

"Uniting the Global Wildland Fire Community"

WILDFIRE

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VOLUME 26.3

SOUTHERN FIRES

FIRED UP:
German Fire Team

THOUGHTS:
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Members of the Waldbrandteam — “Forest Fire Team” — practice cross-cut saw skills during a field training day in Germany. See page 16 for the story of the team’s founding and why they’re this issue’s Fired Up Honorees.

On the Cover:

A firefighter patrolling the West Mims Fire in southern Georgia in May. Photo: Jon Freeman.

Longleaf pine has adapted to fire and fire is managed here as wildfire and prescribed fire. In this issue, Tom Zimmerman reflects on prescribed fires (page 4) and we offer two articles that document work in longleaf pine in this spring’s fire season, starting on page 18.

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TOM
Zimmerman
PRESIDENT,
IAWF

PRESCRIBED FIRE: A TOOL FOR OUR TIME

The wildland fire environment around the world is undergoing profound ecological changes. These changes are triggering extensive shifts in the complexity, behavior, extent, and effects of wildfires that are not only placing ecological processes at risk but are increasing potential impacts to social, management, economic, and political values.

As society and management actions have gained emphasis to reduce the occurrence and extent of natural fire in grasslands, shrublands, and forests, fundamental shifts have occurred in the structure, composition, and volume of fuel and vegetation complexes. Diminished presence of natural fire accompanied by escalated presence of other land management activities resulted in increases in quantities of fine fuels, duff, large woody fuels, rotten material, shrubs, and other live surface fuels. Both vertical and horizontal fuel continuity, represented by shrubs, low vegetation, tree regeneration, and woody fuel layers has increased. Density and compactness of surface fuel components have increased. Wildfires occurring in these altered situations behave quite differently from historic fires, have markedly more severe impacts, and necessitate escalated needs for protection responses.

Prescribed Burning - A Flexible Management Tool

The application of fire for the treatment of natural fuels (live and dead vegetation; downed and dead materials; and duff, litter, and humus layers, etc.) has been conducted throughout much of the history of natural resource management, in varying implementation schedules and spatial scales.

This practice, prescribed burning, has emerged as a keystone land management process with multiple values. Fuels are the only element in the fire-vegetation-weather-topographic dynamic that managers are able to modify through management activities. It is now widely accepted that prescribed burning can mitigate the risk of severe wildland fire impacts to human communities, municipal watersheds, and valuable natural and cultural resources. It can reduce potential fire behavior, increase the potential success of suppression efforts, and maintain and improve the health and resiliency of ecosystems. Prescribed burning can be completed at scales ranging from site-specific to landscape orientations and range from single to combinations of treatments, and single to multiple applications over time.

Around the world, this practice has been characterized by

numerous names such as prescribed burning, planned burning, controlled burning, and management-ignited prescribed fire. We should understand that different names have the same definition and are used interchangeably with prescribed burning. It can be defined as the pre-planned, controlled application of fire under specified environmental conditions to a predetermined area at the time, intensity, and rate of spread required to alter, maintain, or restore vegetative communities; achieve desired resource conditions; protect life, property, and values that would be degraded or destroyed by wildfire; and achieve other planned resource management objectives.

Regardless of exactly how prescribed burning may be known, it is an extremely versatile manage-



*West Cinder Prescribed Burn,
Bureau of Land Management
Twin Falls District, Idaho
USA. Photo: National
Interagency Fire Center.*

ment tool that is increasing in importance and value. It can be used in any kind of vegetation and many different settings and situations. A variety of ignition techniques and firing patterns can be used that allow managers the ability to control intensity, flame lengths, spread rates, degree of consumption, daily and seasonal timing of burning, type and intensity of control tactics, and planned precision of objectives. Prescribed burning results can approximate other treatment methods in terms of the accuracy in accomplishing objectives and is certainly one of the most cost-effective treatment types. It can also have neutral or positive effects on ecosystems as opposed to large and active wildfires, which can have serious negative effects.

Prescribed burning can be conducted as pile burning or broadcast burning. Pile burning generally follows other treatments and is used to reduce woody debris remaining after those treatments. This type of treatment represents small scale, stand maintenance or hazard fuel reduction applications. It is not restricted to any particular season, although is not widely used during drier parts of growing seasons. Broadcast prescribed burning can be used singly or in combination with other treatments and removes natural and activity-generated fuels and modifies surface fuel complexes. This kind of burning has size limits only controlled by the situation and objectives. Consequently, it can be used in small-scale, large-scale, and landscape applications.

In some cases, multiple applications of prescribed burning may be needed to accomplish objectives. This is especially true for areas that have experienced continual fire suppression, have altered fuel complexes, or have substantial numbers of high values present, as is the case in the wildland-urban interface (WUI) area. The combination of mechanical non-fire and prescribed fire applications as a fuel treatment process in WUI areas has been widely and successfully used. This sequence allows the mechanical removal of ladder or vertical fuels followed by reductions in surface fuel amounts.

Prescribed Burning - Status

While prescribed burning has grown in use since the early to mid-twentieth century, it is still not used in all locations around the world. But many countries, such as the United States, Canada, Australia, Portugal, Spain, France, and South Africa, are implementing management plans that incorporate prescribed burning. Other countries have less mature programs and are in developmental stages regarding prescribed burning. In all places where prescribed burning is implemented, commonalities can be found that include references to its importance and value. Common references can be found stating that natural vegetation complexes are prone to wildfires; increased use of prescribed fire is necessary to treat fuels, restore fire-adapted landscapes, and to reduce the impact of wildfires on human communities, vegetation, soils, biodiversity, and ecosystem services; and clear needs exist to better understand how prescribed burning can be used to maximize benefits.

However, while the acceptance of its importance is increasing, prescribed burning is not necessarily widely accepted. It still has a certain amount of uncertainty, misunderstanding-



Burning on the Little Ski Hill Prescribed Fire. Payette NF, Idaho, USA. Photo: Frankie Romero, USFS.

ing, social pressure to avoid even short-term negative impacts like smoke and burned vegetation, and fear of implementation breakdowns that cause reluctance to increase use.

Areas of Continued Focus

In those areas now moving into prescribed burning, a variety of basic needs exist. These include such things as developing planning procedures, standards, guidelines, qualification systems, training programs, implementation guidelines, evaluation processes, opportunities to gain experience, and learning feedback mechanisms.

In those areas where prescribed burning is an integral part of management activities, processes are better defined. Program areas of policy direction, objectives and framework for use, planning guidelines, risk frameworks, performance measures, training and qualification programs, science support, funding, and operational capability are well documented and practiced. Examples of overarching documentation describing the purpose and guidance for prescribed burning that has been developed includes:

- Guidance for Implementation of the Federal Wildland Fire Management Policy - addresses the use of fire to protect, maintain, and enhance resources (USA).
- National Cohesive Wildland Fire Management Strategy - the vision statement includes reference to use fire where allowable; and national goals are to restore and maintain landscapes, promote fire-adapted communities, and support wildfire responses; all of which are supported by prescribed burning activities (USA).
- National Position on Prescribed Burning - articulates nationally agreed upon principles for the development and implementation of prescribed burning policies and programs (Australia).
- Interagency Prescribed Fire Planning and Implementation Procedures Guide - defines purpose, scope, goals, authorities, required documents, implementation organization and qualifications, and responsibilities for the program (USA).

- National Burning Project – delivers a suite of products informing all levels of prescribed burning including objectives setting, planning guidelines, risk frameworks, performance measures, training manuals, support tools toolbox, and soon to be available synopses of best practices (Australia).

Regardless of the variation in the state of prescribed burning programs, there is room for refinement, improvement, and program advancement. Specific areas where additional practices and knowledge can be pursued include:

- Improving the ability to plan, implement, and evaluate ecological effects of prescribed fire treatments in achieving short- and long-term objectives at all spatial and temporal scales. Restoration and maintenance of ecological processes are primary goals of prescribed burning. However, prerequisite to the development of effective, ecologically sound guidelines for prescribed fire implementation is a need for improved understanding of ecological responses. Identification of areas most prone to significant fuel complex changes, assessment of anticipated spatial shifts in environmental suitability and vegetation related to future climate changes, evaluation of prescribed fire options for affecting spatial diversity in vegetation and fuel structure at meaningful scales, clarification of how to affect size and severity of large fires, and evaluation of opportunities for achieving resilience at landscape scales are all important areas of concern.
- Developing a better understanding of the relationship of prescribed fire to human values. There appears to be a disparate understanding of the role of prescribed fire, ecological benefits, economic trade-offs, and precise messages being delivered to the public. It is important that planning and implementation is based on a sound characterization of human values in terms of their impacts to, impacts from, and levels of tolerance of risk from the use of planned fire.
- Improving communication and collaboration activities among governmental units, the public, and partner organizations. Since collaborative prescribed fire management will ultimately involve trade-offs and decisions, the importance of understanding social perceptions about prescribed fire and the need to inform and engage with local and regional communities are essential requisites to program success.
- Developing and defining measures to evaluate prescribed fire program effectiveness. Evaluating the degree of success of prescribed fire program effectiveness and appropriate spatial and temporal scales in mitigating suppression costs, resource loss, risk, hazards, fire behavior, health impacts, and fire-fighter and public safety are important to continued program evolution and improvement. It is also important that better awareness and understanding of the longevity of effectiveness for fuel treatments is gained so that long-term maintenance needs can be defined.
- Establishing and maintaining a strong and efficient link between research and management. Prescribed fire research has

a strong history and record of accomplishment in some parts of the world but is at a relatively early stage in many other parts of the world. A need for research and development to help address high priority knowledge and technology needs still exists.

Moving Forward

The need for prescribed fire application in natural resource management is increasing. Changing fire environment conditions may be accelerating the rate of this increase. To keep pace with needs for reductions in potential fire behavior, support for success in suppression operations, and maintenance and improvement of the health and resiliency of ecosystems, we need to continue to develop and administer prescribed fire programs as part of land management plans.

