverse skill set as a field practitioner in prescribed fire and wildfire management focusing on increasing the wise use of applied fire on large fire adapted ecosystems for forest health and resiliency especially due to drought, tree mortality and climate change. Kelly is also a strong advocate for diversity, inclusion and gender parity throughout the Wildland Fire Community. Her most recent efforts include providing leadership for the Women in Fire Training Exchange (WTREX) since 2016; a highly successful grass roots program aimed at promoting practical wildland fire skills and networking opportunities for both women and men.



**Dr. Cathelijne Stoof,**  
Assistant Professor, Soil  
Geography and Landscape  
Group and Coordinator  
Wageningen Fire Centre,  
Wageningen University,  
The Netherlands

Dr. Cathelijne Stoof studies the effect of human-caused and natural disturbances on soil and water resources.

She teaches about landscape and soil formation and related impacts on land use potential. In her fire research, Cathelijne combines study of fire impacts with assessment of fire risk, with an increasing focus on temperate regions like Northwest Europe.

Currently an assistant professor at Wageningen University in the Netherlands, she was previously at the Soil and Water Lab of Cornell University (USA) and worked in The Netherlands, Portugal and Australia for her PhD on fire effects on soil and hydrology. Her current research focuses on the role of plants in controlling fire impact on soil and water by affecting soil heating and ash. Cathelijne frequently communicates fire science to the general public and recently founded the Wageningen Fire Centre to promote integrated fire science collaboration between researchers and stakeholders on wildland fire challenges in The Netherlands and elsewhere.





**Johnny Stowe, Heritage Preserve Manager, South Carolina Prescribed Fire Council, Columbia, South Carolina**

Johnny Stowe is a forester and wildlife biologist who has managed heritage preserves with prescribed fire for the South Carolina Department of Natural Resources for 23 years. He represents the department on wildland fire management, policy, education and outreach issues, and he helped form the South Carolina Prescribed Fire Council. Johnny lit his first fires 50 years ago on the family farm he still burns today. His passions and energy center on the cultural and natural heritage of prescribed fire and its connection to human ecology, on putting good-fire on-the-ground to restore and maintain the integrity of imperiled ecosystems, and on engaging and mentoring the next generation of wildland fire leaders and managers.

### Thanks to outgoing Board Members for their dedicated service



**Kathy Clay, Fire Marshal, Battalion Chief, Jackson Hole Fire, Wyoming, USA**

**Paulo Fernandes,**  
University of Trás-os-Montes and Alto Douro (UTAD), Dept. of Forest and Landscape, Vila Real, Portugal



**Naian Liu,**  
Professor, Fire Safety Engineering, State Key Laboratory of Fire Science (SKLFS), University of Science and Technology of China

**Guillermo Rein,**  
Senior Lecturer, Imperial College London, UK



### IAWF Awards

At the 15th International Wildland Fire Safety Summit & 5th Human Dimensions of Wildland Fire Conference in Asheville, December 10-14, 2018, we honored two recipients of IAWF Awards.

### IAWF Early Career in Fire Operations Award

The IAWF Early Career in Fire Operations Award recognizes a promising early-career professional who has demonstrated outstanding ability in any field of wildland fire operations. Early career is nominally taken to include professionals who are under 40 years of age when nominated. We are pleased to announce the 2018 Early Career in Fire Operations to **Forest Schafer**. Mr. Schafer is the Forest Science Management Coordinator for the California Tahoe Conservancy and also serves as the Incident Commander of the Tahoe Fire and Fuels Team,

The individual who nominated shared that "Forest is known as the Swiss Army knife of the local fire service in the Lake Tahoe region, possessing a very diverse and effective skill set. In my 28 years of working on Nevada's wildland-urban interface (WUI) issues, he is the most impressive young fire professional I've encountered."



Forest's professional accomplishments include:

- Elected by his peers and currently serving as Incident Commander of the Tahoe Fire and Fuels Team, an organization which coordinates fuel reduction, fire prevention and community engagement for 18 local, state and federal entities in the Lake Tahoe Basin
- Appointed Project Manager and Lead Editor of the Lake Tahoe Basin Community Wildfire Protection Plan. The scale of this project was immense involving the coordination of seven fire protection districts, Nevada Division of Forestry, CAL FIRE, US Forest Service and other entities.
- Appointed and serving as Chair of the Nevada Wildland Fire Cohesive Strategy - Fire Adapted Community Sub-committee and authored the group's goals and objectives document.
- Manages financial and programmatic elements of federal and non-federal grants from multiple sources.

- Fulfills a critical role as a Certified Archaeological Surveyor (i.e., necessary for environmental clearances for certain fuel treatment projects).
- Conducts fuel treatment project environmental analysis and obtains all permits required for implementation.
- Serves as GIS Specialist for the Sierra Front Type 3 Incident Management Team.
- Appointed Network Leader for the Tahoe hub of the national Fire Adapted Communities Learning Network.
- Spearheaded procurement of \$30 million for “Projects to Reduce Wildfires in the Reno/Tahoe Area” via funding from the Southern Nevada Public Lands Management Act for 2017 through 2021.
- Coordinated GIS data collection for project accomplishments for the Lake Tahoe Multi-Jurisdictional Fuel Reduction and Wildfire Prevention Strategy.
- Participated in the development of the 2013 Northern Nevada amendments to the International Wildland-Urban Interface Code.
- Managed data collection, conducted analyses, and compiled maps and reports for the fire district’s ISO Public Protection Classification review.

Elwood Miller, Ph. D. and Coordinator of the Nevada Network of Fire Adapted Communities, described Forest’s worthiness to receive the Early Career for Fire Operations Award by stating, “In my fifty plus years as a forester, educator and administrator I have encountered many individuals that self-identify as a professional. These people divide into three groups; those that set the bar low and perform accordingly, those that set the bar high and deserve the respect accorded to professional performance, and finally those rare individuals who excel and establish a standard of excellence that defines the true meaning of the word professional. Forest Schafer is a member of the third group in every aspect of his service and extraordinarily productive career. The respect any award garners is directly related to the caliber of the recipients who receive it. Presenting this award to Forest Schafer would not only maintain but elevate the standard by which this honor is evaluated.”

## **IAWF Wildland Fire Safety Award**

The International Association of Wildland Fire (IAWF) inaugurated the IAWF Wildland Fire Safety Award at the Association’s first Wildland Fire Safety Summit held in 1997 in Rossland, British Columbia, Canada. The award has been bestowed on twelve other individuals since that time.

The IAWF Wildland Fire Safety Award is presented to a deserving individual within the international wildland fire community who has made a significant contribution to wildland firefighter safety, either directly on the fireline; or indirectly through management,

cultural changes, or through wildland fire research. Their contribution is frequently beyond their normal everyday job expectations -- sometimes at the potential risk to their own career, and their example can encourage others to act in a similar manner.

Selection of the recipient is based on nominations reviewed by a committee comprised of previous award recipients and typically but not always a member of the IAWF Board of Directors.

A number of individuals were again nominated this year for the IAWF Wildland Fire Safety Award. The final selection is always a difficult one, as all the nominees are very well deserving of the award.

It is our pleasure to announce the recipient of the 2018 IAWF Wildland Fire Safety Award is Mr. Kelly Close, Battalion Chief with the Poudre Fire Authority based out of Fort Collins, Colorado.

Mr. Close has worked as a firefighter for more 20 years now. During this time, he has been employed by a local government fire department in the western US that is charged with both structural and wildland fire protection responsibilities. However, his primary influence on improving wildland firefighter safety has come about as having been a fire behavior analyst or FBAN since 1999.



Among some of the most significant accomplishments of this year’s recipient of the IAWF Wildland Fire Safety Award has been:

- Serving as a serious accident investigation team member.
- Working tirelessly via various information transfer and training mediums to ensure that the lessons learned from a major fatality fire would not be lost.
- Acting as an expert witness on contentious litigation cases in the US and Australia.
- Contributions to fire behavior education and knowledge transfer as an instructor and committee member.

