

# 5th International Fire Behavior + Fuels Conference

Wicked Problem, New Solutions: Our Fire, Our Problem

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#2016FBF

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PORTLAND, OREGON, 2016

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# OF WILDLAND FIRE

The International Association of Wildland Fire (IAWF) is a non-profit, professional association representing members of the global wildland fire community. The purpose of the association is to facilitate communication and provide leadership for the wildland fire community.

The IAWF is uniquely positioned as an independent organization whose membership includes experts in all aspects of wildland fire management. IAWF's independence and breadth of global membership expertise allows it to offer a neutral forum for the consideration of important and at times controversial, wildland fire issues. Our unique membership base and organizational structure allow the IAWF to creatively apply a full range of wildland fire knowledge to accomplishing its stated mission.

Vision: To be an acknowledged resource, from the local to global scale, of scientific and technical knowledge, education, networking and professional development that is depended on by members and partners in the international wildland fire community.



#### International Journal of Wildland Fire

Our official fire science journal, published on our behalf by CSIRO, is dedicated to the advancement of basic and applied research covering wildland fire. IAWF members have access to this leading scientific journal online, as a members benefit. For those members who want to receive the hard copy version of the journal, they may receive it at the IAWF discounted rate of US \$225, which includes your IAWF membership and a 1-year subscription to WILDFIRE.

#### WILDFIRE Magazine

All IAWF members receive WILDFIRE magazine, official publication of the IAWF. Our authors submit fire articles from all corners of the world and our topical editors cover a broad array of important issues in wildland fire. We encourage you to submit articles and photographs for inclusion in the magazine. www.wildfiremagazine.org.

There are so many reasons to become a member of the International Association of Wildland Fire but most importantly, the opportunity to be a member of a professional association that is committed to facilitating communication and providing leadership for the wildland fire community.

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www.iawfonline.org



# + NATURAL HAZARDS CRC

The Bushfire and Natural Hazards Cooperative Research Centre draws together all of Australia and New Zealand's fire and emergency service authorities with the leading experts across a range of scientific fields to explore the causes, consequences and mitigation of natural disasters.

The CRC coordinates a national research effort in hazards, including bushfires flood, storm, cyclone, earthquake and tsunami.

From July 2013, \$47 million over eight years in Australian Government funds under the Cooperative Research Centres Program have been matched by support from state and territory government organisations, research institutions and NGOs.

Research partners include universities, Bureau of Meteorology and Geoscience Australia, and several international research organisations.

The research program has developed under the direction of the researchers and end-user agencies. The research has three major themes covering 12 clusters of projects, most of which span the priorities of those working in a multi-hazard environment.

www.bnhcrc.com.au



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# WELCOME

International Association of Wildland Fire (IAWF) is extremely proud to present the 5th International Fire Behavior + Fuels Conference, co-sponsored by IAWF and Bushfire and Natural Hazards CRC of Australia and held concurrently in Portland, OR, USA, and Melbourne, Australia. This conference is being presented to bring focus to the many issues associated with fuels, fire behavior, large wildfires, and the future of fire management.

Much attention is being given to wildland fire management. It seems with each passing year we recognize escalating complexity, increasing risk, and mounting challenges. Wildland fire management cannot respond to current and future challenges without actively enlarging its body of knowledge, experience, and capabilities. Changing situations, what many would characterize as worsening situations, must be anticipated and responded to. Predictive entities continue to forecast worsening fire seasons and continued droughts leading to expectations of increasing numbers of fires, area burned, burning intensities, and duration of wildfire activity.

As all of these elements of wildland fire are manifested, we see that simply put, this is a wicked problem. How this occurred, and what can be done about it are important considerations for future strategic planning and operational management. A significant number of research reports, national leader presentations, political hearings, accountability reports, strategic plans, and forward-looking plans state the problem and actions for the future. It is commonly reported that the most extensive and serious problem related to the health of wildland areas is the over-accumulation of vegetation, which has caused an increasing number of large, intense, uncontrollable and destructive wildfires.

Significant issues abound. New solutions are needed. Obvious targets like increased funding exist, but it is important to realize that short-term fixes are less likely to have success and long-term commitments, strategies, and actions are necessary. Management of fuel complexes; accelerated fuel treatments; preparation of communities to withstand wildfire; incorporation of learning, experience, emerging science and technology; as well as sustainable funding for wildfire suppression and fuel treatments are vital for success.

The International Association of Wildland Fire (IAWF) Bushfire and Natural Hazards CRC recognize these needs. We have an unwavering commitment to promote increased involvement, improved communication, escalated research, focused education and training, and active management support to help, promote success in wildland fire management.

This conference is designed to be innovative, revolutionary, and provocative. It will provide a forum to facilitate discussion of the latest relevant research findings, information dissemination about management treatments, stimulation of policy discussions, and inspire global fire management interaction. Both venues will provide a stage having hundreds of oral and poster presentations of new research information, practical

experience lessons, and case studies; numerous knowledge and skill building workshops; on-the-ground learning field trips and tours; keynote and plenary presentations; and panel discussions by leading experts in the field. Conference participants will be able to share what is known, what needs to be learned, how to advance knowledge, and how to use this knowledge to effectively respond to increasing concerns.

On behalf of the International Association of Wildland Fire, all conference sponsors and partners, I welcome all participants and hope that this conference will meet, and even exceed your expectations of increasing awareness, knowledge, and capability in this important field in addition to networking with peers to establish future avenues of discovery. We hope that you will enjoy attending and gain significant information from what promises to be the most informative, enlightening, and powerful conference to date on fire behavior and fuels in wildland fire management.

If you were not previously a member of the IAWF, you are receiving a one-year membership in the association included in your registration. By participating as an active IAWF member you can help to improve communication between firefighting organizations, enhance firefighter and public safety, increase our understanding of wildland fire science, and improve our ability to manage fire. Your membership in the IAWF provides you with a connection to other wildland fire professionals from across the world. Our membership, which is truly international, includes professionals from the fields of fire ecology, suppression, planning, contracting, fire use, research, and prescribed fire. Our members are scientists, firefighters, mangers, contractors, and policy makers. As an association, we are unique in that we represent all areas of wildland fire management. Membership benefits include, but are not limited, to the following:

WILDFIRE magazine – All members receive Wildfire magazine, official publication of the IAWF published bi-monthly. Writers send in wildland fire articles and news from all corners of the world, and topical editors cover all the important issues in wildland fire. We encourage you to submit articles and photographs to our Wildfire Editorial Board for inclusion in the magazine.

INTERNATIONAL JOURNAL OF WILDLAND FIRE – Our other official publication of the IAWF, published by CSIRO, is dedicated to the advancement of basic and applied research covering wildland fire and is available as an additional membership option. A discounted rate of US\$225 for a 1-year subscription of eight issues is offered to IAWF members; this includes a 1-year membership and a subscription to Wildfire magazine – AND free e-access to the "Journal's" abstracts and articles.

On behalf of the Board of Directors of the IAWF, thank you for your support of our association.

Tom Zimmerman
IAWF President

# STEERING COMMITTEE





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# PROGRAM





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### FEATURED SPEAKERS

#### WELCOME + OPENING REMARKS TUESDAY, APRIL 11



**Tom Zimmerman,** IAWF President & Conference Co-Chair, Retired Program Manager, Wildland Fire Management Research, Development, and Application Program, Rocky Mountain Research Station, U.S. Forest Service

Tom has worked at multiple federal land management agencies, including the Bureau of Land Management, National Park Service, and US Forest Service. His permanent assignments include positions as Forester, Fire Control Officer, Fire Management Officer, State Fire Management Planning Specialist, Regional Fire Management Officer, Fire Technology Specialist, Fire Science and Ecological Applications Program Leader, Regional Director of Fire and Aviation Management, and Wildland Fire Management

RD&A Program Manager. Tom has conducted training in the United States, China, Canada, and India, and presented papers, either in person or virtually, at conferences in the United States, Canada, Italy, South Africa, and Cyprus.

Wildland fire and emergency response constituted a major focus area and Tom has over 30 years of involvement in incident management team operations including service as an Incident Commander and Area Commander on wildland fire incidents and all hazard emergency responses across the country.



#### **Kevin Martin,** Forest Service, Director Fire, Fuels & Aviation Management, Alaska & PNW Regions

Kevin is the Director of Fire, Fuels and Aviation for both the Alaska and Pacific Northwest Regions of the United States Forest Service (Alaska, Oregon and Washington States). He was the Forest Supervisor on the Umatilla National Forest for 10 years and the Deputy Forest Supervisor on the Deschutes before that. Kevin was a member of the National Fire Line Officer Team for many of those years. He helped create and served as a coach for Agency Administrators at the National Fire Training Center on the Advanced Incident Management (S-520) course and has assisted Units and coached Agency Administrators across the west. He was the national lead for the Forest Service for re-working National Fire Management Leadership. He is on the Board of Directors for the Eastside Restoration Strategy, past chair of the Oregon Geographic Board

and then a member of the NW Geographic Board.

The Pacific Northwest Region consists of 16 National Forests in Oregon and Washington. There are 59 District Offices, a National Scenic Area, and a National Grassland. The Alaska Region consists of two national forests, the Tongass, and the Chugach National Forest; however, they are the largest national forests in the Country. The Chugach surrounds Prince William Sound and is near Anchorage. The Tongass includes the islands and mainland of southeastern Alaska and surrounds the towns of Ketchikan, Sitka, Juneau, Petersburg, Wrangell, Yakutat and Skagway.

#### KEYNOTE PRESENTATION TUESDAY, APRIL 11



Ron Steffens, Professor, Green Mountain College; Fire Analyst and Incident Commander, Teton National Park; FBF Conference Co-chair Wicked (Fire) Problems, Sweet (and Messy) Solutions (Live streamed to Melbourne)

Abstract: Is my fire a wicked problem? And will it require a messy solution? The "wicked problem" concept can help us understand and manage problems which seem unsolvable — in wildland fire, these wicked fire problems are becoming too familiar and take the form of climate change, massive landscape-scale fuel transitions, land development changes (a decline in fire use coupled with houses in the fire zone), and a disconnect between politics, fire policy and the best-practices guided by fire science. In this round-theworld review of wicked fire problems (and solutions) we'll visit Africa, Australia, Canada and the United

States to explore how "mess mapping" and other messy strategies may help us work our way through our fire challenges.

Bio: Ron Steffens is a professor of communications at Green Mountain College in Vermont (USA), where he teaches media, nonfiction writing, and environmental and emergency communication for two bioregionally focused graduate degrees, in Environmental Studies and in Resilient and Sustainable Communities.

For the summer fire seasons, Ron has been based out of Grand Teton National Park since 1992 where he supports Teton Interagency Fire as a fire analyst and incident commander. He began his fire career as a fire lookout in Patagonia, Arizona and continued with seasonal positions in Saguaro National Park, where he served as fire effects monitor and lead of a backcountry fire crew. He has provided fire training in Malawi and the Democratic Republic of Congo for the US Forest Service International Program and has studied fire on five continents. He is a past board member of the International Association of Wildland Fire and serves as managing editor of IAWF's Wildfire Magazine.