To do this, we must continue to grow our capabilities. To learn more about ecological interrelationships, share information with developing programs, inform and educate the public, understand the trade-offs between prescribed burning and risk (both during the burn and in the postponed risk of unburnt fuel), and continue the essential investigations that improve or knowledge and best practices.

We must maximize all opportunities to expand every aspect of the prescribed fire program and must keep pace with ecological, social, and political needs and requirements of our fire-prone and fire-adapted landscapes.

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BRIEFING



RON STEFFENS

Swiss Cheese Incidents — With hope and solace.

Our voices were warbling over WhatsApp, one colleague to another, continents apart, when I realized, during one of those pauses when the bytes are racing to reconstruct into voices, that her pause after I said “Swiss Cheese Model” wasn’t because of the balky internet but rather she hadn’t heard of the concept.

I offered this explanation. The Swiss Cheese Model, as I understand it, is a simplified if potent model to understand risk and failure. If our incidents and our lives were a block of swiss cheese, there are times when first one hole and then the next and the next align — hole after hole after hole lining up in this metaphorical block of cheese until you may find yourself moving, in a risk environment, beyond your existing hazard controls and entering a risk zone you’re not prepared for.

It’s a concept that makes a field-worthy image of the complexity that occurs when systems fail, when the small holes become more frequent and larger and more likely to align, and each little step through the cheese-maze (which seem so seemingly safe) can move us closer toward disaster. Little steps and events build an unintended and often invisible route toward catastrophe.

Why I mentioned the swiss cheese model in the first place was because, in my conversation with this far-off colleague, I had heard her recount the outcomes of a multi-year project where the holes in the cheese had aligned for success. Sometimes, the variety of conscious actions and unplanned surprises align for good. Which led to an *ah-ha* moment for the both of us. She learned of a new risk model, and I realized that the complexity of risk, if managed with alertness to its pitfalls and swiss-cheese holes, might just as well lead to success.

In some ways, this issue of *Wildfire* displays such a fortuitous “good news” alignment of all the varied routes through the cheese. We offer stories of incidents and strategies that connect the holes, beginning with a reflection on prescribed fire by IAWF president Tom Zimmerman, who suggests that prescribed fire is key to our renewed and proactive steps as fire managers. And with this introduction, we then share witness to such positive steps — to manage the entwined work of prescribed fire and wildfire — in two articles from the US South: photos from the Saguaro Wildland Fire Module’s work in longleaf pine in Texas and Georgia, followed by a report by Michael Scott Hill (a Virginia native) on aerial ignition as a key tool for longleaf pine restoration. We also profile a new approach to resiliency in the form of a new fire team—the Waldbrandteam from Germany — as this issue’s *Fired Up* honorees.

Alongside these field reports, we offer Mike DeGrosky’s *Thoughts on Leadership*, who offers hints on how to lead in uncertain times, with advice on how we must help our teams maneuver around the alignment of more holes than ever — the result of a chaotic political climate. And perhaps, as our climate warms and our fuels and weather align, the holes in our swiss-cheese-model incidents are growing larger, more frequent, and more likely to align. (Though oddly enough, the “holes” in real swiss cheese are more likely due to flecks of hay, and as we become more antiseptic in our cheese production the holes become smaller and less frequent.)

In this issue, we also share guidance on linking the best tools of science and practice, with a how-to on using LANDFIRE fuel data to cap-

ture changing fuels. Finally, we begin our coverage of the *Cohesive Strategy* conference and movement (another key tool for leading in changing times) with insights by Rob Galbraith on how insurance incentives might offer tools to engage communities in their own fire management.

With all this praise for our contributors, I must note that this issue's production found the swiss-cheese holes aligning in a less than productive way. Some of us (this "us" being me, the editor) found our way into holes aligning into holes — technology troubles, time crunches, travel without internet, a local high water event, and a fire assignment — until all the cheese holes aligned to delay this issue by far too many weeks. And we (I) apologize to those whose messages we've delayed.

Our thoughts now are with Portugal

The stories and images gathered here are all about the potential for positive alignment — what might occur if we reverse and offer a retro application of the Swiss Cheese Model. As we share our mastery and "situational humility" of wildfire and bushfire management, might we also be able to craft and share recipes to help us bake risk into a fine menu of resilience?

The answer, we believe, is yes. Yet the Swiss Cheese Model exists to help us understand how catastrophes occur, and that with this understanding we may be able to prevent such catastrophes. Yet for all our focus and action on prevention, there are too many places where the holes have so tragically aligned. This past year, too many places have become symbolic for wildfire catastrophes: Fort McMurray, Gatlinburg, Chile, South Africa. And now Portugal.

Portugal has already taught the world much about fire. Today,

just days after so many lives have been lost, it is premature to understand the fire storm and fatalities. What we know for certain is that this loss, like those in so many burnt communities, is the loss of family members and livelihoods, homes and landscapes. It is a loss that is unfathomable yet it is a loss that has occurred, and thus we shall seek to fathom it. To begin to comprehend, we offer an initial reflection on Portugal in the closing pages of this issue.

Like the authors of this reflection, (for whom Portugal is either home or close to home), I've traveled the forests and fire landscapes of Portugal, met with fire scientists and professionals there. What they taught me is that a fire landscape may sometimes teach its lessons with an impartial physics -- fire is fire and we must understand, manage and be certain we can escape its physics. Together we've learned that the risks we seek to understand and manage can feel, on these worst days, so unforgiving and consuming that we may think we've lost all ability to act with fortitude and impact. This is understandable, and it's a tactical pause we've all experienced. But the fire challenge demands that we continue. So we think of you — anyone from Alberta to Tennessee, from Chile and South Africa and Portugal, and wherever the next fire tragedy strikes — and we wish to share with you the strength to manage these fires, and we wish for fortitude in our preparedness and sadly our recovery in the months and years to come. May we master these hole-and-cheese incidents with so many unpredictable holes.

Many of our members have worked through such a tragic swiss-cheese route when the worst holes have aligned. As witnesses and fire leaders, we offer our support. Give a call, WhatsApp or whatever. Or better yet, let's simply talk — face-to-face. Until we can connect, please know that we are with you.



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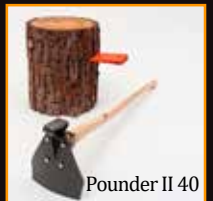
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LEADING IN

9 SUGGESTIONS FOR GUIDING THE

by Mike DeGrosky

It's been termed "permanent whitewater." That's what author and internationally recognized organizational change and development expert, Dr. Peter Vaill, describes the complex systems, dynamic environments, and turbulent conditions that leaders face today: the tumble-and-turmoil challenge of "permanent whitewater."

With political discord rampant, confidence in public institutions at an all-time low, workforces aging, budgets thin, and priorities shifting, one could argue that the already rough waters in public wildland fire agencies are only getting rougher. Frankly, anyone planning on leading and managing in our agencies should plan on running Class 5 rapids for the foreseeable future. Vaill and others who think like him, me included, believe that negotiating permanent whitewater requires a different leadership approach than we traditionally exercised in the more stable operating environments and organizations of the past.

Our leaders will face challenges they have not faced before — for which they have not been tested — that may exceed the knowledge, skill and abilities they have previously applied. So how does one successfully lead through this uncertainty?

Leaders in public fire agencies must build and maintain a culture of readiness, resilience, and commitment. I recently reviewed a set of articles by influential writers about leading through uncertainty, and concluded that, to succeed in the uncertain times ahead, nine lessons learned will serve our leaders well.

1 Lead with flexibility and adaptability. Get proficient and help others get proficient at using a wide variety of behaviors that can produce successful outcomes in a range of situations. Be ready to respond confidently and decisively to both emerging threats and emerging opportunities. Review and evaluate actions and decisions frequently and make course corrections as often as necessary. Do not fear bad news or disconfirming information, but use it as fuel to learn, grow, and improve. Get over the idea that leaders can direct complex organizations in complex situations in traditional ways or control future out-

comes. Instead, focus on fostering conditions that allow new organizational structures to emerge and people to innovate on the fly. To enable individuals and groups to work adaptably and flexibly, organizational researchers contend that leaders should foster network development, become a role model that catalyzes networks, use conflict and uncertainty to disrupt existing patterns, encourage innovation rather than innovating themselves, interpret emerging events rather than trying to direct them, and manage peoples' communication rather than managing people.

2 Get out there, make personal connections, and show your leadership presence. Maintaining existing personal connections and establishing new ones proves critically important when leading people in challenging times. If you want to lead, you need to show up, but once you show up, you need to engage people and keep engaging them. If there ever was a time to be present with your people, this is it. Remember, small gestures like a personal acknowledgement or taking time for a few words reassure people and can make a permanent, positive impression that builds commitment. The people who want and need your leadership want to see your eyes, sit down near you, and benefit from your complete communication; most of which you convey non-verbally. People always value interaction and communication with their leaders, and this proves particularly true in chaotic times. People want to know that their leaders remain committed, care about the people in the organization, and value their employees' expertise and feedback. And remember, uncertain times present opportunities to solidify your leadership by demonstrably serving others.

3 Collaborate – Involve everyone in solving problems. Get people engaged and empower them to help solve the organization's problems. During tough times, people tend to seek out seasoned, safe, conventional leaders to solve problems that they cannot solve themselves. However, those traditional leaders often fall back on their own knowledge, skills, and abilities that served them well in the past. Unfortunately, in today's turbulent environments, those solutions to past problems often

uncertain TIMES



LEADERSHIP RAFT THROUGH THE RAPIDS.

prove inadequate for the modern-day challenge at hand and fail to engage collective resources that could solve the problem with creativity and innovation. Encourage participation, at least in the implementation of change. While people may not have much control over whether change needs to occur, they should be heavily involved in how it will occur and making it happen. Adaptive, flexible leaders — the kind that succeed in chaotic environments — know that they can produce remarkably effective solutions when they involve people in crafting solutions to the organization's setbacks rather than trying to solve problems by themselves.

