

# CAL FIRE Local 2881 SYMPOSIUM



A Comprehensive View  
on the Future of Fighting Wildfires  
by a Team of Experts

2015

Written and Compiled by Dr. Matt Rahn and Terence McHale



## Dr. Matt Rahn

Dr. Matt Rahn has over two decades of experience in applied sciences and policy, with an emphasis on environmental science, statistics, public policy and wildfire science. Having earned both a PhD and JD, Dr. Rahn has focused much of his work on the interface between science and policy, supporting local, state and federal programs in collaboration with lawyers, policymakers and scientists on issues ranging from watershed management, endangered species, land use planning and renewable energy.

As a researcher and educator, Dr. Rahn has been involved in wildfire issues throughout his career. Results of this research have helped establish a benchmark for evaluating economic impacts from large-scale wildfires and understanding the total economic burden. He has also led a staffing study that became the first of its kind to address how firefighter staffing influences initial attack effectiveness and health/safety during a wildfire. He is currently leading a collaboration with CAL FIRE Local 2881, CAL FIRE, US Forest Service, International Association of Firefighters and the National Institute of Standards and Technology. This research focuses on firefighter health and safety, with a specific focus on heat stress, heart and respiratory rates and exposure to air contamination during WUI fires.




## Terence McHale

Terry joined Aaron Read & Associates after serving as Director of the California Fire Foundation and Consultant to the California State Assembly Committee on Fire, Police and Emergency Services. Terry has worked with a wide variety of clients to write and lobby legislation on a spectrum of issues, ranging from the creation of the California Firefighter's Memorial to the line of consanguinity for heirs. In 2009, he was awarded with the Director's Achievement Award on behalf of CAL FIRE.

During his time at Aaron Read & Associates, Terry has interviewed and written stories about such interesting Californians as Clint Eastwood, Kareem Abdul Jabbar, Gary Condit, Governors Pete Wilson and Gray Davis and the great skier, Spider Sabich. Terry was made an honorary firefighter in 2002 for his work in public safety. He has also been awarded the President's Award from the California Dental Hygienist's Association (CDHA) and a special award from the California Athletic Trainer's Association (CATA) for the work he has done on their behalf.

Terry has maintained an integral role in managing both the paid and free media messages of campaigns.



## ***A Comprehensive View on the Future of Fighting Wildfires by a Team of Experts***

**O**n June 16-17, 2014, CAL FIRE Local 2881 hosted their first *California Wildfires and Statewide Challenges Symposium* in Sacramento, California.

Community experts from the federal, state and local levels accepted invitations to attend the symposium. Topics ranged from environmental change, to land management, to firefighter staffing and safety.

The format consisted of individual presentations followed by roundtable discussions. No one arrived at the symposium with a pre-set agenda or a preconceived notion of what the ultimate outcomes would be.

The idea was simple enough – allow the experts to honestly view the California landscape as it relates to wildland fires and encourage common sense conclusions.

The robust discussions were insightful.


A universal conclusion was that urbanization has profoundly and permanently changed the California wildland environment and that we are a generation behind urban strategies for fire suppression and response when dealing with wildland fires. A concomitant view is that the risks are multiplying as the urban/wildland interface is abrogated by increased development and natural factors such as drought and global warming, which contribute to multiple, inevitable fires that singularly would once have been viewed as cataclysmic.

Costs attributed to wildland fires are staggering. An economic study of wildfires in San Diego County alone in 2003 and 2007 estimated costs at \$4.5 billion and that does not include incalculable, indirect costs, such as lost workdays, business shutdowns, watershed losses or decreased tourism. The economic costs far exceed the cost of fighting fires.

*William Craven, the longtime and highly respected consultant to the State Senate Natural Resources Committee, said, “Wildfires cost \$3 billion a year at the federal level, which is half of the Forest Service budget now being spent on suppression. It used to be 15 percent in the 1990s. The economic losses are now five times what they were in the 1980s.”*

As more resources are being directed toward fighting and cleaning up after wildfires, fewer may be available for research and prevention efforts.

A failure to develop a strategy for wildfires that includes cooperation between stakeholders, budget prioritizations, the impact of political vagaries and social and business structuring is an invitation to disasters that will be devastating. Homes, businesses and public lands will be lost. Lives will be profoundly disrupted and tragic impacts will be felt by public safety and the general public.



Numerous wildfires continue to burn out of control throughout California. Many of these fires were ignited in late June by dry lightning and made worse by parched conditions and a lack of rainfall.”

~ **NASA, July 1, 2008**

Governor Arnold Schwarzenegger declared a state of emergency...as Santa Ana winds continued to whip the fires in unpredictable ways ...the flames burst open and the hillside looked like a volcano had just erupted ....looked like a river of fire. Fire was literally flowing down the hill.

~ **San Francisco Chronicle, November 16, 2008**

Residents Evacuate as Hundreds of Firefighters Battle California Wildfires. California Flames Scorch Dry Earth.

~ **CNN, August 13, 2012**

Rim Fire Hits Yosemite and Explodes into One of California’s Largest Wildfires: The Tuolumne County fire nearly doubled in size overnight and stretched over 125,620 acres, or 196 square miles – larger than the size of San Jose.

~ **San Jose Mercury News, August 23, 2013**

Unprecedented Wildfires in California: The January predictions of this year possibly being the worst fire season have come true ... “I’ve been doing this for twenty years,” said San Diego County Supervisor, Bill Horn. “This is the worst I have seen.”

~ **CNN, May 16, 2014**

Wildfires Eat Up Forest Service Budget, Hampering Prevention: The cost of fighting wildfires in California and the western United States has skyrocketed ... fire suppression and other firefighting expenses have increased from 16% of the Forest Service Budget in 1995 to 42% in 2014 ....

~ **Robert Bonnie, Undersecretary**

**Natural Resources and Environment for the U.S. Dept. of Agriculture, March 4, 2015**

“Since 1985, the number of large wildfires in the western United States increased fourfold relative to the previous fifteen years.”

**Dan Cayan, Research Meteorologist**

**UC San Diego’s Scripps Institution of Oceanography**

“I have personally witnessed 45 fire seasons in the West and I worry that we are getting to the tipping point. We have a billion burnable acres in the United States and 250 million of those acres are at risk. 15 million homes are at risk. Wildland fires are a wicked problem that will not rise to other issues like budget and defense, but it is a bad problem getting worse.”

**Tom Harbour, US Forest Service**

“This is not just a fire problem. It’s a development problem, a land-use problem and an ecological problem.”

**Kevin O’Connor, International Association of Fire Fighters**

“18% of the country’s wildlands are developed and the movement into areas once open and wild will never be reversed. Our goal is a consolidated effort between all levels of government as we implement preventive and suppression measures to protect the lives and property increasingly at risk. Failure to act responsibly will result in economic ruin for communities and a tragic loss of life.”