**Dr Kevin Tolhurst AM**, Assoc. Prof., Fire Ecology and Management, Department of Forest and Ecosystem Science, University of Melbourne (Live streamed from Melbourne)

Fire is the Problem and Fire is the Solution

Abstract: In Australia, we have no option but to manage fire in the landscape. This management can be proactive or reactive. Reactive fire management is easier to defend publicly and politically, but this approach is costly and ineffective. Proactive fire management has been practised in Australia for tens of thousands of years by Aboriginal Australians, but in many places, aboriginal use of fire has been disrupted by European settlement. The science of proactive landscape fire management has been

studied systematically since the 1950's, but being equipped with the science of fire does not guarantee sustainable fire management. The view of many Australians, including many fire scientists, is that fire is a damaging process that must be limited. Section 17(2)b of the Victorian National Parks Act (1975) specifically states that the Secretary of the National Parks shall: "ensure that proper and sufficient measures are taken to protect each national and State park from injury by fire;". The concept of fire as a damaging process is enshrined in legislation. However, planned burning is widely used in Australia as a land management tool, but there are ongoing and increasing pressures on fire use. The impacts of smoke on tourism and public health, the ecological impacts, the level of protection afforded to human and natural values and assets from wildfire by planned burning are all topics of debate. The future of fire management will need to have strong political backing. The question is how well the skills, knowledge, experience and capacity of those given the responsibility to manage fire for the population match the complexity of the task. What is clear is that there is no quick fix, but we must systematically progress along a well-defined path and do so at a rate faster than the rate of change in the climate, economy, demographics and political fashions.

Bio: Kevin Tolhurst is Associate Professor in Fire Ecology and Management in the Department of Forest and Ecosystem Science, University of Melbourne based in Creswick. Kevin has developed a professional reputation by providing expert advice on fire behavior and fire suppression strategies at major bushfires. Some examples include the Black Saturday fires in Victoria in 2009, and the Great Divide Fires in 2007. In 2015, Kevin was made a Member of the Order of Australia in recognition of his contribution to fire science and the community over a long period. Kevin has developed and taught a number of fire related subjects at undergraduate and post-graduate level as well as a national Fire Behavior Analyst course for technical specialists in the fire and land management agencies. Kevin's current research activities are centered around developing and applying a bushfire risk management decision support systems. He has established a group of fire scientists in the School of Ecosystem and Forest Sciences with a range of research, fire, land management and teaching skills.

#### **KEYNOTE PRESENTATION WEDNESDAY, APRIL 12**



Vicki Christiansen, Associate Deputy Chief for State & Private Forestry. U.S. Forest Service Wildland Fire: Shared Problems, Shared Solutions

This conference addresses the "wicked" problem of wildland fire. What makes fire such a seemingly intractable, difficult problem? Part of the challenge is maneuvering in a complex wildland fire system. The wildland fire system contains the bio-physical wildland fire environment and it also includes interacting or interdependent factors that drive outcomes. These factors include different agency missions, laws and regulations; assumptions and beliefs; social/political environments; and policies, practices and protocols in how wildland fire management is approached in this nation. Many of these

system factors not only display differences, but they are also not static as evidence by the changes in climate, fuels buildup, prolonged drought, invasive species, and human development. The fire problem is getting more difficult, has greater impact to people, is more costly, and we are seeing more devastating outcomes, as experienced in the Pacific Northwest in 2015. But, while wildfire may be a complex wicked problem, it is not a hopeless problem. Our path forward must be toward a shared solution as framed in the principles and goals of National Cohesive Wildland Fire Management Strategy; restore and maintain resilient landscapes, create fire-adapted communities and accomplish effective, risk-based response to wildfire. Our success depends on collective commitment and by all stakeholders at all levels to take action toward meaningful reductions in risk in the short and long-term. Significant and broad-scale reduction in wildfire risk is a difficult proposition and it will require the engagement of all stakeholders within this complex system. Collectively and at landscape scales we must assess the prioritization and resources necessary to maintain landscape resiliency and create fire adapted communities. Significantly reducing fuels across broad landscapes will require expanded use of wildland fire to achieve resilient landscapes. Using fire as a tool carries inherent risk that must be considered in the short-term to achieve the longer-term benefits. Even with greater efficiency and acceptance of short-term risk, current levels of investment may be inadequate to achieve the levels of risk reduction desired. All who have a stake in the outcome, from individual property owners to the Federal, state, territorial, tribal, and local governments, must share the costs and level of effort necessary to redeem responsibilities for reducing risks posed by wildfire. The National Cohesive Wildland Fire Management Strategy recognizes and accepts fire as a natural process necessary for the maintenance of many ecosystems, and strives to reduce conflicts between fire-prone landscapes and people. By simultaneously considering the role of fire in the landscape, the ability of humans to plan for and adapt to living with fire, and the need to be prepared to appropriately respond to fire when it occurs, the Cohesive Strategy takes a holistic approach to the future of wildland fire management.

Bio: Vicki Christiansen is the Associate Deputy Chief for State & Private Forestry at the U.S. Forest Service in Washington, DC. She has oversight of Fire and Aviation Management, Tribal Relations, Forest Health Protection, Cooperative Forestry and Conservation Education. She joined the Forest Service in 2010 as the Deputy Director of Fire and Aviation

Management. Vicki has worked extensively on the National Cohesive Wildland Fire Management Strategy bringing her experience as a line officer, land manager, wildland fire fighter and State Forester to the effort. Prior to joining the Forest Service she served as the Arizona State Forester and Director of the Arizona Division of Forestry. She was responsible for the protection of 22 million acres of state and private lands in Arizona, including wildland fire management. As State Forester, Vicki represented Arizona at the national and state level on forest health and wildland fire issues. She was Chair of the Wildland Fire Committee for the National Association of State Foresters. Vicki also served as the Washington State Forester where she had a 26 year career with Washington State Department of Natural Resources (DNR). She started as a wildland fire fighter while still in college and held many different positions at Washington DNR with a strong emphasis in operations managing state trust lands and regulating forest practices on state and private lands in Washington State. Her first permanent position was as a forester responsible for the reforestation of state trust lands in the Mt. Saint Helens blast zone. Vicki has been a wildland fire fighter and fire manager for 36 years. She has numerous credentials in the wildland fire program with a special expertise as a fire line-blasting advisor. Vicki has a B.S. in Forest Management from the University of Washington (1983, cum laude). She is married to a Fire Chief (retired) and has two grown sons.

#### PANEL PRESENTATION WEDNESDAY, APRIL 12

How Do We Make the Complex Tradeoffs Necessary to Effectively Manage Fuels for Ecosystem Health and Public Safety? Moderator: Tamara Wall, Desert Research Institute
Panelists:

Lynn M. Decker, North America Fire Learning Network Director, The Nature Conservancy
Zachary Prusak, The Nature Conservancy, Florida Fire Manager and Central Florida Conservation Program Director
Leland W. Tarnay, Ecologist, Air Quality, Smoke, Landscape Fire, Pacific Southwest Research Station



Lynn Decker oversees the North America Fire Learning Network as well as the broader cooperative partnership of the USDA Forest Service, Department of the Interior agencies and The Nature Conservancy. The partnership has a fourteen-year proven track record of helping to restore the nation's forests and grasslands and to make (human) communities safer from fire. The effort serves to strengthen the ability of the partnership, its individual programs and its partners to create and demonstrate transformational change in their relationship to fire. Program elements include the Fire Learning Network (FLN), Prescribed Fire Training Exchanges (TREX), Fire Adapted Community Learning Network (FACLN) and on the ground cross-boundary implementation at scale (SPER). Lynn has extensive experience developing and executing strategy at multiple organizational levels and integrating strategic planning, science, cultural knowledge and adaptive

learning to resolve key barriers to transformative resilience in fire systems. Lynn has authored several publications and served as an internal and external advisor on a variety of fire and restoration strategy planning, collaborative learning and delivery learning network topics. She also managed various teams, designed and led landscape based dynamic collaborative planning, learning events and conferences, and with core staff provides organization-wide leadership in the area of fire, people and landscapes. The Fire Learning Network has been the subject of multiple scientific publications, articles and book chapters. Previously, Lynn spent 20 years with the USDA Forest Service working at national, regional and research positions. Lynn earned a B.S. in fisheries biology from the University of California at Davis, and a M.S. in wildland resource science/freshwater ecology at the University of California at Berkeley.



Zachary Prusak has worked for The Nature Conservancy since January 2005. In his roles, Zach supports the members of the Conservancy's Florida Fire Team, which consist of the on-site fire leaders and crew at places such as the Apalachicola Bluffs and Ravines Preserve, and also supports the operations at the Disney Wilderness Preserve and Tiger Creek Preserve. Zach also works with state, federal, local and private conservation groups in order to lead and promote fire training opportunities, facilitate on-the-ground partnerships, collaborate with the Florida Governor and Cabinet on fire statutory issues while also serving as the Florida Conservancy liaison on national fire issues. The Florida Chapter recently reached their "one million acres burned since 1979" milestone on fires led or assisted by Chapter crews. Prior to joining The Nature Conservancy, Zach was the South Region Land Manager for the Brevard County Environmentally Endangered

Lands Program, conducted fires and studied mosquito populations with the Reedy Creek Improvement District, and worked as a Biologist for the Florida Park Service. Zach has over 27 years' fire experience working on over 500 prescribed burns, is qualified as a RXB2, and holds both an M.S. and B.S. in Biology from the University of Central Florida. He is also serving as the current Chair of the Central Florida Prescribed Fire Council, is an active member of both the International Association of Wildland Fire and the National Center for Science Education and is available for any voice-over work that you might have!



A literal "air" head, Leland (Lee) Tarnay, has spent most of his career on understanding and managing the effects of air pollutants on forest ecology, and of forest fire emissions on air quality. Lee received his Bachelor of Science from University of California, Davis in biological sciences in 1995, and his Ph.D. from the University of Nevada, Reno in 2001, focused on the deposition of nitrogenous atmospheric pollutants to the forests and waters of the Lake Tahoe Basin. Since 2002, and up until 2015, he worked for the National Park Service as an air resource specialist, first for the National Capital Region around the Washington D.C. area, and then for the last 10 years as Yosemite National Park's first air resource specialist. For Yosemite and now as an ecologist with the U.S. Forest Service, Pacific Southwest Research Station, Lee is working across agencies on the foundational

air quality and smoke-related science that will help California forest managers increase the pace and scale of fire treatments, while improving and protecting air quality



#### **KEYNOTE PRESENTATION THURSDAY, APRIL 14**

Gary Berndt, Washington State Wildland Liaison, Commissioner of Public Lands We Have a "Wicked" Problem. How Did It Happen? Can It Be Fixed?

Abstract: Wildland fire management in the 21st century is pervaded with emerging trends, both good and bad; challenges; and opportunities. Wildfires of today are burning in altered vegetation and fuel complexes, exhibiting higher levels of intensity, impacting larger areas, persisting for longer durations of time, and more frequently occurring in the wildland urban interface (WUI). Increases in amounts and

shifting structure of fuel complexes are promoting increases in fire intensity, severity, area burned, and magnitude of postfire weather events. The WUI expansion shows no signs of slowing. Climate change is tending to magnify these issues and bring additional concerns.