4 Do not feed the strain and anxiety people are feeling; instead use the tension to drive learning and development. Remember, you cannot control the circumstances, but you can control your response to them; and how you respond influences how others respond. Remain deeply aware of your emotional and social impact. I have observed that most people in assigned leadership roles underestimate the influence they have on other people and the climate of the organization. We are human, our emotions are part of the human condition, and it is too much to ask for leaders to remain unemotional in tough times. However, leaders set the tone and establish the workplace climate. So leaders must, to the best of their ability, regulate their own behavior; developing and maintaining awareness of their actions and how they come across to others. Effective leaders maintain an intense awareness of their emotions, their behaviors, how people interpret their behavior, and how they affect the attitudes and morale of those they lead. Create a climate in which people see how they may adapt, show their resilience, and see the path forward.

5 Make decisions. Uncertain times can cause leaders to become very cautious, making decisions that seem only a sure bet or avoiding decision-making altogether. However, in reality, what tough times really demand is the ability to make quick, effective decisions, which can be done by deferring to expertise and drawing on the insight of the people closest to, and most knowledgeable of, the problem at hand. Convey a sense of urgency and encourage action. Organizational change expert

John Kotter contends that people who share a sense of urgency remain alert and responsive, act on change initiatives, and focus their time and priorities on the tasks of those initiatives. Combating complacency and establishing a sense of urgency requires leaders to act boldly and decisively, resolving to move the organization in some direction without hesitation.

6 Focus, focus, focus: so that you navigate disruptions as strategically as possible. Do not spend your attention or energy, or allow your people to spend their attention and energy, on factors beyond your control or theirs. Doing so wastes time, distracts people from what is important, and drags morale down. Get people together and revisit your mission, vision, and core values. It is precisely in times like these those elements of strategy prove invaluable as guideposts. If organizational upheaval makes pursuing your strategic vision difficult, pull the key stakeholders together and adjust your vision to reflect the changed circumstances. Separate the essential from the more expendable, concentrate on the mission-critical, and innovate in order to achieve the most mission-critical aspects of your vision.

7 Communicate honestly, directly, frequently, and with clarity. In tough times, people want, and need, to know what is going on. Be transparent and share whatever information

"In reality, what tough times really demand is the ability to make quick, effective decisions, which can be done by deferring to expertise and drawing on the insight of the people closest to, and most knowledgeable of, the problem at hand. Convey a sense of urgency and encourage action."

you can. Give honest answers. If someone asks for information that is confidential or you are not authorized to talk about, be honest and tell them why you cannot answer. Pay close attention to people, ask lots of questions, and listen to people. Their answers will help your organization power through tough situations. In learning organizations, leaders invite input from others in their discussions, actively question employees, and listen to them, all in order to prompt dialogue and debate. When a leader asks the right kinds of questions, listens to the answers, uses the information they gain to make better decisions, and communicates their decision with clarity, people in the organization feel confident in their ability to contribute to the organization's learning and improvement.

8 Lead with empathy and compassion. When faced with uncertainty, people can feel overcome, anxious, and distracted. To help people stay focused despite their angst, effective leaders strive to strike an effective balance between knowing how they can serve and benefit their employees while keeping them on task and accomplishing meaningful work. Ask people what they need, talk with people one-on-one and let them tell you how they feel and what's on their mind. Have empathy; put yourself in their shoes and work to understand what they think and feel. You do not have to agree, or even feel what they are feeling, but strive to understand, because your empathy forms the basis of trusting relationships. Be ready to provide extra guidance; help people to work more flexibly, focus on priorities, and reduce distractions.

9 Take care of yourself. You will support your team and organization if you manage your own stress and health. You do no one any good if you are home sick, in the hospital, incapacitated, or simply working below your capacity. Plus, research by the Center for Creative Leadership showed strong linkage between effective leadership and regular exercise, showing that co-workers rated executives who exercised significantly higher on their leadership than those who do not. And of course, regular exercise improves one's energy, stamina and general health.



Mike DeGrosky is Chief of the Fire and Aviation Management Bureau for the Montana Department of Natural Resources and Conservation, Division of Forestry, and 2016 Adjunct Instructor of the Year for the College of Arts, Humanities, and Social Sciences at Fort Hays State University, where he taught for the Department of Leadership Studies for 10 years. Follow Mike on Twitter @guidegroup or via LinkedIn.

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IAWF News

Celebrating Leaders

COHESIVE STRATEGIES, AWARD WINNERS, AND A JOINT CONFERENCE TO PREPARE FOR

NATIONAL COHESIVE WILDLAND FIRE MANAGEMENT STRATEGY WORKSHOP

The National Cohesive Wildland Fire Management Strategy Workshop — All Hands, All Lands: Implementation Rooted in Science — was hosted by the IAWF in partnership with the Wildland Fire Leadership Council (WFLC) and the Western, Southeastern and Northeastern Regional Strategic Committees in Reno, Nevada April 25-27.

At the beginning and throughout all stages of planning and development of the national strategy, science was at the center of both the vision statement and goals. The purpose of this workshop was to continue advancement and accomplishment of Cohesive Strategy goals hinge on reinforcing the importance of science in implementation activities and improving mechanisms to facilitate science integration with implementation.

One hundred and sixty-five people participated in the workshop, from various organizations and agencies and from the USA, Australia and Canada. Our plan is to make this an annual event and to grow it each year. The next workshop is scheduled for March 26-29, 2018, to be held in Reno again. The presentations from this year's workshop can be found on the IAWF webpage – www.iawfonline.org.

IAWF DISTINGUISHED SERVICE AWARD

The IAWF's Distinguished Service Award recognizes individuals, groups, or organizations for their outstanding contributions to furthering the goals of the Association. The Distinguished Service Award was presented to Charles L. (Chuck) Bushey at the National Cohesive Wildland Fire Management Workshop in Reno, Nevada in April.

Since 1985, Bushey was the founder and President of Montana Prescribed Fire Services, Inc. (MPFS) performing the duties of Wildland Urban Interface (WUI) Fuel Mitigation Specialist, Fire Ecologist, Prescribed Fire Specialist, and Fire Behavior Analyst. He was wildland fire red-carded as a Fire Behavior Analyst, Strike Team Engine Leader, Wildland Fire Arson Investigator, and Fire-line Explosive Specialist. He also served as a Fire Behavior Service Center Team Leader and Long Term Assessment Team Leader.

Bushey has over eighty articles, research publications and re-

ports to his record, principally dealing with fire effects, fire behavior and fire policy issues. In his role as an international consultant and lecturer, and as a primary developer of the Fire Behavior Service Center concept, he was honored in 1995 by being selected as a member of US Registry's "Who's Who of Outstanding Americans" and in 2000 he was honored in "Who's Who in America" 2001 Edition for his contributions as a wildland fire researcher.

From 2007-2011 Bushey served as President of the International Association of Wildland Fire (IAWF) and led a 15-member international Board of Directors and office staff. Before his role as IAWF President, he served for twelve years as an IAWF Director. As president, he oversaw IAWF's involvement with their membership magazine Wildfire providing a "Presidents Desk" article for each issue, and the International Journal of Wildland Fire, the only peer-reviewed publication of wildland fire research.



In his role as IAWF President he interacted with a wide range of organizations interested in wildland fire topics such as the US Forest Service, the US Department of the Interior, the United Nations FAO, the Australasian Fire & Emergency Service Authorities, the Bushfire Cooperative Research Center to name a few. He initiated an international learning webinar series with the USFS Lessons Learned Center and operated a listserve called "FireNet." IAWF organizes at least two international wildland fire conferences per year, and during his service as IAWF president, Bushey made several oral presentations, served as session moderator, and met with attendees and the membership. He is currently IAWF's representative to the western US region's National Cohesive Wildland Fire Management Strategy.

Bushey has been involved in wildland fire since 1970. Previous to MPFS, Bushey worked with the US Forest Service Rocky Mountain Research Station Fire Sciences Laboratory (Missoula, MT) as a wildland fire researcher (fire effects, fire behavior, fuels, fire weather, smoke). Recently he has agreed to bring his wildland fire and private sector business expertise to helping the International Fire Relief Mission, a nonprofit NGO, better perform its goals of providing refurbished fire equipment, gear and firefighting tools to regions of the globe in need.

Side and hobby interests for Bushey include fishing, photography, meteorology, and honey bees. He is also a member of the City of Billings Animal Control Board and a member of the Yellowstone County Local Emergency Planning Committee (LEPC).

ALEXANDER RECIPIENT OF 2016 WRIGHT AWARD



Former IAWF board member (2009-2013) and IAWF Life Member Dr. Marty Alexander was the recipient of the Wright Award presented during the Wildland Fire Canada 2016 Conference held in Kelowna, British Columbia, October 24-28. This career-achievement award recognizes excellence in wildland fire research, and

its significant contribution to the advancement of wildfire management in Canada (<https://sites.ualberta.ca/~wildfire/awards.html>).

The Wright Award, established in 2012, is presented on a biennial basis and is named in honor of James G. Wright who established a fire research program within Canada's Dominion Forest Service beginning in 1925. His early fire-hazard research at the Petawawa Forest Experiment Station in eastern Ontario laid the foundation for the development of the current Canadian Forest Fire Danger Rating System. The two previous recipients of the Wright Award are Charlie Van Wagner and Brian "BJ" Stocks.

Dr. Alexander retired in November 2010 as a senior fire behavior research officer with the Canadian Forest Service (CFS) stationed at the Northern Forestry Centre in Edmonton, Alberta, following nearly 35 years of public service. In his acceptance speech, he acknowledged that his wife Heather's support over the years had made it all possible.



SAVE THE DATE FOR OUR JOINT CONFERENCE IN MAY 2018

The Fire Continuum Conference: Preparing for the Future of Wildland Fire

- * May 21-25, 2018
- * University of Montana, Missoula, MT
- * Co-hosted by International Association of Wildland Fire and Association for Fire Ecology

Wildland fire science and management are defined by continuums. There is the continuum of fire experience from the rookie firefighter to the seasoned fire manager. There is a continuum of fire succession from the post-burn environment to the development of vegetation to eventually be burned again. There is the continuum of education from the basic fire courses to the advanced degrees offered by Universities and certifications offered by professional societies. And most important, there is the continuum of fire management from pre-wildfire fuel treatments and prescribed burns, to seasonal wildfire planning and fire danger prediction, to the actual event of a wildfire, and after wildfire to rehabilitation of burned areas and development of post-burn communities.