**Mike Lopez, President, CAL FIRE Local 2881**

## Quotes by Symposium Attendees



Mike Lopez, President CAL FIRE Local 2881: **“When Rick Swan and I sat down to plan the Symposium, our goal was simple – We wanted to get beyond the posturing and hyperbole to begin developing a realistic wildland fire plan for California and the country.”**



Ken Pimlott, Director of CAL FIRE: **“We keep going down the paradigm of let’s throw more stuff at it. But when you look at the cost of rebuilding, it doesn’t matter how much you throw at it, you’re still going to lose all those things... Go to the Oakland-Berkeley Hills. They rebuilt exactly the way it was. The roads aren’t wider and the vegetation is twice what it was.”**



Kevin O' Connor, International Association of Fire Fighters (IAFF) Governmental Affairs assistant to the General President: **“Any firefighter west of the Mississippi and south of central North Carolina is going to be a wildland firefighter at some point in their career. Even New York City last year had some significant events.”**



Karon Green, Chief Consultant to the Assembly PERS Committee, answering a question about encouraging the Legislature to enact policies: **“I look at it as...How do you get it proposed for funding? The more research you have to back up your asks, the more weight it carries.”**



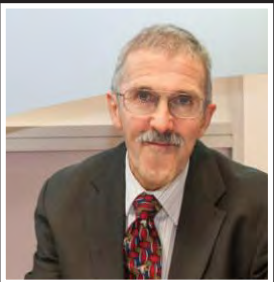
## Quotes by Symposium Attendees Continued



Rex Frazier, Personal Insurance Federation of California (PIFC):  
**“The Insurance industry is looking to firefighters for assistance as we begin to assess a future with fires no one would have predicted possible a decade ago.”**



William “Bill” Craven, Chief Consultant of the California Senate Natural Resources Committee: **“A couple of numbers jumped out at me. One is that in California so far, we’ve had 1,100 fires of various sizes, two times the yearly average. The second is a statistic from NASA... 30 to 60 percent higher projections for fire numbers by the end of the century...Seventeen percent of the California WUI is developed with housing. As population pressures increase, the rest of that WUI is going to be subject to potential development. That is going to make things very dicey in terms of fire policy.”**



Tom Harbour, Director of Fire and Aviation Management for the U.S. Forest Service: **“We don’t think far enough down the road about how we are going to get out ahead of this wildland fire problem. We can’t cut our way out of it and we can’t one-more-air tanker our way out of it. It’s too big. Choices are going to have to be made. If we don’t make them, folks outside of us are going to make them for us....25-year-old staffers on the Hill are going to be making decisions...unless folks like us get together and say, ‘We have some ideas.’”**



Deputy Chief (Ret.) Rick Swan, former member of the CAL FIRE’s Personal Protective Clothing Committee: **“This whole issue of wildland firefighter PPE (personal protective equipment) and heat stress and smoke and particulates are in such an infant stage of what we should know. We don’t know what we are breathing in and how it’s affecting us, how that comes back into our bodies. We know what’s going on in structural stuff, but what about the intermittent CO exposure? We don’t know what that does or how that affects us. We flat out don’t know.”**

## Quotes by Symposium Attendees Continued



Nelson P. Bryner, Chemical Engineer Leader for the National Institute of Standards and Technology (NIST): **“I think the fact that WUI is a problem has not received much attention until recently. ‘America Burning’ started us down a path that we are still on with 40 years of science. We don’t have 40 years of science for the WUI side.”**



President Chris Mahon, President of Ventura County Professional Firefighters Association: **“Ventura County has had an aggressive prevention program for 30 years. We’ve been working with property owners for a long time. It was difficult program to start, but now it is ingrained in our department. We get great compliance. New people are often skeptical of our program until they experience their first wildfire. Once they have lived through one, they are the first ones out there saying, ‘Hey, can you come tell us what to do?’”**



Dr. Dan Cayan, Scripps Institution of Oceanography (SIO): **“We cannot escape the relationship between a more volatile fire environment and climate change. It must be addressed. The impact on fire safety is significant.”**



Dan Silver, MD, CEO of the Endangered Habitats League: **“Fire departments, from my perspective, facilitate the continued expansion of the WUI by checking boxes. ‘You build it and we’ll defend it.’ Somehow that chain needs to be broken.”**



George Broyles, Fire Test Leader, U.S. Forest Service: **“The landscape in the West has changed quickly and become more susceptible to the conditions which lead to wildland fires.”**

## ***INDEX/DEFINITIONS***

### **CHANGING NOMENCLATURE OF CALIFORNIA FIRES**

**Fire Season:** An antiquated term that refers to annual discrete periods where patterns of temperature, precipitation and humidity facilitate conditions for wildfires; modern trends indicate that the nomenclature be changed to “**Fire Year**”

**EHL:** Endangered Habitats League

**IAFF:** International Association of Fire Fighters

**LRA, SRA, FRA:** Local-, State-, Federal Responsibility Area

**NIST:** National Institute of Standards and Technology

**PIFC:** Personal Insurance Federation of California

**USFS:** United States Forest Service

**Wildland Fires:** This term has become a misnomer. Fire is no longer isolated to wildland areas; fires now impact highways, houses, businesses, etc... Collectively referred to as a wildland urban interface fire (**WUI**)

**WUI:** Wildland Urban Interface





*In June of 1970, fifty acres burned in Sonora, the California foothills, and the consternation caused was front page news. People were alarmed. In the last few years, we have grown accustomed to stories of thousands of acres being burned and incomprehensible loss. (Tom Harbour US Forest Service, June 16, 2014)*

## STATUS AND TRENDS



Since the 1970s, our nation has witnessed an increase from three million to an overwhelming seven million acres burned each year – with further increases projected.<sup>1</sup>

The Oakland Hills Fire in 1991 placed an orange glow in the sky that was unfamiliar and, at least momentarily, frightening for Californians. Firefighters who responded have said since then that we “dodged a bullet” as the fire nearly escaped into total catastrophe. This singular event exposed inefficiencies that we have allowed to continue in the subsequent two decades. Recent fires have finally begun to strain the great trust that our firefighters, the best trained and educated in the world (and certainly not short on courage), will be able to put out all the fires.

Given the complexity of our communities and land use, most firefighters will, at some point in their career, respond to a fire in the Wildland Urban Interface (WUI). In the conterminous US, the WUI covers 277,668 square miles and has approximately 45 million housing units.<sup>2</sup> The WUI is widespread in the eastern US, reaching a maximum of 72% of land area in Connecticut, while in the West, California has the highest number of WUI housing units of any state (5.1 million). Between 2007-2011, local fire departments responded to over 330,000 wildfires each year.<sup>3</sup> There are approximately 1.1 million firefighters and 30,100 fire departments in the US.<sup>4</sup> Conservatively speaking, if roughly 9% of the U.S. is part of the WUI, then at least 100,000 firefighters are regularly involved in WUI and wildland incidents across 2,709 departments. Despite this, many of these firefighters do not generally consider themselves wildland firefighters.

The statistics are staggering. In California, only 4% of wildfires are natural events, meaning that well over 95% of our wildfires are the result of human activity. Of these events, one in six engulfs transportation infrastructure and one in ten includes some type of structure (about 3,000 homes are lost each year in the U.S.)<sup>5</sup> Sadly, 2014 was a hit in the gut when 34 wildland firefighters lost their lives. As a result, emphasis has shifted from “traditional wildland firefighting” to structure defense in the WUI where over 40% of our homes are now located.<sup>6</sup>

If trends continue, and the woeful problems associated with drought and global warming suggest the trend is inexorable, it is conservatively predicted that large fires (defined as 500 acres or more) will increase nearly 35% by 2050 and an alarming 55% by the end of this century.<sup>7</sup> Future decisions on development and management of the WUI are critical in determining future vulnerability and risks. The paradigm shift from wildland to WUI firefighting has transformed conventional risk.

Traditionally, fire studies focus on the three broad categories: wildland, structure and vehicle. Each incident type comes with distinctive exposures, hazards and risks with protocols, tactics and PPE specific to each scenario. A WUI fire represents a dynamic and multifaceted incident where these incident types merge. Firefighters may respond to a wildland fire, but often focus on community defense where structures and vehicles can become involved. The evolution of modern wildland fires and the complex matrix of land use and development suggest that this is not only a common scenario, but is a virtual certainty. As a result, we are experiencing a transition from a “traditional” wildland fire (where firefighters and communities may be reasonably prepared and protected) to an incident with diverse risks and consequences.