What is happening today in wildland fire management is a "wicked" problem. It is not unique to any one country or geographic area of the world. We need to directly address how to restore and maintain resilient landscapes, how to make communities better able to withstand wildfires without loss of life and property, how to sustain proactive landscapescale vegetation management and fuels reduction activities, and how to consider and implement the full spectrum of management activities and the full range wildfire responses. Responsibility for addressing these issues extends beyond just fire management professionals; social awareness of issues, ramifications, opportunities, and capabilities must increase. Collaborative undertakings that involve affected and interested participants must be used to set action plans.

For this talk, I would like to focus on a specific example of this situation, how it happened, and actions are underway. The State of Washington's East slopes of the Cascades, where I am from, experiences a significant threat - the potential for catastrophic wildfire followed by burned lands washing away before restoration can begin. The County I live in is "fire prone". Our County is very much a fire-adapted environment as are all the counties of this area. The rapid population growth in western cities has led to an unprecedented outmigration to the quiet lifestyle of the dry Eastern Washington environment. Commonly the dream is about having five acres and a babbling brook, and even better, bordering public land. This has resulted in a significant number of new homes on lands previously considered industrial forest. These lands are directly adjacent to federal USFS lands. This migration and lifestyle shift has made my county the fifth fastest growing county in Washington State.

In our county, we have now suffered four major wildfires in the last five years with large-scale negative impacts. Large, damaging wildfires are not just a product of wildland vegetation. The WUI growth, lack of forest management, changing weather patterns, fire suppression budget reductions, expectations that 911 solves all problems, and general resistance for developments that can survive the passage of a wildfire have all interacted to create this problem. This scenario came upon us with little resistance socially or politically until it reached the scale of continuous catastrophic impact to everyone across the landscape.

Now what? Can this be fixed? More of the same will not help. Proactive measures are necessary. Increasingly frequent and damaging wildfires cannot simply be accepted as unavoidable events. Industrial forests are being lost to subdivisions, citizens see the forest as static and unchanging, economies are built on growth models, demand increases, suppression costs escalate. It's time to consider the past, examine where we are, and develop strategies for solutions because there can be solutions that make a difference. It's up to us. The problem is complex, the solutions will not be simple.

Bio: Gary Berndt is actively involved in his community and served as City Council member and later Mayor (1988-2004). He formerly served as a County Hospital District Commissioner and the Vice President of the local Chamber of Commerce. He is also an active Rotary member and past president of the local chapter. Gary served as a Kittitas County Commissioner from 2013 until April 1, 2016 when he resigned to take a position as "Washington State Wildland Liaison" reporting to the Commissioner of Public Lands. He was formerly employed by Washington State Department of Natural Resources (1973-2011), he retired in May 2011 as Assistant Region Manager for Resource Protection in S.E. Washington. He was responsible for wildland fire management program on State and private lands and directed prevention, preparedness, training and suppression activities. He also served as Agency Administrator and as Line Officer (agency representative) on many Type 1,2, and 3 incidents.

Gary was involved with curriculum development and course delivery nationally of the National Association of State Foresters "Complex Incident Management Course" from 2000-2010. He served as an instructor and as team coach. This course is currently S-520 equivalent for Type 1 National rating.

He was on the National Steering Committee for the development and delivery of the "Leadership of Organizations Course" known as L-480 from 2003-2006. He was recruited and assisted in the development and delivery of an Australian Course known as the "Advanced Incident Leadership Program" which was a national course delivered once per year to 20 selected managers from across Australia, New Zealand, and Tasmania. The course was developed in 2001 and was been presented annually from 2002 –2012.

Gary has lived in Cle Elum, Washington with his wife, he has 2 daughters and 3 grandchildren.



#### TUESDAY, APRIL 12 9:35-9:55 EXHIBIT HALL E



# NASA FIRE SCIENCE AND APPLICATIONS: TECHNOLOGY, SATELLITES, AIRBORNE DATA AND MODELS

Presented by Amber Soja, NIA / NASA

NASA supports fire research and the application of fire data, models and technology in many cross-cutting Earth Science programs to include Terrestrial Ecology, Carbon Cycle and Ecosystems, Climate Variability and Change, Atmospheric Composition, Interdisciplinary Science and Applied Science. In this presentation we will discuss NASA Missions that have data that could support fire research, land management, fire recovery and active firefighting. We will also provide several examples of the successful use of NASA satellite and model data in fire science research and the application of those data.

Bio: Amber's research interests focus on connections between fire regimes, the atmosphere and biosphere, and feedbacks to and from the climate system. She has two decades of research experience, where she has taken part in and led numerous national and international teams of research scientists. Specifically, she uses Geographic Information Systems (GIS) and satellite-derived data as tools to explore these dynamic relationships. Dr. Soja is currently an Associate Research Fellow at the National Institute of Aerospace, resident in Climate Sciences at NASA LaRC. She has recently taken a part-time Associate Program Manager position in the NASA Applied Sciences Program, Wildland Fire.

#### APRIL 12 9:35-9:55



#### **SMOKE IS A GLOBAL PROBLEM**

Led by Int'l Smoke Symposium Committee

Join the planning committee for the 2nd International Smoke Symposium to discuss how we can raise awareness of the global diversity of approaches, issues and ideas in fire behavior and smoke management.



### PUTTING THE "I" IN WILDFIRE PREPAREDNESS: INSURANCE & NFPA WORKING TOGETHER TO ENSURE WILDFIRE SAFETY IN THE WUI

Presented by Michele Steinberg and Lucian Deaton, NFPA

Communities at risk to wildfire across the United States share the common challenges of risk reduction, resident understanding, and motivation. The insurance industry can and does play an active role in the shared responsibility with residents on homeowner engagement and recognition for their preparedness.

Hear from NFPA about successful partnerships that have been forged with insurance companies to motivate homeowners in the wildland urban interface through the Firewise Communities/USA® Recognition Program and other local efforts. The session will also explore social behavioral change and decision making influenced by risk considerations in the wildland urban interface.

Bio: Michele Steinberg is the Division Manager for Wildland Fire Operations at the National Fire Protection Association (NFPA), where she leads a team dedicated to wildfire safety education, advocacy and outreach. NFPA is a global nonprofit organization established in 1896 and devoted to eliminating death, injury, property and economic loss due to fire, electrical and related hazards. Michele has worked in the disaster safety arena for more than 25 years. Current NFPA wildfire safety initiatives include the Firewise Communities/USA® Recognition Program, home wildfire risk evaluation seminars, Wildfire Community Preparedness Day, and TakeAction, focused on preparedness for youth and families.

Bio: Lucian Deaton manages international partnership development for NFPA's Wildland Fire Operations Division with its Firewise and wildfire standards focus in Africa, Latin America, Canada, Europe, and Australasia. Lucian previously managed the national Firewise Communities Program. Former to NFPA, Lucian worked with the International Association of Fire Chiefs (IAFC) managing the National Ready, Set, Go! Program and was a lobbyist in DC starting in 2001 on public safety issues before Congress and the Federal agencies. He has an MS in Urban Planning and an MS in Natural Resources from Virginia Tech and lives in Denver, CO.

#### TUESDAY, APRIL 12 3:35-3:55 EXHIBIT HALL E



#### INNOVATIONS IN EARLY WILDFIRE DETECTION: INTERNATIONAL CASE STUDIES

Presented by Brendan Kramp, Director of Business Development, North America, Insight Robotics



Recent technological innovations in wildfire detection have developed the ability to detect fires at very early stages with precise location, enabling more effective risk avoidance and response. In this presentation, Brendan Kramp will give a brief overview of how thermal detection has been developed to detect fires as small as one tree several miles away in both daytime and nighttime conditions. International case studies will show how the technology is being used to save lives, property and forests while significantly reducing costs associated with suppression.



Bio: Brendan Kramp is Director of Business Development, US and Canada, at Insight Robotics. With a strong commitment to social innovation and environmental conservation, Brendan is responsible for building strategic partnerships and helping customers in agriculture and forestry safeguard natural resources and infrastructure with intelligent threat detection. Prior to Insight Robotics, Brendan held several roles in fundraising, partnership development and business development for international institutions in the US, UK and Europe, including academic institutions, international conservation organizations, and an international media organization. Brendan holds an undergraduate degree from Brown University and an MBA from HEC Paris.





#### **COME LEARN MORE ABOUT COLUMBIA HELICOPTERS!**

Presented by Jim Rankin, CEO of Columbia Helicopters



#### STUDENTS OF FIRE

led by Kelsy Gibos

Connect with us and we'll use technology to make a connection with conference participants in Melbourne, Victoria, Australia. Join us for some heated discussion about hot wildfire community topics that apply in both hemispheres.

Kelsy Gibos is a Wildfire Management Specialist at Edson Wildfire Management Area, Canada. Kelsy has been instrumental in implementing the Students of Fire initiative!

#### **WEDNESDAY, APRIL 13 3:35-3:55 EXHIBIT HALL E**



#### NATIONAL FIRE DANGER RATING SYSTEM

Presented by Matt Jolly

The National Fire Danger Rating System has been used by many agencies in the United States since 1972. A few updates were introduced in 1988, but the system has remained relatively static form more than 40 years. Based on recent science, three updates to improve and simplify NFDRS are being implemented: 1) Growing Season Index (GSI) will compute live fuel moistures; 2) The Nelson Model will compute fine dead fuel moisture; and 3) Fuel models will be reduced to five fuel types. This presentation will discuss how these updates affect NFDRS outputs and the user experience.

Bio: Dr. Matt Jolly is a Research Ecologist in the Fire, Fuel and Smoke Science Program of the US Forest Service, Fire Sciences Laboratory in Missoula, MT. His main research interest is to improve our understanding of the roles that live and dead fuels play in wildland fires and to use this improved understanding to develop or improve predictive tools that can help support fire management decisions.



#### FIRE BEHAVIOR FUEL MODEL (FBFM) GUIDEBOOK-DATABASE

Demo by; Wendel J. Hann, PhD, Landscape Fire Ecologist, University of Idaho, Wildland Fire RD&A and Linda Tedrow, MS, Research Fire Scientist, University of Idaho, Wildland Fire RD&A (photos in folder)

This session demonstrates development of a Fire Behavior Fuel Model (FBFMP) Guidebook-Database for the US. The demonstration will illustrate interactive engagement in reviewing vegetation and fuels information, making mapping rule changes, and recording rationale for changes. The LANDFIRE Program experienced first-hand the value of guidebooks during the Alaska FBFM calibration workshop. The FBFM guidebook-database will improve LANDFIRE ReMap and enhance future updates to data products. The Guidebook may also be useful for other purposes such as site-specific project planning. The primary focus will be on the conterminous United States with possible additional work in other areas of the U.S. LANDFIRE is hosting a workshop on the guidebook-database at the International Association of Wildland Fire conference in Portland, on Monday April 11, 2016. Following the conference, there will be interactive webinars organized by geographic areas. Watch the LANDFIRE website, our bulletins, and our post cards for webinar announcements. To be included on the invitation list for the workshops, please contact us at http://www.landfire.gov/contactus.php.



