"Uniting Our Global Wildfire Community"
APRIL 2018 - VOLUME 27.2

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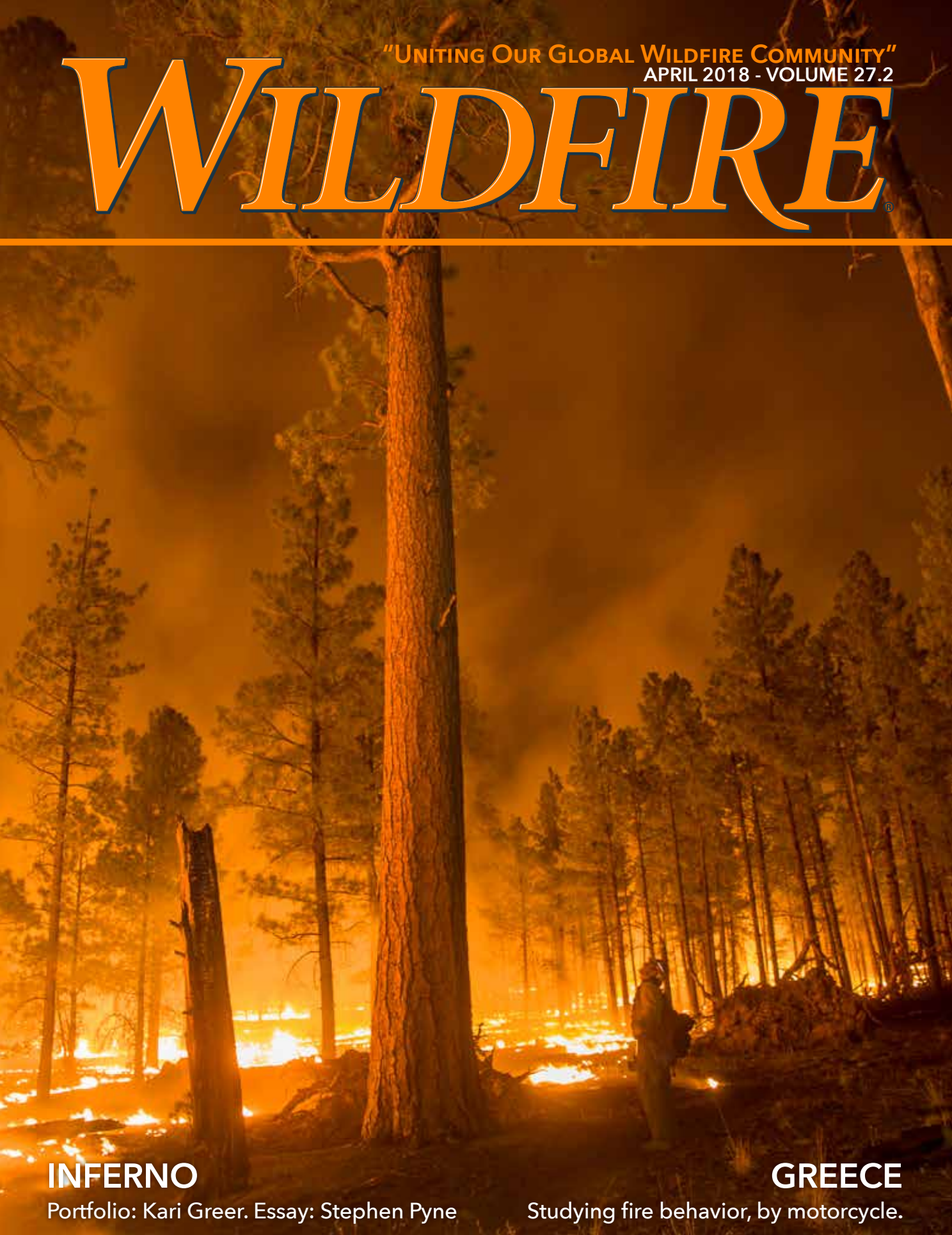

INFERNO

Portfolio: Kari Greer. Essay: Stephen Pyne

GREECE

Studying fire behavior, by motorcycle.

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

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April 2018 *Volume 27 Number 2*

Favorable low intensity backing fire behind a home in First Creek on Lake Chelan during the First Creek Fire, Okanongan-Wenatchee NF, WA, 2015

ON THE COVER & ABOVE:

???? Firefighters at work on the Thomas Fire in Santa Barbara County, California, December 2017. Photos and tweets by Mike Eliason.
See more of Kari Greer's work, and an esssay on fire imagery by Stephen Pyne, see page 20.

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IAWF to promote policy on diversity and inclusion

In my first column as President in January, I expressed my desire to increase the diversity of participation in the IAWF – gender, race and age. A few weeks after, the IAWF received a letter signed by many eminent scientists from the USA, asking the IAWF to consider including more gender diversity into its conferences.

Our Board had a discussion about the letter and we decided that immediate action was needed, not just for conferences, and not just on gender diversity. We agreed to develop a broad policy on diversity and inclusion that covers all our membership activities. The policy promotes gender diversity for our conference speakers and attendees. Importantly, as we claim to be an "international" organization, we will also strive to be better at being inclusive of people of all races who are dealing with wildfire issues and research. We want to encourage more participation from interested people of all ages, all cultures, all countries and all backgrounds. Finally, we want a membership base that also meets these ideals, and to have that reflected in the make-up of the Board. At the February 2018 Board call, we adopted the new policy. These are worthy ideals and we know we have much to do to achieve these goals. And I know that writing the policy is a lot easier than actually making real change. However, it is an important start for the IAWF. I am very proud of the Diversity and Inclusion Policy that we have created (see below).

ALEN Slijepcevic
PRESIDENT, IAWF

As the same letter was also send to the Association for Fire Ecology (AFE), both Boards have agreed to establish a shared Inclusivity and Diversity Committee to focus effort on improving diversity and inclusivity in all activities. This Committee will be monitoring progress towards and provide advice on how our goals could be achieved. Also, the IAWF Board made a commitment that we will be reporting on our progress in the area of diversity and inclusion in all future annual reports.

As most of you would be aware, this is a big issue within most communities globally, and fire communities are no exception. It has been an issue that historically has not be spoken about openly within our sector as well as within society. The #MeToo movement

has encouraged people that were harmed to speak publicly or to report their issues within their organizations. This has led and it will continue to lead to the changes within organizations for the right reasons. Our sector is seen as a male dominated sector and this needs to change. Over my career, I have had pleasure to work with a diverse workforce, including a variety of gender, age, cultural and religious backgrounds and the ideas and work that comes out of those teams are always superior to the one coming from non-diverse teams. That is what is making our future exciting, not that we must do what is morally and ethically right, but as a result of those actions, we will also excel in our work.

DIVERSITY AND INCLUSION POLICY

Adopted February 2018 by the IAWF Board

Embracing diversity and inclusion

Becoming a diverse and inclusive organisation will enable the International Association of Wildland Fire to learn from each other, grow our understanding and find new ways to address, understand and find solutions to complex problems.

Our positive, empowering, inclusive and innovative culture will enable all members of the fire community to feel safe and valued when contributing to the IAWF. We want our members to achieve their fullest potential, while we operate in a flexible way to meet our membership's needs.

What we mean by diversity and inclusion

Diversity encompasses all the differences between people in how they identify in relation to their age, caring responsibilities, cultural background (including Indigenous peoples), disability, gender, sexual orientation and socioeconomic standing, as well as their profession, education, work experiences and organisational role (professional identity).

Inclusion is when a diversity of people (e.g. different ages, genders) feel valued and respected, have access to opportunities and resources, and can freely contribute their perspectives and talents to improve the IAWF.

Our principles

We live our diversity and inclusion values when our people:

- leverage the experience and ideas of others
- embrace different viewpoints
- feel they belong and know their unique contribution is valued
- have equal opportunity to participate
- connect synergistically with our diverse membership and broader fire community to understand their needs.

Our goals

By year 2025 we will strive to achieve the following:

- Gender balance at our conferences, including panels, keynote speakers and registrations.
- Gender balance within our membership and Board members.
- Geographic diversity within the membership, Board members and IAWF activities.
- Greater inclusion of other underrepresented groups (age, Indigenous, disability, etc)

We will achieve our goals by;

- Actively seeking gender balance for our conferences and membership
- Actively encouraging and proactively seeking membership from all parts of the globe
- Actively encouraging and proactively seeking members from all different professional backgrounds within the global fire community.
- Eliminating any organisational structures or actions that oppress, exclude, limit or discriminate on the basis of race, gender, ethnicity, financial ability, sexual orientation, religion, disability or age.

"Uniting the Global Wildland Fire Community"
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Fire effects - or the beneficient hunt for burn morels

IS IT MORAL TO HUNT FOR FIRE MORELS? Or should the question be, how might we make this rite of spring more right? This might be a question that concerns a dedicated mushroom hunter, as some argue there seems some divine moral character in the exquisite taste of a well-sautéed morel. And this season, in the US West at least, morels may be more plentiful after the active 2017 fire season, since morels are a post-fire responder, a fire effect as valuable and valued as any.

So it's with pleasure (and even a bit of anticipatory gusto) to note that the culinary crafts-people have adopted the results of fire — wildfire, that is — to help produce a component of many a tasty dish. Otherwise known as the "burn morel," the post-fire flush of mushrooms. The current focus on morels and fire in the culinary world came to our attention via a media release from "Foods In Season," a company that collects morels from harvesters and brings the morsels to market. They have launched a campaign, "Moral Morels," to help raise awareness for the work and challenges facing wildland firefighters.

The reason for this campaign, as explained by Francoise de Melogue. "The moral dilemma posed by burn morels is: one person's disaster becomes another person's bounty. It becomes more striking when talking to a customer, and they ask what our forecast for the upcoming morel season. On one hand forest fires produce extraordinary mushroom flushes, but on the other, several of our friends lost their homes, businesses and even their lives."