We invite you to join us in Montana next May at this conference designed around that fire management continuum where each day of conference week will be dedicated to a part of this continuum.

TIMELINE AND KEY DATES

- * Call for Special Sessions: Open from Sept 1 to Nov 7, 2017
- * Call for Workshops: Open from Sept 1 to Nov 7, 2017
- * Call for Attached Meetings: Open from Sept. 1 until we are out of space
- * Call for Presentations: Open from Nov. 7 to Feb. 6, 2018
- * Presenters Notified: February 28, 2018
- * Program Finalized: March 13, 2018
- * Room Blocks Expire: April 21, 2018
- * Conference: May 21-25, 2018

FIRE D👍 UP

honoree

WALDBRANDTEAM (FOREST FIRE TEAM), GERMANY

**SUCCESS
STORY:**
Forming a
regional Type 2
Initial Attack
Fire Crew.



by Tom Zimmerman

The Waldbrandteam or Forest Fire Team was formed in 2015 to establish a Type 2 Initial Attack (IA) Crew in Germany. This was made possible through the efforts of several individuals, who also became members of the crew. Their previous experience in other areas of wildland fire fighting, helped them fully appreciate the need to expand firefighting capabilities and helped frame a vision for the potential benefits of such an effort. Their goal was to organize a Type 2 IA Crew that would be able to support European States in responding to wildfire emergencies.

The first step in development of this crew was for the Waldbrandteam originators to review the US National Wildfire Coordinating Group (NWCG) standards for crew characterization, firefighting qualifications, and training principles. They then planned the crew size, necessary qualifications, program goals and objectives, and operating principles by closely following these standards. They then began to build the list of participants and seek training and hands-on learning opportunities. Some team members were able to participate in training exchanges in other countries, including the USA.

All team members are volunteers and their contributions

involve taking time away from regular jobs and families to go abroad and help others, often on their own vacation time. The guiding association for the Waldbrandteam is a non-profit Non-Governmental Organization that relies on membership fees and donations to help defray travel expenses and equipment.

To date, 21 members of the team have achieved at least the NWCG Firefighter 1 (FFT 1) status while overhead have gained qualifications up to the Crewboss Level. The majority of the overhead have been to the United States several times at their own expense and vacation time, have completed training, and shadowed US firefighters to gain experience and leadership skills necessary to perform their tasks.

The ability to obtain equipment and supplies is limited and subject to donations, contributions, and other support from outside sources. Recent donated additions to the fire cache include a Mark 3 pump and a 22" bar wildfire chainsaw. It is hoped that as experience and awareness increases, more equipment and support will become available. Principle benefits of the team are related to increased international firefighting capabilities by increasing the numbers of trained, experienced, and mobile crew and overhead resources. These resources are available throughout



the European States; mobility and rapid response are trademarks of the team. Secondary benefits of this effort include the ability to deliver internationally accepted wildfire training for local Fire Departments and Forest agencies in Germany. Currently there is no wildfire training curriculum and fire events during the past few years have involved several near misses and burned engines. Developing and delivering such training will promote and ensure safer and more efficient operations during wildfire response activities. Training consists of classroom instruction including LACES, pump and roll operations, use of handtools, use of local fire engines, use of a combination of tools and resources, and also teaching the Campbell fire behavior prediction system. In addition, live fire training exercises using prescribed fire classes that members have completed are used to engage trainees in real events, see fire behavior first-hand and on a scale that promotes increased learning, and to have opportunities to gain a greater appreciation of the interactions of the fire environment variables and highly changeable nature of wildfire.

Networking has been and will be a big part of the team's goals and members have traveled to fire events, conferences, and training exchange in Portugal, Spain, Italy, Austria and USA. This type of interaction accelerates learning, creates new opportunities, and helps with information exchange and team members being students of fire.

Those responsible for development of the Waldbrandteam had a vision to increase wildfire response and training capabilities. This vision faced many difficult challenges, but selfless individual commitment and many sacrifices have made success possible. These efforts have already yielded increased numbers of qualified individuals; improved initial attack support, both in terms of numbers, capability, and mobility; escalated opportunities to deliver necessary and valuable training, and are promoting safer and more efficient wildfire response activities in Europe.

In 2017, some team members attended the 14th International Wildland Fire Safety Summit and the International Congress

on Prescribed Fire in Barcelona, Spain. Planned activities include having the team travel 1500 miles to Portugal to assist the Firefighters of the City of Mondim de Basto in managing wildfires threatening the landscape and the wildland-urban interface (WUI) close to the village. Another trip will take the team to Austria for a large-scale exercise involving five helicopters to assist and train local firefighters in handtool and helicopter tactics for use on fires in the rugged, alpine Terra.

About the Waldbrandteam

WHERE THEY WORK: The team has members around Germany (see map upper left for where team members are based). A non-regional group with several bigger clusters of active members. Our fire cache sits in the middle where the majority of members is located.

TEAM GOAL: The major goal of the team is to support southern European states (and even the United States maybe one day) during severe wildfire crisis so the support for German Fire Departments is an ancillary goal.

FIRE RESPONSE: All fires in Germany are managed by municipal Fire Departments (or Federal responders if the fire is on military installations). Waldbrandteam is a non-profit NGO but as an approved component of the civil protection service in Germany we can work closely together with other departments -- not as an initial attack force but by providing handcrews or advice depending on the needs on scene.

ORGANIZATION: Waldbrandteam is similar to Working on Fire as all members are volunteering too. Some are paid firefighters in their main job, but the majority are volunteer firefighters and volunteer outside of the team.

FINANCES: The team doesn't charge for the service apart from fuel or damaged equipment if being called. The team raises money by delivering training to fire departments doing live fire exercises on open rangelands, training them in LACES and other applicable safety standards.

SOUTHERN FIRES



The West Mims Fire, southern Georgia.

Photo: **Jon Freeman** (acting Assistant Module Lead, Saguaro Wildland Fire Module.)



Days in the work of a fire module in the longleaf pine forests of east Texas and Georgia.

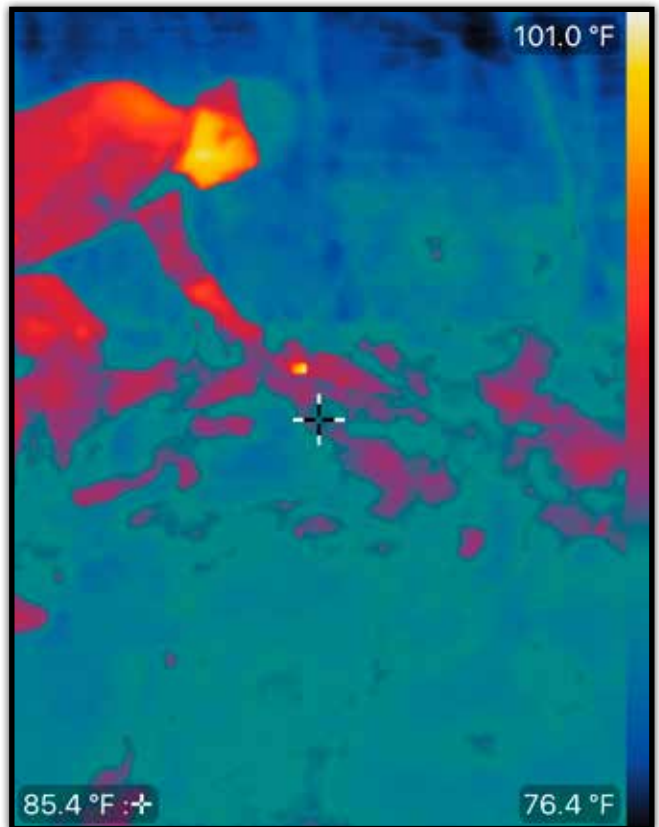
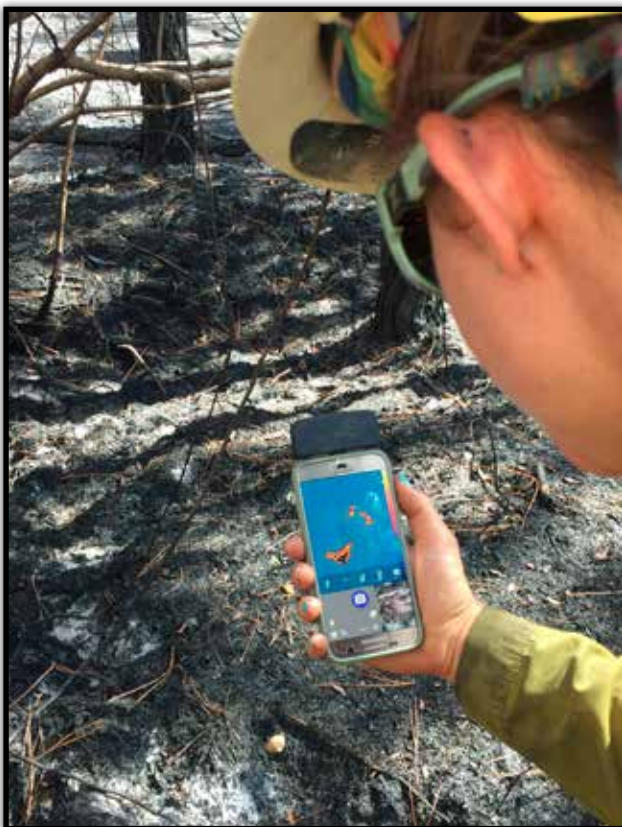
This spring fire season, the Saguaro Wildland Fire Module (based in Saguaro National Park, Tucson, Ariz.), managed fires across the longleaf pine forests of the South. Top photos are on a prescribed fire in Big Thicket National Preserve. Bottom photos from Okefenokee National Wildlife Refuge in May, 2017, on the West Mims Fire, which burned nearly 153,000 acres in southern Georgia and northern Florida.

Photos: Saguaro Wildland Fire Module / Jon Freeman.