Bio: Wendel is an accomplished landscape fire ecologist with over 40 year's experience. Current work with the Wildland Fire RD&A involves LANDFIRE fire regime, fuel, and fire behavior mapping and development of associated technology transfer. Wendel retired from the U.S. Forest Service in 2009 with more than 30 years experience ranging from early years fighting fires, packing mules, and clearing trails to work in land, wildland fire, and prescribed fire management to landscape ecology research to his last assignment as National Landscape Fire Ecologist. Wendel has a PhD from the University of Idaho, and MS and BS from Washington State University.



Bio: Linda is an accomplished Research Fire Scientist. Her current work with the Wildland Fire RD&A involves LANDFIRE fire regime, fuel, and fire behavior mapping and development of associated technology transfer. Linda started her work with the University of Idaho as a Remote Sensing Specialist. Prior work involved development of geospatial algorithms to identify radioactive landfills for the Idaho National Laboratory as a Visualization Engineer. Linda is currently working on a PhD from the University of Idaho and has an MS in Geographic Information Sciences from Idaho State University and a BS in geology from the University of California at Berkeley.



CAMPFIRE SESSION SESSION THREE

#### **WOMEN IN FIRE SCIENCE**

led by Kara Yedinak

This campfire session is aimed at gathering information regarding who may be interested in forming a Women in Fire Sciences group. Groups supporting women in a particular field have been around for quite some time now. However, these groups tend to focus on the traditional academic STEM disciplines, thus often missing interdisciplinary fields such as fire science. In exploring the interest and ideas participants may have, we hope to identify key areas where grass roots support and communication may be beneficial. We encourage ideas and support from any and all interested conference attendees.

Bio: Kara Yedinak is a postdoctoral research fellow in the Department of Forests, Rangelands, and Fire Sciences at the University of Idaho. Kara received her BS in Physics from Pacific University (2002) where she studied low dimensional chaos and fluid flow. She worked as a fire behavior science research technician at the Fire Sciences Laboratory in Missoula, Montana (2004 to 2007). In 2013, Kara completed her PhD at the Laboratory for Atmospheric Research at Washington State University studying coupled atmosphere-fire behavior interactions using simulations and field observations. Currently Kara is focused on investigating concepts surrounding wildland fire propagation theory and acoustics.

#### THURSDAY, APRIL 14 10:35-10:55

### LIGHTNING INFO SESSION SEVEN NATIONAL FIRE DANGER RATING SYSTEM



## MONITORING THE FIRE EDGE AND TRACKING PERSONNEL WITH MODERN TECHNOLOGY

presented by Josh Hintze

Exploring how the modern technologies of RFID and radar can improve the safety of fire fighters and increase the effectiveness of firefighting strategies.

Our website is www.tagsmyth.com



#### LANDFIRE

led by Henry Bastian and Frank Fay, LANDFIRE Business Leads, DOI and US USDA Forest Service

LANDFIRE is a program that provides over 20 national geo-spatial layers (e.g. vegetation, fuel, disturbance, etc.), databases, and ecological models that are available to the public for the US and insular areas. Henry Bastian and Frank Fay are the project business leads. Come and visit with them about LANDFIRE current and future status, updates, remap, and new developments. LANDFIRE, Landscape Fire and Resource Management Planning Tools, is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior, providing landscape scale geo-spatial products to support cross-boundary planning, management, and operations. LANDFIRE is a cornerstone of a fully integrated national data information framework for developing and improving vegetation and fuels data products based on the best available authoritative data and science. LANDFIRE's mission is to provide agency leaders and managers with a common "all-lands" data set of vegetation and wildland fire/fuels information for strategic fire and resource management planning and analysis.



Bio: Henry is a Fire Manager with DOI, currently located in Boise, ID. He oversees and coordinates enterprise systems for the National Fire Plan and Operations System (NFPORS), Interagency Fuels Treatment Decision Support System (IFTDSS), and LANDFIRE. Prior, he was in Washington, D.C. as the business lead for LANDFIRE. Henry worked for the National Park Service as a fire ecologist where he led the fire ecology and fire effects monitoring program. Prior to this, he worked in the State of Utah in vegetation management. He graduated from Snow College and Utah State University, with a degree in fish and wildlife biology.

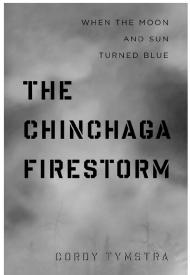


Bio: Frank is an Applied Fire Ecologist with US Forest Service in Washington DC where he oversees LANDFIRE and the Hazardous Fuels Programs. Prior to this work Frank was in Utah, Oregon, and California working in forest planning, silviculture, environmental coordination, project planning, and hotshot firefighter. Temporary

assignments have included: Senior Assistant to the Climate Change Advisors Office in Washington DC, Assistant Director of Fuels and Fire Ecology

Washington DC, and District Ranger. Frank is a certified Fire Ecologist and a certified Silviculturist. Frank has a BS in forestry from Humboldt State University and graduate work from the University of Washington.





How the biggest forest fire in North American history affected and changed forest fire management.

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# LOOKING BACK & MOVING FORWARD WITH COLLECTIVE WISDOM

The fire season of 2015 was yet another monumental season. Such seasons with severe, intense fire behaviour; lost values; records for acres burned and expenditures are becoming commonplace. What do we learn from these seasons that helps us move forward with research and management to ensure the trajectory of our fire management programs and their outcomes benefit land management and societal objectives? During these two World Café's we will hear the experiences of two land managers: what they have learned from recent fire seasons and how that leads to changing direction. Following their experiences the attendees will share their experiences and learn from others as they meet in smaller groups led by subject experts to discuss critical management issues.

#### **WEDNESDAY** MORNING

8:00-9:00 AM EXHIBIT HALL E

# Fire Behaviour and Fire Management – Does Normal Exist?

Denise Blankenship, Deputy Fire Director, US Forest Service

Denise will share her observations across several seasons; providing examples of well-known fire 'rules' that have been broken as fires, fire seasons, and climate have been changing. What do we know?What should we expect in this ever changing world? And how do we adapt?

#### **DISCUSSION TOPICS:**

Fire Behaviour – What is the new normal?

Modeling Fire Behaviour – Nuances and challenges Fuel Treatments – When do they work best?

Air quality – To breathe or not to breathe? is not the only question.

#### **THURSDAY MORNING**

7:30-8:30 AM EXHIBIT HALL E

## Protecting Values While Managing Fire

Jack Oelfke, Chief of Natural and Cultural Resources, North Cascades National Park, National Park Service

Managing diverse values on a landscape poses significant challenge especially when considering the threats they may face from fire and fire management. Jack will share his experiences with the National Park Service working to incorporate direct and indirect impacts from fire suppression and fire and its effects on cultural and natural resources as well as other values. He will share interesting insights into values and potential impacts that may be overlooked as well as incorporating those considerations into fire planning and wildfire management.

#### **DISCUSSION TOPICS:**

Cultural Artifacts – Arrowheads to ghost towns

Natural Resources – From the species to the ecosystem

Act Now While the Fire is Hot - Communicating and integrating in an emerging incident

After the Fire is Over – Managing fire effects

#### GENERAL INFORMATION

#### **BANKING**

ATM machines are located in the MLK Lobby next to Stir, in Exhibit Hall A Lobby at the bottom of the escalator, and in the South Gingkoberry Lane Lobby across from Portland Roasting. There is a transaction fee of \$3.

#### CONFERENCE PROCEEDINGS

All authors are invited to submit an Extended Abstract to the Conference Proceedings. To properly prepare your extended abstract, please adhere to the provided instruc¬tions. You can use the Word soft copy of this instruc¬tions file as a formatting template. Please remember that your abstract must be in final form when you submit it to us; it will not be reviewed or edited. Copies of the extended abstracts will be posted on the conference web site. There will be no distinction between oral and poster presentations in the proceedings. The deadline for submissions is

June 1, 2016. For more information, templates and submission system visit:

http://portland.firebehaviorandfuelsconference.com/ presenters/conference-proceedings

#### **CONTINUING EDUCATION**

The program has been approved for Continuing Education from the Society of American Foresters. Please ask for tracking sheet at the registration desk.



#### DINING

A light continental breakfast will be provided each morning in the Exhibit Hall E.

Light refreshments will be provided each day during the morning and afternoon networking breaks, also in Exhibit Hall E. All conference guests are invited to attend the Award Luncheon on Wednesday where we will have a plated lunch. There are several eating establishments in the Oregon Convention Center including two in Exhibit Hall E, as well as many within walking distance.

#### **EXHIBITORS**

The exhibitors will be set up on Monday afternoon, April 11. Monday evening from 6-8 pm there will be Social Reception with the exhibitors featuring a Pacific Northwest Menu and no-host bar. The Exhibitors are located on the1st level of the Oregon Convention Center in Exhibit Hall E. We encourage you to visit our sponsors and exhibitors each morning and during lunch and breaks.

#### **EXHIBIT HALL HOURS**

Monday . . . . . . 6:00-8:00 pm Tuesday . . . . . 7:30 am – 7:30 pm Wednesday . . . . 8:00 am – 4:00 pm Thursday . . . . . 7:30 am – 1:00 pm

# GREAT INITIATIVE/SUSTAINABILITY/ RECYCLING

The International Association of Wildland Fire (IAWF) is committed to minimizing the environmental impact of its conferences and meeting through:

 Reducing the amount of solid waste produced by the event;

- Reducing energy and water consumption at the event;
- Minimizing or off-setting harmful emissions resulting from vehicular transportation and energy consumption associated with the event;
- Disposing of solid and liquid waste in an environmentally responsible manner;
- Selecting facilities who have developed a sustainability policy;
- · Buying environmentally aware products; and
- Educating participants and exhibitors.

We invite our conference participants and vendors to join us in this goal of incorporating environmentally responsible procedures and practices and in the use of environmentally responsible products while participating in this conference. Working together, we can make this a successful 'Green' event. Please remind yourself and help others to remember to reduce, reuse, and recycle!

The Oregon Convention Center is committed to recycling and provides recycling areas within the exhibit halls for exhibitor use. In addition, there are specialized recycling containers with designated labels throughout the facility to meet your event waste needs.

#### INTERNET/CHARGING STATIONS

Complimentary Wireless Internet is available throughout the Exhibit Hall and the meeting rooms. We have provided charging stations near the entrance of the Exhibit Hall.

#### **MOBILE APPLICATION**

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To download the mobile app:

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- Our Conference will be listed under All Conferences
- Click on our conference to enter the mobile app site.

Thanks! We hope you enjoy the mobile app!

#### PARKING

In addition to street and bus parking in the surrounding area, the OCC provides on-site parking in its clean and secure underground parking garage. Eight hundred spaces are available on the garage's two levels. Disabled parking is available in the garage and all OCC lots on a first-come, first-served basis. In addition, there is public parking in the Lloyd Lot (corner of Northeast MLK Boulevard and Northeast Lloyd Boulevard) via a credit card only pay box. In/out privileges are not available. The maximum daily rate to park is \$10. Overnight parking in the garage is prohibited.

The parking garage offers four electric vehicle charging stations, two on each level. Spaces are indicated by brightly-lit green murals and are available on a first-come, first-served basis.