The "Moral Morels" campaign, announced in more detail on the closing pages of this issue, is donating a bit of every "burn morel" sale to the Wildland Firefighters Foundation. But this isn't the only article here that looks at the dilemmas faced in our profession, as we begin with a commitment by the International Association of Wildland Fire, launched in the "President's Desk" column, to embrace diversity and inclusion, so that "all members of the fire community ... feel safe and valued when contributing to the IAWF."

We also explore the challenge from the stress we face and the impacts of stress on us, as "Thoughts on Leadership" columnist Mike DeGrosky observes and reflects that "It's time to understand — and act — on wildland firefighter suicide." And we remember that amid our professional challenges, we must take care of ourselves and our colleagues and families — as focused, in this issue, on "Fire and Smoke Alarms," the first installment of an occasional column, "Taking Care of Us," launched by Kathy Clay.

The variety of ways we face our professional challenges are as unique as each individual wildlife manager and firefighter. Demonstrated in this issue by a range of stories from our profession — a Fired Up Honoree with a commitment to her FireSafe Council in California, and the update on a former IAWF scholar in Greece whose focus on fire behavior is often researched on the back of a motorcycle.

And the heart of the issue explores the aesthetic value of imagery in a portfolio of work by long-time fire photographer Kari Greer, and an accompanying essay by long-time fire historian Stephen Pyne. This pairing will also appear at the FIre Continuum conference, as the continuum of fire so often seems to blend the aesthetic and scientific response.

As you savor the flavors of fire in this issue, remember that the work we do is such that values all of our variety and diversity. The humanist and the artist inspires the scientist, and vice versa. Whoever we are, we belong In the family of fire.

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It's time to understand – and act – on wildland firefighter suicide

by Mike DeGrosky

LET'S TALK, NOT ABOUT LEADERSHIP, but about a critical issue requiring leadership. Specifically, I 'm speaking of the epidemic of wildland firefighter suicide that is happening right before our eyes. I was aware of the prevalence of suicide in the fire service but had considered it primarily a problem of municipal fire and emergency medical services. I was aware that suicide visited our wildland firefighter ranks; and had even experienced such a loss. However, I'll admit that, until fairly recently, I misunderstood the scale of the problem we confront. Reliable statistics on wildland firefighter suicide elude us, but it seems we average around 25-30 known suicides among our brother and sister wildland firefighters each year, though suicides are likely underreported in wildland fire just as they are in the fire service as a whole, law enforcement, and the military.

While 25-30 suicides each year may not sound like an epidemic as I describe it, our rate is much higher than society as a whole. A similar rate of suicide in the greater society would mean that nearly one-half million Americans would take their own lives each year; more than ten times the actual rate. If 25-30 firefighters died from snag related incidents or burnovers every year, we'd be having a full-on, collective, risk management freak-out. Think about this for a moment; it is possible that more wildland firefighters took their own life this year than died from all causes of tracked line-of-duty deaths combined.

We don't really understand the breadth or depth of the problem. Not only has no one been systematically counting; but we suffer the same stigma over suicide that exists both in other high-risk services and across our society.

My experience is that people don't want to talk about suicide, I know I haven't. The reasons are myriad - we hope that people won't harm themselves; we fear that if we talk about suicide we encourage suicide; we don't believe that we can intervene successfully; we have unfortunate attitudes about peoples' mental illness including PTSD; and we are unwilling to talk about the role of common elements of the firefighter lifestyle, including a myriad of stressors including:

- high stress,
- physical and mental exhaustion,
- low pay and seasonal work,
- a lack of benefits and career prospects,
- time away from home and trouble re-connecting with family,
- inconsistent health care,
- a masculine culture,
- and alcohol abuse.

I have known hundreds, if not thousands, of firefighters — and at the risk of understatement, most firefighters don't seem likely to willingly talk about an intensely personal and emotional topic like mental health.

However, we can remain reluctant and silent no longer; because the experts suggest that reluctance and silence at all levels of the wildland fire service are likely preventing, or at least discouraging, wildland firefighters from reaching out to mental health services when they are in trouble. For a number of years now, we've been acknowledging that for many reasons we are experiencing a significant occurrence of PTSD among wildland firefighters. I am reminded of a story that a colleague told me several years ago. My friend had brought a colleague, with a mental health background, along to observe a staff ride. The visitor, who had no previous experience with the wildland fire community, casually observed that there were a lot of emotionally wounded people walking around in the wildland fire service. A quick search for "wildland firefighter PTSD" reveals a few interesting articles on the phenomenon. I hear people talking about PTSD and firefighter mental health at national conferences, including the immeasurably courageous Kim Lightley. Unfortunately, more often than not, when I read something or hear a talk about PTSD and wildland firefighters it includes impotent admissions that, like our nations soldiers, our wildland firefighters resist accessing mental health counseling and that, too often, won't talk about mental health – their own or others'.

Having a keen grasp of the obvious, I know that wildland firefighters can be a hard-drinking, and binge-drinking, crowd. However, try searching for "wildland firefighter alcohol abuse" – you won't find much - though alcoholism in the broader fire service is a well-known, and much-discussed problem. It's the collision of these topics that increasingly concerns me. We acknowledge that our people are increasingly experiencing PTSD, both acute and cumulative. We feebly admit that our personnel

Wildland firefighting is a stress-filled job. And it's time for leaders to talk about stress injuries in the same way we talk about any other cause of work-related injury. Photo: Kari Greer.

resist accessing mental health counseling and observe that our folks with PTSD often self-medicate with alcohol instead. Talk about something we don't want to talk about! Just as it is in the fire service as a whole, uncommon drinking is supported by the social norms of our community. Don't get me wrong, I enjoy a cold one as much as anyone; and enjoy it best when I'm across the table from someone with whom I share the bond of fire. However, here's the deal: alcohol and suicide are partners. One third of all suicides in this country involve alcohol and an adult alcoholic is 120 times more likely to commit suicide than a non-alcoholic. There are lots of possible reasons for both those statistics, but bottom line, alcohol is the most common factor in suicide.

It's pretty clear that until leaders, at all organizational levels of fire agencies, open a workplace dialogue about mental health and model the idea that talking about mental health and coping with mental health issues is similar to talking about other injuries or diseases, we'll remain locked in the pattern we are in.

I'll close up with a few suggestions for courageous leaders:

- Open a dialogue – it's the first step. There will be no progress until we start talking
- Model the idea that talking mental health is similar to talking about injury or disease
- Acknowledge the exposure to mental health risk factors that firefighters face
- Teach people about suicide warning signs and what to do when they spot them
- Teach people how to watch out for one another
- Know your people well enough to know when their behavior changes
- Provide social support and peer support, but recognize that peer support may not be enough
- Provide fire personnel with ready access to relevant mental health professionals
- Teach people resilience, model resilience, expect resilience as a performance metric

Don't fail to act on this problem because you can't be fancy. We have access to free resources that can form the foundation of an excellent DIY team discussion and brainstorming session at any organizational level. The Spring 2017 edition of Two More Chains (http://www.wildfirelessons.net/viewdocument/two-more-chains-spring-2017-1) includes both some excellent content and an extensive list of helpful references and resources. In addition, both the Wildland Firefighter Foundation Family Outreach Recovery Programs (https://wffoundation.org/outreach/) and the Wildland Fire and Aviation Critical Incident Management Website (https;//gacc.nifc.gov/cism/suicide.html) have some good resources.

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 News

WELCOME NEW BOARD MEMBER – AMBER SOJA

Amber Soja (board member since 2018) Associate Research Fellow, National Institute of Aerospace.

Dr. Amber Soja is resident in the Climate Science, Chemistry and Dynamics Branches of Atmospheric Sciences at the NASA Langley Research Center (LaRC). She is currently an Associate Program Manager for the NASA Applied Sciences Wildland Fire program and a Disasters Coordinator for NASA LaRC. Her research focuses on using satellite, Geographic Information System, relationships that exist between fire regimes, fire weather, air quality, the biosphere, atmosphere, and climate systems.

She has 25 years of research experience that has primarily focused on the beautiful expansive wildlands of Siberia. Soja is proud to have worked to enhance the use of satellite data in stakeholder agencies, so our nation benefits from the use of our applicable information. This includes working with the Environmental Protection Agency (EPA) to introduce satellitebased fire data to enhance the fire emissions portion of the National Emissions Inventory. She holds a B.A. (1996) and a Ph.D. (2004) in Environmental Sciences from the University of Virginia.

CORRECTION for February 2018 Wildfire Magazine: An editing error incorrectly prefaced the award announcement in the February print issue of Wildfire Magazine. The IAWF award to Dr. Travis Paveglio is for "Early Career in Fire Science," and does not include "Ember Award," which is a separate IAWF award. We regret any confusion.

and modeled data as tools to explore the dynamic interactive

Fuel and topography influences on burnover fatalities, and more fire science in latest and most viewed articles.

INTERNATIONAL JOURNAL OF WILDLAND FIRE - VOLUME 27 NUMBER 3, 2018

Welcome to the latest contents for the International Journal of Wildland Fire. IJWF content is free to IAWF Members. All journal content can be accessed by IAWF members through the IAWF Members-Only site.

Fuel and topographic influences on wildland firefighter burnover fatalities in Southern California. Wesley G. Page and Bret W. Butler

Locations of past fatal firefighter burnovers coupled with a machine-learning algorithm were used to identify and characterise the environmental variables that contribute to the likelihood of a fatal burnover in Southern California. Steep, south-west-oriented slopes located in canyons that have a shrub fuel type were found to be the most dangerous locations for firefighters. Open Access Article.

What are the drivers of dangerous fires in Mediterranean France? S. Lahaye, T. Curt, T. Fréjaville, J. Sharples, L. Paradis and C. Hély.

Some large wildfires are very dangerous for firefighters. These fires grow rapidly and behave erratically, sometimes entrapping the responders. We analyse reports of past fires and determine the weather conditions that are conducive to those dangerous fires in the French Mediterranean Basin.