We need to change the way our society thinks about wildland fires.





The discussion during the Symposium focused some on the disconnect between the various levels of government. Immediately problematic is that the same mistakes keep being made. Much of this is ascribable to the curious fact that the federal government does not have an independent fire service with an autonomous, operational point person taking charge and assuming the demands of leadership. The federal responsibility for fighting fires is scattered through too many bureaucracies, and too many agencies.

As mentioned previously, only .05% (5 out of 1,000) firefighters consider themselves wildland firefighters. Consequently, the training for wildland firefighting can be marginalized both in terms of importance and budgeting. The situation can also be exacerbated by the distances perceived between a forester and a firefighter.

One of the participants said the fire service can sometimes be characterized as 100 years of tradition unencumbered by progress. For example, Ed Pulaski created the firefighting tool that carries his name, the Pulaski, more than 100 years ago. If Pulaski had been a soldier a century ago, he would not recognize the modern way we conduct war, but sadly his familiarity with firefighting strategies and tools would be immediate.

The internecine issues inherent with firefighting are problematic when helping policymakers construct a coherent firefighting blueprint. A politician can be expected to listen when firefighters provide a linear narrative, but a cacophony of 'fire specialists providing conflicting images' only adds to the problem. We could resolve many of the problems if we develop a list of ideas as a step toward establishing public policy.

At the end of this document, we will provide a series of ideas that will streamline wildland fire policy and result in more effective protection of property, greater security for our neighbors, and increased health and safety for our firefighters.

*“A couple of numbers jumped out at me. One is that in California so far, we’ve had 1,100 fires of various sizes, two times the yearly average. The second is a statistic from NASA ... 30 to 60 percent higher projections for fire numbers by the end of the century ... seventeen percent of California is WUI developed with housing. As population pressures increase, the rest of that WUI is going to be subject to potential development. That is going to make things very dicey in terms of fire policy.” ~ William Craven, Chief Consultant, Ca.Natural Resources Committee*



## BEHAVIOR OF FIRE IN CALIFORNIA

The term “fire season” has become archaic in the public safety lexicon. The mission has changed due to environmental reasons and the widespread development in previously pristine areas. The idea of seasonal firefighters may be an idea whose time has passed. This is particularly true when we realize that the vast majority of our fires (over 95% in California alone) are the result of human causes rather than natural events. We should also be asking why firefighters fall under the aegis of the Department of the Interior, the Department of Agriculture, BLM and others in a piecemeal approach to fighting fires at the federal level. The Fire Service as a professional partner is not there with the U.S. Forestry; and while no one is accusing anyone of anything nefarious, the idea of benign neglect wading toward incompetency is mentioned.

Large-scale wildfires have significant, overlooked economic impacts, often exceeding billions of dollars in losses. In the conterminous United States, there are over 45 million homes in 70,000 communities in the WUI<sup>4</sup>, with the annual cost of fires exceeding \$14 billion.<sup>8</sup> Each fire has a unique personality and concomitant economic impacts. In California, the most alarming trend is that half of the twenty largest wildfires in California’s recorded history have occurred in only the past decade, with many of these events having an unprecedented physical and financial impact to the state. The economic, social and environmental costs of wildfires are often staggering.

For example, the 2003 wildfire event that consumed much of San Diego County became one of the most costly fire incidents in California’s history. With three co-occurring fires (Cedar, Paradise and Otay), the fires consumed a total of 375, 917 acres, 3,241 homes were lost and, sadly, 16 people lost their lives, including one firefighter. At the peak of the fires, 6,635 crew were fighting the blazes. The Cedar Fire is still the largest recorded fire in California’s history (at over 280,000 acres).

In a comprehensive economic impact assessment, the total economic impact of the 2003 wildfires in San Diego County is estimated at over \$2.45 billion.<sup>9</sup> This equates to a cost of over \$6,500 per acre. Surprisingly, the total suppression costs amounted to **less than 2 percent** of the entire economic impact, a relatively negligible cost in contrast to the overall loss. Major categories of losses included utilities and other infrastructure (\$147.3 million), ecosystems (\$61.2 million), lost business and tourism (\$365.5 million), unemployment insurance (\$400 million), FEMA disaster loans (\$170 million), FEMA grants (\$137.5), insurance claims (\$1.2 billion), and increased medical costs (mainly respiratory/pulmonary cases - \$10.7 million). In 2007, San Diego County experienced another large-scale wildfire siege, costing the region an additional \$2 billion in economic losses.

More recently, the Rim Fire from 2013 became the third largest fire in California's history having burned over a quarter-million acres in the Sierra Nevada Mountains near Yosemite National Park. Over a year passed before the fire was officially declared "out" due to a lack of winter rains and several deep-interior inaccessible areas that continued to smolder. In comparison to other large-scale fires in California, the Rim Fire had relatively few structures lost (11 residences, 3 commercial buildings, and 98 outbuildings). Because of the significant timber resources and ecological value of the affected area, total economic losses neared \$1 billion. In comparison with other fires in the state, suppression costs were staggering (\$127 million or nearly 14% of the total economic loss). Had the Rim Fire reached the Hetch Hetchy reservoir (the main water supply for the Bay Area), economic losses could have made this one of the most financially devastating fires in the world (see below for further discussion on water resources).

While these case studies provide an interesting cross-section of recent, large-scale wildfires in California, actual economic and social impacts are not adequately addressed. Further, it does not account for the total losses inflicted on our state from all wildland/WUI fires (both large and small). Finally, not all of the economic impacts or losses are captured in these analyses. It is relatively easy to quantify economic losses in terms of property, buildings, infrastructure, goods and suppression costs. It is more difficult to quantify the long-term costs to health and welfare (for both community members and firefighters), ecosystem services, watershed and water quality degradation and air quality. Regardless, we now recognize that large-scale wildland/WUI fires have become commonplace; the frequency and intensity of these fires is increasing and the resulting economic and societal impacts are significant.

Experts at the Symposium highlighted that what we don't know about wildland and WUI fires may exceed what we do understand. Nelson P. Bryner of NIST said they lack data on the WUI. For example, in urban fires we know kitchens are the number one location for ignition and most fatalities are caused by upholstered furniture. In the WUI we don't know if its wood shingles that first ignite or the walls and the lack of reliable information has a negative impact on how we plan to attack.

NIST studies provide some evidence that wooden decks are a main ignition point, yet we don't know how many embers it takes to ignite a deck. NIST conducted some wind tunnel experiments and discovered if the embers are spread out, they blow away and won't start a fire. As studies mature, the idea of how we build a deck will change.





## SYMPOSIUM DISCUSSION

Awareness of wildfires as an issue has never been greater in our country’s history than now. What were once generally considered issues of the West are now nationally recognized as an increasing threat to all of our communities and ecosystems. As a result, the term ‘wildland fire’ has become a bit of a misnomer. Large wildfires frequently threaten homes, businesses and lives, shifting the focus to structure defense. Further exacerbating the situation, a new paradigm is emerging: we are witnessing a dramatic shift in the frequency and intensity of wildfires due to a variety of factors, most of which are human-caused.