Kelly has demonstrated an unparalleled passion for wildland firefighter safety so as prevent fire tragedies in the future. His presentations and writings have bridged both fire behavior and human behavior in the context of decision-making in rapidly deteriorating environments.



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# ENGAGING THE FIRE BEFORE IT STARTS:

## A CASE STUDY FROM THE 2017 PINAL FIRE (ARIZONA)

by Christopher D. O'Connor and David E. Calkin

**"The work done by the RMRS Wildfire Risk Management Science Team developing the Potential Wildfire Operational Delineations — coupled with the reinforced message and alignment from the Regional Forester, forest leadership, line officers, and local fire managers — gave us the support and tools needed to conduct successful pre-season meetings with our cooperators and stake holders. This was a huge factor in the implementation of the plan as well as alignment with our National Strategic and Forest Plan while managing the Pinal Fire."**

— Andrew Mandell, Incident Commander  
Central West Zone Type 3 Incident Management Team.

On the afternoon of May 8, 2017, lightning struck a single snag just off of forest road 651, along the main ridge of the Pinal Mountains of southern Arizona, USA. Four weeks later the smoke had cleared and the city of Globe had a 7,500 acre fuel treatment, including 6,600 acres of restored pine forest and woodland, and 700 acres of chaparral brush that was already re-sprouting and wouldn't pose a serious fire threat again for decades.

How did the forest and community get to the point where they were willing to take on managing a fire of this size and duration for resource benefit and hazard reduction? Science has recognized for decades that many forested ecosystems of the American West are shifting away from historically fire-adapted conditions. Beginning in the 1970's a small handful of managers recognized this issue and developed wildland fire use concepts. However, in the current era of increasing encroachment of human development, climate change, and accumulated fuels, uncertain outcomes have emphasized the default response of aggressive suppression.

What if, instead of waiting for a start to formulate a response strategy, land managers had a formal process for developing a range of wildfire response options for an entire landscape prior to the fire season? Response options could be discussed openly between agency administrators, fire staff and resource specialists, and negotiated with





Planning for control opportunities prior to the fire ignition may help to return fire to the landscape. From this initial case study, fire managers in the US Southwest and beyond are adding a process that can return fire to the landscape and build fire resilience.

partners to create a shared understanding of wildfire hazards and benefits and realistic expectations for wildfire response. Tactics for meeting response strategies would be left to the Incident Management Teams to carry out the work, but the strategies themselves would be determined locally and with long-term land management in mind.

For the past three years a group of researchers from the USFS Rocky Mountain Research Station, Oregon State University, and Colorado State University have been collaborating with land managers from the national forest system and their partners to test out a framework that brings together quantitative wildfire risk assessment, fire responder exposure, and operational fire response opportunities to develop risk-based strategic wildfire response zones. These zones summarize information about values at risk and potential fire behavior and spread to allow fire responders to keep all options on the table, managing fire for resource benefit when and where appropriate, and identifying the safest and most effective suppression opportunities when necessary. This risk-based spatial fire planning framework

was first applied to incident response during the summer of 2017 on the Pinal Fire, located on the Globe Ranger District of the Tonto National Forest.

Two years previous, the Simpson fire on the next ridge over had been managed with full suppression and was out in four days, but that was during peak fire season when fuels were cured, winds were active, and resources were stretched by major fires in California and Alaska.

Starts were frequent here, but it had been more than 50 years since the last large fire on this part of the Pinals; and the pine forest had accumulated significant downed fuels and understory infilling. The community of Globe at the base of the Pinal watershed had voiced concerns about the changing forest above them, but the only fires they had been willing to tolerate were a few prescribed burns to clear fuels around cabins and communications towers. It was only a matter of time before a lightning start or a careless match during the pre-monsoon dry season would start a fire mid-slope that would crown and burn off the top of the mountain, including those cabins, TV towers, and some of the only living specimens of bristlecone pine, redwood, and sequoia in the state. A fire like that would

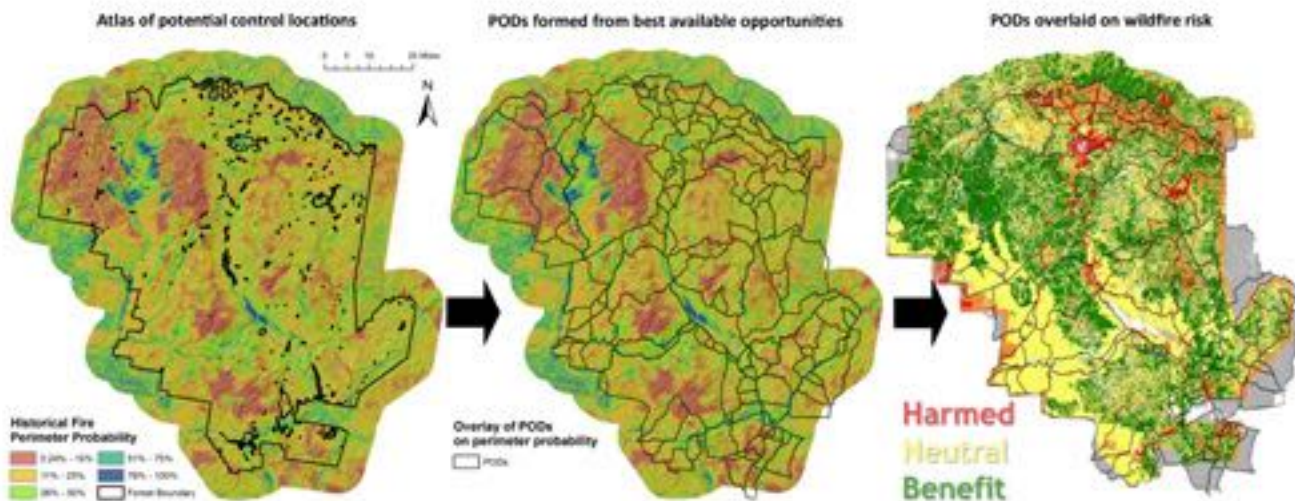
cause catastrophic post-fire flooding for the town below and alter the landscape for generations. The District and community knew something had to change, but perceived risk from past fires precluded managing fire to reduce future risk and improve ecological condition.

A year earlier, the local Central West Zone Type 3 Incident Management Team had worked with the district to the north of Globe to successfully manage the 30,000 acre Juniper Fire to reduce fuel loads and mitigate both flood and fire risk to a youth camp and several private inholdings. For that effort, fire staff from the local team had scouted potential control features over the winter and pre-gamed how a fire on that landscape could be successfully managed. They had gotten lucky with an early June lightning start and the plan had been executed without a hitch, even as ERCs rose to the 97th percentile. The difference on that fire had been significant pre-season planning and no nearby communities at risk. The stakes had been relatively low on the Juniper so uncertainty about fire weather and resource availability had been acceptable. But on the Tonto there were plenty of other places where managed fire was desirable but perceived risks were too high.

### **A new model for pre-planning fire control locations**

About the time of the successful management of the Juniper Fire, researchers from the RMRS Wildfire Risk Management Science Team were developing a model of potential wildfire control locations that was based on conditions where fires had stopped or continued burning in the past. The goal was to leverage data to pre-identify the best available control features for use in fire management operations, much as the local fire staff on the Tonto had pre-identified control features for the Juniper Fire. These control features could then be linked together into a series of fire containers or “Potential Wildfire Operational Delineations”, aka PODs, effectively breaking up the potential for fire spread into a series of manageable chunks.