Model-specification uncertainty in future area burned by wildfires in Canada. Yan Boulanger, Marc-André Parisien and Xianli Wang.

We projected changes in future burning rates in Canada using several statistical models. The consensus showed a strong increase in burning rates, but large variations among single models, variations that were significantly higher than the one related to climate scenarios.

An analysis of Southeastern US prescribed burn weather windows: seasonal variability and El Niño associations. M. Chiodi, N. S. Larkin and J. Morgan Varner.

By area, 70% of US prescribed burns take place in the Southeast, where treatment objectives are wide ranging and accomplishing them depends on finding specific weather conditions for the effective application of fire. Our findings offer a tool for understanding and predicting the climatological and interannual variability of this weather window.

An analysis of the effect of aspect and vegetation type on fine fuel moisture content in eucalypt forest. Alen Slijepcevic, Wendy R. Anderson, Stuart Matthews and David H. Anderson.

The effect of aspect and vegetation structure on the fine fuel moisture content of different fuel strata was investigated. The effect of the percentage of fuel available for burning and when top litter moisture content fell into categories associated with severe fire behaviour and fire management planning was further discussed.

Post-fire water-quality response in the western United States. Ashley J. Rust, Terri S. Hogue, Samuel Saxe and John McCray.

This study evaluated water-quality data from 159 fires in 153 burned watersheds to determine if there is a common water-quality response after forest fire. Findings from this study show a significant increase in nutrient concentrations and flux (different forms of nitrogen and phosphorus), major-ion flux and elevated suspended metal concentrations are the most common responses after fire. Concentrations of dissolved matter tended to decrease after fire, partly due to increased volume of discharge after fires, whereas particulate matter increased in concentration, likely due to recurrent increased erosion. Elevated loading rates of these constituents persist for up to 5 years or more after fire.

The most downloaded papers in the last 60 days (March-April 2018), see http://www.publish.csiro.au/wf#MostRead.

Sleep in wildland firefighters: what do we know and why does it matter? IJWF 27 (2). Grace E. Vincent, Brad Aisbett, Alexander Wolkow, Sarah M. Jay, Nicola D. Ridgers, Sally A. Ferguson.

Fuel and topographic influences on wildland firefighter burnover fatalities in Southern California. IJWF 27 (3). Wesley G. Page, Bret W. Butler.

Mapping Canadian wildland fire interface areas. IJWF 27 (1). Lynn M. Johnston, Mike D. Flannigan.

How do weather and terrain contribute to firefighter entrapments in Australia IJWF 27 (2). Sebastien Lahaye, Jason Sharples, Stuart Matthews, Simon Heemstra, Owen Price, Rachel Badlan.

You own the fuel, but who owns the fire? IJWF 26 (12). Michael Eburn, Geoffrey J. Cary.

A comparison of the US National Fire Danger Rating System (NFDRS) with recorded fire occurrence and final fire size. IJWF 27 (2). Nicholas G. Walding, Hywel T. P. Williams, Scott McGarvie, Claire M. Belcher.

Human-caused fire occurrence modelling in perspective: a review. IJWF 26 (12). Sergi Costafreda-Aumedes, Carles Comas, Cristina Vega-Garcia.

Post-fire surface fuel dynamics in California forests across three burn severity classes. IJWF 27 (2). Bianca N. I. Eskelson, Vicente J. Monleon

Simulating the effectiveness of prescribed burning at altering wildfire behaviour in Tasmania, Australia. IJWF 27 (1). James M. Furlaud, Grant J. Williamson, David M. J. S. Bowman.

Downward spread of smouldering peat fire: the role of moisture, density and oxygen supply. IJWF 26 (11). Xinyan Huang, Guillermo Rein.

2017 AWARD RECIPIENT

EXCELLENCE IN FIRE MANAGEMENT AWARD

An interview that introduces "Steve's Parade Theory of Life," and other lessons learned from Florida, fire and beyond.

Tell us about your career, what attracted you to it, and throughout your career was there a favorite position?

My dad was an engineer and one time I asked him why he didn't encourage me to be an engineer, and he said that I was the first person he ever met who knew in the 3rd grade what they wanted to do, which was to have a career in forestry. So, I went to Stevens Point and had a great time there, and when I got to the Texas Forest Service, they introduced me to fire. I have had the opportunity to introduce people to fire, many of them have embraced it and made it a part of them, and only 3 cases who said, yep, that must be fire and walked away from it and they were done with it. I was one of those people who recognized it for what it was, as far as the ability to paint or mold landscapes and how effective it is at so many things. I became a firm believer in wise fire use. It was there in Texas where I developed this relationship with fire. After Texas, I worked for what was then the Florida Division of Forestry for nearly five years. My last position with them was a fire control supervisor, so I was responsible for prescribed fire and wildland fire suppression in the Jacksonville area. That gave me a bigger picture to the importance for managing fuels in the wildland urban interface. When I came to over to the Water Management District, the program was part of the land acquisition staff, acquisition was the focus and management was an afterthought. Because of this, when I arrived, I was able to be part of the team who built the land management program. I was able to take the things I had learned and implement them, use that experience to mold a program that could capture all the good points and avoid some of the chaff that we'd had the opportunity to observe. When you asked where I have fit best and enjoyed the most, it is my current position because we are molding landscapes on a huge scale, and I'm blessed to work with a really effective team. This is where I think I am supposed to be right now.

Do you have an accomplishment you are most proud of and what do you think might be your most rewarding accomplishment?

You mean beyond earning the Excellence in Fire Management Award from my peers? It is always an honor to be recognized by your peers, because they know what you do best. Many people still think that when we work in fire, you sit in a fire tower and look out over the forest, they don't realize it has more depth than that. When you are recognized by your peers who know what it takes to do what you do, it means so much more.

As you worked through your career, what were some of the biggest challenges you faced?

My first time as an Ops Chief out West, in 2000, Montana was facing a firestorm similar to what they were facing this year (2017). Resources were spread thin. We were supposed to get this little fire in Idaho and instead they had a serious problem in Townsend, MT so they sent our team over there. They gave us the briefing and basically told us that the standard tools won't work because we are that dry and frankly we don't have enough of the standard tools to make a difference anyway, so good luck. We were able to pool some of the resource we were assigned. One of the challenges was that the cattlemen were concerned about the grasslands. They wanted us to know that their houses were insured, what they really wanted us to protect was the grass. That was counterintuitive, but our staff had some experience in agriculture, so they bonded with the ranchers, and suddenly everything started to come together. All of the sudden a light bulb came on, and things turned a corner, and everything worked out and ended successfully. That was one situation that was a really big challenge that we were able to overcome.

How do you feel, in general, about the Wildland Fire Management Program today and what issues and challenges do you see facing us?

I recently completed my Master's degree, and the last class I

STEVEN MILLER

took was Managing Public Lands and Waters. In that course we looked at what Pinchot was trying to do when he was establishing the Forest Service. He looked for people who were connected to their community, had a good skill set and could make good decisions. He tended to empower them because they were going to be a long way from Washington DC, and they were going to have to make good decision without a lot of communication. I think the system has come a long way from that. There is improvement in some ways, we have more tools in the toolbox. But I think we'd strayed away from that path of getting the right people in place and empowering them and helping them to grow with training and opportunities. I would hope we would get back on the track where people were empowered to make decisions, and we are investing in people and their long-term careers. If you provide an employee with really good working environment where they feel like they are contributing and making a difference, and then you nurture that feeling and you support it with training and growth, that is a successful model and I feel we have strayed a bit from that successful model.

At the Fire Behavior and Fuels Conference in Portland, when we were linked to the folks in Australia, one of the speakers in Australia said – you know, "You American's work fire like you play football, when you are on offense you have one group of people out on the field playing offense and when you are on defense you have a different set of people out there. When you switch back and forth, some of the site specific, or time sensitive information is not transferred from one team to the next." He said "We (Australians) approach fire much like we play football, it is the same people on the field whether they are playing offense or defense, they just switch roles, but the same people stay there." I think we could learn from that, it seems like prescribed fire is in one camp, and suppression is in one camp, and people focus on one or the other. There are different sets of rules and different ways of making decisions. Quite possibly we should take a lesson from the Aussies, and work fire like they play their football, soccer, and have the same people on the field whether they are doing prescribed burning with the same guidelines as if they are working suppression.

If you were to look at what you do in your job, and new people coming into the profession, is there any particular skill or knowledge set you could add to make yourself and others do their job better?

I remember going through High School and College, and when I went with my daughter when she was picking a college, people thought all the students who didn't like to talk to people should go into forestry and wildlife. Today, I don't think anything could be further from the truth. People working with natural resources need to be able to communicate clearly with the people they encounter, whether they are people in the community, a lessee on the property, managers, or politicians. Land managers, forester, fire managers need to be able to communicate what they are doing and why it is important to you! So, they need strong communication skills. And the other thing is Geographic Information System, GIS is what I recommend to new students. I used to say Air Photo Interpretation, but now GIS has replaced that. These are both absolutely essential skills for people who want to be successful in lands management or fire management.

Do you have anyone who has been an inspiration to you who has helped you get where you are?

I have two. The first one is the first IC I worked with, Doug Voltolina Sr, he was a district manager with Florida Division of Forestry out of their Bradenton office. Doug had the ability to identify talent and then he would provide them with opportunities to grow. When I would get a phone call from Doug, it was always a good news/bad news situation. The good news was, it was going to be a great opportunity for you, the bad news was that it was going to be an inch outside your comfort zone. He had the ability to see in people more then what they thought themselves capable. You were always challenged, but there was always enough safety in there.

The other is Dale Wade, he sees people who are in places where they could stay and be comfortable, but he encourages them to broaden their horizons and dig deeper for more information. When I would tell him about something we had gotten done, he would say, that's really good but have you looked at this? That is a really good thing to have around, it is easy to become comfortable, but it is good to have a coach who can tell you how to get one more notch up or one more mile down the road.