Enter the garage via its First Avenue or Lloyd Boulevard entrances. Clearance on the P1 level is seven feet; clearance on the P2 level is nine feet.

#### **POSTERS**

Posters will be on display in the Exhibit Hall E. The formal poster presentation will be Tuesday Evening from 5:30-7:30 pm. Light hors d' oeuvres and no-host bar will be available.

Please see the detailed program for the list of posters. All posters will be left up the entire three days, and will be staffed by the authors during the formal presentation on Tuesday.

Poster presenters may place their posters anytime between 7:30 am -4:00 pm on Tuesday. All posters

must be removed before 1:00 pm on Thursday, April 14th.

We will provide you with the means to attach your poster (pushpin, Velcro, clips).

#### **PRESENTERS**

Please note that all presenters will be required to use the computers we are supplying; this will ensure smooth transitions between presentations.

We have provided an on-line submission system to upload your presentations. All oral presenters are required to turn in their presentations the day prior to their session. This is very important so we can load your presentations and make any adjustments that may be needed before your presentation. Please do your very best to help us out with this!

You can either use the online system or you can upload your presentation at the speaker table in the registration area onsite.

Online Submission System: https://iawf.submittable.com/submit/53904

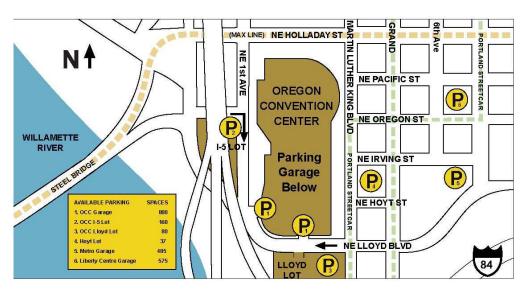
#### SIDE MEETINGS

We have a room available for impromptu side meetings throughout the week; Room E148. There is a schedule on the door, sign up at your desired time, please respect others by staying to your schedule time.

**SPEAKER READY ROOM** – A Speaker Ready Room is available for all conference presenters to preview their material prior to presentation. The Speaker Ready Room is Room E147.

#### **TRANSPORTATION**

Portland's MAX light rail stops 300 times a day at our front door, connecting riders to downtown, surrounding neighborhoods, the Oregon zoo, and Portland International Airport. The Streetcar's Central Loop stops



at our MLK lobby entrance every 15 minutes. Also, at the MLK lobby entrance, TriMet's Bus Line No. 6 provides access to downtown stops and outlining areas.

Compliments of Travel Portland each conference attendee will receive a pass that is good for the week of the conference for all busses and trains in Portland.

Travel

PORTLAND

### WELLNESS =\_\_

Take care of yourself at the Fire Behavior and Fuels Conference. We all know that our health and wellness should take top priority, but sometime we need a reminder. Take advantage of the group led physical activity session that we will be providing. Please check at the registration desk for a list of activities.

Also, take advantage of the hotels fitness and recreation offerings.

#### **DoubleTree by Hilton Portland**

- Bicycle Rental
- Fitness Room
- Stationary bikes
- Treadmills

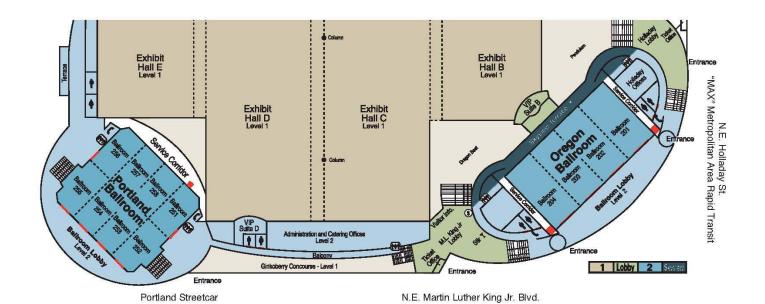
#### Courtyard Marriott-Portland Downtown/ Convention Center

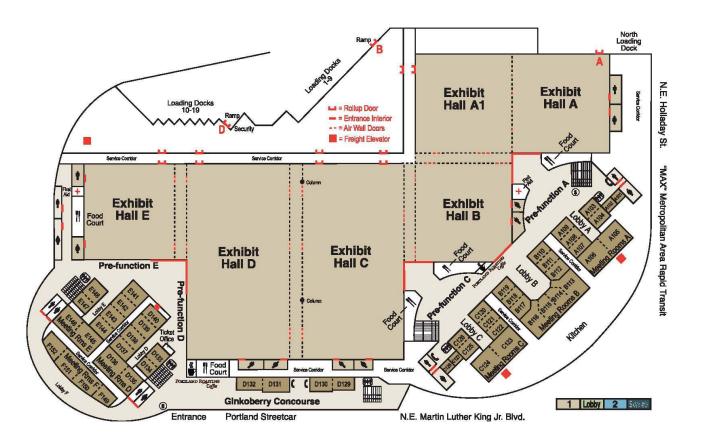
- Hotel Fitness Center
- Cardiovascular equipment
- Free weights
- Treadmill, elliptical, universal gym, free weights
- Indoor Pool

#### **QUESTIONS/INFORMATION**

If you have any questions or need any assistance please visit the registration desk which will be located in the foyer area outside of the Exhibit Hall E.

# convention CENTER maps





|                 |  | Monda   | y, April 11, 2016   |   |  |  |  |
|-----------------|--|---|---|---|--|--|--|
| 7:00 am-6:00 pm |  |   | tion/Information Desk Op  | oen (Pre-Function E   | ·)   |  |  |
|                 | Room E141  | Room E143   | ORKSHOPS Room E144  | Doom 5146   | Page 5147  |  |  |
|                 | #1 - Fuel and Fire Tools   | #11 -The Future of Fire and   |   | #2 - Fire Behavior  | Room E147 Fuel #3 - Accessing Fire   |  |  |
| 8:30 - 12:30    | (FFT)—An application for<br>Wildland Fuel and Fire<br>Management Planning  | Fuels Management:<br>Adapting Fuels Treatments<br>in a Changing Climate   | BehavePlus fire modeling system   | Model Guideboo<br>LANDFIRE: Invest v<br>knowledge in FBF<br>calibration rules fo<br>conterminous U  | your Tutorial on Using the FM MesoWest/Synoptic API r the Web Services                 |  |  |
| 12:30-1:30 pm   |  |   | Lunch - on your own   |   |  |  |  |
|                 |  | WOR   | (SHOPS (cont.)  |   |  |  |  |
|                 | Room E141  | Room E143   | Room E144   | Room E146   | Room E147  |  |  |
| 1:30 - 5:30 pm  | #7 – How to generate,<br>interpret and apply<br>landscape-scale hazard<br>and risk assessment results  | #11 - Cont The Future of<br>Fire and Fuels<br>Management: Adapting<br>Fuels Treatments in a<br>Changing Climate | #10 - Linking Fire Behavior,<br>Fire Effects, and Weather<br>Systems in Prescribed Fire<br>Planning   | #12 -Fuels Treatm<br>Effectiveness: Joint<br>Science Workshop<br>Current Researc<br>Preliminary Results<br>Implications (by invi-<br>for JFSP PI's) | t Fire Fire" on the Ground Across for North America h,                                 |  |  |
| 12:00-6:00 pm   |  | Ext   | nibitor Set-up (Exhibit Hal   | I E)  |  |  |  |
| 6:00-8:00 pm    |  | Social Rece   | eption with Exhibitors (Exh   | hibit Hall E)   |  |  |  |
| 8:00 pm         | A  | fterhours Networking - Sp   | oirit of '77, 500 NE Martin   | Luther King Jr Blvd,  | Portland   |  |  |
|                 |  | Tuesday   | y, April 12, 2016   |   |  |  |  |
| 7:30 am-5:00 pm |  | Conference Registra   | tion/Information Desk Op  | oen (Pre-Function E   | )  |  |  |
| 7:30-8:15       | Gr   | eet-the-Day Gentle Yoga   | - Led by Johnny Stowe (V  | /ellness Lounge Roo   | m E142)  |  |  |
| 8:30-9:30       | Welcome and Opening Session (Portland Ballroom 254/255)  Tom Zimmerman, IAWF President and Conference Co-chair  Ron Steffens, Professor, Green Mountain College & Conference Co-chair  Kevin Martin, Director Fire, Fuels & Aviation Management, Alaska and PNW Regions, US Forest Service |   |   |   |  |  |  |
| 9:30-10:00      |  | NETWORKING BREAK with Exhibitors (Exhibit Hall E)   |   |   |  |  |  |
| 9:35-9:55       | Lightning Info Ses  NASA Fire Science and Technology, Satellites, A  Models  Presented by Amber  | I Applications: Pu<br>irborne Data and Insura   | Lightning Info Session Itting the "I" in Wildfire Pr Ince & NFPA Working Toge Wildfire safety in the Itented by Michele Steinber Deaton, NFPA | eparedness:<br>ether to ensure<br>WUI   | Campfire Session One: Smoke is a Global Problem Led by Int'l Smoke Symposium Committee |  |  |