As our population grows, decisions on developing and managing the WUI will determine our vulnerability and the risks imposed on our firefighters and communities. Throughout the United States, an ongoing debate is ensuing that questions the adequacy of modern firefighter staffing, resources, response protocols and land management. Critical decisions are driven by such malleable and extrinsic factors as public perception, environmental concerns and budgetary constraints. As a result, decisions can be made without adequate empirical support or understanding of the issues, resulting in serious consequences to wildfire/WUI response, community safety, attack effectiveness and firefighter health and safety.

Although firefighting response and effectiveness has vastly improved, many of the most basic issues have not been researched and considerable uncertainty remains. As a result, wildland and WUI fires have not kept pace with the advancements seen in structure and high-rise fires. In 1973, the National Commission on Fire Prevention and Control published a report that was the result of nearly two years of work. Findings and recommendations from this report served as a catalyst for significant changes and advancements in our urban fire sector. The results are nothing short of miraculous, especially when you consider that the U.S. population has increased by about 100 million people, with corollary increases in buildings and homes.

Table 1. Trends in fires, deaths, injuries, and dollar loss in the United States.

Category	1971 <sup>10</sup>	2012 <sup>11</sup>
Deaths	7,570	2,385
Property Loss (Adjusted for 2012 dollars)	\$12.85 Billion	\$7.10 Billion
Number of Fires (structure)	996,900	374,000
Injuries	Tens of Thousands (estimate)	13,050

\*Data based on Appendix V, America Burning, the Report of the National Commission on Fire Prevention and Control (1973)

\*\*Data based on US Fire Administration statistics ([http://www.usfa.fema.gov/downloads/pdf/statistics/res\\_bldg\\_fire\\_estimates.pdf](http://www.usfa.fema.gov/downloads/pdf/statistics/res_bldg_fire_estimates.pdf))

Unfortunately, consensus among participants at the symposium estimate that analogous advancements in wildland/WUI fires are easily decades behind structure fires. For example, we are only starting to understand how staffing influences initial attack effectiveness of wildland/WUI fires, yet we do not fully understand the potential risks that firefighters face, including exposure to carbon monoxide and hazardous air pollutants. Further, although there are a variety of programs in the fire sciences, they tend to focus on structure fires, fire administration and fire technology. Wildfire science and education programs remain under represented in the fire services industry and our educational institutions.

The result of the America Burning Report (1973) provided several broad recommendations, for what ultimately seems to have been a successful national program. It is worth highlighting these key points here, as they can easily be adapted to meet the wildland/WUI agenda and coincidentally follows closely with many of the recommendations that emerged from this symposium:

*Table 2. America Burning (1973) key recommendations*

There needs to be more emphasis on fire prevention
The fire services need better training and education
Americans must be educated about fire safety
In both design and materials, the environment in which Americans live and work presents unnecessary hazards
The fire protection features of buildings need to be improved
Important areas of research are being neglected

Again, the purpose of this symposium is to highlight critical areas of need and discussion for wildland and WUI fires in California (and the United States), and help advance public safety, community protection and firefighter health and safety. We need to begin a statewide and national dialogue on wildland fire issues that receives the same attention, support and implementation that resulted from America Burning (1973). Generating this dialogue and awareness of wildland fire issues could have a galvanizing affect across California and the United States, resulting in meaningful societal, economic, and environmental benefits.

Much like America Burning, the recommendations herein are simple, straightforward and timely. Our goal is to highlight critical needs (at a time when policymakers are focusing more carefully on costs), address long-term planning and land-use change and recognize our changing demographics. We need to answer the question of how we are going to continue protecting our families, communities, businesses and open lands in the future. The results of the symposium are provided below, organized into five areas: Climate and Environment, Land Management, Resources and Infrastructure, Firefighter Health and Safety and Attack Effectiveness.





## CLIMATE AND ENVIRONMENT

*“Wildland fire service in the West is still based on what used to be a limited fire ‘season.’ But climate change is expanding the ‘natural’ season, and there is no season for human-cause fires.”*

For thousands of years, the frequency and intensity of natural wildfires shaped the distribution and configuration of the forests and grasslands in many parts of the United States. Over time, many of our ecosystems became adapted to wildfires with some plant and animal species becoming dependent on fire as part of their natural history. However, modern catastrophic wildfires are significantly different from the historic fire regime in California. Today, only a fraction of the wildfires we experience in California are caused by natural events.

As described earlier, wildfires can have major economic consequences with large-scale incidents and through aggregate annual losses of smaller fires. Much of that economic toll occurs in our ecosystems where the services that they provide are lost or degraded. According to our panel of experts, the two areas of greatest concern are impacts to our watersheds and air quality. Other key areas include habitat losses, impacts to endangered and sensitive species and the resulting increases in invasive species post fire.

### **Status and Trends**

Specifically, scientists have linked climate change to the amount of carbon dioxide in the atmosphere. It used to be 280 parts per million of CO<sub>2</sub> concentration per-Industrial Revolution. Today it is around 400ppm. By the end of the century it will be even higher as explained by Meteorologist Cayan.

### **Identifying Need for Action**

As more than one speaker noted, urban fires were a wicked problem in the 1970s when the fire death toll was averaging 9,000 a year. A federal blue-ribbon commission tackled the issue and produced the landmark America Burning Report. In the 40 years since, that report has shaped the fire service and led to better scientific understanding about fires in enclosed spaces, better safety gear for firefighters, more fire-resistant building codes and better prevention efforts and equipment. As a result, fire deaths in America have been cut by two-thirds, even as the population has expanded.





## **WATER RESOURCES**

The relationship between our nation's water resources and our wildland areas cannot be overlooked. According to Tom Harbour, probably one of the highest risks lies in watershed management and water quality. Economic assessments support this assertion, where the majority of the funds allocated to our ecosystems tend to support watershed restoration programs. For example, after the 2003 Cedar Fire, FEMA provided over \$47 million in watershed restoration funding and \$14 million in hazard mitigation efforts. Portions of these funds were used to restore habitat and control the potential impact of erosion and floods in the following winter. It will never be clear how much funding private landowners, tribes and municipal entities spent on erosion and flood control measures, but we know this was an extraordinary expenditure.<sup>9</sup>

These impacts pale in comparison to the potential losses that could have occurred during the 2013 Rim Fire. Potential impacts to the Hetch Hetchy reservoir put at risk the main water supply for the San Francisco area, servicing over 85% of their water needs with over 2.6 million customers. As a precautionary measure, the San Francisco Public Utilities Commission diverted water from Hetch Hetchy to downstream reservoirs in San Mateo and Alameda counties. However the Utilities Commission still paid over \$116 million for supplemental water and electrical services as a result of the fires. The Utilities Commission estimated that if the Rim Fire had actually impacted their water infrastructure, economic losses would have been between \$100 and \$736 million. We rely on these pristine watersheds for a large part of our state and national water supply. We cannot afford to ignore this risk.