OPERATIONS in Big Thicket National Preserve. Photos left to right. 1. Planning a firing operation around a trailhead and associated structures. 2. Using a very pistol/flare gun during burnout operations. 3. Holding and patrolling.



TECHNOLOGY - West Mims Fire. Photo 4. Hunting hotspots with an infrared camera attached to a smart phone. Photo 5. The heat zone -- firefighter mopping up hotspot.





WILDLIFE and WILDFIRE - West Mims Fire. Photos 5-6. Alligators and armadillos along the fireline.

RETURNING GOOD FIRE TO THE LONGLEAF PINES

A day of aerial ignition and ecosystem management in Virginia.

An understory prescribed fire is key to restoring longleaf pines to a healthy fire-adapted forest.

Story and Photos by Michael Scott Hill

Soon the wisp of light grey smoke began to rise out over the forest canopy below the whole right side of my open door. I can feel the aircraft slowing, and I move my right leather fire boot back out into the slipstream sweeping by the helicopter. With this slower speed, my boot is much easier to hold down onto the skid, and I hang my right knee comfortably outside as well. It is nice riding in the rear with the passenger door off, flying five hundred feet up in our Bell 407 helicopter above a deep green needle-sea of longleaf pine.

The firing boss comes over the mic. "You can turn the machine on and prepare to start firing."

I key my mic to acknowledge. "Turning the machine on and preparing to start firing." This consists of flipping up three switches before me, and with that, the balls pre-loaded into the hopper on the top of the machine begin agitating around their confined space.

The pilot has our helicopter's flight path lined up to fly parallel next to our first run, where a long curtain of smoke is now drifting up from the forest floor. Suddenly he places us into a hard left turn to flip around and head back in the opposite direction to pick up on our next parallel strip.

That's when I hear the firing boss's voice again. "Mike, prepare to fire. It'll be four gates, slow."

I acknowledge his command into the aircraft's radio. "Preparing to fire. four gates slow." There is a two-part lever on the machine's side, just above the needle-punching mechanism of the machine, which I can flip up to control the amount of balls that will be dropped from the aircraft. One lever will feed in either four channels of balls or I can lift up that lever's insert to send down just two channels. And contrary to what you'd think, the least amount of balls being dropped actually starts a much more active and hotter fire below. The firing boss's last order instructs me to position my flight-gloved right hand on top of the machine lever, controlling all four gates, and be ready to lift it, on order. I follow his command.

"Begin firing," the firing boss says, and I reply, "I'm beginning firing," and with an easy sweep of my fingers I flip up that lever to allow the now churning balls in this hopper before me to begin to enter the machine's needle-punching area below.

This bulky silver plastic sphere dispenser (PSD) machine fills

my half of the narrow helicopter floor before me. It has a clear lid allowing the balls inside its storage hopper to be seen, as well as several small windows over its four channel lines leading down from its hopper, the route the balls travel downward to get punched. With that lever up I watch the four lines of balls filling up into those channels slowly, as if rolling down into sets of parallel assembly lines. Seconds more, and the balls begin falling free of the machine, past our helicopter skid below in a slow motion in a series of chugs each carefully spaced out to be one at a time. I glance down from the open door, back beneath this great big sea of green treetops and down into their scruffy ground cover. As of yet there is no sign that our balls are starting any fires on this run. That will change and soon there will be plenty of orange dancing flames across all the needle-cast, grass and shrubs crowded in with these longleaf pines below.

When you look down at the green, rooftop canopy of a forest you are actually looking at a community, an ecosystem complex of interrelated vegetation and animals. Some of these communities are millions of years in the making, like this fragment of a forest we are flying over now, a remaining relic of the ancient lowland forests of the Southeastern United States. Before colonists arrived, massive longleaf pine woodlands like this once dominated the Southeast's large well-drained lowland expanses, from the coastal plains all the way up to the rolling hills at the edge of Piedmont country that arrives just before rising into primarily oak-blanketed mountains.

These longleaf pines below us are tough trees. They can tolerate a wide range of moisture and nutrient levels. Individually they are attractive too, with their straight trunks, large clusters of long needles and giant cones. They were a key resource for early American colonists, valued as the source of pitch and turpentine for naval stores. These mighty longleaf pines preside over an inviting, endlessly complex series of open woodland communities stretching across the forest's airy, sunlit character. At the ground level, you'll find wiregrass and in some places, knee-high scrub oak, ankle-high huckleberries and sunflowers. There are plenty of animals down there too. If you look close you'll see white-tailed deer, wild turkeys, fox squirrels and red-cockaded woodpeckers.

SOUTHERN FIRES (II)

The longleaf pine woodlands do have a weakness. They can't tolerate competition. They must have sunlight offered by open spaces, and to get that, they must have periodic fires to wash beneath them to cut down encroaching shrub layers. If the flames don't come to reopen the forest so sunlight can return, the encroaching shrubs will eventually crowd out the longleaf pines so they can't reproduce, and the longleaf woodlands transform into other, much thicker types of forest.

So fire is the friend of the longleaf pines, and in the past fires were fairly common where the longleaf pine once thrived. These fires that helped maintain the longleaf's domination were once lit by Native Americans and lightning storms. Colonization led to the elimination of that fire, and where longleaf pine woodlands once covered large parts of the lower American Southeast, today they, and the complex communities they shelter, can only be found in less than five percent of their original massive range. They survive as fragmented relic vegetation pockets, like this one that we're returning fire to today.

The types of fire the longleaf forests need are creeping, low-intensity fires that will clean off the wiregrass and shrubs, but allow mature trees to survive. A series of fire exposures, as frequent as every two to three years, tends to kill off most tree seedling and shrubs, but not the longleaf pines. Left in their natural fire-frequent condition, longleaf pine communities have a dense, ground cover that supports many other interacting species. This ground cover itself is made up of wiregrass and scrub, living beneath the pines that will carry flames and after they have been consumed and any possible competition eliminated, the longleaf pines again return to being the masters of the sunlight in their communities. This is very old cycle of life here in these forests, and its returning sunlight, also creates excellent conditions for the thriving of many other plants, animals and insects at home beneath the pines.

Longleaf pines — as with other fire-dependent ecosystems worldwide, such as Australia's eucalyptus forests and grasslands, California's chaparral, Montana's lodgepole pine, ponderosa pine throughout its range, America's central tall grass prairie or the Southeast American mountainous oak forests to name a few — have all evolved through millions of years of living closely with fire.

In the longleaf pine's case, instead of growing up as miniature pine trees, they spend their first few years as youngsters without a trunk. The bud is the most vulnerable part for a young pine, and a young longleaf spends its first few seasons growing at a lower ground level; when a fire passes, the bud will remain cooler and passing flames will only burn off needles which can easily be re-grown. Their seedlings store its nutrients in their roots and, when they become ready, they sprout up as saplings sometimes as much as five feet over a year or two, which raises their branches and needles above the level of most cool burning fires.

As mature pines, the longleaf are also adapted to live with passages of fire. The longleaf have evolved an open crown, they grow needles in clusters at the end of branches and they lack lower branches, traits which make them well adapted to living with fires. Their branches spread out wide so that future flames can't spread easily from one limb to another. Their needles are also easily replaceable; if they get burned off, they can just re-grow in the aftermath of the fire.

As part of an intertwined ecosystem community, the longleaf pine have evolved a special relationship with wiregrass that is just as adapted to periodic exposure to flames. Like most grasses, once the grass's

blades are lost in a blaze, they sprout again, directly from its roots if needed, and grow vigorously. Many of the other plants of the longleaf community that grow down at the level of this grass can't even flower unless they get an exposure to fire.

Forest animals have also adapted their lives to periodic fires. Larger animals will move deep into their burrows, or clear of the passage of flames, and some will even return before those flames are completely cooled, searching in its ashes for prey or seeds to consume. Other animals such as deer and turkeys (some of which we spot as we fly over) will return to a burned area weeks later to feed on fresh sprouts of grass.

For the tiny insects or other animals that can't escape the heat or an exposure to fire, new members of their kind will return to the burned areas from unburned patches nearby, or hatch post-burn. All of this community down below us has been on nature's scale, exposed to countless exposures to fire, and as the by-product its members have adapted to thrive in the shadows-and-light of these unique open pine forest woodlands. And without periodic fire exposures, they are and will continue to be vanishing from the landscape. This woodland — and its many interconnected cycles living below our helicopter and our flying drop of igniting spheres — truly needs fire. As much as it needs sun and air and water.

Fires can be classified as good — in that the fire can help simulate and maintain ecosystems — or bad. A bad fire burns too hot and kills off whole communities and afterwards helps set up conditions that can cause deep erosion to the land.

Today, flying five hundred feet above the green canopy sea of this longleaf pine forest, we are creating a good, cool, fast-moving fire, which is exactly what the pines need down there. Today we are dropping our igniting spheres to create our forest fire to make these longleaf pines smile again.

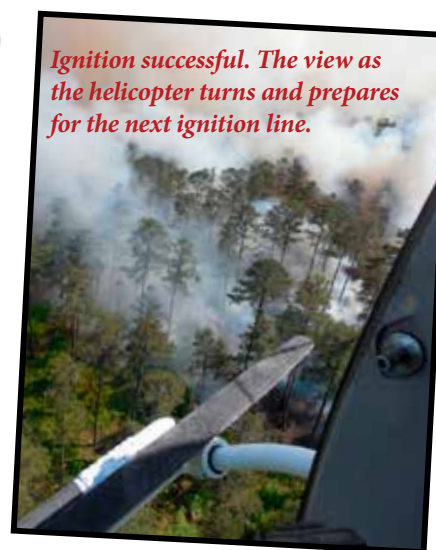
Today is their day.

Everyone of us at various times finds ourselves in need of a helping hand, and for this rare, remaining fragment of what once covered so much of the Southeast United States, we are now flying back and forth over of it, dropping our incendiary balls, as today is its day.

With our fire, we are giving its whole community system its rare opportunity to survive in a landscape so greatly altered by generations of forest clearances, residential and commercial development, the introduction of numerable exotic species, and fire protection.