Another piece of the puzzle that came together at this time was the completion of the Quantitative Spatial Wildfire Risk Assessment (QRA) for all Forest Service Lands in Arizona and New Mexico. The Regional QRA summarizes and maps out wildfire risk (including both positive and negative fire outcomes) for 11 primary classes of natural resources and human assets. While the Team and partners had originally conceived of the assessment as a landscape planning tool, overlaying a map of wildfire risk with opportunities to engage fire was exactly the framework needed to bring strategic wildfire risk into operational incident response.



Examples of the atlas of potential control locations summarized into PODs and overlaid on the results of the forest-scale quantitative wildfire risk assessment. (QRA) product shown here is the conditional net value change in response to wildfire exposure. QRA analysis courtesy of Jessica Haas and Tessa Nicolet.

Over the winter of 2017, Team members met with Forest staff to vet and improve the forest-scale atlas of potential control locations and to downscale risk assessment results to the Forest level, incorporating input from local hydrologists, wildlife specialists, fire staff, and line officers. Through a series of workshops, the mapped atlas of all potential control locations was paired down to a network of 138 PODs bordered by the best available control features on the Forest and near its boundaries. The exercise highlighted the fact that Forest boundaries are often not defensible locations, and that PODs often need to extend onto surrounding ownerships.

The Forest then used this POD network to summarize the results of the QRA into actionable strategic wildfire response zones. While this concept has some similarities to the old “fire management units” designations, strategic response zone boundaries are defined by suppression opportunities instead of land management designations. Each POD can be assigned a strategic response that reflects the relative risk within its boundaries:

- PODs with a net negative projected outcome from fire are classified with an initial response of “protect”;
- PODs with a net positive outcome from fire exposure are classified with an initial response of “maintain”;
- and PODs with condition-dependent outcomes are classified with an initial response of “restore,” where managed fire under the right conditions could eventually convert the POD into the “maintain” class.

On the Tonto, two other strategic responses were developed for PODs representing unique risk profiles:

- PODs where invasive grasses are converting

fire-resistant Sonoran Desert into fire-prone savannah are classified as “exclude”;

- and PODs dominated by naturally fire-adapted ecosystems interspersed with sensitive infrastructure are classified as “high-complexity.” In this last class of PODs, direct engagement with private land owners and targeted fuel treatments could be used to develop new control opportunities, allowing larger PODs to be partitioned to separate resources likely to benefit from fire from assets likely to be damaged by it.

### The Pinal Fire – prepared to learn and benefit from a lightning start

In the spring of 2017, several factors aligned to facilitate the decision to manage the Pinal Fire for resource benefit and risk reduction. Completion of the strategic wildfire response zones map provided the tools necessary for the District FMO to approach the county commissioners, city council, and mayor of Globe to discuss managing a wildfire in the Pinal Mountains with a strategy other than full suppression. On the Forest, a fire simulation exercise focused on the top of the Pinals allowed local staff to hone their fire management objectives and to formulate a tactical response prior to the actual fire season. Results from the simulation and the map of strategic response zones and control opportunities swayed landscape partners, setting the stage for the opportunity the Forest had been waiting for.

On May 12, four days after the initial lightning strike, the same local Zone team that had successfully managed the Juniper Fire was assigned to the Pinal, taking over when the fire was 13 acres.



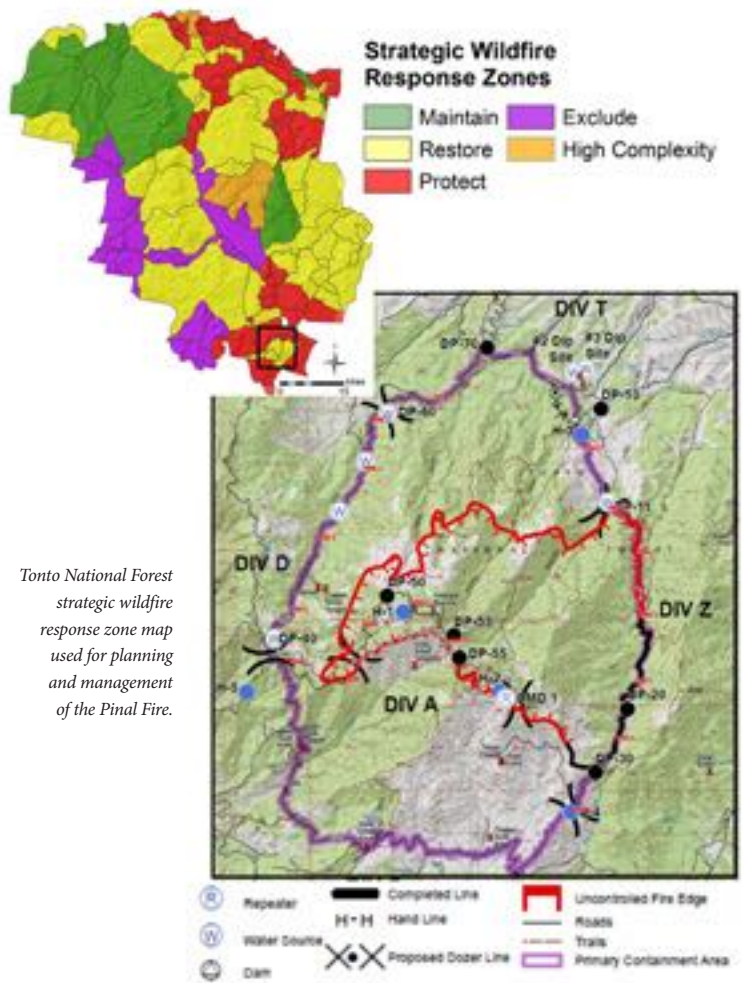
Similar to the Juniper, the strategy was to use backing surface fire to consume abundant downed woody fuels, reduce the number of seedlings and samplings, remove fuel jackpots, and restore fire resilience to the ecosystem. With a clear strategy and well-defined control features, it was up to the operations group to determine tactics necessary to meet strategic objectives. To monitor progress toward the strategic goal of fuel reduction, the Incident Commander brought in a fire ecologist to install and measure fuels transects ahead of burn operations.

But the realities of fire management are never simple. The terrain of the Pinals is steep and treacherous, road access is limited, and within the transition zone from pine forest to chaparral shrubland, decades of accumulated needle drape made fire behavior unpredictable. For the first two weeks of the fire, the incident management team used a combination of aerial ignitions and drip torches to shore up backing stringers and minimize uphill runs and torching through twisting canyons and valleys.

Shrub fuels still had high live moisture and were serving as a backstop to fire progression, though in some areas even the chaparral was underburning. Up top the burn was patchy, leaving some of the heavier fuels only scorched. Overall the fire was meeting restoration objectives but frankly, the fire could have burned a little hotter and torched a little more to open up the dense overstory.

The situation changed on May 24th (day 16). Daytime temperatures jumped 20 degrees, humidity dropped to single digits, the Haines index went to six (on a scale of six), and ridgetop winds surpassed 20 mph. Live fuel moistures plummeted more than 20%; the shrub backstop was gone. By this time the majority of pine forest was already safely in the black, but the chaparral was sending up 50-foot flames, making uphill runs and starting to spot.

Anticipating the change in conditions, a regional Type 1 Team was transitioned in to ensure the planned control lines held. The new team used air support to counter uphill runs in chaparral and a series of back burns to cut off any threat to the private inholdings in the canyon bottom. Within a week the fire had moderated and was returned to local control. In the aftermath, the only patches of high severity had been in the chaparral shrubs, and patch sizes were small enough that BAER Team



*Managing fire behavior with night burning. PHOTO: C.D. O'Connor.*

rehab took care of any runoff concerns.

From the Forest's perspective, the resulting risk reduction and ecological improvements reversed a 40-year trend of divergence from intended land management direction. While conditions were dynamic on the Pinal fire and will always be variable from day to day during an incident, the combination of pre-planning, strategic assessment, and tactical prowess allowed land managers to make the right decision and end up with a desirable outcome.