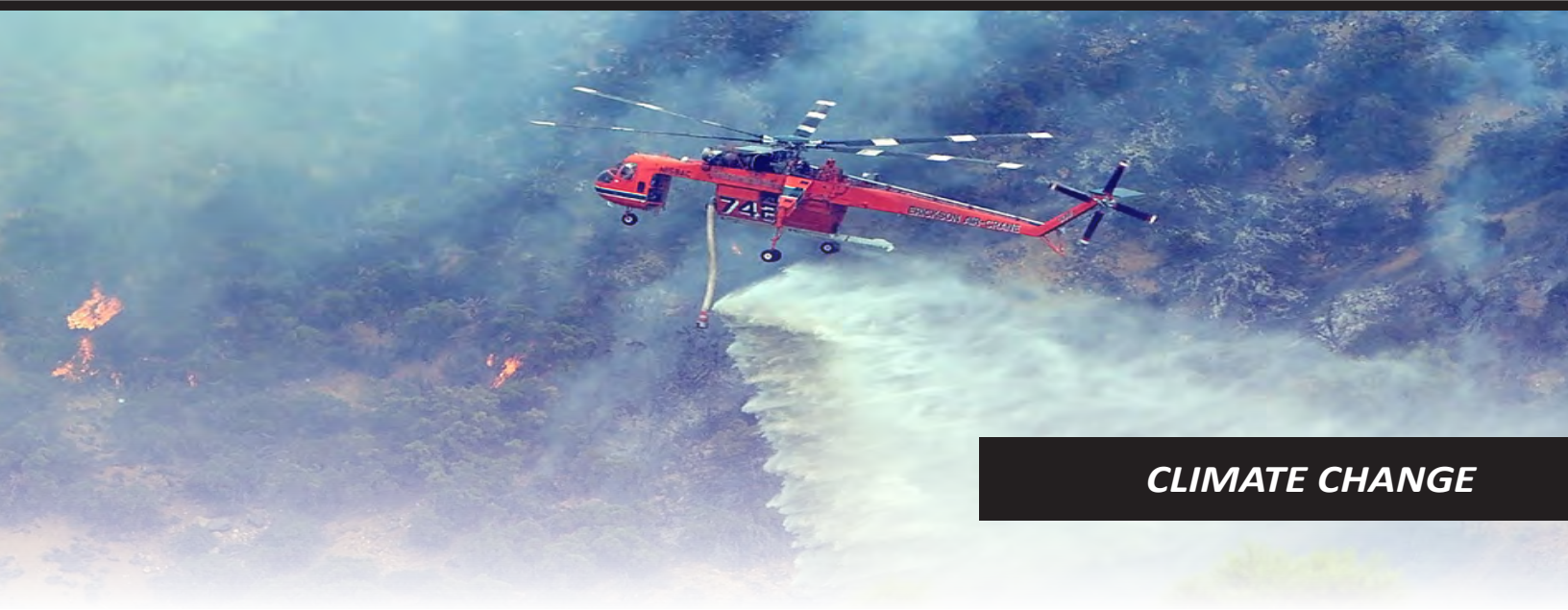
Finally, flooding after a wildfire is a very serious threat. There is a possibility that the fire created a hydrophobic layer beneath the surface, increasing the chance of a landslide in subsequent rain events. The lack of aboveground vegetation and compromised root structures can also lead to flood and landslide risk.

## **AIR QUALITY**

Second only to watershed impacts is the threat wildfires have to our air quality. The effects of smoke exposure on the body are diverse and cover a range of conditions including eye and respiratory tract irritation to more serious disorders, including reduced lung function, bronchitis, exacerbation of asthma and premature death. Concrete data is not available for calculating total health impacts from wildfires, but it has been estimated at over \$10 million in health care costs for a single large (500+ acres) incident.<sup>9</sup> During the Cedar Fire in 2003 (California's largest wildfire on record), hospitals experienced significantly higher than average numbers of complaints from local residents for illnesses plausibly associated with exposure to fire or smoke such as asthma, burns and respiratory distress. There was also an increase in potentially related complaints such as altered neurological function, cardiac-related chest pain and palpitations.<sup>12</sup>

The physical effects associated with a fire are a result of the types of pollutants found in the smoke, which can be unpredictable and chaotic. The smoke from wildfires is a highly variable and complex mixture of CO<sub>2</sub>,

water vapor, CO, particulates, unburned fuel, polycyclic aromatic hydrocarbons (PAH), nitrogen oxides, trace minerals and diverse toxic constituents. Composition depends on variables such as fuel type, moisture content, temperature and wind. Different types of wood and vegetation contain cellulose, lignin, tannins and other polyphenols, oils, fats, resins, waxes and starches that produce different compounds when burned, some of which are hazardous. When wildland fires become WUI fires, man-made materials (once ignited) release a variety of chemicals, many of which are considered carcinogenic and highly toxic. The composition of this chemical mixture is largely unknown during various stages of a wildfire, and hazard assessments and decision-making cannot adequately account for firefighter and community risk.



## CLIMATE CHANGE

Climate change impacts are a growing concern, not just because of the potential increases and risks of wildfires, but also because wildfires may be a significant contributor to carbon emissions. For example, the estimated GHGs from the 2001-2007 wildfires in California were roughly 200% higher than the annual car emissions for those same years, or the equivalent of adding 50 million vehicles to the state.<sup>13</sup> In fact, the amount of carbon released by the dead and decaying trees (post fire) may emit more carbon into the atmosphere than the actual fire event itself.<sup>14</sup>

In an analysis of the western United States, wildfires have significantly increased since the mid 1980s. Shifting climatic conditions and land use change have combined to produce more frequent and intense wildfires while also increasing the overall annual wildfire season.<sup>7</sup> California is also considered a climate change hotspot likely to experience higher than average impacts when compared to the rest of the United States.<sup>15</sup> Difficulty in managing the dramatic increases in fire frequency and intensity over the past decade suggests that historic management and response practices are inadequate.

Recent research suggests that regional temperatures in California may increase from 1.7 C to 5.8 C by 2100, depending on the climate model used and the emissions scenarios assumed.<sup>16</sup> This of course leads to an increase in the number of days of high or extreme fire risk (as assessed by CAL FIRE in their daily wildfire risk warning system). Ultimately, the fire season may be longer in California, with predicted increases in the number of Santa Ana wind days under future climate scenarios.<sup>17</sup>

In fact, recent research suggests that the fire seasons are already longer than they were historically.<sup>17</sup> There is more uncertainty about how California's future precipitation patterns will be influenced by climate change. It is generally predicted that most precipitation will still occur during the winter months, with little or no predicted changes in the total annual precipitation. However, most studies suggest that there may be considerable changes in inter-annual and decadal fluctuations in precipitation.<sup>16</sup> Future climate scenarios also predict decreases in snowfall with more of California's annual precipitation coming from rainfall.<sup>18</sup> As the climate warms, the snowpack in the mountains will melt faster, causing spring runoff to happen earlier in the year. This ultimately means that the availability of water for vegetation communities will be significantly reduced during the dry seasons (spring through fall) leading to decreased fuel moisture and increased fire risk.<sup>7</sup>

Increased frequency of lightning may occur as a result of climate change.<sup>19</sup> This, of course, has direct implications on the risk of wildfires that we may already be experiencing. In 2008, over 2,000 wildfires were started by over 6,000 dry-lightning strikes in Northern California. The record number of lightning strikes and extreme drought conditions created catastrophic conditions that burned nearly 1.2 million acres, destroyed over 500 structures and killed 15 people.<sup>20</sup>





## INVASIVE SPECIES

Biological invasions have been characterized as “self-regenerating pollution.”<sup>21</sup> Whether intentional or accidental, this type of “pollution” can be thought of in much the same way as water or air pollution.<sup>22</sup> Unfortunately, reducing or controlling invasive species requires a distinctly different strategy because of:

- The economic value, trade activities and other activities that depend on or involve invasive species
- The diverse entry points or pathways for introduction
- Poor understanding of native flora, making identification of invasive species difficult
- Problems knowing which species may become invasive
- Difficulty in determining which activities must be regulated to combat the problem, like traditional types of pollution the approaches to deal with invasive species are similar; they include prevention, cost recovery (polluters pay a penalty), and prohibitive or regulatory legislation<sup>23</sup>

Wildfires may also augment the current spread of invasive species. This occurs when the normal disturbance regimes under which the native community evolved are altered. Throughout the western United States, we have witnessed the spread of invasive species, particularly grasses, which change the fire frequency and intensity and shorten the return interval of fires. This results in a feedback loop where wildfires advance the spread of invasive species, ultimately leading to a type-conversion of the habitat to a nonnative dominated ecosystem.<sup>24,25</sup> Beyond non-native grasses and noxious weeds, additional threats may exist in increased infestations of certain beetle species and other insects or pathogens that can decrease ecosystem health and increase fire risk. While many of these pathways and relationships are still being investigated, one thing is clear: invasive species must be dealt with in our long-term wildland fire management strategy.