Do you have any advice you would offer to anyone aspiring to be successful in the wildland fire management discipline?

Stephen Pyne said this specifically about Floridians, but I think it has application on a much broader level, he said– "they, Floridians know that in the public eye, if one of them fails, they have all failed, elsewhere fire divides, in Florida it joins people together." I don't think this is unique to Florida, but I think it has a really good message. Often people get worried about their turf or they become siloed or protective and have boundaries, when in fact if we were all working together we are going to be able to achieve so much more, and it doesn't matter who gets the credit. What matters is the final outcome on the ecosystem, have we made the world a better place. And if we can say we made the world a better place, we can move on to the next mission, that's great!

Do have any favorite quotes or words to live by?

I have what I refer to, Steve's Parade Theory of Life. When we are born we join a parade that is our family. When we begin our careers, we join a parade that is our profession. At the front of

the parade there are people who have gone before us, they've learned lots of things, they served as our teachers, they served as our mentors. They lead us through our families and our careers, and over time they begin to retire and in our families, they begin to pass away. As you are going through your life/career, you don't really think you are necessarily moving forward in the parade, but you've been busy, then one day you look up and you realize that the front of the parade is pretty short, and the back of the parade is pretty long. At that moment you may lament the loss of all those people who were your mentors or teachers. It would be easy to become lost yourself because that leadership is gone. It is at that point, that you turn around and look at the back of the parade and you realize that your responsibility has shifted from learning from the people in front of you, to teaching and leading the people who are behind you in the parade. It is at that point where much of your focus shifts from building your career to helping other build theirs. Going back to my two leaders who served as an inspiration to me, they did this well.

Any thoughts on the role and importance of the IAWF and how the association can help the wildfire organizations accomplish their missions?

I think Steve's Parade Theory of Life highlights the role of the IAWF. It is a mechanism like a switchboard operator for connecting some of the people who are at the front of the parade with some of the people who have recently joined the parade. I think, if we can convey some of the lessons we learned, we will be able to help people go further down the track, because they start with more knowledge and wisdom because we shared it with them. I think IAWF has the ability to connect people throughout the length of the parade.

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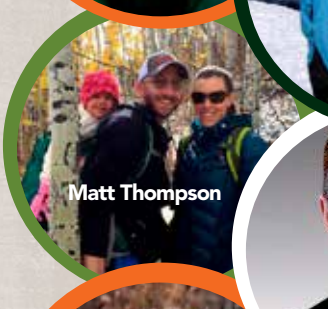

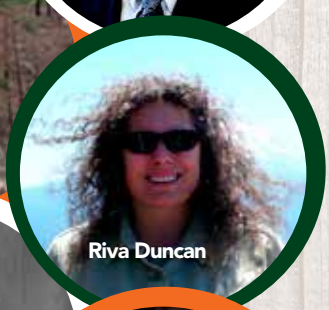

The Association for Fire Ecology and International Association of Wildland Fire have partnered to bring you an enlightening and innovative event! This not to be missed event will be held on the beautiful University campus in Missoula, Montana the week of **May 21 - 24, 2018**.

Wildland fire science and management are defined by continuums, **The Fire Continuum Conference** will take you on a journey from science and management activities that take place before a wildfire occurs through the post fire activities and fire ecology.

Visit our webpage for a full listing of our Plenary and Panel Sessions. The detailed program schedule will be completed soon. We have already accepted 19 Special Sessions and 14 Workshops. We also have 5 great Field Trips we are offering on Wednesday afternoon.

THE FIRE CONTINUUM CONFERENCE

MAY 21-24, 2018 • MISSOULA, MT

PREPARING FOR THE FUTURE OF WILDLAND FIRE

WELCOME & OPENING REMARKS

Tony Incashola, Sr.,Tribal Elder, Confederated Salish & Kootenai

KEYNOTE PRESENTATION – MONDAY

The Fire Season Next Time: The Need for a Modern Analytical Strategy for Wildfire Management

Dave Calkin, PhD, Supervisory Research Forester, Human Dimensions Program, US Forest Service Rocky Mountain Research Station, Missoula, MT.

KEYNOTE PRESENTATION – TUESDAY

What Will it Take to Advance Wildland Fire Behavior Science?

Mark Finney, Research Forester, USDA Forest Service, Missoula Fire Sciences Laboratory

KEYNOTE PRESENTATION – THURSDAY

Postfire Ecology in the Face of Rapid Global Change

Jon E. Keeley, Senior ST Research Scientist, U.S. Geological Society

LONG TERM FIRE PLANNING PANEL – MONDAY

Riva Duncan, Interagency Fire Staff Officer, Umpqua National Forest, Roseburg, OR
Matthew Thompson, Research Forester, RMRS, Fort Collins, CO
Tim Sexton, Program Manager, Wildland Fire Research Development & Applications Program

FIRE BEHAVIOR PANEL SESSION – TUESDAY

Erin Noonan-Wright, Fire Application Specialist, Wildland Fire Management Research Development and Application Group (WFMRD&A)
Laura Ward, Lolo National Forest Fire Management Officer
Rod Linn, Los Alamos National Laboratory

FIRE EVENT PANEL SESSION – POST FIRE ACTIVITIES AND FIRE ECOLOGY – THURSDAY

Michael Norton, Director General, Northern Forestry Centre, Natural Resources Canada, Edmonton, Alberta
Paul Hessburg, Research Landscape Ecologist
Bill Avey, Forest Supervisor, Helena-Lewis and Clark NF

THE

FIRE CONTINUUM

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PREPARING FOR THE **FUTURE** OF **WILDLAND FIRE** CONFERENCE

Evening Events

WEDNESDAY 6:30-10 PM
DOWNTOWN IN CARAS PARK

STREET EATS & BEATS – featuring food trucks, a no-host bar, and music by the **Zeppo Blues Band**. Zeppo likes to get the party going from set one til time to shut it down…experience road house blues, southern blues, motown soul, instrumentals, smooth vocals, and just a down right great band for any occasion.

THURSDAY EVENING MARSHALL MOUNTAIN
AFTER CONFERENCE PARTY AT MARSHALL MOUNTAIN.

Jam and sing along with The Flaming Wheelbarrows, fire-pit, s'mores, no-host bar and great networking! Bring your instruments to join in! High in the Rattlesnake Mountains, just seven and one-half miles from Missoula – we will provide transportation to and from the host hotels.

ART EXHIBIT & COMPETITION

Join us by sharing your expression in our Wildland Fire themed Art Exhibition. All art media is welcome and encouraged including textile, painting, wearable, photography, ceramics, collage, poetry, sculpture, carving etc. You don't need to attend the conference to participate. Participants are invited to donate their work to a silent auction fundraiser supporting the "Mike DaLuz Memorial Student Travel Scholarship Fund" and the "IAWF Student Scholarship Fund".

WELLNESS PROGRAM

We all know that our health and wellness should take top priority, but sometimes we need a reminder, especially while traveling. Take advantage of the group led physical activity sessions we will be providing. such as Yoga, Running, Hiking and more. We will also be offering a wellness lounge where you can relax and get away for a few moments.

If you would like to host or sponsor an **Alumni Event**, **please contact us.** We would be happy to help you organize and promote your activity

Association for Fire Ecology

International Association of Wildland Fire

firecontinuumconference.org

IMAGES
INFERNO

PHOTOS: KARI GREER
ESSAY: STEPHEN PYNE

Low intensity ground fire at night on the Elk Complex, Boise NF, ID, 2012

Seeing the Light, Feeling the Heat

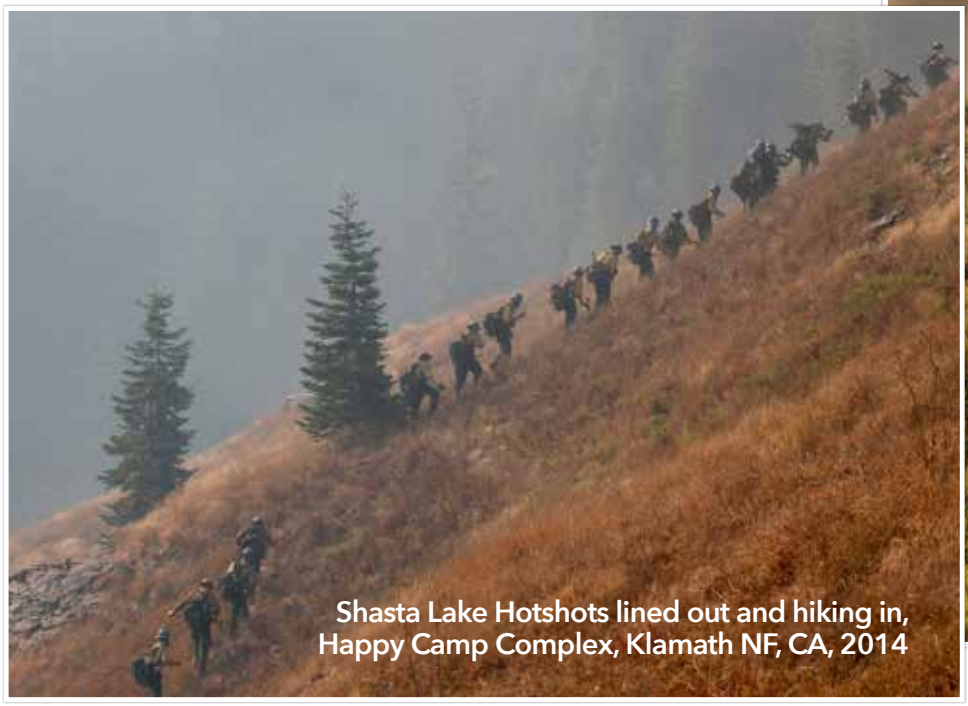
An essay by Stephen Pyne

FIRE PHOTOGRAPHY BEGAN EARLY. As soon as photographs could replace lithographs in magazines and newspapers, photos of firefights, the aftermath of bad burns, and occasionally even flame and smoke appeared. When Harper's Weekly covered the 1871 and 1894 fires in Wisconsin and Minnesota, it relied on artists' drawings. The 1903 and 1908 fires in New York and the Northwest had photographs. Their value spread from reportage to propaganda as those who campaigned for forest conservation recognized the value of such images for publicity.