Strategic response zones used during this incident and several others over the 2017 and 2018 fire seasons are guidelines for initial response developed locally. Language defining these zones emphasizes land management direction and leader's intent while keeping all options on the table. The risk-based spatial fire planning process used on the Tonto enabled integration of fire operations into land and resource planning by combining local expertise with analytics and fire science.



*Fire effects – underburning leaves the canopy unburnt.*

PHOTO: C.D. O'Connor.



*Re-sprouting after the fire.*

PHOTO: Mary Lata, Tonto National Forest.



*The fire transitions and the chaparral begins to burn.*

PHOTO: Mary Lata, Tonto National Forest.

Understanding wildfire risks in advance and communicating these to landscape partners allowed the Tonto to move a step closer to fire adapted landscapes and communities by engaging many of the political, social, ecological and operational complexities of the Pinal Fire before it even started.

### Expanding the pilot to the region, and beyond

With the support of regional leadership, the initial effort on the Tonto has expanded to include all national forest lands in Arizona and New Mexico as well as a series of pilot forests throughout the West. Fire managers on the Tonto continue to find new and innovative ways to leverage these tools to develop large-scale prescribed fire plans, track progress toward desired landscape conditions, and develop or strengthen existing shared fire agreements.

Actions like these are helping to leverage the knowledge of land managers to re-integrate fire while protecting public and private stakeholders. Through proactive pre-season planning and engagement, partners in this effort are helping to leverage safe and effective wildfire response to support resilient landscapes and promote fire-adapted communities.

## ABOUT THE AUTHORS

**Christopher (Kit) O'Connor** is an ecologist with the Wildfire Risk Management Science Team at the US Forest Service Rocky Mountain Research Station. He is development and applications lead on a series of spatial fire planning products that bring together place-based wildfire risk (benefits and hazards from fire), modeled fire engagement opportunities, and suppression difficulty for wildfire responders.

**Dave Calkin** is a supervisory research forester with the Rocky Mountain Research Station in Missoula. Dave's research incorporates economics, risk management, and decision sciences to explore ways to evaluate and improve the efficiency and effectiveness of wildfire management.





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## MODOC COUNTY UNITES TO FIND SOLUTIONS FOR RESOURCE MANAGEMENT

*By Heather Hadwick*

Recent wildfires in the northern California county of Modoc inspired a Resources Tour through the Stone and Cove Fires in November 2018. The Modoc County Sheriff's Office and Office of Emergency Services organized the event, inviting agencies and organizations that play key roles in natural resource management in the area. The gathering provided a venue for sharing knowledge about planning, practices and limitations. "It was really a day to teach each other and get information first hand to share with the public," said Tex Dowdy, then Sheriff-Elect and now Sheriff of Modoc County. "We're trying to get all the players to the table so that we can all work together to improve our public lands. In the end, we all have the same goal and that is to serve our county the best we can."

In 2018, more than 1.6 million acres burned in over seven thousand individual fires in California on state, private and federal land. Modoc County accounted for just under 42,000 acres burned. The last two fire seasons in California have produced eight of the top 20 most destructive wildfires in state history, with losses eclipsing previous records. The economic impact of wildfires in the state is astronomical and growing. In 2018 alone, California spent nearly \$3 billion on fires, including nearly \$1.4 billion in fire suppression costs. "We have so many examples of devastation in the aftermath of these fires" said Modoc County Sheriff Mike Poindexter. "I'd like to see a more concentrated effort and more of our precious dollars spent on prevention. Fire is inevitable but a properly managed forest has a much better chance to survive and thrive. We can change things by working together to remove restrictive barriers so that those with the job of managing can actually be proactive rather than reactive."

The tour began within the boundaries of the Stone Fire which had burned in September. North of the Cottonwood

Flats Campground the difference between treated and untreated forest was clear. A distinct line separated the healthy burn created by fuels treatment, and the untreated area blackened by flames. In the treated area grasses had already started to grow back, and the trees, although







## A NATURAL RESOURCES TOUR ...

*Example of fire behavior in treated forest on the left and untreated on the right.*

scorched by fire, held branches of healthy green needles. Kenneth Heald, Fuels Specialist from the Modoc National Forest spoke about the impact of reducing fuels in the forest. He noted that in the treated area, wildlife had returned to forage and trees were recovering just two

months after the fire. He pointed out that the untreated, severely burned areas could take up to 80 years to recover. “It won’t just bounce back” he added. “If we’d been able to get in there and remove biomass and give the heat somewhere to escape, we’d have had a healthier burn.”



*Stone Fire High Intensity Burn Zone which had not been treated prior to the fire.*

### **Wildfire, Wildlife, and Ranching in Modoc County**

Wildlife and livestock live side by side in Modoc and both are equally important to residents and visitors alike. The vast open range and countless outdoor recreational opportunities are what bring people to Modoc, a place that’s truly emblematic of its slogan: “Where the West Still Lives.” It has the largest expanse of permitted grazing land in California within 1.7 million acres of National Forest. The group discussed grazing opportunities, needs, and range readiness.

The county is also home to one of the oldest deer herds in the state. The California Deer Association’s Dale McDougall said, “We have migration corridors that are vital to the sustainability of the deer and elk here. The herd historically ran 100,000 plus deer. It’s running only 10% of those numbers today. We can add credibility to our cause by collectively telling the story. Resource management is not just up to one agency or one organization. We all need to be in this together.” Paul Bailey of the Rocky Mountain Elk Foundation added, “We need to ask ourselves if we want to pay for it before or after. The Stone Fire cost seventeen million dollars. But in the end, we just lost 80 years of forest growth. What is the cost of that?”

Bryon Hadwick, District Conservationist with the Natural Resources Conservation Service outlined some of the NRCS resources available for ranchers and private landowners that can help wildlife and livestock alike. These include technical



and financial assistance, erosion control, removal of invasive juniper, range seeding, cross fencing, wildlife/livestock water projects, and pre-commercial thinning through the Environmental Quality Incentives Program and the Emergency Watershed Protection Program. Collectively these actions increase fire resilience by mitigating fire severity, conserving water, and restoring habitat for wildlife including sage-grouse, mule deer and elk.

## Defensible Space for The Win

Although wildfires are inevitable, the destruction of property and lands is not. This was clear during the next stop where the group visited the 2017 Cove Fire and the Bushey Ranch in Canby, where participants were able to clearly see where the private landowner was prepared for wildfire.

The homes and outbuildings were saved because of the defensible space created around the structures. Steve Walker, CAL FIRE Battalion Chief, provided perspective about property protection and CAL FIRE's defensible space inspections. "On the big fire seasons, people are a lot more receptive about our inspections. It's on their mind and in the news. In the years that we don't have fires, landowners don't make fire safety a priority and it gets put on the back burner. "We need to make sure that our county ordinances are being monitored and know who enforces them" he added. "Keeping up with the violations takes a lot of resources and most of our county agencies are already stretched thin."

Noting that CAL FIRE can only inspect structures, Heather Hadwick, Deputy Director of Modoc County OES added, "We want to emphasize the importance of resilient forests as a whole and local community capacity in wildfire preparation and response. The fire events in California have highlighted the consequences of not making resource management a priority in our state. We want to be the county that does."

The final tour stop was also in the Cove Fire between Adin and Canby. The Pit River Resource Conservation District is overseeing the Cove Fire Restoration Project.



*Chester Robertson, Modoc County CAO, Chris Christofferson, USFS Modoc District Ranger, and Modoc County Sheriff-Elect Tex Dowdy discuss the Cove Fire Recovery project near Adin, CA.*

The plan includes removing 10 miles of roadside hazard trees, additional biomass removal, and the planting of 1,400 acres of merchantable timber. But like many postfire restoration efforts, conflicting perspectives among citizens threaten completion of the plan. Some feel that logging this area is taking away from wildlife habitat and would like the project stopped.