It is a good day to be working for this fire-adapted forest, flying back and forth above this sea of green needles, raining down our balls of good fire. We drop the fire and as we help this forest burn we become, in a way, as much a part of the forest as the fire that we return, the fire the forest needs, an essential force for this ancient and highly complex ecosystem so in need of our flames.

Michael Scott Hill is a contributing editor of Wildfire and a native of Virginia.



UPDATING THE LANDFIRE FUEL DATA JUMPSTARTS LOCAL PLANNING EFFORTS



McCann Fire, 2013. The McCann Fire was one of four large fires that burned through the South Central Idaho Fire Planning Unit in 2013 providing the impetus for the data update project. Photo: Anthony Beauchaine.

By Kori Blankenship, Anthony Beauchaine,
Don Helmbrecht and Jeannie Patton

Keeping fuel data current over time is an issue faced by many wildland fire managers. The landscape changes constantly – due to natural events like wildfires and hurricanes, and human activities, such as forest thinning, prescribed fire, and development – and such changes quickly render fuel data out of date.

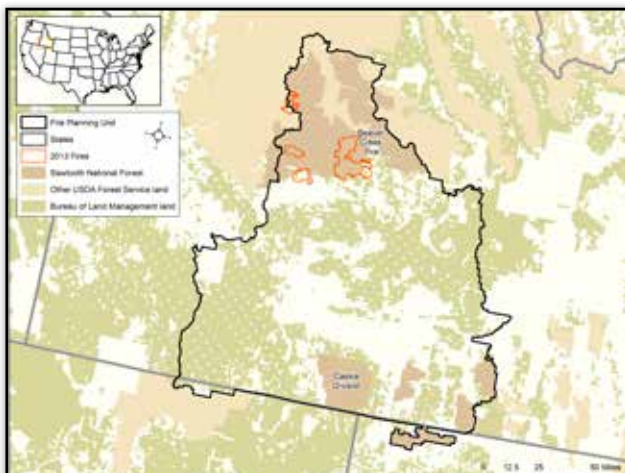
For fuel, fire and land managers in the United States, the LANDFIRE program provides a data safety net by producing biannually updated fuels products for all US lands. But even these data are two to three years old when they are delivered, and while they provide a good starting point, they are designed for national and regional level application. Local review and calibration is recommended to ensure that the data are suitable for smaller landscapes. An example from Idaho illustrates how adjusting LANDFIRE fuel data can ensure that current, accurate fuel infor-

mation is ready to support fire and land management activities.

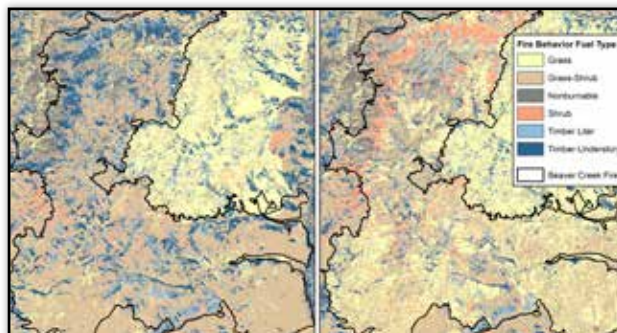
BIG FIRE SEASON REDUCES DATA UTILITY

In summer 2013, four major fires burned 178,000 acres across the South Central Idaho Fire Planning Unit (hereafter the FPU), reducing the usefulness of the existing fuel datasets in the area for fire planning. The FPU is largely comprised of federally managed land, including the Sawtooth National Forest and Bureau of Land Management holdings. While individual federal units within the FPU maintain local fuel and vegetation spatial data, only LANDFIRE data provide complete coverage across all lands.

LANDFIRE continually updates and releases data. However, the 2013 wildfire events would not be reflected before the circa 2014 version was completed and made available in 2017. Not able to wait that long, in 2015 the area fire staff began working with a team of LANDFIRE and Forest Service colleagues to bring LANDFIRE's 2012 fuel data current for the FPU. While they were in the process of updating, the team also decided that it was a good time to calibrate the fire behavior fuel models to better fit local conditions.



OVERVIEW. Four large fires burned in the South Central Idaho Fire Planning Unit in 2013. The Beaver Creek Fire and the Cassia Division of the Minidoka Ranger District on the Sawtooth National Forest are labeled here and referenced in later figures.



UPDATING FOR FIRE IMPACT. The LANDFIRE 2012 fire behavior fuel model layer (left) was updated to reflect the impact of the 2013 fires in the South Central Idaho Fire Planning Unit (right). Here, changes within the 2013 Beaver Creek Fire as a result of the update process are shown. Within the fire perimeter, Grass-Shrub fuel models changed to Grass models and Timber-Understory models changed to Shrub models in areas where fire severity was high. Fire behavior fuel models are grouped into fire-carrying fuel types for ease of visualization.

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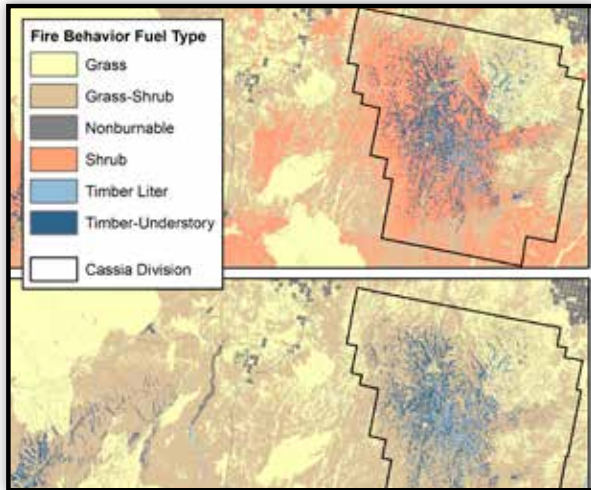
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UPDATE AND CALIBRATION PROCESS

The team's process for updating the fire modeling data was similar to LANDFIRE's. First, they used information from the Monitoring Trends in Burn Severity program to determine the location and severity of the 2013 large fires, and to reduce the forest canopy cover to reflect the post-fire condition.



CALIBRATING FUEL MODELS. Local fire behavior fuel model calibration resulted in shifting areas mapped to Shrub models in the LANDFIRE 2012 fire behavior fuel model layer (above) to Grass-Shrub models in the updated 2015 product (below) developed by the FPU managers. These maps show the changes in the area of the Cassia Division of the Minidoka Ranger District on the southern end of the Sawtooth National Forest and the FPU. Fire behavior fuel models are grouped into fire-carrying fuel types for ease of visualization.

Next, interagency fire planner Ian Rickert reviewed the LANDFIRE fire behavior fuel model layer outside of the wildfire footprints and found several areas for improvement. Specifically, in an area known as the Bennet Hills just north of Gooding, Idaho and on the southern part of the Sawtooth National Forest where sagebrush shrublands occur, Rickert felt that a grass-shrub fuel model better represented the potential range of fire behavior than the pure shrub models mapped in the two areas.

The team's spatial analyst took Rickert's feedback and translated it into a set of mapping rules in a geographic information system using the LANDFIRE Total Fuel Change Tool, designed to edit LANDFIRE fuel data. Post-fire fuel models were mapped within the areas burned in the 2013 wildfires using the updated forest canopy information and the default LANDFIRE mapping rules contained within the Total Fuel Change Tool. With these adjustments, the team produced both a circa 2015 fire behavior fuel model layer and the associated canopy fuel layers required for fire behavior modeling.

UPDATED DATA SUPPORTS LOCAL PLANNING

The updated fuel data quickly proved useful. For example, the rules developed on the FPU for mapping fuels were shared with the Bureau of Land Management to assist in its fuel calibration efforts on near-by units and to use in the Bureau's state-wide fire management plan.

Also, during the 2016 Grape Fire, the updated fuel data formed the basis for landscape rule changes in the Wildland Fire

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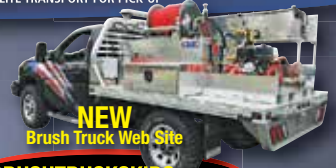
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Decision Support System. The Long-Term Fire Analyst (LTAN) trainee used the locally adjusted fire behavior fuel model mapping rules to further calibrate the data for a near-term fire behavior projection and a fire spread probability analysis for the Grape Fire.

LANDFIRE spatial data and rules can provide an all-lands foundation for creating up-to-date local fuel data sets, such as in South Central Idaho. Rickert noted that it was “definitely helpful having a list of landscape rules to provide to LTANs when they come in. It gives them a jumpstart in places where they’re unfamiliar with the fuel characteristics.”

Leveraging national data for local use

Attempting to keep data current is an ongoing challenge and, while LANDFIRE fuel products provide a solid foundation, they cannot meet everyone’s needs. However, when individual units adjust the products based on local knowledge, their usefulness can be enhanced. Although it took time and effort to update and calibrate the fuel data for the FPU, land managers in the region were rewarded with up-to-date and improved data for fire management and planning efforts that would work until the next version of LANDFIRE products became available.

WHAT IT TAKES TO UPDATE YOUR FUEL DATA

Teamwork. Updating and calibrating LANDFIRE data requires spatial analysis skills and knowledge of fire behavior and fire behavior modeling systems. In this case, a team consisting of a spatial analyst, a fuels planner and technical sup-

port staff from LANDFIRE and the Forest Service Enterprise Program worked together to produce the final products.

Affordable, accessible data. The LANDFIRE data used in this project are available for free online for the entire United States and its island territories. Fire severity data suitable for this type of analysis are available through either the Monitoring Trends in Burn Severity (MTBS) or the Rapid Assessment of Vegetation Condition after Wildfire (RAVG) programs for fires greater than 1,000 acres in the west and 500 acres in the east. While both datasets work, RAVG data are available within 45 days of wildfire containment, but only for fires on National Forest System lands. MTBS products are not delivered as quickly post-fire, but they are available for any fire meeting the size threshold in the United States.

Tools. The spatial data manipulation for this project was performed in ESRI’s ArcMap software using common raster data tools and the LANDFIRE Total Fuel Change Tool, a free tool which allows the user to easily manipulate fuel data.

IF YOU WANT TO ADJUST LANDFIRE FUEL DATA...