|             | CONCURRENT SESSIONS (Tuesday, April 12)  |   |   |   |   |  |  |
|-------------|--|---|---|---|---|--|--|
|             | Room E141  | Room E143   | Room E144   | Room E145   | Room E146   |  |  |
|             | SPECIAL SESSION ONE: Towards Efficient Large Fire Management: Monitoring, Modeling, and Accountability Moderator: Matt Thompson  | <b>Rx Fire</b><br>Moderator: Johnny Stowe   | Fire and Smoke Modeling<br>Moderator: Casey Teske   | Risk Assessment<br>Moderator: Elizabeth<br>Reinhardt  | <b>Fire Behavior</b><br>Moderator: LaWen<br>Hollingsworth   |  |  |
| 10:00-10:20 | SS1.1 A framework for optimal incident management: safe and effective response in a new fire management paradigm  Christopher Dunn   | 1. Is It Time To Say<br>Goodbye to Fire<br>Rotations?<br><i>Cecil Frost</i>   | 6. Multiphase CFD Model<br>of Wildland Fire Initiation<br>and Spread (remote)<br>Vladimir Agranat                           | 12. A National Wildfire Risk<br>Assessment for U.S. Forest<br>Service Lands<br><i>Greg Dillon</i>                 | 17. Trends and thresholds in fire behavior across Yellowstone's young lodgepole pine forests Kellen Nelson                                    |  |  |
| 10:20-10:40 | SS1.2 Large airtankers in US fire management: describing historical use and discussing implications related to efficiency Crystal Stonesifer   | 2. Restoration of xeric oak<br>forests in south-central<br>United State with<br>prescribed fire<br>Stephen Hallgren                           | 7. Data-driven Forecasting Paradigms for Wildland Fires using the CAWFE modeling system and Fire Detection Data Janice Coen | 13. Perception and<br>Management of<br>Sociopolitical Risks on<br>Large Fires<br>Armando Gonzalez-Caban           | 18. Fuels and Fire<br>Behaviour in New Zealand<br>Wilding Conifers<br>Tara Strand   |  |  |
| 10:40-11:00 | SS1.3 Meaningful translation of aerial firefighting objectives, context and outcomes into effectiveness across the range of fire sizes for the Aerial Firefighting Use and Effectiveness Study Keith Stockmann | 3. Post-fire tree mortality model assessment following prescribed burning treatments in National Park units of the western U.S.  Jeffrey Kane | 8. GridFire: A Fast Raster-<br>Based Fire Spread and<br>Severity Model<br><i>Gary Johnson</i>                               | 14. Investigating temporal trends in wildfire hazard Jessica Haas   | 19. Using McArthur Model<br>To Predict Bushfire Prone<br>Areas In New South Wales<br><i>Liran Sun</i>   |  |  |
| 11:00-11:20 | SS1.4 Firefighting Resource Use and Movement in the United States Erin Belval  | 4. 2015 National<br>Prescribed Fire Use Survey<br>Pete Lahm   | 9. Towards an integrated<br>fire-atmosphere prediction<br>system with data<br>assimilation<br>Sher Shranz                   | 15. Wildfire threat to<br>residential structures in<br>the Island Park Sustainable<br>Fire Community<br>Joe Scott | 20. An experimental study<br>of the stochastic nature of<br>firebrand flight<br>Ali Tohidi  |  |  |
| 11:20-11:40 | SS1.5 Develop a simulation/optimization procedure to study the daily suppression resource movement in Colorado <i>Yu Wei</i>   | 5. The Smoke-wise<br>Community and the Path<br>to More Fire<br>Peter Lahm   | 10. High Fidelity Reduced<br>Order Models for Wildland<br>Fires<br>Alan Lattimer  | 16. Impact Oriented Fire<br>Paths<br>Joaquin Ramirez  | 21. The Frequency in the<br>Flames: Acoustic Impulse<br>Events Generated by<br>Wildland Fire Fuels<br>Kara Yedinak                            |  |  |
| 11:40-12:00 | SS1.6 Summary: Infusing Risk Management Principles into the Fire Management System Matthew Thompson & David Calkin   | Discussion  | 11. Field-scale testing of<br>detailed physics-based fire<br>behavior models<br><i>Eric Mueller</i>                         | Discussion  | 22. Exploratory analysis of interactions of patchy/clumpy fuel configurations on fire behavior with a physicsbased fire model Francois Pimont |  |  |
| 12:00-1:45  |  |   | Lunch - on your own   |   |   |  |  |
| 1:30-1:45   | Work   | -the-Kinks-Out Gentle Yo  | ga - Led by Johnny Stowe  | (Wellness Lounge Room E   | [142]   |  |  |

|            | CONCURRENT SESSIONS (Tuesday, April 12)   |   |                                  |  |  |  |  |
|------------|---|---|----------------------------------|--|--|--|--|
|            | Room E141   | Room E143   | 3                                | Room E144  | R  | oom E145   | Room E146  |
|            | Smoke Management<br>Moderator: Tamara Wall  | Community Prote<br>and Adaptatic<br>Moderator: Jen<br>McAdams   | on                               | Fire and Smoke Modeling<br>Moderator: Kurtis Nelson  |  | e and Climate<br>ator: Tim Brown   | Fire Behavior<br>Moderator: Kara Yedinak   |
| 1:45-2:05  | 23. Managing Fire in the<br>Only EPA Declared Public<br>Health Emergency in<br>America<br>Nikia Hernandez   | 28. Landscaping<br>Ornamental Tree<br>Exterior Structure F<br>using EcoSmart Fire<br>Mark Dietenber                                     | s and<br>eatures<br>Model<br>ger | 32. The effect of static<br>stability on the<br>atmospheric response to a<br>wildland fire<br>Joseph Charney   | popula<br>obligat  | weather drives the<br>ation collapse of<br>te-seeder forests<br>vid Bowman                                 | 42. ForestFireFOAM: A<br>Numerical Tool For<br>Investigating The Burning<br>Dynamics Of Wildland<br>Fuels<br>Mohamad El Houssami |
| 2:05-2:25  | 24. When there's Fire there's Smoke: Linking Wildfire to Distant Urban Airsheds. A 5 Year Health Economic Assessment of the Western US, 2010-2014  Benjamin Jones   | 29. Setting Wildfire Evacuation Triggers by Coupling Fire and Traffic Simulation Models Dapeng Li                                       |                                  | 33. A Study of the<br>Influence of Vertical<br>Canopy Structure on Fire-<br>Atmosphere Interactions<br><i>Michael Kiefer</i>                             | megafi<br>winds, o<br>build<br>s   | entributions to a<br>ire: Fire-induced<br>drought, and fuel<br>dup due to fire<br>uppression<br>anice Coen | 43. A Fundamental<br>Exploration of Flame<br>Structure in Wildland Fires<br>Colin Miller   |
| 2:25-2:45  | 25. Smoke in the City: How<br>Often and Where Does<br>Smoke Impact<br>Summertime Ozone in the<br>United States?<br>Steven Brey  | 30. Coupling the human and biophysical dimensions of wildfire to better understand wildfire risk and risk mitigation Max Nielsen-Pincus |                                  | 34. Ignition from fire perimeter and assimilation into a coupled fireatmosphere model Adam Kochanski   | 39. Climate-induced<br>variations in global wildfire<br>danger from 1979 to 2013<br><i>W. Matt Jolly</i> |  | 44. Forward Heating in<br>Wind-Driven Fire Spread<br><i>Wei Tang</i>   |
| 2:45-3:05  | 26. Impact of wildfires on regional air pollution Alexandra Larsen  | 31. Wildland/Urban Interface: U.S. Fire Department Wildfire Preparedness and Readiness Capabilities Michele Steinberg                   |                                  | 35. Developments in the<br>BlueSky smoke modeling<br>framework and related<br>smoke tools<br>Sim Larkin  | am<br>disturb<br>future (  | oring interactions ong multiple pance agents and climates in forest andscapes obert Keane                  | 45. Laboratory Studies on<br>the Generation of<br>Firebrands and Ignition of<br>Structural Components<br>Raquel Hakes            |
| 3:05-3:25  | 27. Sensor Messaging: Guidance for Interpretation of Short- Term Concentration Readings Susan Stone   | Discussion  |                                  | 36. The Effect of Forest<br>Gaps on the Transport and<br>Dispersion of Smoke<br>Plumes from Low-Intensity<br>Wildland Fires<br>Jovanka Nikolic           | clima<br>vegetati<br>Huachu  | jected impacts of<br>ate change on<br>ion and fire in the<br>aca Mountains of<br>Arizona<br>opher O'Connor | 46. Experimental Study on<br>the Surface Spread of<br>Smouldering Peat Fires<br>Xinyan Huang                                     |
| 3:25-4:00  |   | NETW  | ORKING                           | BREAK with Exhibitors (  | Exhibit H  | lall E)  |  |
| 3:35-3:55  | Innovations in Early Wildfire Detection: Col<br>International Case Studies  |   | Con<br>Pres                      | Lightning Info Session Four:  me learn more about Columbia Helicopters!  Students of Fire Led by Kelsy Gibos  sented by Jim Rankin, Columbia Helicopters |  | dents of Fire<br>by Kelsy Gibos  |  |
| 4:00- 4:45 | GENERAL SESSION (Portland Ballroom 254/255) - Live streamed to Melbourne Wicked (Fire) Problems, Sweet (and Messy) Solutions Ron Steffens, Professor, Green Mountain College & Conference Co-chair  |   |                                  |  |  |  |  |
| 4:45-5:30  | GENERAL SESSION (Portland Ballroom 254/255) - Live streamed from Melbourne  Fire is the Problem and Fire is the Solution  Dr Kevin Tolhurst AM, Assoc. Prof., Fire Ecology and Management,  Department of Forest and Ecosystem Science, University of Melbourne |   |                                  |  |  |  |  |
| 5:30-7:30  | Poster  | Session (Exhibit H  | all E) L                         | ist of Poster Presentations  | listed at  | the end of the pr  | ogram  |
| 7:30 pm    | After Hours Netwo   | rking - Altabira Cit  | y Taver                          | n (located on the top floo   | r of the H   | Hotel Eastland) - 1  | .021 NE Grand Ave.   |



|                 |  | Wednesd  | ay, April 13, 2016   |   |  |  |  |
|-----------------|--|--|--|---|--|--|--|
| 7:30 am-5:00 pm | Conference Registration/Information Desk Open (Pre-Function E)   |  |  |   |  |  |  |
| 7:00 am         | Group Lo   | Group Led Run/Walk - Led by Amanda Stamper - (meet in the lobby at the DoubleTree Hotel)   |  |   |  |  |  |
| 8:00-8:45       | Gr   | eet-the-Day Gentle Yoga  | - Led by Johnny Stowe (M   | ellness Lounge Room E14/  | 2)   |  |  |
| 8:00-9:00       | World C  | afé - Fire Season 2015 – I<br>Fire Behavior an   | IE ~ Breakfast with the E<br>Looking Back and Moving<br>If Fire Management – Doo<br>hip, Deputy Fire Director, U                                     | Forward with Collective \ es Normal Exist?  | Wisdom   |  |  |
| 9:00-9:45       | Vicki C  | Wildland Fire:   | ESSION (Portland Ballroor<br>Shared Problems, Shaputy Chief for State & Priv   | ared Solutions  | ervice   |  |  |
| 9:45-10:00      |  | Trar   | nsition to Concurrent Sess   | ions  |  |  |  |
|                 |  |  | CONCURRENT SESSIONS  |   |  |  |  |
|                 | Room E141  | Room E143  | Room E144  | Room E145   | Room E146  |  |  |
|                 | SPECIAL SESSION TWO: Wildland Fire Emission Factors – Latest research and implications for management and policy Moderator: Shawn Urbanski | Smoke Management<br>Moderator: Steve Miller  | <b>Case Studies</b><br>Moderator: Norman<br>Arendt   | Wildfire Response<br>Moderator: Tim Sexton  | Fire Weather<br>Moderator: Faith Ann<br>Heinsch  |  |  |
| 10:00-10:20     | SS2.1 Emission Factors and Wildland Fire: Policy Implications and Applications  Pete Lahm  | 47. Differential respiratory<br>health effects from the<br>2008 northern California<br>wildfires: a spatiotemporal<br>approach<br>Colleen Reid | 53. Lessons Learned from<br>an Unexpected Spread<br>Event on a Large Fire in a<br>Remote Mountain Park<br>Kelsy Gibos/Dave Finn                      | 57. The effectiveness of<br>large air tankers for<br>containing wildfire<br>ignitions<br>Hari Katuwal   | 63. Introducing and<br>Validating a New Fire<br>Weather Index: The Hot-<br>Dry-Windy (HDW) Index<br>Alan Srock           |  |  |
| 10:20-10:40     | SS2.2 Background to<br>Emission Factor<br>Development<br>Shawn Urbanski  | 48. Montana Idaho Airshed<br>Group Smoke<br>Management Decision<br>Support<br><i>Erin Law</i>  | 54. Developing and Implementing Geospatial Data Collection of Fuel Treatments, Lessons Learned Justin Shedd  | 58. Providing Information<br>about Uncertainty Using<br>Probability Distributions:<br>USDA Forest Service<br>Wildfire Suppression<br>Expenditure Forecasting<br>Charlotte Ham | 64. Testing the Hot-Dry-<br>Windy Index for the 2015<br>Fire Season in the Pacific<br>Northwest<br>Brian Potter          |  |  |
| 10:40-11:00     | SS2.3 Emission Factors –<br>Latest Research<br>Shawn Urbanski  | 49. A Flexible Decision<br>Support Framework for<br>Smoke Management: 3<br>Case Studies<br>Matthew Mavko                                       | 55. A 72-day Probabilistic Fire Growth Simulation as a Decision Support Tool on a Large Mountain Fire in Alberta, Canada Kelsy Gibos/Neal McLoughlin | 59. What Does It Mean to<br>Have a High Initial Attack<br>Success Rate in Wildland<br>Firefighting?<br>Karen Short  | 65. Daily Relationships Between Fire Danger and Satellite-Derived Metrics of Fire Activity Across CONUS Patrick Freeborn |  |  |
| 11:00-11:20     | SS2.4 Assessing the limits of large diameter live and dead fuel consumption and their potential influence on emissions  Matt Jolly         | 50. Understanding Smoke<br>Transport from Prescribed<br>Burning in the Wildland<br>Urban Interface of Bend,<br>Oregon<br>Susan O'Neill         | 56. Something Wicked This<br>Way Burns: A Wicked Fire<br>Problem in a Coastal<br>Oregon Town<br>Ron Steffens   | 60. Beyond ICS:<br>Propositions on Managing<br>Complex Fire Events<br><i>Branda Nowell</i>  | 66. Alaska Fire and Fuels<br>System<br>Joe Young   |  |  |
| <u> </u>        | ı  | I  | i .  | I   | i  |  |  |