Chris Christofferson, District Ranger from the Modoc National Forest, spoke about this challenge. "The problem arises when we aren't able to make restoration efforts after a fire. If dead trees are not removed, they will fall on the ground. This will result in a tremendous amount of fuel loading and subsequent fire risk. It's not just the regrowth though. Think of our water systems, the soil erosion and the downstream users. I'm thankful for meetings like this to educate each other. We need to figure out how best we can spend what little money we have to prioritize areas for restoration to do the most good."

The Modoc Fire Safe Council provided lunch while Bruce Ross, District Director for Assemblyman Brian Dahle's office, gave an update on a new bill that passed in August regarding wildfire mitigation funding. "The passing of this bill means that there will be \$200 million each year for the next five years for fuel reduction, prescribed burns and forest health in general. Meetings just like this need to happen all over the state. Cooperation between communities and organizations is exactly what we want to see with this grant program. There is money for capacity building as well."

Sheriff Mike Poindexter highlighted the urgency of the need, adding, "Unfortunately, most of the public

*Bushey Ranch in Canby, CA. Stone Fire, August 2018. Credit: Chris Bushey*



forest that burns may not be in a condition that draws visitors to Modoc County to boost our economy, enjoy our beauty and bucolic lifestyles. Every fire is taking this away from our grandchildren and their children. The cost of fire is more than just dollars. Working together to change that is a good thing for all."

The group agreed that there are many examples of devastation in the aftermath of recent wildfires in our own backyard. Poindexter cited the 2007 Fletcher Fire and the 2012 Barry Point Fire as examples of how federal foresters struggle with bureaucracy when trying to restore burned areas. Restoration activities remain incomplete in these areas. "We need to ensure that the Cove and Stone fire sites don't end up that way," he added. "The contrast between the two areas is easily seen today. Restoration needs to be a priority."

As the tour ended, Tex Dowdy summarized the big picture, saying, "In the end, we need to have a united front for the public. We need to have accurate information about our partners and stakeholders, and what we are all able to do. The collective impact of our area agencies and organizations working together is very powerful. We need to create movement and accept nothing less than excellent when it comes to our quality of life. We are blessed to live in Modoc County; where there are so many different uses for our land.

Whether we are hiking, hunting, farming, grazing cows, or just going for a drive, we want to make sure that our lands are at their full potential. Our natural resources deserve our best."

**About the Author:** Heather Hadwick is the Deputy Director of the Office of Emergency Services in Modoc County, California. She received an Ag Science from Chico State and then her Masters in Leadership and Management. Her focus on agriculture and partnering with agencies supports her new role in Emergency Services for the county.



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# Research gives insight into community bushfire response in Australia

*Burnt land surrounds a house that survived one of the fires. Credit: NSW Rural Fire Service*

*By Dr Josh Whittaker, Bushfire and Natural Hazards CRC and the University of Wollongong, and Dr Mel Taylor, Bushfire and Natural Hazards CRC and Macquarie University.*

New South Wales, Australia faced some of the worst bushfire conditions ever forecast for the state in January and February 2017, which included the “Catastrophic Fire Danger” rating (Australia’s highest danger level for fire) for many communities. During this time, a number of large and damaging fires occurred. Fortunately, no human lives were lost during the worst of the conditions.

Following the fires, the New South Wales Rural Fire Service (NSW RFS) commissioned the Bushfire and Natural Hazards CRC to conduct research into preparedness and responses by communities affected by the Catastrophic Fire Danger warnings and fires.

The research involved interviews with people affected by the Currandooley, Sir Ivan and Carwoola fires, along with an online survey of residents in bushfire risk areas throughout NSW.

## THE FIRES

The Currandooley fire was caused by a bird set alight from contact with a high-voltage powerline and subsequently landing in dry grass. Under Severe Fire Danger conditions, the fire destroyed a house, sheds and two vehicles. Approximately 200 sheep and cattle were lost.

The Sir Ivan fire ignited from lightning strikes near Leadville and burnt under Catastrophic Fire Danger conditions. 35 houses and over 50,000 hectares of land were lost. Many agricultural assets including livestock, fences, pasture and machinery were destroyed.

The Carwoola fire was caused by sparks from a metal cutting wheel under Severe Fire Danger conditions. It destroyed 11 houses around 20 km south east of Canberra.

The research involved interviews (113) with affected residents, and an online survey completed by 549 people threatened or affected by bushfires throughout NSW in 2017. Information was collected about:

- Effectiveness of warnings;
- Catastrophic Fire Danger messages;
- Information people sought out in relation to bushfires;
- Motivations for those who sought to enter fire grounds;
- Perceptions of risk;
- How people value assets and prioritise their protection;
- Influences of previous fire history or experience on decisions and actions;
- Public expectations of fire and emergency services;
- Opportunities for greater utilisation of local knowledge and participation.

# WHAT THE RESEARCH FOUND

## INFORMATION AND WARNINGS

Most survey respondents found warnings easy to understand, up-to-date and useful.

Participants expressed a preference for highly localised information. Survey respondents most often identified the 'Fires Near Me' smartphone application and website as the most useful information source.

'Fires Near Me' was easy to understand (88 percent), useful (82 percent) and sufficiently localised (76 percent). Two-thirds of interviewees felt the information was up-to-date. Interviewees commonly expressed strong support and a high degree of satisfaction with 'Fires Near Me'.

Landline telephone warnings were more often seen as useful when compared to SMS warnings, (78 and 67 percent), up to date (72 and 66 percent) and timely (68 and 66 percent). Nevertheless, survey respondents most often identified SMS as their preferred mode for delivery of warnings. Most people expected to receive warnings from multiple sources. However limited mobile phone coverage, particularly in the Sir Ivan and Currandooley fires, meant that some people did not receive SMS warnings.

## CATASTROPHIC FIRE DANGER WARNINGS

After the 2009 Black Saturday fires in Victoria, Australian fire danger warnings were revised and Catastrophic was introduced as the highest level of fire danger.

These conditions do not occur regularly – this was only the second time large population centres in NSW had been subject to Catastrophic Fire Danger ratings since their introduction.

88 percent of survey respondents considered Catastrophic Fire Danger warnings to be easy to understand. 83 percent found them timely and 78 percent found them useful. However, most people do not intend to leave before there is a fire on days of Catastrophic Fire Danger. Those who intend to leave will wait until there is a fire, and others intend to stay and defend. The research shows that some people may underestimate the risks to life and property if the fire danger is not Catastrophic.

Receipt of an official warning about Catastrophic Fire Danger prompted survey respondents to discuss the threat with family, friends or neighbours (63 percent) and look for information about bushfires in their area (62 percent).

Equal proportions began preparing to defend or leave (39 percent) and a smaller proportion (12 percent) left for a place of safety.

When asked what they would do next time they received a message about Catastrophic Fire Danger, 12 percent of survey respondents said they would leave before

there is a fire. 4 percent said they would wait until a fire started, then leave. 27 percent reported that they would get ready to stay and defend, while nearly a quarter said they would wait for a fire before deciding what to do.

Analysis of interview data highlights that many people believe it is impractical to leave on days of Catastrophic Fire Danger before there is a fire. Many are also committed to defending, despite being aware of the increased risks to life on such days.

Interviews with people affected by the Carwoola and Currandooley fires suggests that some people underappreciate the risks to life and property on days that are not Catastrophic.

In contrast, some interviewees affected by the Sir Ivan fire did not anticipate the size or severity of the fire, despite forewarning of the Catastrophic Fire Danger they would experience. Many felt that they were prepared to respond to smaller fires, which were more common in the area, but believed there was little they could have done to prepare for a fire of the size and severity that was experienced.

## HOW PEOPLE ACCESSED INFORMATION

Over half (53 percent) of all survey respondents accessed information via the internet. Respondents most commonly sought information about the location of the fire (91 percent), traffic and road blocks (64 percent) and weather conditions (60 percent).