- * Follow the step-by-step tutorial *Updating LANDFIRE Fuels Data for Recent Wildfires*, which documents the process used to adjust the fuel data for the South Central Idaho Fire Planning Unit.
- * Tell LANDFIRE how you calibrated the fuel models for local conditions. Combined with comments from other users in the same area, LANDFIRE may be able to identify areas in need of improvement in the national data set.

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One of the key messages The Supply Cache hears often is that many of the products made available to wildland firefighters lack innovation and change. To address this, The Supply Cache is taking steps to engage customers from across North America to get their views on what innovation and change is needed. This is a market-back initiative for The Supply Cache. In other words, the voice of the customers will dictate the initiatives that we take with our suppliers to develop the right products and solutions for the wildland firefighting community. One of our key manufacturing suppliers that is renowned for innovation is Vallfire. The Supply Cache is the exclusive distributor of Vallfire's innovative products in North America. You can see these along with other products and solutions from other key industry-leading manufacturers in our Master catalog and on our website (supplycache.com).

The Supply Cache works closely with various foundations associated with wildfire to find ways where we can contribute and give back. Community involvement is a key strategic initiative for The Supply Cache. Another key initiative is to get our employees closer to the voice of our customers. To this end, our target is to have 50% of our employees trained in 130/190 and possibly red card holders by the end of 2017. Our employees combined, have close to 100 years of experience serving the wildland firefighting community.

The Supply Cache is absolutely dedicated to the Wildland Fire community; we will continue to be the Industry Leader for Innovative Solutions; we will always be a customer-led and market-back driven company; our employees will engage closely with firefighters on the front line; and we are proud to be an American company. After being in the wildland firefighting industry for more than a quarter of a century, we know a fair amount about what is needed to best serve our firefighter customers. However, we always remind ourselves: our customers don't care how much we know until they know how much we care. The Supply Cache cares about you and your crew mates!



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Where wildfire meets homes, the fire suppression response may protect homes but distort the full cost of insuring the homes from wildfires. Waldo Canyon Fire, Colorado Springs, CO, 2012. Photo: USFS.

THE POWER OF INSURANCE INCENTIVES TO PROMOTE FIRE ADAPTED COMMUNITIES

By Rob Galbraith
Director of Property Underwriting at USAA

If you work with wildland fire and managing its impacts (good and bad), you know that it is a complex topic in which many stakeholders have a vested interest. Governmental agencies at the federal, regional, and local level play leadership roles and provide strategic direction. Academic institutions and non-governmental organizations (NGOs) are also major players, both on a national and regional level, and they often play a critical role in their communities. And, critical to successful management of wildland fire, political leaders and the citizenry are engaged to drive action on the ground.

Of the many stakeholders focused on helping communities become fire adapted and building resilient landscapes in areas where fire is a natural part of the ecosystem, insurance carriers are often perceived as a secondary player. There are a variety of reasons why this is the case, but what is generally overlooked is that insurance carriers have “levers” at their disposal in the form of incentives to policyholders. Compared to education alone, such incentives can drive more homeowner mitigation activity and better land use planning decisions. If community leaders are able to effectively partner with one or more private insurance carriers in their neighborhood to work together,

they will likely achieve greater success than simply working alongside insurance carriers with no coordination of efforts.

The role that insurance carriers play in promoting wildfire mitigation

Many insurance carriers provide some form of education and outreach to their policyholders to inform them of their risk of being impacted by a wildland fire. Included in these messages are steps that the policyholder can take on their property to mitigate the risk of loss from a wildland fire, typically based on the concept of the home ignition zone and creating defensible space. Policyholder education efforts are often spearheaded by local agents and/or insurance trade associations and provide general advice in attractive marketing infographics. These are valuable messages, but often these messages are not tailored to the local community or coordinated with similar outreach efforts by governmental agencies and local NGOs. This can result in confusion by the property owner since there is no coordination on the wording or look and feel of the communications, even if the underlying messages are the same. Worse, at times the messages brought delivered by insurance carriers can conflict with those delivered by government authorities as landscapes vary widely across countries as do appropriate mitigation tactics. These differences across landscapes are generally not always incor-

How can we rethink risk after such huge losses, for individuals and housing stock and the economy, after the wildfires in Fort McMurray (a \$3.6 billion loss) and Gatlinburg (an estimated \$1 billion loss)? And how well do we truly understand and rate for wildfire risk? This is a question that Rob Galbraith helped explore at the Cohesive Strategy Workshop in Reno, NV in April. Galbraith, who combines expertise in property underwriting and wildfire impacts, shares the insights he presented at the Workshop and in a recent webinar, in which he details the economic “levers” of change that may be guided by insurance carriers working in coordination (and cohesively) with community, governments, and fire responders.

porated into communications developed by insurance carriers, leading to impractical and/or ineffective mitigation messages.

Beyond policyholder education efforts, insurance carriers have at their disposal two big levers to back up their mitigation messages and spur action by their customers.

The First Lever: Insurance Discounts support mitigations

The first lever is the provision of insurance discounts to policyholders for performing wildfire mitigation actions, either at the individual homeowner level or community level. For example, my employer USAA is a national carrier in the United States that is a member-owned company dedicated to serving military members and their families, and they offer a discount for policyholders living within the boundaries of a recognized Firewise communities in seven states (AZ, CA, CO, ID, NM OR, TX). (The Firewise pro-

gram is administered by the National Fire Protection Association in collaboration with the US Forest Service. Currently, over 1,400 communities in over 40 states are recognized as Firewise. For more information on the Firewise program, visit www.firewise.org).

In most locations, the discount is up to 5% of the total policy premium; for instance, if the total premium for a homeowners policy is US \$1000 annually, then the discount is 5% or US \$50 annually. While US \$50 is not a large amount of money relative to the amount that homeowners typically spend to perform mitigation activities, it serves as a meaningful incentive or reward to motivate behavior. I have attended several community meetings -- co-presenting with local fire departments to encourage homeowners to take proactive steps to mitigate their exposure to the threat of loss from wildland fire. And the impact of combining intangible benefits (e.g., life safety, avoidance of property and financial loss) with tangible benefits (e.g., discount on



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“Insurance premiums, however, fail to capture the full economic cost of protecting structures built in areas exposed to loss from wildland fire.”

homeowners insurance, recognition as a Firewise community through signage) can be a powerful motivator.

The Second Lever: Provision of Insurance – offering to insure a house, or not

The second lever that insurance carriers have at their disposal is the provision of insurance itself. In the private marketplace, insurance carriers are generally free to choose whom to offer policies to and whom to refuse coverage to. This decision on whether to offer or decline to offer insurance coverage can be for homeowners making an initial inquiry to quote coverage, or it can occur at the policy renewal for existing customers, most often annually. Different jurisdictions have different regulations guiding the offering of insurance coverage, but in most locations insurance carriers have (1) the freedom to use reasonable means to assess the risk that wildland fire poses to their set of policyholders, and (2) the option to restrict offering coverage if they feel that the exposure to losses is greater than what they are reasonably able to charge in premium.

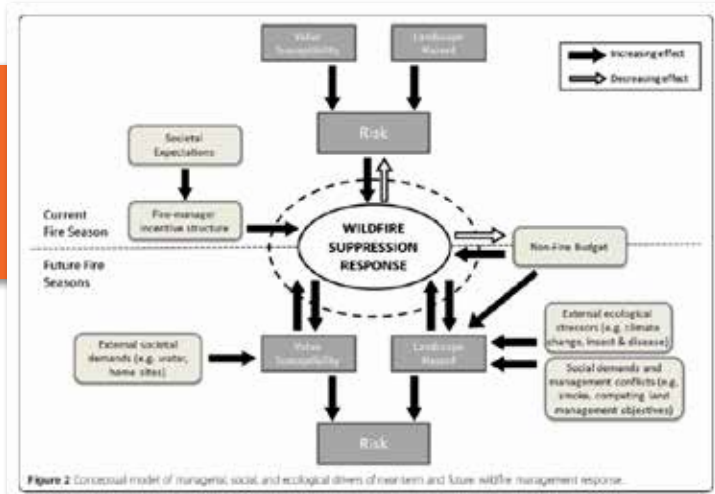
Why Insurance Pricing Does Not Properly Reflect Risk? Reasons include (but not limited to):

- Financial losses and risk mismatch
- Impact of suppression which subsidizes insurance industry
- No industry standard wildfire model
- Historically inexpensive reinsurance
- Lack of good statistical data valuing \$ loss reduction from mitigation
- Cost to obtain home characteristics and other key hazard information

Insurance carriers may make the determination that the exposure is too great for an individual property location or for a particular area if they have a large concentration of exposure overall. For carriers looking to reduce their overall exposure to losses from wildland fire in a particular geographic location, a common technique is to impose some requirements to perform mitigation activities by the time the insurance policy renews (often 60 days). If the policyholder does not perform the required mitigation activities, the carrier will not renew the policy and the property owner will need to seek coverage elsewhere.

Requirements by insurance carriers for property owners to take steps to mitigate their exposure to property losses from wildland fire can be a powerful motivator -- when those requirements adhere to scientifically-based principles. Government entities may have similar levers in the form of citations, fines, fees, tax withholdings, etc. when property owners are not in accordance with local regulations and ordinances, but these generally are not as impactful as an insurance carrier's refusal to continue coverage.

However, at times the requirements from insurance carriers can be counter-productive as they impose unreasonable or unnecessary burdens on homeowners. For example, a carrier may require



Where wildfire meets homes, the fire suppression response may protect homes but distort the full cost of insuring the homes from wildfires. *Waldo Canyon Fire, Colorado Springs, CO, 2012. Photo: USFS.*

100 feet of clear cutting to create defensible space around the home, but the property line to the adjacent parcel may be within 100 ft. Removing vegetation may also run afoul of local ordinances on the size and types of trees that may be cut down. Finally, these requirements from carriers may not be performed reasonably in the amount of time given and may give the homeowner misleading direction on the prioritization of mitigation actions, namely starting 0-5 feet from the structure and moving outward over time.