Some systematic use began when Gifford Pinchot institutionalized photography in the embryonic U.S. Forest Service. Its purpose was to inform, motivate, and dazzle. The agency could stay with a fire and its aftermath long after newspaper journalists rushed on to the next new thing to catch the public's fancy. The Forest Service's investment also shifted the human-interest focus from general citizens to firefighters. The best visual record of the American fire scene in the first half of the 20th century is that agency's historic photo collection.

Those early images defined the type of scenes, topics, composition, and message or emotion sought in the viewer. The photographers were informed by earlier drawings and paintings, but photography had its own attributes, and matters of basic design evolved to suit its capabilities. As in so many areas of wildland fire, the Great Fires of 1910 estab-

Before



Shasta Lake Hotshots lined out and hiking in, Happy Camp Complex, Klamath NF, CA, 2014

lished the modern genre when, two weeks after the Big Blowup, the Forest Service sent R.H. McKay from the Missoula office to photograph the fires' aftermath around Wallace, Idaho.

In those days photography was cumbersome and deliberate. McKay's portfolio gave us wrecked landscapes, portraits of participants like Will Morris and Joe Halm, the lethal root cellar at the Beauchamp homestead, and the striking drama of the Nicholson adit where Ed Pulaski had held his men while the flames passed over. McKay didn't invent fire photography—there are other images from even those fires, including smoke plumes, and other themes, notably the burning of towns like Wallace—but McKay's suite of images seemed to imprint themselves onto the psyche of the Forest Service. This mattered because the agency became a consistent patron of fire photography.

Besides newspaper photos, those images were the primary means fire entered popular culture. Increasing numbers of Americans knew fire not from personal experience but through photographs. (Moreover, panoramas of blasted landscapes were of a piece with disaster photographs generally, and with the evolving photography of war.) Wildfire images merged with those of disasters and wars to shape what seemed a common genre. Those formative photos served as templates for much of what would follow.

Today's fire photos still echo those early images. Early black and white photos were well suited for burned-over landscapes or posed portraiture. But no photographer in 1910, burdened with the cameras of the day, could hope to embed himself in the action as it unfolded. With the technology available, a select number of topics could be addressed in a select number of ways. In time cameras became more mobile, and photographic journalism more agile. Modern photographers could add color and action; images looked like reports from the front rather than documentaries after the flames had passed.

Contemporary technology has changed imagemaking and publishing. Today's cameras allow for greater speed and details. They capture split-second movement, blasting the eye with swirling colors of flame and smoke. Photographers can enter the movement of the fire. With no limits on the number of photographs taken, after-the-fact curation replaces on-site composition, further encouraged by digital editing software. With the advent of drones and remote cameras, we don't even need an on-the-scene photographer to record events. It's an era of inexhaustible images. The role of the contemporary fire photographer is no longer simply to record but to interpret, investing a sensitivity that we call art.

One soaring visually striking flame image can look much like another. They become visual clichés, amenable to machine algorithms. The big and the garish are just images, so much visual data. Everyone carries cameras in their pockets; the culture is awash in fire imagery. Saturation soon segues into surfeit, which yields to boring. The truly

Large column produced by extreme fire behavior in heavy timber dropping embers out ahead of itself and starting spot fires on the Pioneer Fire, Boise NF, ID, 2016

striking and enduring of today's photos are not those filled with the most gargantuan flames, but with an artful arranging of the fire, smoke plume or people in ways that enhance understanding and emotional connection. These images convey meaning through the aesthetic pleasure of seeing something thought familiar with fresh eyes. This is fire photography as fine art.

Meaning can also come from the theme conveyed. Here the subject gets stickier. For 50 years after 1910, led by the U.S. Forest Service, the country tried to remove fire from the landscape. The traditional tropes—fire as battlefield, fire as disaster—fit this message like a hand on a pulaski. The strategy, however, took out good fires as well as bad.

Then came a revolution in thinking, which led to policy reforms. For the past 50 years we have tried to reinstate good fire, with mixed results. It's a much trickier proposition to convey a message of pluralism than to advance a single argument. Smokey Bear could boldly declare that "Only You Can Prevent Forest Fires," and Smokey as propaganda art flourished in popular consciousness. (It's useful to remember Smokey's World War II origins as part of the Wartime Ad Council.) It's harder to convey a message that says some fires are good and some bad and to rally art to embed that notion in the culture. It's much easier to continue the old tropes, now more dramatic and visually spectacular than ever thanks to digital technology. Fire suppression remains the default setting, with fire photography working in support of that mission.

Visual media—both motion and still images—remain the primary way the American public understands fire. Fire photography has excelled in delivering the story of the firefight. It has not found an equivalent way to deliver the modern story of fire's varied management. The fault doesn't lie with the visuals so much as the story they must narrate. The modern desire to manage fire has an operating thesis; it doesn't yet have a working narrative agreeable to the general public. It's hard for photographers to illustrate a story that remains inchoate, and perhaps harder to devise images that can substitute for story. Still, photography has in the past helped inform our guiding narrative. It could do so again.

Our great philosopher of Pragmatism, William James, got it right when he argued in "What Makes a Life Significant" that what we want is the visible sign of struggle. The higher the stakes, the more desperate the battle, the greater the viewer's engagement. A firefight can stand as a dictionary definition of such a contest. Our current relationship with fire is more fraught and complex, and it lacks the visual clarity of the firefight, which is to say, a moral melodrama. We have a photographic chronicle, and a remarkable family album of the fire community, as combatants. What we need is the message of being co-inhabitants; a sense of fire as a way of life. A war on fire can only end in defeat. A shared journey with fire can light our way into the future.

During

THE WILDLAND FIRE SCENE TODAY is full of paradoxes. It has mixed landscapes, where wild and urban mingle promiscuously. It has mixed wildfires, in which suppression and prescribed burning can co-exist even on the same fire. Today's wildland fires are fusing what had been separate realms, and for photography, separate genres.

But that is true for the West generally. Landscape photographers have eliminated borders that once separated old scenes and the images appropriate to them. They put powerlines and human artifacts into wilderness panoramas. They treat trailer courts and waste dumps with the aesthetic sensibility previously reserved for pristine parklands. They make the ordinary exotic, and the fabulous banal. They are overlaying current scenes with pastiches of past images. This is also where fire photography as art—as imagery beyond simple reportage—may likely go. It will be interesting to see what genre paradoxes might result.

Fire is a supremely sensuous phenomenon, and primarily a visual one. It does not merely illuminate: it radiates. Photography can allow us to see that blasting light and in recent developments to almost feel the heat. It remains the primary bond between the American fire subculture and American society at large. How photography might use its aesthetic prowess to not only record today's fires, but to speak to contemporary ideas and policy is the challenge for the years to come. In that, once again, fire photography can stand for the American fire community overall.

Pyrocumulous column on the Pioneer Fire, Boise NF, ID, 2016

Gila Hotshot cooling the base of a tree during a burn operation on the Umpqua North Complex, Umpqua NF, OR, 2017

Favorable low intensity backing fire behind a home in First Creek on Lake Chelan during the First Creek Fire, Okanongan-Wenatchee NF, WA, 2015

After

Idaho City Hotshots hiking up dozer line on the Springs Fire, Boise NF, ID, 2012

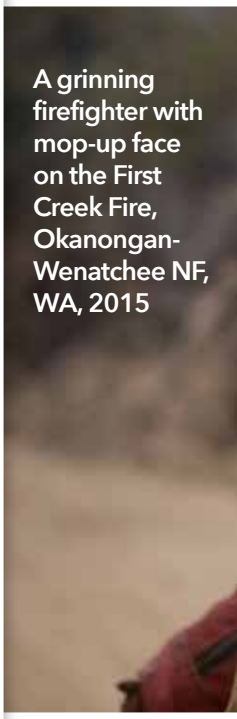
Idaho City Hotshots hiking on the Pioneer Fire, Boise NF, ID, 2016

After effects of stand replacement burn in contiguous heavy timber on the Whitewater-Baldy Complex, Gila NF, NM, 2012

ABOUT THE EXHIBIT

In April 2018, THE PRICHARD ART GALLERY at the University of Idaho (Moscow, ID) presented the first thorough exhibition of Kari Greer's photographs (with the exhibit also being shown in May 2018 at The Fire Continuum Conference, co-hosted by the Association of Fire Ecology and the International Association of Wildland Fire). Greer's images usually serve as supplements to words and reports; this project provides the space for their full appreciation. Due to increased wildfire activity our summer skies progress from azure blue through hazy tones, achieving a true sense of brown. In 2015, 10.1 million acres burned in the US. The increasing length and severity of fire seasons makes this project timely and important. Scientists comprehend what it means to live in a fire environment, including when to suppress, contain or let fires burn. The goal of this project is to help propel greater public coversation and understanding of this volatile dynamic. KARI GREER is a photographer with the National Interagency Fire Center based in Boise, Idaho. Kari specializes in wildland fire photography and editorial photojournalism. Her interest in wildland fire photography was sparked during her college years, working on a Forest Service fire crew on the Gifford-Pinchot National Forest in Washington. Her work has appeared in numerous publications including Outside Magazine, National Geographic Adventure, Wildland Firefighter and The New York Times. She has an online video interview in Yahoo Studios for The Weekly Flickr as well as on CNN. Kari studied photography at California State University-Sacramento and spent time in a workshop with Mary Ellen Mark, collaborating with Icelandic photographer Erla Stefánsdóttir and National Geographic photographer Brooks Walker. Essayist STEPHEN PYNE is a Regents professor at Arizona State University and the author of 30 books, 21 of them dealing with fire. He's twice held NEH fellowships, twice been a fellow to the National Humanities Center, has received a MacArthur Fellowship, and been awarded the Los Angeles Times' Robert Kirsch award for body-of-work contribution to American letters.