|             | CONCURRENT SESSIONS (Wednesday, April 13)  |  |  |  |   |  |
|-------------|--|--|--|--|---|--|
|             | Room E141  | Room E143  | Room E144  | Room E145  | Room E146   |  |
| 11:20-11:40 | SS2.5 Will fire average emission factors provide the ability to evaluate the effectiveness of emission reduction techniques?  Roger Ottmar           | 51. Wildland Fire Smoke: A<br>Hazard for Health Disaster<br>Management<br><i>Darlene Oshanski</i>  | Discussion   | 61. Writing Incident Objectives in WFDSS: What we Know, How we can do Better Tim Sexton  | 67. Comparison of temperature and relative humidity values from Sling Psychrometers and Electronic Weather Meters in an Controlled Environment Charles McHugh |  |
| 11:40-12:00 | SS2.6 Assessing New<br>Emissions Factors for<br>Estimating Emissions from<br>Wildland Fires<br>Duncan Lutes  | 52. Smoke Monitoring in<br>the Field: Understanding<br>Equipment and the Value<br>of Particulate Matter Data<br>in Making Smoke<br>Management Decisions<br>Don Schweizer | Discussion   | 62. What is the Strategy? A<br>Comparison of WFDSS and<br>ICS 209<br>Tim Sexton  | Discussion  |  |
| 12:00-1:30  |  | Awards L   | uncheon (Portland Ballroom   | 256/257)   |   |  |
|             |  |  | CONCURRENT SESSIONS  |  |   |  |
|             | Room E141  | Room E143  | Room E144  | Room E145  | Room E146   |  |
|             | Continued SPECIAL SESSION TWO: Wildland Fire Emission Factors – Latest research and implications for management and policy Moderator: Shawn Urbanski | Fire Economics<br>Moderator: Joe Scott   | Fire and Smoke Modeling<br>Moderator: Nancy French   | Fire Effects<br>Moderator: Kelsey Gibos  | Fire Weather<br>Moderator: Brian Potter   |  |
| 1:30-1:50   | SS2. 7 Smoke Emission<br>Modeling Inter-<br>comparison Project<br>(SEMIP)<br>Susan O'Neill   |  | 73. Assimilation of satellite active fires detection into a coupled weather-fire model  Jan Mandel   | 78. Black Carbon Production and Storage as a Result of Differing Fire Frequencies in Longleaf Pine Forests Adam Coates                         | 84. The MesoWest/Synoptic Web Service: A Tool for Accessing Fire Weather Data Joshua Clark  |  |
| 1:50-2:10   | Panel Discussion   | 69. Minority Households Willingness-to-Pay for Public and Private Wildfire Risk Reduction in Florida: A Latent Class Analysis Jose J. Sanchez                            | 74. Evaluation and improvement of an advanced regional modeling framework, addressing effects of wildfire emissions on modeled air quality for the Pacific Northwest Vikram Ravi | 79. Recovering Lost Ground: Effects of Soil Burn Intensity on Nutrients and Ectomycorrhiza Communities of Ponderosa Pine Seedlings Ariel Cowan | 85. A Novel Wildfire<br>Prediction Tool Utilizing<br>Fire Weather and Machine<br>Learning Methods<br>Leo Deng   |  |
| 2:10-2:30   |  | 70. Hedonic Models for<br>Homes Vulnerable to<br>Wildfire<br>David Rossi   | 75. The importance of biomass burning feedbacks: Focus on CALIOP-based estimates of smoke plume injection height Amber Soja  | 80. Basal duff smoldering beneath old pines: a distinctive pattern of ground combustion  Jesse Kreye   | 86. Modeling of<br>Thunderstorm-Induced<br>Wind Shifts<br>Scott Goodrick  |  |



|                 | CONCURRENT SESSIONS (Wednesday, April 13)  |   |           |  |   |   |   |
|-----------------|--|---|-----------|--|---|---|---|
|                 | Room E141  | Room E14  | 13        | Room E144  | Room E14  | 5   | Room E146   |
| 2:30-2:50       |  | 71. Systematic Investigation of Wildfire Damage and Risks on Property Values Qiuhua Ma  72. The Effect of Wildfires on Recreation Visitation: A Historical Analysis of the National Park Service's Intermountain Region Kara Walter |           | 76. Field-Scale Validation<br>of Data-Driven Wildland<br>Fire Spread Simulations<br>Cong Zhang | 81. Quantifying E<br>Factors from Smo<br>Peat Fires: a Labo<br>Study<br>Rory Hadde          | uldering<br>oratory   | 87. How Do Very Large<br>Fires Get to be Very Large<br>Fires?<br>Harry Podschwit                                      |
| 2:50-3:10       | Panel Discussion   |   |           | 77. Effects of Forest Canopy on Atmospheric Turbulence During Wildland Fires Warren Heilman    | 82. Flammability of America Pin <i>Morgan Vari</i>  | es  | 88. Defining fire season<br>length using daily climatic,<br>satellite, and documentary<br>fire records<br>Karin Riley |
| 3:10-3:30       |  | Discussion  | ו         | Discussion   | 83. Can Wildfire I<br>Conifer-encroa<br>California Blacl<br>Woodlands<br><i>Deborah Nem</i> | ched<br>c Oak<br>s?   | Discussion  |
| 3:30-4:00       |  | NETV  | VORKING   | BREAK with Exhibitors (  | Exhibit Hall E)   |   |   |
| 3:35-3:55       | (NFDRS) – Update 2016  |   |           | ehavior Fuel Model (FBFM) Guidebook- Wor   |   | npfire Session Three:<br>omen in Fire Science<br>ed by Kara Yedinak |   |
| 4:00-6:00       | JOINT PANEL SESSION WITH MELBOURNE (Portland Ballroom 254/255) - Live streamed  How Do We Make the Complex Tradeoffs Necessary to Effectively Manage Fuels for  Ecosystem Health and Public Safety?  PANEL MODERATOR:  Tamara Wall, Desert Research Institute  PANELISTS:  Lynn M. Decker, North America Fire Learning Network Director, The Nature Conservancy  Zachary Prusak, The Nature Conservancy, Florida Fire Manager and Central Florida Conservation Program Director  Leland W. Tarnay, Interagency Ecologist, Air Quality, Smoke, Landscape Fire, Pacific Southwest Research Station |   |           |  |   |   |   |
| 6:00-7:00 pm    | Sahy   | inidra Yoga and I   | Meditatio | on - Led by Johnny Stowe   | (Wellness Lounge  | Room E  | [142]   |
| 7:00 pm         | After H  | lours Networking  | - Doug    | Fir Restaurant and Lounge  | e, 830 E Burnside   | Street, P   | ortland   |
|                 |  | Т   | hursda    | y, April 14, 2016  |   |   |   |
| 7:30 am-5:00 pm |  | Conference  | Registra  | tion/Information Desk O  | pen (Pre-Function   | E)  |   |
| 7:30-8:30       | Exhibit Hall E ~ Breakfast with the Exhibitors ~  World Café - Fire Season 2015 – Looking Back and Moving Forward with Collective Wisdom  Protecting Values While Managing Fire  Jack Oelfke, Chief of Natural and Cultural Resources, North Cascades National Park, National Park Service   |   |           |  |   |   |   |
| 7:30-8:15       | G  | reet-the-Day Gen  | tle Yoga  | - Led by Johnny Stowe (V   | Vellness Lounge R   | oom E14   | 12)   |