The impact to ecosystems is largely uncertain, however some changes are likely. For example, some insect species instigate high fire risk conditions. Vegetation mortality from insects and pathogens can become a significant contributor to wildfire risk.<sup>26</sup> Further, insect infestations and pathogens are predicted to increase as a direct result of changing climate.<sup>27</sup> This occurs because future climate scenarios may actually enhance the survivability and spread and by reducing overall health thereby making the biological community more susceptible to damage or disease.<sup>28</sup> For example, increasing the winter temperatures in the Sierra Nevada Mountains could make conditions more suitable for pitch canker, resulting in increased disease and economic losses.<sup>29</sup>

### ***Native Habitat and Endangered Species***

In many of the economic assessments on large-scale wildfires, ecosystem impacts and endangered species figure significantly into the loss estimates and recovery costs. Future wildfire management plans and response strategies must account for native habitat and endangered and sensitive species.



## **LAND MANAGEMENT**

Land use change and urbanization (including the increasing development into the WUI seems divorced from natural processes and ecosystems. Much like our historic development in the high-risk areas, like flood plains, we continue to expand our homes, business and infrastructure into the WUI without rigorous constraints or societal acknowledgment of the risk. There seems to be a disconnect between the risks created by our land-use decisions and the ultimate costs incurred by local, state or federal governments.

CAL FIRE is a world-renowned emergency response agency dedicated to protecting over 31 million acres of wildland in California. Today, their role has expanded to cover over 350,000 calls a year for non-fire related incidents, including medical aids, hazardous material spills, swift water rescues, search and rescue, floods, earthquakes and more.<sup>30</sup> However, when budget reductions are proposed, the focus is typically on wildfires rather than other areas of CAL FIRE's responsibility.<sup>31</sup> In recent decades, our Governors, Legislature and Legislative Analyst's Office have suggested strategies for coping with the budget impact, focused on fire protection in the WUI and State Responsibility Area (SRA). Generally, these proposals emphasized the development of a new fee for properties located within the WUI/SRA.

The original goal was to create an SRA fee program to offset the roughly \$200 million cost of CAL FIRE's annual wildfire protection/response budget. However, increases in major disasters and a failing economy led to a substantially different program. During the 2013-14 fiscal year, the newly implemented fire prevention fee program collected \$74,978,000, and spent \$58,765,000 on prevention activities and \$14,396,000 on administration. Admittedly, this program is still in the early stages and the long-term results have yet to be realized. However, the high cost of wildfires continues and there has been no significant reductions in the state's operational budget.

## **FIREFIGHTER HEALTH AND SAFETY**



*“Let’s review together the combined resources in place for prevention and suppressing.”*

*“There are huge inefficiencies that we allow to exist.”*

*“We have allowed benign neglect to become overall incompetence.”*

*“Because of budget problems and the vagaries of nature, firefighters are being asked to do more with less.”*

### **Status and Trends**

The ability to effectively combat wildfires is inextricably linked to community and firefighter health and safety. Again, the wildland/WUI fire industry significantly lags behind structural firefighting. For example, a considerable amount of research has addressed CO exposure and risk in structural fire incidents with aggressive outreach and education campaigns.<sup>32</sup> However, analogous research programs on WUI and wildfire incidents are more limited. As a result, there is a serious deficiency in the current understanding of wildfire practices and firefighter health and safety. Fundamental uncertainties based on our fragmentary understanding of the relationships between resources, land management and environmental conditions creates a situation in which sound and well-informed decision-making is extremely challenging, if not impossible.

While smoke exposure at some wildfires and prescribed burns can be no more than a nuisance, on occasion it approaches or exceeds legal and recommended occupational exposure limits.<sup>8</sup> As discussed in the section on Air Quality above, wildland and WUI fires create a highly hazardous, carcinogenic and toxic environment for

firefighters. As WUI fires become more commonplace, we are recognizing that many safeguards for structure and vehicle fires are not part of WUI standards. Customary protocols and personal protective equipment (PPE) may actually be incompatible in many situations. For example, extended duty on many wildland/WUI fires means that an SCBA could provide only a fraction of the protection needed during a 12-hour shift. This device is further limited simply due to the physical constraints it places on the firefighter in the field. Similarly, turnout gear for structure fires is designed to afford adequate protection for an interior attack, not the exterior attack more typical of WUI firefighting. The thick, heavy, urban gear induces serious heat stress for firefighters conducting exterior or vegetative fire suppression. Proper WUI safeguards are imperative.

The typical responsibilities of a firefighter are also a leading contributor to the health risks they face. Firefighters often go from a state of sleep to near 100 percent alertness and extreme physical exertion in a matter of minutes. When combined with the heavy equipment and gear they carry through extended periods of intense heat and brutal environmental conditions, wildland firefighters experience the limits of what the human body was meant to withstand. Repeated exposure to these conditions can lead to cardiac arrests, where the heart's electrical impulses become rapid (ventricular tachycardia) or chaotic (ventricular fibrillation).<sup>33</sup>

All of the studies from the 1970s to present look at vehicle fires, structure fires and wildland fires as though they are isolated incidents. But in California, you would be hard-pressed to find just a wildland fire (a point made at the symposium by Dr. Matt Rahn, from California State University San Diego). The wildland firefighter goes in with standard gear and no SCBA and yet we don't know the answer to the basic question, when you're standing 20 feet from the burning vehicle, what are you being exposed to?

The number of wildland firefighters suffering from dehydration also appears to be on the rise, yet the reasons have not been delineated, studied or reviewed at length. The reason may be as simple as the fact that firefighters are drinking sports drinks instead of water. NIST points out that we have not yet developed to test for hydration.

Studies are now being conducted on the long and short-term effects of exposure to carbon monoxide, but researchers are hampered by the inability to measure the exposure in real time, especially as a firefighter moves in and out of smoke. The roundtable discussion at the symposium triggered concern over the ramification of being exposed to CO and the subsequent ability of a firefighter to think clearly and act decisively. Potentially, a risk management decision is being undermined because people aren't thinking clearly.



## ***Identify Needs and Priorities***

Advancements in technology and assessment methods can help us understand the relationship between the harmful effects of CO, particulates, hazardous air pollutants (HAPs) and other threats that occur during a fire incident. We need to understand the actual exposure and risks our community and firefighters face during a wildland/WUI fire incident. We need to understand how the response, training and protection protocols can be improved to enhance the health and safety of firefighters and our community. This not only helps protect the firefighters, but also contributes to improved initial attack and response effectiveness: a healthy firefighter is an effective firefighter.