Websites most commonly included 'Fires Near Me' in addition to the app; the NSW RFS; Bureau of Meteorology and various Facebook pages, including local RFS and community pages.

Almost two thirds (62 percent) of all survey respondents used social media during the fires.

Interviewees and survey respondents often sought information about the fire through direct observation. This is reflective of past research, where many residents left their homes and properties to go and look at the fire. For some people, observing the fire appears to have helped ready themselves to defend and, for others, confirmed the need to leave.

## PERCEPTION OF RISK TO AND VALUE OF AGRICULTURAL ASSETS VERSUS HOMES

Perceptions of value and risk to agricultural and domestic assets are complex. Economic value is important in decisions about what to protect, but is balanced against utility and sentimental values. Many farm properties were large, with a wide distribution of assets. Some landholders also had additional blocks that came under threat. They often did what they could to prepare, for example by ploughing fire breaks and moving livestock, then 'fell back' to protect what was manageable, typically the house and nearby paddocks and sheds. This appears to have been



based on an assessment of what was possible with available resources and not necessarily what was valued most.

**DRIVERS AND MOTIVATORS FOR RETURNING**

Most survey respondents were at home when they found out about the bushfire (60 percent). Of those who were not at home, 71 percent indicated that they tried to return to their house or property. The drivers for returning to fire-affected areas are many, but most often revolve around the desire to protect houses and property, rescue or assist vulnerable people, and protect animals. While some interviewees complied with roadblocks, others described passing through or circumventing roadblocks in order to return. Some used backroads or gates through private property to return, sometimes on foot or in vehicles unsuitable for the roads, tracks or paddocks that were taken. There was a perception that some people were exposed to more danger than if they had passed through the roadblock.



*Researchers and NSW Rural Fire Service personnel preparing for community interviews at Carwoola. Credit: NSW Rural Fire Service*

**PUBLIC EXPECTATIONS OF FIRE SERVICES**

It is generally well understood that there are resource constraints during major fires, such as not enough fire trucks for every property. However, there is less appreciation of the operational constraints of large and dangerous fires, and that it's often too dangerous for firefighters to directly attack the fire front.

Most interviewees affected by the Currandooley and Carwoola fires praised the efforts of firefighters and did not expect to receive personal firefighting support. Residents in Carwoola were particularly aware of the limitations from fire agencies, a message that had been clearly communicated by the local brigade over time.

Some interviewees affected by the Sir Ivan fire were more critical of the firefighting response. Criticisms centered around the perceived lack of firefighting in the agricultural areas between Leadville and Cassilis. Some saw the fire service



*An interviewee shows a researcher the impact the bushfire had on his property. Credit: NSW Rural Fire Service*

## WHAT WAS SAID

'The Fires Near Me app was very good actually because I could see exactly where the fire was going and the local area and all that sort of stuff. That was good because I could see that it got out of hand, and it had jumped the highway and that's when I knew it was gone.'

- CASSILIS

'That day wasn't even really high on my radar in terms of fire danger. It was a hot day, and there was a bit of wind, but it wasn't Catastrophic. It wasn't like two or three weekends prior to that when it was 45 degrees and blowing a gale. It just proves that accidents can create a big fire.'

- CARWOOLA

'When we came out here we knew that we had a responsibility to manage our fire risk and we did what we could to reduce the fuel load and have a good plan in place to save ourselves ... we've sometimes found it a bit daunting about how we do all of that ... we did not expect that council or the RFS would come in and save us. We believed that it was our responsibility to be aware of the risk and manage it.'

- CARWOOLA

as overly bureaucratic and risk averse.

These criticisms reflect a mismatch in expectations and should be viewed in the context of a large, destructive bushfire that burnt under Catastrophic conditions with limited operational capacity or opportunity to deal with such fires due to dangerous conditions.

### TAKE AWAYS

This research is now being used by the NSW RFS to put in place new processes to better liaise with communities during major fire events, as well as to further strengthen its approach to public information through websites, smartphone applications and face-to-face communication.

The research confirms the tendency for people to wait and observe the fire directly before getting ready to defend themselves or confirm the need to leave. This behaviour presents opportunities for emergency service personnel to meet people at a time when they are seeking and receptive to information and advice.

While there is strong appreciation for the danger of fires under Catastrophic conditions, there is a need to more clearly communicate the risks posed by fires burning under non-Catastrophic conditions. Such messages could be incorporated into community education and engagement resources, as well as emergency warnings and information.

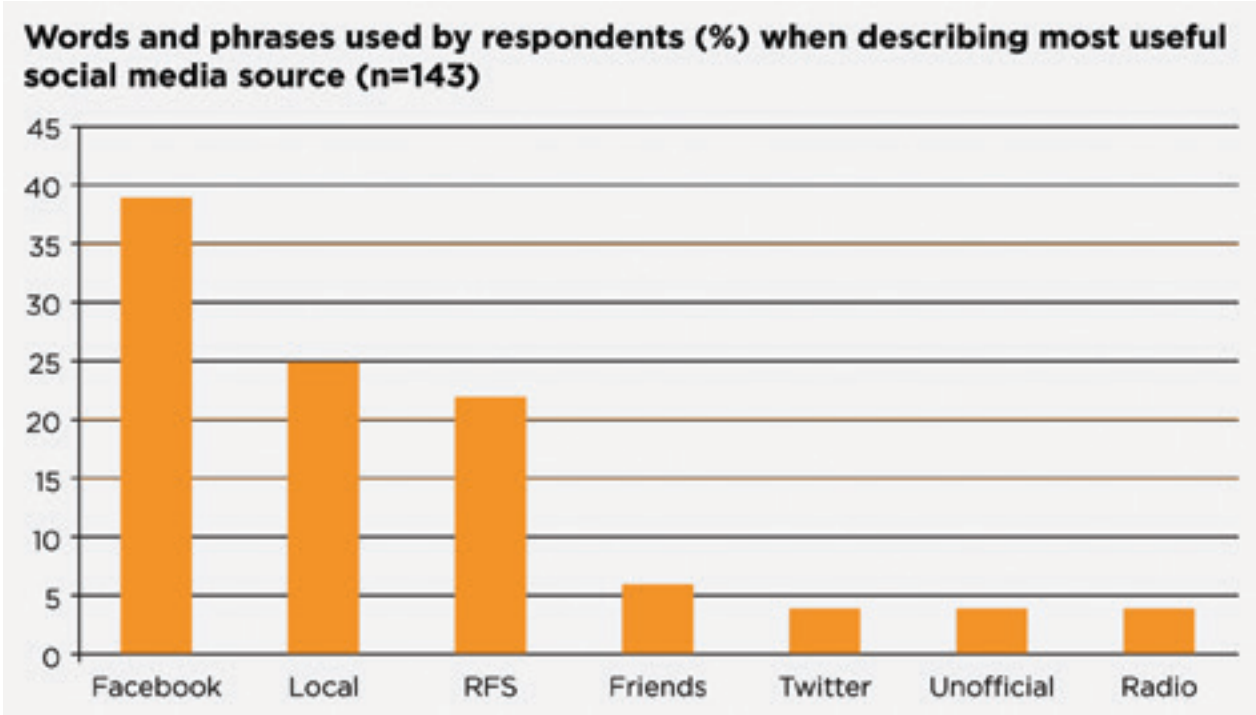
There is potential to develop additional resources to assist agricultural landholders to plan and prepare for bushfire. Resources are needed to help businesses more systematically identify assets and values, prioritise, and plan for their protection. These materials could include best practice case studies and information about insurance.

There is a need to more clearly communicate the limits of response capacity. In addition to limitations due to resource constraints, which are generally well-understood by the public, there is potential for enhanced communication about the dangers large and fast-moving fires pose to firefighters and that it can be too dangerous for direct attack on the fire front.

Findings suggest that local brigades could be effective in communicating these messages; however, this may require considerable engagement and training.