Boise Hotshots saw team Allison Lund and Dan Walker mopping up on the Mack Fire, Boise NF, ID, 2014



A grinning firefighter with mop-up face on the First Creek Fire, Okanongan-Wenatchee NF, WA, 2015

PROJECT PARTNERS include:

The National Endowment for the Arts, through an Arts Work grant. The Idaho Commission on the Arts, through a QuickFunds grant. Forest Fire Lookout Association, founded in 1990, is an organization involved in research of forest fire lookout sites, ground cabins and early forest fire detection methods. Northern Rockies Fire Science Network disseminates science and cultivates networks of managers and scientists.

(And this exhibit is also being displayed at the Fire Continuum conference, Missoula MT.)

Project consultant PENNY MORGAN is a professor in the Department of Forest, Rangeland, and Fire Sciences at the University of Idaho. Recently recognized with a Lifetime Achievement Award by the national Association for Fire Ecology, she seeks to understand how vegetation responds so quickly to fires.

Project consultant C. ROD BACON first served as a fire lookout in 1969. He has spent 20+ seasons as a lookout in the Northwest. He has a long interest in photography. He's taken workshops with master photographers Al Weber, Gordon Hutchings, Bruce Barnbaum, John Sexton and Anne Larson.

PRICHARD ART GALLERY staff who supported the exhibit includes Roger H.D. Rowley, Director & Project Curator, and Nara Woodland, Assistant Director.

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– Sponsored Product Update –

Artificial Intelligence - the Next Tool for Fire Detection

FIRES ARE DETECTED INCIDENTALLY. For many years firefighters, foresters, non-profit organizations, insurance companies and many other institutions actively educate society on wildfire prevention. From primary education, through Smokey Bear to national Firewise programs – we learn how to prevent wildfires and minimize the potential consequences. Thanks to longstanding education 95% of adults and 77% of children recognize Smokey Bear's admonition, "Only you can prevent forest fires." Almost 1400 local communities in the United States apply the principles of reducing wildfire risks and home protection drawn up in Firewise programs. Undoubtedly, the effects of education, are a major success.

9 OUT OF 10 FIRES ARE DETECTED BY CHANCE. Thanks to education and worsening fire seasons, the sensitivity to the matters of wildfire in American society is very high. Yet from our observations, it appears that some 90% of fire reports are made by random people and only 10% by specialized services. Modern, very expensive, government-financed satellite technologies (MODIS, VIIRS, Landsat-8/OLI, GOES-16, even Australian geostationary satellite Himawari-8) are detecting only a minority of fires. Regardless of the method of detection, time is of utmost importance while fighting a fire. The quicker the fire is detected, the faster the firefighters reach it. It goes without saying: the quicker the fire is under control, the lesser the consequences.

Firefighters do not like to waste time and are ready for work as soon as they receive a report. But how much time passes since the fire started and is in fact detected and reported? Sometimes it takes minutes, sometimes hours - in 90% of cases, it happens by chance.

Human sensitivity and observance is certain, but what about when no one is there to see the fire? How to help local communities?

CAMERAS INSTEAD OF EYES. For years, specially designed cameras and software have been used for fire surveillance. The cost of installation is high, and creation of the complicated and necessary infrastructure makes it almost impossible to be applied on a big scale. Foresters and firefighters are familiarized with IT tools which analyze and detect smoke in images. Unfortunately, those devices do not function at their best – the software takes two pictures and analyzes differences between them, and this method's side effect is the high percentage of false alarms. Additionally, such approach eliminates the potential input of the local communities.

What if an inexpensive AI-equipped camera, capable of independently detecting fire, was used? Such a perfect surveillance device could be installed on homes, buildings, poles, chimneys etc. It could automatically notify the residents and firefighters about the detected fire. SmokeD intelligent camera is exactly such a device. It uses its software to detect fire, works 24/7 and its available now. This will help communities be aware and help with early fire detection warnings.

ARTIFICIAL INTELLIGENCE. Traditional methods of image analysis are based on comparing two pictures made at different times. The algorithms search for differences in the images and if any are found, an alarm is sent. It is difficult for an algorithm to find smoke, as it lacks distinct boundaries and is frequently similar to clouds, fog, smog or dust. Traditional algorithms work very well when there are no clouds in the sky, but their efficiency drops when images include clouds or even their shadows.

The newest research proves that those algorithms supported by AI analyze the images more accurately. The methodology used perceives smoke not as an object, but rather as a noise, an interference disrupting the image. Moreover, the AI is capable of learning about its surroundings – the longer it works, the smarter it gets. Thanks to all those characteristics, the SmokeD camera is capable of detecting smoke in one picture, without the necessity of comparing it to another, which considerably shortens the time of fire detection.

10 MINUTES AND A PHONE NOTIFICATION. In 2017 SmokeD camera's software was able to detect fires, on average, in 10 minutes or less from the beginning (meaning the time when smoke appeared above vegetation). The fastest detection was 45 seconds. Some false alarms happened during that year, but they were all a part of the learning process for the AI. The SmokeD system, which consists of a camera and software, using millions of images to learn.

The fire notifications were sent to over 5000 users of SmokeD Alerts app. In the newest version of the app, apart from being sent the notifications, users can report a fire themselves by taking a picture and sending it to the fire department. This is a perfect tool for firefighters, wildfire zones residents as well as tourists. SmokeD Alerts app is available for free both on the AppStore and Google Play.

According to the report by National Interagency Fire Center, in the last year alone 71,499 fires were detected, affecting over 10 million acres. Extinguishing the fires cost almost 3 billion dollars. What would be different if all of those fires were detected and reported in up to 10 minutes?

Sponsored content written by***Artur Matuszczak*. IT for Nature.**
https://www.linkedin.com/in/art-matuszczak/

– Sponsored Product Update –

To measure and document wildfire behavior, and share the research findings with those who can apply the lessons.

Miltiadis Athanasiou on a fire assignment in 2012. Photo: Bryan Dudas

The IAWF annually awards a range of scholarships to students, scholars, and researchers working in the wide range of interdisciplinary fields that increase our knowledge and management of wildfires and bushfires. Dr Miltiadis Athanasiou was awarded the IAWF Doctoral Student Scholarship in 2014. Read more about what he has been up to since as a scientist, a teacher and a fire fighter.

***By** Dr. Miltiadis Athanasiou*

My research work includes data collection on "live" wildfires and relevant analysis. I have produced several publications documenting wildfires and analyzing fire behavior (fire spread, spotting, crowning) in Greece and I am the recipient of the International Association of Wildland Fire (IAWF) Doctoral Student Scholarship for 2014.

STUDIES IN WILDFIRE

I studied Environmental Science at the University of the Aegean, Lesvos, Greece and I have also received a M.Sc. Degree in Prevention and Management of Natural Disasters from the National and Kapodistrian University of Athens. My post-graduate dissertation was on the topic of wildfire management and I pursued my PhD degree in the same field at the same University. The title of my Ph.D. dissertation is "Development of an optimal methodology for forecasting forest fire behavior in Greece" [1].

Receiving the IAWF scholarship, was a strong encouragement for me in my final push for completing my PhD thesis and it made me feel deeply honored. Although the scholarship helped me offset some costs, the financial aspect comes second when considering that the scholarship came from

the IAWF, which is a true global effort for advancing all aspects of wildfire science and real-world applications.

Measuring wildfire behaviour is a difficult subject with highly demanding data collection procedures and tasks which I have carried out effectively and with safety, helped by my 18 years' experience in firefighting.

WORK AS A TRAINER AND A TEACHER

My firefighting training and operational experience commenced in 2000 with the Special Units of Disaster Response, Hellenic Fire Corps. I became Lead Supervisor and Operational Coordinator, of a Natural Disaster Response and Relief Volunteer Team and I have also served with the 6th Fire Department Station of Athens as a volunteer firefighter (fire engine crew member). I have also worked in aerial firefighting, as crew member of heavy-lift (Type I) helicopters in Greece, for five fire seasons (2011-2015).

I have 20 years experience in environmental management and have built significant experience in forest fire management. I have undertaken and carried out research projects, studies and operational plans for wildfire management and suppression, cooperating with the National and Kapodistrian University of Athens, the Technological Educational Institute of the Ionian Islands, private companies and with the Non-Governmental Organization WWF Hellas.

I also teach the "Topography and Geoinformatics in Disaster Relief and Rescue Operations" Course, in the Hellenic Fire Academy and the "Wildfires management" courses in two postgraduate programs at the National and Kapodistrian University of Athens.

Last but not least, I give lectures at fire stations across Greece, teaching both professional and volunteer firefighters, about the topics of wildfire behaviour, hazards, human factors, safety and health on the fire line, and forest firefighting tactics.

RESEARCH ON FIRE BEHAVIOUR PREDICTION IN GREECE

My research aims to improve wildfire behaviour prediction in Greece and the Mediterranean region, to support fire management (prevention and suppression) and to improve fire fighter safety.

To begin with, my research strove, at first, to provide scientifically supported answers about the accuracy and reliability of predictions of existing surface fire behavior modeling systems ([2], [3], [4]) when used with Greek fuel models as inputs. Furthermore, a similar evaluation of an existing crown fire behavior prediction system [5], has been conducted, also. My research has addressed questions such as comparing fire modelling (with its expected accuracy) to the empirical capacity of officers of various levels of firefighting involvement and experience to forecast fire behaviour for a set of conditions; it examines the role and thresholds of non-linear phenomena such as spotting [6] and crowning as well as of extreme phenomena, such as the onset of strong plumes and megafires [7].