## **ATTACK EFFECTIVENESS**

*“It is a tribute to firefighters that, under such extreme conditions, the vast majority of fires are controlled quickly”*

### ***Status and Trends***

Emergency response effectiveness is driven by four factors: 1) land management practices, 2) existing environmental conditions, 3) equipment resources available to fight a fire, and 4) the number of firefighters dispatched to an incident. When one variable is unbalanced (e.g. extreme environmental conditions or insufficient staffing) the result is an inability to effectively contain wildfires.<sup>34</sup>

The availability of adequate resources and staffing to combat wildfires also has a direct impact on meeting fire suppression goals. Suppression failures generally happen when the resources available for an initial attack response are ineffective or insufficient at controlling the fire. This can occur when firefighting resources throughout a region are spread too thin due to excessive activity or when adequate resources are not provided, particularly at the outset of a wildfire event.

Rahn (2010) conducted the first wildland fire staffing study to assess initial attack effectiveness under various staffing levels and environmental conditions. Basically, the results suggested that by increasing the number of firefighters on an engine, the efficiency, effectiveness and the overall ability to potentially control a wildland fire significantly increased, thus enhancing emergency response and the ability to protect California from modern wildfires. This preliminary study also has serious implications for firefighter health and safety.



The most startling difference was the peak heart rates recorded by a 3-0 engine. During these trials, these firefighters traveled nearly ½ a mile longer than a 4-0 engine on the same 2,000-foot hoselay. Furthermore, adding a single firefighter to a 3-0 engine resulted in faster completion times that were up to 50 percent faster. Firefighters on a 3-0 engine also sustained peak heart rates of over 220 beats per minute, well beyond acceptable limits, increasing the risks of complications and tachycardia. It should be noted that this initial study was conducted under “ideal” conditions in Southern California, lacking the intensity, heat and stress that a wildfire creates.

Current research conducted by Rahn (2014-2015) has demonstrated that real-world scenarios are far more serious. Monitoring California firefighters during actual wildfire incidents has shown that firefighters regularly exceed safe physiological conditions. Many individuals sustained peak heart rates above 220 beats per minute, had core body temperatures well above 102 degrees fahrenheit, demonstrated excessively rapid respiratory rates and were exposed to CO levels well beyond occupational limits. Each factor could significantly impair attack effectiveness, let alone having firefighters experience all factors simultaneously.





## **NEXT STEPS AND RECOMMENDATIONS**

### ***Identify Needs and Priorities***

It is imperative that we improve our understanding of how staffing, resources, tactics and technology can improve attack effectiveness.

- We must increase programs that focus on prevention; improve education and awareness of homeowner responsibility in the WUI. These programs cannot continue in isolation of a more serious discussion on how we manage and expand into the WUI.
- We must create a comprehensive policy and management program that adaptively and scientifically informs when and how we suppress wildfires, allow fires to be a natural part of the landscape, allows for future development, designs fire-safe resilient communities and provides for ecosystem and watershed-level protections.
- Address the issue of inter- and intra-agency cooperation, including how best to navigate the LRA, SRA and FRA. We need to address the diverse land management, land use and fire response practices between and among agencies, the funding mechanisms for fire prevention and response and the allocation of resources and firefighters at a local, state and national level. This discussion should include the concept of a consolidated federal fire agency.
- There is a need to create a comprehensive wildfire/WUI education and training program that meets the diverse needs of urban and wildland fire agencies with an emphasis on providing new tools, technologies and operational strategies to meet the evolving risks and demands.
- Develop a better understanding of future risks related to wildland/WUI fires and create proactive (rather than just reactive) programs to address key areas such as drought, flooding, Santa-Ana wind events, landslides, etc.
- A change in the frequency, intensity and distribution of wildfires has, and will continue, to occur throughout California. It is imperative that we acknowledge this change and identify ways to avoid, minimize and mitigate the risk and impacts.

- We need to develop a long-term firefighter health survey that addresses key factors associated with exposure and injuries and a better understanding of the short- and long-term consequences.
- We need to improve funding for research, especially in key areas that can help improve situational awareness, environmental monitoring (e.g. exposure and risk), communications and protective equipment.
- We need to help firefighters understand when they are experiencing compromised decision-making (related to factors such as stress, heat, CO exposure, dehydration, etc.).
- We need to ensure that policy and decision-making is informed by good science and information (striking a balance between theoretical, applied and basic science).
- We need to address mental health issues in wildland firefighting, particularly in the areas related to post-traumatic stress disorders and suicide rates.
- We need to develop a better tool for hazard risk assessments for wildland/WUI fires and implement land management that prospectively protects and plans accordingly.
- We need to understand how the incident command and/or other remote operations can better serve firefighters and firefighting through enhanced monitoring, situational awareness and biometrics.
- Identify opportunities where programs that address issues such as greenhouse gas emissions, climate change, ecosystem management, invasive species removal, watershed management, habitat conservation and endangered species programs can align with and facilitate landscape level management for wildland/WUI fires.



- Improve communication and coordination between fire and insurance agencies.
- Ensure that current and future regulations and codes are supported by the best available science and understanding of the particular issue.
- Improve the communication and dissemination of research and technology to fire agencies and decisionmakers.
- Improve our understanding of how and where small scale proscribed burns can be a useful management tool and identify opportunities where this can assist in improving habitat and ecosystems.
- Work with the building, insurance and development industry to help identify and implement the best practicable design and materials for construction within the WUI. Identify opportunities for retrofitting requirements for resale and/or reconstructed homes within the WUI that do not meet current standards.
- Identify potential opportunities for tax and/or insurance incentives for homeowner prevention and management programs within the WUI.
- Develop wildfire impact assessment tools that accurately captures the total loss, as well as the “saves” that occur due to fire suppression activities.
- Develop a clearinghouse for information on wildfires and firefighter health/safety.
- Create a center or group that can provide independent expert analysis on policies, laws and regulations related to fires and emergency response services and how they relate to fire response agencies and firefighters
- Advocate for Blue Ribbon Commission on Wildland/WUI that follows in the spirit of the work done in 1973 – America is Still Burning





## **ADDENDUM - A NATIONAL PERSPECTIVE**

### **FEDERAL GOVERNMENT STRUGGLES WITH FIRE POLICY**

*“Currently, agencies like the Forest Service must borrow from non-fire accounts with fire suppression costs exceeding the budget. ‘Fire Borrowing’ was intended to be an extraordinary measure, but as fire seasons have grown more destructive it has become common practice (8 of the last 10 years) - and has created a devastating cycle that prevents agencies from doing needed hazardous fuels removal or timber harvest, leading to worse fires. Until we reform the way we budget for wildfires, none of the actions we advocate can take place.” - Congressman Mike Simpson 2015*

### **2014 IAFF ANNUAL CONVENTION WILDLAND TASKFORCE MEETING, CINCINNATI, OHIO**

On July 17, 2014, Dr. Rahn and symposium representatives met with firefighter experts from across the United States at the 2014 annual convention for the International Association of Fire Fighters (IAFF), and their Wildland Taskforce meeting. Representatives of the Taskforce came from across the United States, including Florida, Colorado, Texas, New Mexico, Arizona, Virginia, Washington and many other states. The purpose was to discuss trends and the continuing crisis in California, which is being felt almost identically, although with some differing local flavor, across the country. The group echoed many of the same issues discussed at the California Symposium. It became clear that fire agencies throughout the US are battling many of the same wildland/WUI issues experienced in California. Topics discussed at the meeting included the following:

- Changing Environment
- Firefighter Health and Safety
- Community Preparedness
- Firefighter Staffing and Resources
- Navigating the Protection and Management Landscape
- Dealing with Government Bureaucracy



Participants generally agreed with the outcome and recommendations from the California Symposium, but also introduced a variety of challenges and opportunities of both a persistent and timely nature. In particular, the following issues were highlighted during the meeting:

- Significant changes in the frequency and intensity of wildfires have been occurring throughout the rest of the U.S. Firefighter impacts are increasing as a result. We need to recognize that this impacts not just the traditional wildland firefighters, but also municipal agencies. The continuing drought and lack of water resources is also a significant issue/concern.
- Develop advanced education and training programs focused on wildland and WUI firefighting that are accessible to career firefighters and diverse agencies throughout the U.S.
- Incentivizing homeowners to maintain defensible space and resolving conflicts with ecosystem and watershed management.
- Resolve funding, reimbursement and cost recovery mechanisms between local and federal agencies.
- Improve coordination of land management practices across federal, state and local lands. Prevention programs are vital but there are often not enough resources to educate land owners or enforce requirements.
- Land management hurdles must also be overcome, including environmental challenges, legal, regulatory and policy hurdles associated with proscribed burns, brush clearing or other practices. We need to identify streamlined procedures to address environmental clearances to provide timely and efficient wildland management. Air quality permits/approval seems to be one of the more major hurdles.
- There is a growing disconnect in land use where local government continues to permit development in the WUI, shifting the risk and burden to state and federal fire agencies., Also, federal fuel management may be placing an increased risk on local communities and government resources.
- There is a disconnect between land management, policies, local land use, and private property. In some cases, homeowners may be unwilling to cooperate or manage their land/property in the WUI.
- There was significant interest in improving the science behind firefighting, especially in the areas of firefighter tracking, communications and hazard/exposure identification.
- Minimum wage is being discussed as a living wage argument and the impact on entry-level firefighters is real, and concerns of salary compaction are daunting.

Additionally, the workgroup expressed an obvious frustration related to wildland firefighting that stems from inconsistencies across the nation when confronted by multiple agencies and various regulatory frameworks. Due to the continued expansion of our urban areas, many fire departments previously tasked with the primary roles of structural suppression and EMS are seeing an emphasis placed on wildland firefighting. Often this results in conflicts with federal agencies and federal priorities regarding suppression, prevention and the maintenance of lands adjacent to the communities.

As a member of the Training Program in National Wildfire Coordinating Group, the IAFF could help inform the training curriculum to provide for emerging concerns. It is also important to consider developing a nationwide “surge capacity” where qualified local members provide the staffing. Currently the federal government deals with states through a nationwide process; individual states need to query their respective local departments as to how they need to work within the federal process to ensure a more streamlined and comprehensive approach.

The workgroup also suggested that we should, as a nation, leverage the work in concert with the 2009 FLAME Act, which includes supporting the framework recommended under the National Action Plan for a “National Cohesive Wildland Fire Management Strategy” (April 2014). This can assist in implementation, planning and guidance, including: 1) enhancing wildfire response preparedness in areas more likely to experience large, long-duration wildfire, 2) enhance wildfire response preparedness in areas experiencing high rates of structure loss per area burned, and 3) emphasize both structure protection and wildfire prevention to enhance the effectiveness of initial response.





## ***DELIVERABLES***

At the end of the session, the Taskforce recommended the following deliverables:

### ***IAFF White Paper on Wildland Fire Fighting***

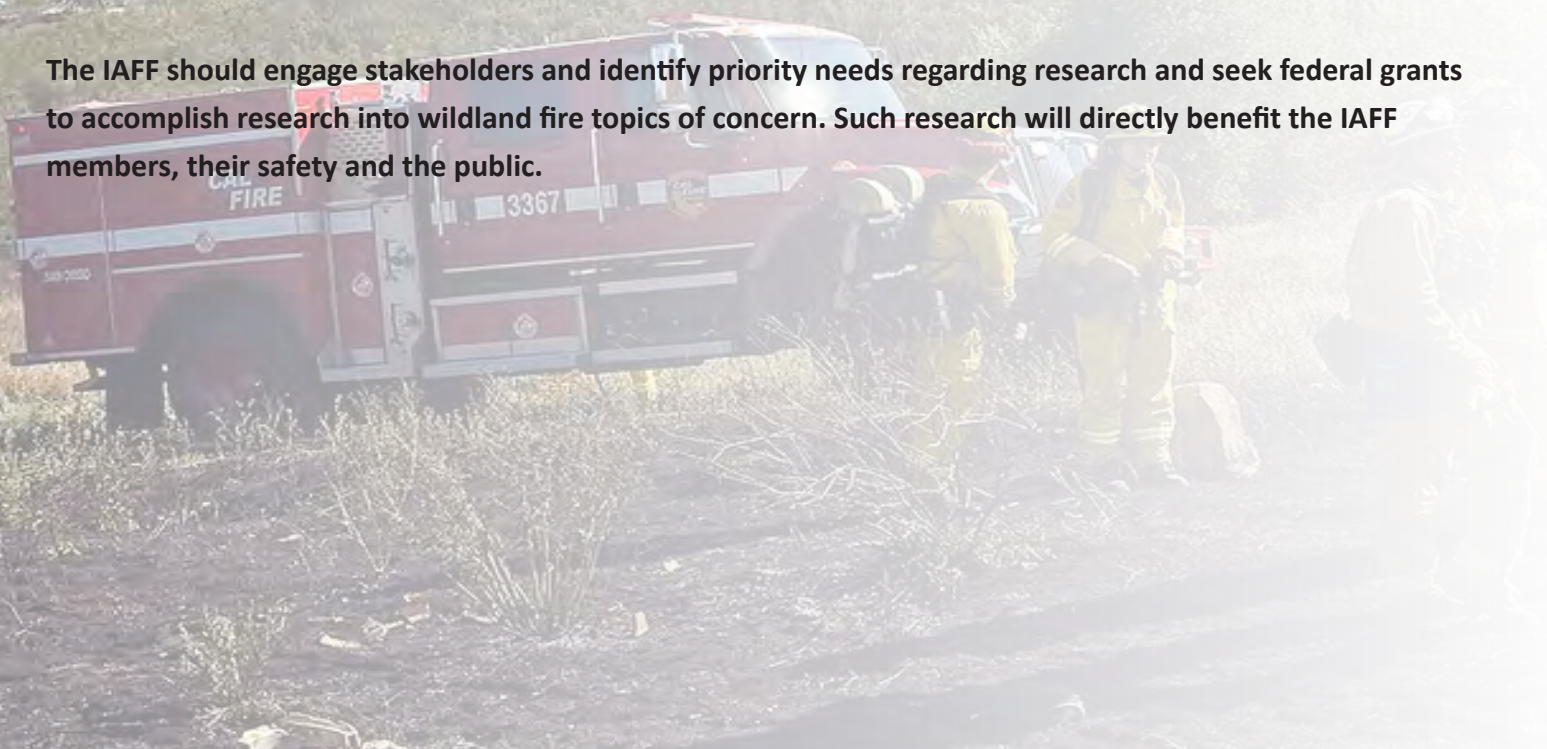
The Task Force members and forum participants agree that the development of an IAFF “White Paper” regarding wildland firefighting is a viable first step in identifying issues and priorities regarding wildland firefighting. This would include the IAFF and others to encourage a Federal Blue Ribbon Commission on Wildland/WUI fires (similar to America Burning, 1973).

### ***Evaluation of Training Requirements***

Training requirements across the spectrum regarding wildland firefighting should be evaluated by the IAFF Training Department and a database created. An evaluation of state and federal requirements will allow the IAFF to address inconsistencies or concerns.

### ***Research Grants***

The IAFF should engage stakeholders and identify priority needs regarding research and seek federal grants to accomplish research into wildland fire topics of concern. Such research will directly benefit the IAFF members, their safety and the public.





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