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# “Fire Ecology of Florida and the Southeastern Coastal Plain”

A deep-time fire ecologist explores the history, policy and practices of fire in the heart of America’s prescribed fire landscape.

## An essay-review by Johnny Stowe

In “Fire Ecology of Florida and the Southeastern Coastal Plain,” Reed Noss has given lovers of the firelands of Southeastern North America another well-written book of immense value.

As a land manager ever-reflecting on ways to better use fire as a tool for restoring and maintaining South Carolina’s heritage preserves, as well as on my own farm and the lands of others, this book helps me get things done where it counts most: on-the-ground. Noss answers many of the questions that have arisen in my mind in a half-century of burning wild lands, and in discussions with policy makers, land managers and ecologists, and he deals well with other issues that I have never thought about.

Reed’s book has been particularly helpful to me in dealing with public concerns over conducting prescribed burns in the growing season, which in my part of the world coincides with the thunderstorm season as well as the period when ground-nesting birds are laying eggs and raising young. This late spring through mid-summer period is when lightning-ignited fires first shaped the ecosystems and landscapes of the Southland, long before human-ignited fires came into play.

Noss tells well the story of how soils, water and fire interacted during a period of climatic shifts to shape the vegetation and wildlife of the southeastern coastal plain, most particular in Florida. Using an evolutionary lens, he reveals how grassland birds, including bobwhite quail and other imperiled species, have evolved to

prosper in a frequent-fire regime in which growing-season fires sometimes directly impact nesting.

Paradoxically, although regrettably sometimes nests are lost to fire, growing-season burns yield habitat benefits that outweigh the costs, with numbers of individuals in an area overall – i.e. at the population and landscape level – increasing. In a densely populated and highly fragmented landscape where allowing lightning-lit fires to burn is seldom a safe or effective option, and fires must be lit under prescription, having a rigorous work of scholarship that advocates for spring and summer burning is invaluable. Noss’ book provides an altogether welcome voice of reason to an issue too-often dominated by an emotional, Bambi-esque, anti-management fringe. The less time Southern firelighters spend dealing with polemics the more opportunities we have



Johnny Stowe in a coastal plain savanna with insectivorous pitcher plants a few weeks after one of his Rxd thermal-prunings.



by Reed Noss



to burn our savannas, woodlands and forests for the myriad, interconnected and synergistic public safety, economic, ecological and cultural benefits that frequent fire provides us.

Noss applies key critical thinking skills, developed over many decades as an academic researcher as well as a conservation practitioner, as he makes firm arguments in places, while qualifying statements for which the evidence is less clear or when he is giving his intuitive opinion. Throughout the work, what shines through is his keen field observations based on many years studying and visiting fire-dependent ecosystems and talking with the people who burn them; his broad, deep and tight scholarship; and his thorough familiarity with the ecological literature.

This latest book, like his wonderful “Forgotten Grasslands of the South: Natural History and Conservation,” begins with deep-time, evolutionary explanations of how these special landscapes have come to be, including historical evidence enchantingly told and inspiring, and then delves into why and how we should protect them, both for their intrinsic value as well as their broad range of benefits to humans.

As an ecosopher (ecological philosopher) in the vein of Aldo Leopold, as a naturalist whose hero is the first modern fire scientist Herbert L. Stoddard, as a passionate lover of all things wild and free, and as a paragon scientist, Reed’s latest book (like his “Saving Natures Legacy: Protecting and Restoring Biodiversity”, co-authored with Allen Cooperrider) is a work that will benefit not only land managers and policy makers,

but all wildlife biologists, foresters, botanists and others who seek to ensure special places remain that way.

Noss explores the weave of fire and human history, and the challenge of managing our lands with fire, writing:

*In Florida, despite better public acceptance of fire than in perhaps any U.S. state, the surge of newcomers from less fire-prone regions and the rapidly increasing urbanization and highway network now complicate controlled burning and smoke management. These changes raise serious questions about the extent to which fire will be part of our environment in the future. One thing we know for certain, however: without fire, our landscapes would be much poorer biologically and less attractive aesthetically. Without frequent burning, some natural communities would degrade to a condition where more severe and potentially dangerous fires are bound to occur. It is incumbent on naturalists and conservationists to serve as fire advocates and ambassadors and to use evidence-based arguments to promote rational fire management. (5)*

Reed’s timeless books — whether read for pure enjoyment, used as textbooks and references for students and others, to inform management, or as tools for policy — will endure and shape the lands he loves far into the future.

**Johnny Stowe** is a forester who lights fires in Southeastern North America, and he’s a new board member with the IAWF (see IAWF News for a full bio).

**MORE INFORMATION:** University Press of Florida. [upf.com/book.asp?id=9780813056715](http://upf.com/book.asp?id=9780813056715).

**Winter is the beginning of burn season** in the coastal plain of southeastern North America celebrated by Reed Noss and Johnny Stowe (prior pages). While the US federal furlough delayed a range of fire activities, it didn't stop all the burning. These photos by Danny Fairchild document a few days during the 35-day furlough when crews burned but pay was delayed (see President's Desk for more on this). The burns ranged from Florida Forest Service to US Department of Defense and US Fish and Wildlife Service lands, and were part of the Prescribed Fire Training Center. Fairchild was working on his Firing Boss qualification.











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# THE WILDFIRE WITHIN

A reflection on the field experience that led to new research on leadership and gender in wildland fire.

*Editor's Note: This reflection offers background on the writer's experience that led to a research article, "The wildfire within: gender, leadership and wildland fire culture," published in November 2018 in our sister IAWF publication, the International Journal for Wildland Fire. Your IAWF membership provides access to this and all IJWF articles at IAWFonline.org.*

*by Rachel Reimer, MA.*

It's 2015 and a hot, dry summer in the Fraser Canyon, British Columbia, Canada. I'm juggling two radios and a cell phone in the staging area as firefighters mill about. I've just received approval for my plan for the day from the Incident Commander, including aerial burning operations to support our hand ignition later in the day. It's my first large fire leadership role, and I'm 12 months into master's degree research on gender and leadership in wildland fire. I'm aware that my every move is being watched. I feel vulnerable, and at the same time, confident that I'm the right person for the job. I'm one of very few women in the crowd







*Rachel Reimer on the East Lookout for the Cisco Road Fire, Lytton BC 2015. Photo: Jon Mundall.*

of 60 on the south side of the fire. How did I get here?

My path in high-risk professions began in conflict zones in the Middle East. I was attracted to helping people. With a degree in International Development Studies in hand, I headed off into the Palestinian-Israeli conflict to research women's leadership in refugee camps for the UN in Lebanon. After that I was off to Africa to build capacity for small scale drinking water projects in dry villages. When my curiosity and work ambitions eventually led to me Afghanistan in 2011, I left knowing I needed something new.

In 2012 I started work with the BC Wildfire Service. The toughness of the culture resonated with me and the austerity of fireline life felt familiar. Like many

other firefighters I developed a tough persona to fit in, but it was still me. I believed deeply in the mission and knew that the physically strenuous work, mental toughness, and commitment required would draw on my deep strengths. I felt strong. I felt brave. I was proud of being a firefighter. I was good at my job.

At what cost? As a rookie, I was the only female on the fire base and was subsequently tasked with cleaning bathrooms and doing dishes for the entire season. The male rookies cleaned trucks. I did this work from alternating places of rage, resignation, and at last, acceptance of the gendered division of labour. I noticed differences in risk tolerance as my chainsaw and falling skills advanced alongside my

peers. I took fewer chances, electing to practice basic falling cuts over and over before trying more advanced cuts. My male peers seemed to learn faster but ran from more trees as they spun off the stumps in the process. When I moved into leading my own crew the differences in approach and perspective were amplified. I was modeling the leadership approaches of my male mentors but getting push back. When I softened I was “too sensitive.” I felt like the first firefighter to be both “too hard” and “too soft” at the same time. It was confusing and lonely.