The greatest challenge for tackling these questions is obtaining appropriate wildfire behaviour data. Starting from my M.Sc. work in 2007 and continuing every fire season, I have been developing a database of fire behaviour data from field observations and measurements made during

Embers burning a slope. The study of fire progression in Greece was a component of Athanasiou's doctoral studies. Photo: Dimitris Psaltakis.

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Much of Miltiadis Athanasiou's research required on-scene monitoring, often facilitated by motorcycle. Photo: Miltiadis Athanasiou.

wildfires in Greece. It now consists of more than 200 records and is continuously being enriched and extended.

I carry out fire behaviour observations in the field by following running fires, documenting the main controlling factors (fuels, topography, weather, firefighting) and observing and documenting fire behaviour through photographs, video and voice recording. A large number of kilometres has to be travelled, which I mainly do on motorcycle, in order to get to the fires and eventually achieve a thorough and detailed documentation of their evolution, spread and behaviour. Furthermore, office analysis of the recorded material demands endless hours and post fire interviews, live TV footage and internet sources, are also used to double check my personal observations.

The results of my research have been incorporated into a spreadsheet that can be used as a simple and easy to use Decision Support System (DSS). Based on this research, a table has been assembled suggesting the wildfire behavior prediction method of choice for each fuel and fire type while limitations, weaknesses and strengths are also reported, and cases for which there is no available wildfire behavior prediction method are identified.

The findings fall into three main categories:

1. Those which are already being used by a few firefighters and peers as a supportive tool in operational firefighting;
2. Those which have been found to be robust enough so that they can be adopted and utilized as a potential basis of decisions or as predictive tools in wildfire management in the country and,
3. Those that must be examined and validated before they could be applied for practical purposes.

Regarding the first category, presence or lack of spotting have been examined for more than 100 fires, categorizing them in four empirical spotting classes (absence of the phenomenon, rare, limited and massive spotting) and correlating these classes with air relative humidity values and with the three forest fuel types on which the firebrands were landed (maquis, small xeric shrubs (phrygana) and grass) [6].

Analysis of the observations and measurements of spotting led to some preliminary conclusions on RH% thresholds for spotting that were presented at the 16th, Panhellenic Forestry Conference, in Thessaloniki, Greece, in 2013 [6]. The data series and the results of this paper were the first approach of this type to the spotting phenomenon in Greece. Though preliminary, those findings are already being utilised by many professional and volunteer firefighters in Greece.

Of course, the analysis of spotting phenomenon has not stopped; the initial data (enriched by those that were obtained during the last four fire seasons) are currently being processed and will soon be submitted for publication.

For the second category, the Greek fuel models that describe tall maquis, short maquis, some phryganic areas and grasslands, respectively, BehavePlus can be a useful tool for predictions of surface wildfire Rate of Spread (ROS) [8] and provide a quick and easy way to do either initial, managerial or real-time fire behavior assessments due to its 'point-based' fire modeling approach. Four corresponding statistically significant linear regression equations that have been developed and can be used for adjusting BehavePlus predictions to match "real world" fire behaviour, can also be incorporated in fire spread simulation systems used in Greece such as FLogA [1]. This spatial wildfire spread simulation system was found to produce reasonable fire behaviour simulations, regarding the ROS and the burned area, when these Greek fuel models and realistic wind field data were used as input data [1].

The analysis of the flame length (FL) for the same fuel types that were described by the same fuel models, showed that BehavePlus predictions are not reliable. Moreover, the finding that FL is seriously under-predicted when using BehavePlus with the Phrygana II fuel model [9] to predict fire behaviour in Sarcopoterium spinosum dominated phrygana fields is an important result that can be very useful for the safety of firefighters. It should be seriously taken into consideration in operational

firefighting as the underestimation takes place in a narrow band of FL values that includes the FL threshold value of 1.2 m, which is considered as the limit for direct attack on the flames with hand tools [8]. The first results of this effort were presented at the 7th International Conference on Forest Fire Research in Coimbra, Portugal, November 2014 [8].

Even though CFIS was deemed as inappropriate for operational use in Greece before further testing, since it failed systematically to predict the crown fire type and the active crown fire ROS in Aleppo pine forests with tall maquis understory, it might still be quite useful as a training tool for the estimation of crown initiation and could be suitably incorporated in firefighters training courses [1]. The necessary input data can be estimated using the above mentioned DSS, which includes three different ways of Canopy Bulk Density (CBD) estimation for Pinus halepensis forests.

In the third category, empirical equations have been developed for the prediction of surface and active crown wildfire ROS and for the estimation of the minimum surface ROS value for active crowning. Their reliability and the ranges of conditions into which they are valid, need to be tested [1].

For instance, the analysis of the database subsets of passive crown and active crown fires, has led to the generation of a ROS criterion for active crowning in Aleppo pine forests with tall maquis understory. Following the empirical approach of Van Wagner [10], the equation that was developed calculates, for any specified value of CBD, the critical surface ROS value (threshold) above which active crowning can be sustained. Another preliminary result about active crown ROS in Aleppo pine forests is that it is about two times greater than surface ROS in tall maquis understory.

Recently, we developed a fuel model for areas covered by Cistus spp. by using the destructive sampling method. This fuel model is intended to be used as input for fire behavior prediction systems such as BehavePlus. The next necessary step for adopting it, is to test its performance by comparing fire behavior prediction through modeling with fire behavior observations. The overall effort was presented at the 18th Panhellenic Forestry Conference, in Edessa, Greece, October 2017 [11].

APPLIED OUTCOMES FROM FIELD-BASED RESEARCH

All this work is expected to benefit the Greek fire management community as it will provide scientifically supported arguments on which methods should be employed for fire behaviour prediction, when they should be used and how they should be adopted. International fire managers can also benefit. Increased understanding on the expected accuracy of fire behaviour predictions for Mediterranean fuels can have a significant effect on safety margins establishment during decision making and hence, increase fire management effectiveness in prevention, pre-suppression planning and fire suppression.

Downslope smoke and fire. Photo: Miltiadis Athanasiou.

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A component of Athonasiou's research is dedicated to field outreach. Here he discusses fire behavior with a crew on a hillside of fuels. Photo: Dimitris Psaltakis.

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FIRE AND SMOKE ALARMS

In our work we focus on wildland fires but we can't overlook the fire risk in our own homes.

In this issue we introduce an occasional column focusing on the lives and families of wildland firefighters — on the fireline and in our homes and communities. This joins a range of initiatives designed to help us take care of ourselves and our families with the same attention that we take care of our communities and landscapes.

By Kathy Clay

It is 2 a.m. and you are in a deep sleep.

Downstairs in your living room, some papers that got tossed too close to the baseboard heater start to burn. The fire spreads rapidly to the polyester curtains and furniture nearby. Your small living room is minutes from flashover – a condition where everything in the room is burning and nothing living can survive.

Will your smoke alarm work? Will you be able to get out of your house?

Smoke alarms are the first defense to notify you of smoke in the air. Without this alarm, the fire grows and your time for escape narrows. With the introduction of synthetic fabrics, fire spreads quicker and has become more deadly due to increased heat and smoke generated from burning synthetic materials.

Underwriters Laboratory (UL) provided the structural fire service the results of intensive studies on modern fires verses the legacy fire in a report titled, "Analysis of Changing Residential Fire Dynamics" (Kerber, 2014). In other words, how fire behaves when burning Grandmother's interior decorating compared to your modern interior decorating. The results were game-changing for the structural firefighter. Rooms that historically took 25 minutes to come to flashover, are now taking less than five minutes to flashover. The impact of this change in fire behavior is even more reason why rapid alarming of developing smoke is a critical warning in the home.

According to the National Fire Protection Association (NFPA), more than 1.3 million fires were reported by fire departments in 2015. About 475,500 of these fires were structure fires with 371,500 occurring in residential structures. The good news is this number is a drop of 5 percent from the year before and the lowest number since NFPA began collecting fire data (Haynes, 2017).

Unfortunately, as the occurrences of structure fires decreases, the number of fatalities has escalated to 3,390 civilian deaths, the highest number of fatalities since 2008. The way a residential fire has changed due to the introduction of synthetic materials might help explain this increase in fatalities.

As a wildland firefighter, this might seem like an unusual topic to ponder. Most of the summer days, you sleep in a tent or under the open sky. Smoke is quite often in the air. Night comes, the air cools, the smoke drops and you sleep, weary from a hard day's work.

The seasons change and we come inside. Consider the expansion of your personal protection to include smoke alarms in your home. Safety is not limited to the time you are on the line.

When was the last time you thought about your smoke alarm? A study conducted by Vision 20/20, which focuses on "National Strategies for Fire Loss Prevention" (https://strategicfire.org), identified "The Smoke Alarm Problem" and revealed these life-saving devices are simply forgotten about in the home (FireEngineering, 2014). Smoke alarms are not viewed as an essential part of daily living by most homeowners. Easily forgotten and often overlooked, many homes have inadequate devices for proper protection and many devices are not maintained. The average lifespan of a smoke alarm is ten years. Ask yourself, how old are your smoke alarms?

Given the data, your first step should be to install a smoke alarm in every bedroom and on every floor of your home, and then insure that the alarms are maintained and in good working order – so you and your family can receive the sounding alert and then can respond to the rapid development of fire in your home.

Having an escape plan is a critical next step. If you cannot escape a fire, your bedroom door can save your life. Once again, through the research of UL and the Fire Safety Research Institute, research proves that closing your door to fire can save your life (FireScience, n.d.). The results are dramatic. Compare a room exposed to fire with an open door next to a room with a closed door. The difference is remarkable. (FSRI, 2017)

Today's fast-moving residential fires require a new awareness. Don't make the mistake of thinking a fire can't happen to you. Make sure you have a working smoke alarm in all the right places. Make sure you have an escape plan and know that if you cannot

Fire safety isn't only for the fireline. Research by Vision 20/20 notes the increased risk we face from modern, more flammable materials that jump to "flashover" far faster when fires ignite in homes. Which makes an update and check of your home smoke alarm even more vital. PHOTO: Kathy Clay.

get out of your home, closing the door will give you more life-saving time. Enhance your PPE and make sure you have another summer ahead to enjoy the outdoors and wildland firefighting.