Land use planning decisions – and how fire response subsidizes the Insurance Industry

If you ask a variety of individuals with different perspectives who should bear the cost of protecting private structures built in areas prone to loss from wildland fire, virtually all will agree that the cost should be borne by the private citizen(s) who own the property.

In reality, around the globe, this rarely occurs. Conceptually, the cost of protecting a home or other structure is reflected in the insurance premium that is paid by the property owner. This premium should reflect both the likelihood of ignition or smoke damage and the cost to repair or remediate the damage. Insurance premiums, however, fail to capture the full economic cost of protecting structures built in areas exposed to loss from wildland fire.

The main reason for this is the presence of fire response efforts. No organization actively “puts out” a tornado or earthquake or tropical storm, but agencies do put out wildland fires. These suppression efforts play a large role in determining whether a particular structure ignites and suffers a loss. However, fire response resources are typically supported through taxes and fees to local homeowners, and therefore they act (inadvertently) as a subsidy for insurance premiums. If an insurance carrier does not pay a claim on the property because a potential loss has been avoided through the efforts of fire response, then the claim does not flow through to and affect their actuarial indications, which are used to set premiums.

Wildland fires that threaten structures but do not cause economic damages due to response efforts unwittingly disrupt the process by which insurance carriers assess risk and set premiums – through historical claims incurred and losses paid to policyholders. For other catastrophe perils such as tropical storms and earthquakes, statistical models have been developed that supplement historical losses. These catastrophe models



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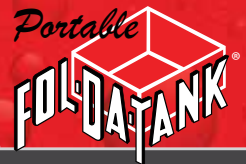


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“Umbrella organizations such as the International Association for Wildland Fire (IAWF) and the National Fire Protection Association (NFPA) are also great resources that can assist in bringing stakeholders together.”

serve as better measures of exposure to losses for insurance carriers and are relied on to set adequate premiums to cover expected claims from these perils. While there are many models to estimate the exposure to loss from wildland fire, none are currently used in a widespread and consistent manner by the insurance industry. So historical losses remain (for now) the method used to determine insurance premiums for wildland fire.

Since historical losses are used as the basis for setting insurance premiums to cover expected losses from wildland fire, and since suppression efforts prevent many structures from suffering economic losses, insurance premiums tend to under-represent the true economic costs associated with construction in areas prone to wildland fire. This directly reduces the power of offering insurance discounts to spur mitigation activities by property owners.

In addition, often the governmental agencies responsible for suppression are not connected with the agencies responsible for land use planning and development. As a result, the governmental agency responsible for approving new construction in areas with high exposure to wildland fire may not fully incorporate the total cost to government of providing fire response services to those property owners.

When these two factors come together in a community -- the inadequacy of insurance premiums to account for the full exposure to loss from wildland fire, and the failure of governmental land use planning agencies to fully account for the costs of providing response capabilities -- the result can be greater development in high-risk areas than would otherwise occur.

This is in contrast to areas prone to tropical storms, where insurance premiums based on catastrophe models appear to be driving more informed land use planning decisions as builders do not want to develop new construction in areas where high insurance premiums are a deterrent to potential home buyers. It also provides greater financial incentive to homeowners, which drives more action to harden their home against potential damage caused by tropical storms. A great case study is in Florida, where the passing of statewide building codes in 2001 along with the creation of the Florida Building Code mitigation credits has helped create a more resilient home stock over the past 15 years.

Incorporating insurance carriers into efforts to promote homeowner mitigation

In most cases, governmental agencies (and local fire departments in particular) do not have a line-of-sight picture into how insurance carriers factor into managing the negative impacts of wildland fire. In fact, the homeowner is often the first one to alert government authorities to the activities of insurance carriers by requesting advice on how to handle mitigation requirements being asked of them by their insurer.

Sometimes, property owners request government assis-

tance with performing the required mitigation actions and request a letter to be sent to the insurance carrier vouching for their insurability. Local fire departments and fire marshals are generally stretched thin and do not have excess capacity to act as an intermediary between homeowners and their insurance carriers, yet it is not uncommon that they are put into this situation. The lack of coordination and communication between the insurance industry and other key stakeholders leads to confusion for one critical constituency in the effort to create fire adapted communities: the property owner.

Finding the best way to bring the insurance industry into the set of key stakeholders at the national, regional, and local level will vary greatly. A great place to start engaging with the insurance industry is through trade associations that represent a large segment of the insurance carriers as well as through governmental agencies tasked with regulating the insurance industry in your jurisdiction. Umbrella organizations such as the International Association for Wildland Fire (IAWF) and the National Fire Protection Association (NFPA) are also great resources that can assist in bringing stakeholders together.

Once engaged, a great first step is to identify common interests: namely, working together to prevent the loss of life and property from wildland fire while recognizing the integral part that wildland fire plays in many ecosystems. Just as government agencies and fire departments may not sense the role of insurance, many insurance carriers also lack the line of sight connection to all of the relevant stakeholders and are not familiar with efforts to coordinate actions in pursuit of common goals such as the Cohesive Strategy in the United States. Thus, a discussion of shared objectives between stakeholders that identifies areas of mutual interest and benefit will help greatly to better coordinate activities from traditional stakeholders as well as the insurance industry.

By working together towards these common objectives, traditional stakeholders can benefit from the powerful levers that insurance carriers have at their disposal to motivate action by homeowners to help create fire adapted communities. Additionally, through coordination of efforts, less time will be spent by insurance carriers and government agencies in a back-and-forth discussing of the insurability and proper mitigation of individual properties to retain insurance coverage, and more time providing a consistent message to property owners. And a core element of this message -- that effective fire response may undercount the full economic risk of development in fire-prone areas -- is a message we all need to learn, share and put into practice.

Author's note:

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A FIRST REFLECTION ON PORTUGAL

What links Portugal's deadliest wildfire to Grenfell Tower? Economics and neglect.

Published originally and in longer form in *The Conversation* on June 22, 2017 at <https://theconversation.com/what-links-portugals-deadliest-wildfire-to-grenfell-tower-economics-and-neglect-79815>.

THE CONVERSATION

by *Stefan H Doerr, António Bento Gonçalves, and Cristina Santin*

In one tragic week, many dozens died in two seemingly unconnected fires in the UK and Portugal. One blazed through a high-rise building in London, far away from natural ignitions and clad with what should have been non-flammable insulation. The other was a wildfire, suggested to have been started by lightning, which then engulfed rural communities surrounded by highly flammable forest plantations.

Yet the two tragedies share parallels, and not only in the search for answers. Both fires spread quickly and burned with an intensity well beyond what firefighters were able to stop. Both caught residents largely unprepared, with their escape routes cut off, and both left a death toll far beyond what might have been expected for either a building or a forest fire in such highly-developed countries.

Indeed, the fires in Portugal claimed 64 lives, making it the country's deadliest wildfire in recorded history.

Potential ignition sources for fires are common, be they lightning, accident or arson. However, advances in fire detection, firefighting and use of less flammable building materials have led to a much lower threat from fires in modern cities. The same cannot be said for the rural communities in north-central Portugal and indeed many other regions of the Mediterranean.

The tinderbox of Europe

The roots of Portugal's latest fire can be found in economic and social changes. Over the past few decades, the country's rural areas – already among Europe's poorest regions – have seen significant depopulation as residents moved to wealthier cities or countries in search of work, leaving behind almost abandoned villages. As a result, a landscape that was once dominated by farming, grazing and open oak forest land, has been replaced with denser vegetation such as plantations of native pine (*Pinus pinaster*) and, more recently, Australian eucalyptus (*Eucalyptus globulus*).

Both trees grow fast and provide valuable timber. In theory, they are lower maintenance, and require fewer workers, than the more open and intensely managed agri-forest of the past. Such plantations therefore sound like a sensible option for the region.

However, the switch to pine and eucalyptus also resulted in a much more flammable landscape. In fact, *Eucalyptus globulus*, introduced in many countries for pulp production, is one of the world's most flammable tree species and its extent has more than doubled in Portugal since the 1980s. In severe forest fires, burning bits of vegetation (firebrand) are often lifted by wind and can travel hundreds of metres. Eucalyptus

bark is particularly effective at spreading fire in this way.

The humid Atlantic climate of the northwestern Iberian peninsula also plays a role. Mild winters with high rainfall allow for excellent growing conditions, yet its dry, hot summers combine to make this region the tinderbox of Europe.

Impossible to extinguish

Forest fires are therefore common in this region and Portugal has one of the best fire detection and fighting capabilities in Europe. But though its average annual area burned has decreased in recent years, this tragic fire has been a stark reminder that the threat remains.

Firefighters are well aware that once a fire spreads in dense vegetation, such as pine or eucalyptus forests, in hot and windy conditions, it is essentially impossible to extinguish. Efforts are then typically aimed, not always successfully, at halting its spread at its flanks and onto infrastructures, or aiding the evacuation of residents. In the mountainous terrain of Portugal with few escape routes and the fires' spread accelerated by firebrand igniting new areas ahead of the fire front, this can become an impossible task.

Just as was the case in the tragic Australian Black Saturday fires in 2009, in attempts to escape or avoid the fire, residents drove along mountain roads through dense smoke and were trapped by the fire in the process. Indeed, vehicle entrapment during late evacuation is one of the most common causes of death in wildfire.

The scale of human losses in this fire has been unprecedented in Portugal's recent history, yet the occurrence and extent of fire is not. What caused the fire could be seen as almost immaterial as there will always be potential ignition sources, particularly in areas with widely scattered population. Whether fire will spread and pose a risk to people is then a matter of vegetation flammability, terrain and weather, along with the level of planning and effective communication required to quickly move residents to safe areas.

In this event, hot dry weather, scattered villages with a dwindling population insufficiently prepared for fire, surrounded by steep terrain with extensive monocultures of highly-flammable trees and insufficient communication, combined into a tragic loss of life. Yet, as with London's Grenfell Tower fire, the high fire risk was far from unforeseeable. There is much that can be done to reduce the threat from, or even eliminate, highly flammable materials – be it insulation around buildings, or dense forest plantations surrounding villages. In both cases, important lessons must be learned.

About the Authors

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