Noticing these differences in treatment over my early career made me feel like I was betraying my loyalty to the crew and my agency simply by perceiving these biases in behavior and expectations. No one else in my work environment shared my observations. I added internal criticism to the external feedback. It was all my fault – my personality, my approach, and my leadership style. I felt like I didn’t belong in fire or in leadership.

And then one day after returning from a fire with my Nomex® covered in soot, I paused, looked in the mirror, and took it all in: dirty, sweat-stained face, scratches, twigs in my hair and covered in ash. “Is this who I am?” I thought. The answer came: Yes, very much yes. I realized that I deserved to be there. I had passed every test, both external and my own internal barrage. I’d fought every fire I’d gone to. I decided that I belonged and that my voice and perspectives had value.

This represented a huge shift. Each day, I started reminding myself that I belonged in fire. It wasn’t just the wildfire service anymore. It was my wildfire service. As long as I was in the uniform I wasn’t going to turn a blind eye. My courage grew. Nothing changed externally in my work environment but my perspective towards my own experience changed. I believed in myself, and I started listening more closely to the parts of me that knew change needed to happen in the job I loved. I stopped seeing the act of asking questions as disloyal. I realized that by silencing my questions I was not serving my crew, my colleagues, the wildfire service, or the public. I thought back to my experiences in the Middle East, to the trauma and the challenges I’d faced and overcome in life, and I recognized that I was perfectly equipped to take on this task.

In 2015, I began research into gender and leadership in wildland fire and inquired, from within, into how this affects us all.

## SMOKE

In the 2015 fire season I dusted off my social science research skillset and began the work. Where there’s smoke, there’s fire. Finding it and defining what was going on was my task. I got up at 4:30 AM to do schoolwork before going to fires. I read every gender study on wildland fire from the last two decades. I sought and received permission from senior leadership to do the study. I began introduc-

ing the topic of gender and leadership research within my circles in the agency. I lost friends immediately. Mentors stopped returning emails and calls. It was a dark and lonely time and self-doubt became a constant companion.

Eventually the holes left by former friends and mentors were filled with people who said, “I have those questions too.” My mentorship relationships and coaching conversations now took into account how female leaders are perceived differently. I could be more honest about my experiences at work and I noticed that my male colleagues were more honest too. Over dinner at firecamp one evening, a colleague shared that every fire season he had to leave his “city masculinity” behind and put on the tough persona he has in fire. He was over 6 feet tall, bearded, and an up-and-coming leader on a hotshot crew. I started to see that this was not about men doing things to women. It was a cultural problem that affected men too.

## GETTING HOTTER

My research goal was to start a conversation about gender and leadership in wildland fire. By gender, I mean the ways that we all perform masculinity or femininity. Women can perform masculinity (e.g. the tough fire persona), and men can perform femininity (e.g. fatherhood, empathy). It’s not linked to biology. By leadership I mean how we each lead ourselves first, and then our crews. When we put on a uniform we are leaders regardless of our position in the hierarchy. In addition, we shape ourselves after the leaders we look up to. From early stages within fire we are taught to fit into the image we collectively hold of how a “good” leader looks and acts. In 2016 I collected data through a survey and interviews. Out of 1645 employees (an average of 24.6% female), 245 participated.

## THE FIRE

The study found that gender made a difference at work for both males and females. Men shared stories of having to be more “macho” than they wanted to be. Women shared stories of being belittled, having skills questioned, and assumed to be less competent than their male colleagues. Taken as a whole, the stories shared by both men and women revealed that masculinity was seen as strength and femininity was seen as weakness. It didn’t matter if you were a male or female. Anything feminine was seen as weak and shameful. The basic rule of fitting in was not to be seen as weak. This underlying cultural norm affected men and women differently. Some men could hide behind their height, strength, or facial hair but still feel quite lonely and distraught. Women were more easily associated with femininity and therefore respected less until proven otherwise. The more masculine a woman acted the more likely it was that she would gain respect. Sexism and misogyny were described as daily occurrences.

The “ideal” leader in wildland fire was described as



someone, regardless of gender, who supported others, created mutually respectful environments, and had the humility to admit mistakes. Stories about females in leadership being perceived differently described a trade-off -respect for any masculine characteristics they exhibited, but not liked or respected as leaders. Some men shared stories of feeling like they had to pretend to be something they weren't in order to fit the cultural expectations of how a leader behaved. Despite a rather open and inclusive ideal of leadership, the firefighters in this study revealed that there are difficult choices leaders must make regarding a performance of masculinity in order to be seen as effective and to gain and keep respect.

What do firefighters in this study want their future to look like? The ideal future was one with equal representation of diversity across the fire agency where skills and qualifications were the only factors for hiring decisions. Diversity was a shared value to be achieved without sacrificing high performance. Diversity was actively linked to higher performance including better decision-making and risk management. Firefighters in this study connected with the benefits of diversity. It was clear that while they desired more diversity in leadership as well as throughout the organization, that it shouldn't come at the cost of high-performance teams.

What actions should fire agencies take to help bring the profession to a place where diversity is a shared value and doesn't compromise performance? In this study, firefighters recommended that actions focus on creating conversations about cultural norms. The importance of collaborating towards a better future was highlighted because for many, the hidden costs to men and women are not clear. Sharing stories with time for self-reflection and discussion would help everyone soften their "fire persona". This would help people engage honestly with their own behaviors and the effects those behaviors have on their relationships with themselves and with others, ultimately improving organizational performance in the face of challenges.

### PUTTING THE FIRE OUT?

This study did not inquire into experiences of sexual harassment and none were shared, however accountability did emerge as an important point. It is very difficult for people to speak openly about gender discrimination and sexual harassment given the history of diversity and gender in the profession. There are perceptions that women are favoured even though the data does not support that. The BC Wildfire Service has never had an affirmative action or preferential hiring system for women, yet strong evidence of resentment from men towards women emerged in the data. This includes perceptions that females are treated "better" than men. It also

includes the perspective that women who say they are experiencing sexism do so because they are "bad at their jobs."

These beliefs are very real and present significant challenges for many women and men who choose to speak out when they witness a peer acting inappropriately. The parable of the frog in the pot is useful here. Cultural change begins with the willingness to see the water we are in before it begins to boil around us. Seeing the invisible is best done in groups by raising awareness through constructive and honest conversations in a safe space. It often takes someone from outside the organization to facilitate these "aha" moments. If we can soften our collective "fire persona" and release the fear of being



*Initial Attack Crew. Katie Bennett (H76B); Rachel Reimer (H76A); Greg Broadworth (H76C). Helipad on Cisco Road Fire, Lytton, BC 2015. Photo: Nick Matheson.*

weak, we'll be able to transform the negative, mostly unintended consequences in our fire culture.

Should we abandon the "fire persona" completely? As a firefighter I experienced my courage, physical strength, and mental and physical toughness as a gift. These aspects of firefighting masculinity are beautiful and brave especially when they are paired with firefighting femininity.

We have not failed when we associate masculinity with strength in firefighting culture. We fail when we single out masculinity as the only strength, excluding of all other forms of strength available in the human spirit. It's time to open to our full potential as firefighters and leaders. Not because it's the right thing to do, but because it will enhance our ability to perform and excel at our mission.

## ABOUT THE AUTHOR

### Rachel Reimer

led initial attack crews for the Province of BC from 2013–2016 and worked a total of six years in wildland fire. She currently holds an MA in Leadership Studies and provides research-based change management for male-dominated, mountain-based professions. She co-founded Open Mountains Project in 2016, a non-profit organization dedicated to connecting vulnerable youth with the mountain environment through backcountry skiing and mountaineering.

This article is background of and based on:

Rachel Reimer and Christine Eriksen. (2018) The wildfire within: gender, leadership and wildland fire culture. International Journal of Wildland Fire 27, 715-726. <https://doi.org/10.1071/WF17150>.

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