Background

For a side-by-side comparison of modern vs. legacy fire behavior, see the UL produced video at https://www.youtube.com/watch?v=aDNPhq5ggoE.

For information on installing and maintaining smoke alarms, go to https://www.nfpa.org/Public-Education/By-topic/Smoke-alarms/Installing-and-maintaining-smoke-alarms For further information on *Close Your Door*, go to http://bit.ly/2GIoJnq.

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About the Author

Kathy Clay is Fire Marshal and Battalion Chief for Jackson Hole Fire, Wyoming, USA, and an IAWF board member since 2013. She serves the fire world promoting fire and injury prevention, works with new and existing structures to ensure code compliance, investigates structure and wildland fires, provides command on emergency incidents, and maintains EMT certification for medical first response.

Fired Up Honoree

Cybelle Immitt

IAWF commends Cybelle for her innovative approach of tying in wildfire safety with natural resource planning. In addition to being featured in **Wildfire Magazine.** *Cybelle will receive a complimentary one-year IAWF Membership and her story will be shared on social media. To nominate someone you think is worthy of mention to "Fired Up," please visit https://www.iawfonline.org/fired-up/.*

By Michele Steinberg

Our Fired Up honoree for April 2018 is Cybelle Immitt, a Senior Planner for Humboldt County Natural Resources Planning. One of her favorite responsibilities is providing organizational support to the Humboldt County Fire Safe Council. We met Cybelle in 2016 in Santiago, Chile, where she was participating in CONAF (Chilean national forestry agency) as part of a tour for the Chile California Council.

At that meeting she presented her background and achievements to the assembled group at a workshop; we were amazed to learn all that she had done in her role as a county planner in tying in wildfire safety with natural resources planning. She is largely responsible for the great success of the local Fire Safe Council and for motivating many small communities in the county to become Firewise. She has a unique background that serves her well in her multifaceted role at the county level. The findings about "what works" in her mostly rural county are

very important and should be shared widely with similar areas throughout the US and other countries (as she did in Chile).

In her role as a Senior Planner, she has the opportunity to work closely with a group of local, state, and federal professionals and volunteers from diverse backgrounds who are all passionate about preparing residents to live safely within a wildfire environment. With guidance from and in collaboration with Fire Safe Council members, Ms. Immitt has focused significant effort on implementing the Humboldt County Community Wildfire Protection Plan, which includes the administration of a Firewise Communities technical support and small grant program.

The Firewise Program is designed to empower communities within the wildland urban interface to reduce their risk to wildfire losses and encourages residents to work together and take action. Many of the communities she works with are rural and remote with homesteads dispersed over a forested, high wildfire hazard landscape. Identifying local champions for the Firewise message and providing them with support and resources has been important to the success of the program.

To date, Ms. Immitt has helped ten communities complete the Firewise recognition program and is in the process of completing an eleventh. She has managed the disbursement of grant funds to support projects in these communities such as defensible space demonstration sites, chipper programs, Firewise events, the creation and distribution of outreach materials, and home risk assessments.

Ms. Immitt collaborated with others to develop the Fire-adapted Landscapes and Safe Homes Program or FLASH. FLASH is a program that shares the cost of managing wildfire prone vegetation (hazardous fuels) with local property owners who live within the wildland-urban interface. This work makes homes and forests less vulnerable to catastrophic damage from wildfire. This is done by creating defensible space around their homes and strategic fuel breaks along escape routes and high-risk areas on their property. She has secured multiple rounds of funding for this program and manages contracts with local organizations to implement the work in their communities. With support from this program, over 750 acres have been treated by hundreds of property owners. In addition to financial support, technical guidance is offered through site visits, hazardous fuels treatment recommendations, and home risk assessments.

Ms. Immitt grew up in rural Humboldt County. She first learned about wildfire hazard reduction and forest heath from working for her father who ran a small sustainable forestry company. As soon as she graduated from high school she was hired as a seasonal wildland firefighter for the US Forest Service.

Ms. Immitt worked her way up to a Type 1 hotshot crew for the Sequoia National Forest and was deployed to wildfires throughout the country where she learned about fire behavior, wildfire management techniques, and the destructive power of wildfire when communities are not adequately prepared.

She earned a Bachelor of Science in Forestry Management and a Master of Arts in Social Science, Environment and Community Program, from Humboldt State University in Arcata, California. Her experiences and education prepared her well for her leadership role in wildfire preparedness planning, hazard mitigation project implementation, and community collaboration. Ms. Immitt was one of two individuals selected for the 2012 "Director's Partnership Award" for "superior performance and outstanding contribution demonstrating the ability to work in cooperative partnership with the California Department of Forestry and Fire Protection."

The families of fallen firefighters do not receive any benefits for up to three months after tragedy strikes. Typically, severely injured firefighters only receive 60 percent of their base pay, barely able to support their families after an injury. Many families and firefighters struggle with suicide, depression and guilt after fires, often needing counseling to help cope with the long-term effects caused by horrific fires. The Wildland Firefighters Foundation is a charity built to help families of firefighters killed in the line of duty and to assist injured firefighters and their families deal with the human toll of fires.

Foods In Season is donating a portion of every burn morel sale towards our goal of $100,000, and is asking the 5,000 restaurants we sell to nationally, and our grocery partners, like Costco and Whole Foods, to join us and help raise awareness for the wildland firefighters. Restaurants in every market can host special morel dinners and donate a portion of the proceeds. Grocery stores can participate by posting signage to help raise awareness and set up in house programs to raise money. Anyone who wants to participate can contact Francois for a downloadable Moral Morel toolkit with more information.

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If you would like more information about how you can participate, please call Francois de Melogue at 866.767.2464, or email Francois@FoodsInSeason.com. FoodsInSeason.com/moralmorels/


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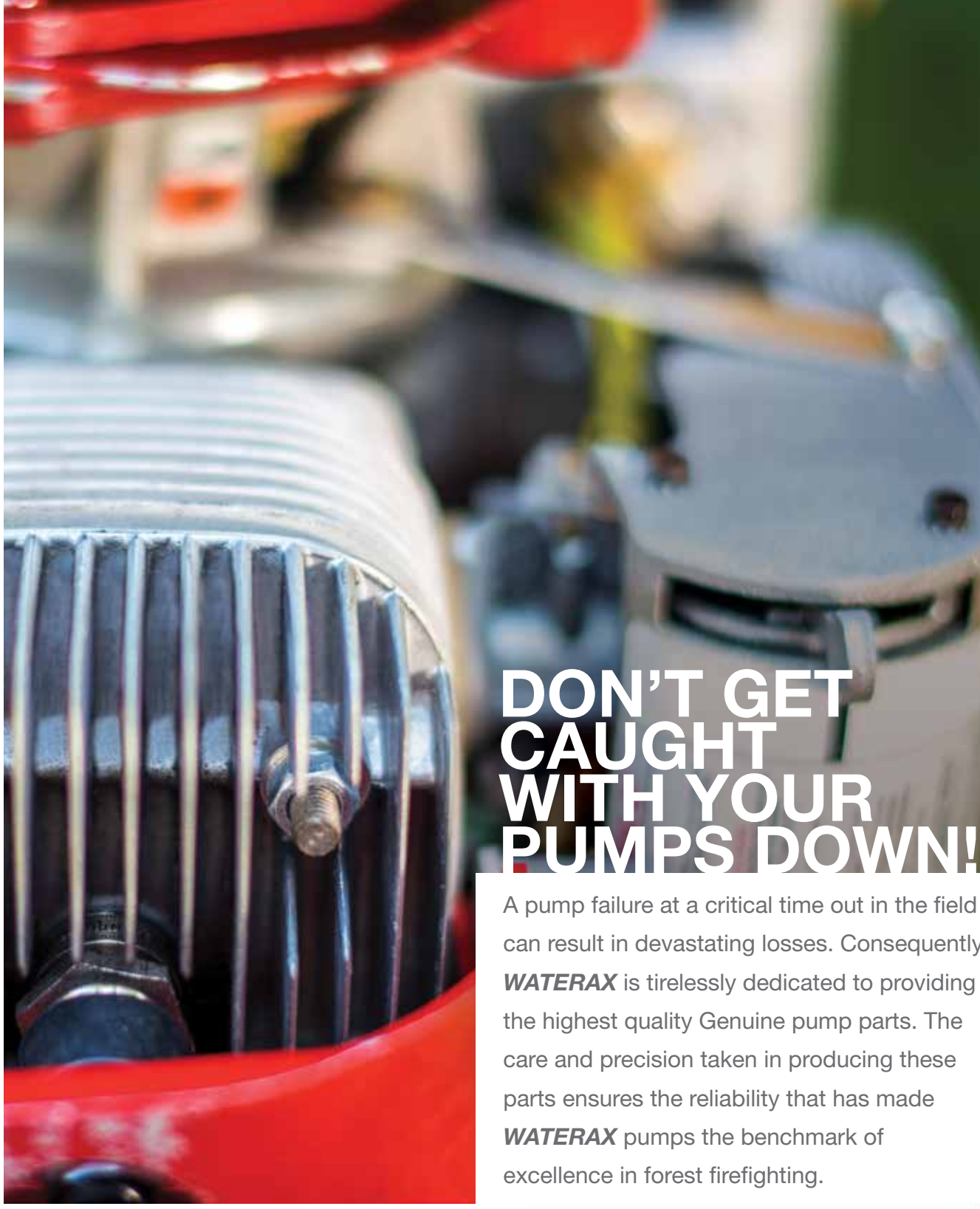

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