|             | CONCURRENT SESSIONS (Thursday, April 14)   |  |   |  |   |  |
|-------------|--|--|---|--|---|--|
|             | Room E141  | Room E143  | Room E144   | Room E145  | Room E146   |  |
|             | SPECIAL SESSION THREE: Joint Fire Science Program and Smoke Science Research: Status of Progress Towards Meaningful Solutions Moderator: Al Riebau | Fire Use/Restoration<br>Moderator: Gene Rogers   | <b>Technology</b><br>Moderator: Robert Ziel   | Fire Effects<br>Moderator: Eric Miller   | <b>Education, etc</b><br>Moderator: Amanda<br>Stamper   |  |
| 8:30-8:50   | SS3.1 Critical Assessment<br>of Wildland Fire Emissions<br>Inventories: Methodology,<br>Uncertainty and<br>Effectiveness<br>Wei Min Hao            | 89. Modeling alternative fire response policies: proof-of-concept and preliminary results  Karin Riley                                     | 94. Emerging<br>Communication<br>Technologies for Wildland<br>Firefighting<br>Ed Mills  | 100. Impacts of Post-fire<br>Salvage Harvesting on<br>Early-seral Ecosystems in<br>Western Oregon<br>John Bailey   | 106. Automating Fuel<br>Model Assignment and<br>Spatial Alignment for Fire<br>Spread Modeling in<br>Roaded Areas<br>Casey Teske |  |
| 8:50-9:10   | SS3.2 Overview of the SC<br>Regional Emissions and<br>Aging Measurements<br>(SCREAM) study<br>Sonia Kreidenweis                                    | 90. Analyzing tradeoffs among socioeconomic and ecological restoration goals on the national forests of the Pacific Northwest Kevin Vogler | 95. Synergistic Use of New<br>NASA Technologies for Pre-<br>, Active, and Post-Fire<br>Applications<br>E. Natasha Stavros                   | 101. Mapping Severe Fire<br>Potential in the Contiguous<br>United States<br>Brett Davis  | 107. Educating the Future<br>Fire Workforce to Respond<br>to Increasingly Complex<br>Challenges<br>Leda Kobzair                 |  |
| 9:10-9:30   | SS3.3 Emissions and properties of light absorbing particles emitted from fire Gavin McMeeking  | 91. Using Natural Ignitions<br>to Accomplish Land<br>Management Objectives<br>Kelly Martin   | 96/97. Efforts to Enhance the Emergency Fire Shelter: A Collaboration between the U. S. Forest Service and NASA Tony Petrilli and Josh Fody | 102. Spatial Analysis of the<br>Influence of Fire Severity<br>on Forest Structure on the<br>North Rim of Grand<br>Canyon National Park<br>Valentijn Hoff | 108. Burning for Blooms, Birds, and Butterflies: Partnerships and Pyrodiversity in the Willamette Valley Amanda Stamper         |  |
| 9:30-9:50   | SS3.4 Investigation of particle and vapor wall-loss effects on controlled wood smoke smog chamber experiments  Jeffrey Pierce                      | 92. Restoring Fire to North<br>American Wildlands - A<br>Call to Action<br>Tim Sexton  |   | 103. Fire Moss as a Tool<br>for Post-Wildfire<br>Ecosystem Restoration<br>Chris Ives   | 109. Aerial Firefighting<br>with Helicopters<br>Jim Rankin  |  |
| 9:50-10:10  | SS3.5 Data and Tools for<br>Analysis of Smoke Impacts<br>on Ozone and PM<br><i>Matt Mavko</i>  | 93. Planning for a future of<br>more fire, safer fire, and<br>better fire<br><i>Christopher O'Connor</i>                                   | 98. Evaluating the Quality<br>of a Wildfire Defensible<br>Space with Airborne LiDAR<br>and GIS<br>Jason Harshman                            | 104. Disentangling the<br>Drivers of Wildfire Severity<br>in a Multi-Owner Forest<br>Landscape<br>Harold Zald  | 110. UWSP Fire Crew<br>Approaching Tomorrow's<br>Problems With Today's<br>Education and Training<br>Jacob Livingston            |  |
| 10:10-10:30 | Discussion   | Discussion   | 99. Detection of Forest<br>Fires Impact with Remote<br>Sensing Data, ALSAT, In<br>Semi-arid Zones, Algeria<br>Zegrar Ahmed                  | 105. Estimating Fire<br>Induced Basal Area<br>Mortality with Multi-<br>temporal LiDAR<br><i>Michael Hoe</i>  | Discussion  |  |

| 10:30-11:00 | NETWORKING BREAK with Exhibitors (Exhibit Hall E)  |  |  |  |   |  |  |
|-------------|--|--|--|--|---|--|--|
| 10:35-10:55 | Monitoring the Fire Ed   | nfo Session Seven:<br>ge and Tracking Personne<br>gy Presented by Josh Hintz   |  | Campfire Session Four:<br>LANDFIRE<br>Led by Henry Bastian and Frank Fay   |   |  |  |
| 11:00-11:40 | GENERAL SESSION (Portland Ballroom 254/255)  We Have a "Wicked" Problem. How Did It Happen? Can It Be Fixed?  Gary Berndt, Washington State Wildland Liaison, Commissioner of Public Lands |  |  |  |   |  |  |
| 11:40-1:00  |  |  | Lunch - on your own  |  |   |  |  |
| 12:40-12:55 | Work   | -the-Kinks-Out Gentle Yo   | ga - Led by Johnny Stowe   | e (Wellness Lounge Room I  | E142)   |  |  |
|             | 2  |  | CONCURRENT SESSIONS  |  |   |  |  |
|             | Room E141  | Room E143  | Room E144  | Room E145  | Room E146   |  |  |
|             | Continued SPECIAL SESSION THREE: JFSP and Smoke Science Research: Status of Progress Towards Meaningful Solutions Moderator: Doug Fox  | SPECIAL SESSION FOUR: Managing Wildfire for Resource Benefit: Increasing Opportunities, Improving Ecosystems Moderator: Laurie Kurth                       | Fuels<br>Moderator: John Bailey  | Fire Effects (landscape)<br>Moderator: Lily Konantz  | Shared Responsibility<br>Moderator: Michael<br>Gollner  |  |  |
| 1:00-1:20   | SS3.6 A casual inference<br>analysis of the effect of fire<br>smoke on ambient air<br>pollution levels<br>Alexandra Larsen   | SS4.1 Where are we and where can we go with managing fire and what do we need to get there?  Jim Hubbard   | 111. New frontiers in fuel sampling: new techniques for measuring fuels for fire management in the US Robert Keane                 | 117. Simulating the Joint<br>Impacts of Wildfires and<br>Fuel Management on<br>Landscape Resiliency in<br>Central Oregon USA<br>Ana Barros                       | 123. Successful Stewardship Begins with Trust: The Southern Blues Restoration Coalition Dana Skelly                             |  |  |
| 1:20-1:40   | SS3.7 Comparative study of emission factors and mutagenicity of red oak and peat smoke from smoldering and flaming combustion Yong Ho Kim  | SS4.2 Where have we been<br>with managing fire for<br>resource benefits?<br>Laurie Kurth, Frankie<br>Romero, Henry Bastian                                 | 112. Modeling fuels and<br>fire effects in 3D with<br>FuelManager and<br>STANDFIRE<br>Francois Pimont                              | 118. Forest fuels and potential fire behavior twelve years after variable-retention harvest in lodgepole pine  Justin Crotteau                                   | 124. A Framework for Collaborative Learning: Forest Fuels and Vegetation Monitoring in the Southern Blue Mountains Becky Miller |  |  |
| 1:40-2:00   | SS3.8 Fire and Smoke<br>Model Evaluation<br>Experiment (FASMEE)<br>Roger Ottmar  | SS4.3 Do We Need<br>Wildland Fire Use Back?<br>Frankie Romero  | 113. Next-Generation Fuels Mapping at Regional Scales: accounting for uncertainty and spatial variability Susan Prichard           | 119. Multi-dimensional cost-effectiveness of fuel treatments in dry mixed conifer forests: an inventory originated analysis  Jeremy Fried                        | 125. Fire Adapted Communities - Networking on a Local & National Scale Jerry McAdams and Forest Shafer                          |  |  |
| 2:00-2:20   | SS3.9 Airborne based<br>smoke marker ratios from<br>prescribed burning<br>Amy Sullivan   | SS4.4 Managing Fire – Working with partners to protect communities and other values, reduce risk, and improve ecosystems Panel Members:                    | 114. Changes of<br>masticated fuelbed<br>properties over time in the<br>western US<br>Pamela Sikkink                               | 120. The effects of a long-<br>term, landscape-scale, fuel<br>management program on<br>three-dimensional fuel<br>loading and distribution<br>Nicholas Skowronski | 126. Think bigger:<br>statewide wildfire risk<br>perceptions in Idaho<br>Thomas Wuerzer   |  |  |
| 2:20-2:40   | SS3.10 How wild is your model fire? Constraining WRF-Chem wildfire smoke simulations with satellite observations  Jeffrey Pierce   | Forest Schafer — Lake<br>Tahoe Fire Districts<br>Darren Borgias — The<br>Nature Conservancy<br>Judy Reese — State of<br>Alaska<br>Judy Knobel — Washington | 115. Estimating Litterfall Rates Following Stand- replacement Disturbance in Northern Rocky Mountain Ecosystems Christine Stalling | 121. Driving fire behaviour<br>models with forest<br>inventory data in Canada<br>Dan Thompson  | 127. How Wildland Fire<br>Leaders are Co-Managing<br>Risk<br><i>Michael Zupko</i>   |  |  |
| 2:40-3:00   | Panel Discussion   | Department of Natural<br>Resources<br>Dave Baker – Livestock<br>rancher  | 116. Post Treatment Fuel<br>Loading Differential in Two<br>Logged Areas of Banff<br>National Park<br>Erin Tassell                  | 122. Utilizing drought science and information in wildfire management decision context Timothy Brown   | 128. New Approaches for<br>Mapping the Wicked<br>Problem of Wildfire<br>Cody Evers  |  |  |

| 3:00-3:15                   | NETWORKING BREAK (Pre-Function E)  |   |   |   |   |  |
|-----------------------------|--|---|---|---|---|--|
|                             |  |   | CONCURRENT SESSIONS   |   |   |  |
|                             | Room E141  | Room E143   | Room E144   | Room E145   | Room E146   |  |
|                             | Continued SPECIAL SESSION THREE: JFSP and Smoke Science Research: Status of Progress Towards Meaningful Solutions Moderator: Cindy Huber | Continued SPECIAL SESSION FOUR: Managing Wildfire for Resource Benefit: Increasing Opp., Improving Ecosystems Moderator: Laurie Kurth                 | Fire and Carbon<br>Moderator: Ron Steffens  | Fire Management Planning Moderator: Tom Zimmerman   | Fire Weather/Fuel Moisture Moderator: Mary Taber  |  |
| 3:15-3:35                   | SS3.11 Megafire, Fuel<br>Loading, and Emissions in<br>the Continental United<br>States<br>under Changing Climate<br>Yong Liu             | SS4.5 Risk Assessment in<br>the Southern Sierras<br>Matt Thompson, Phil<br>Bowden   | 129. Quantifying avoided wildfire emissions from significant wildfires in California Thomas Buchholz  | 135. A Legacy of Fire Use:<br>Fire Management and Fire<br>Use in Eastern Province of<br>Zambia<br>LaWen Hollingsworth                             | 141. Moisture Exchange<br>Models for Standing Dead<br>Grass in Alaska<br><i>Eric Miller</i>   |  |
| 3:35-3:55                   | SS3.12 Future Mega-fires<br>and smoke impacts<br>Sim Larkin  | SS4.6 Rogue Basin – Risk<br>Assessment across land<br>ownership boundaries<br><i>Kerry Metlen</i>   | 130. Estimates of biomass consumption based on MODIS Fire Radative Power overestimate global biomass consumption and carbon release Bryce Kellogg | 136. Living with Fire – Lessons Learned from Central Africa Grass Savannas and how it relates to Fire Management in the United States Jim Menakis | 142. Examination of pyrophytic plant combustion and the relationship between fuel moisture, energy released, and emissions  Evan Ellicott |  |
| 3:55-4:15                   | SS3.13 Modeling evaluation of the contribution of wildland fire emissions of BC deposition rates in the Western US Serena Chung          | SS4.7 Application of landscape-scale wildfire risk assessment results to incident management <i>Joe Scott</i>   | 131. A new top-down<br>method for estimating<br>aerosol emissions applied<br>to large wildfires in North<br>America<br>Tadas Nikonovas            | 137. Introduction to<br>STARFire: wildland fire<br>spatial planning and<br>budgeting<br>Douglas Rideout   | 143. Climatic and eco-<br>hydrological drivers of fuel<br>moisture dynamics in<br>complex terrain<br>Petter Nyman                         |  |
| 4:15-4:35                   | SS3. 14 Estimating climate<br>impacts on future wildfires<br>and SE US Air Quality<br>Uma Shankar  | SS4.8 Case Study - Bald<br>Knob Fire, Pisgah NF<br><i>Riva Duncan</i>   | 132. Snag Dynamics and<br>Fuel Succession Following<br>Wildfires in the Eastern<br>Cascade Mountains<br>David Peterson                            | 138. A Survey of Fire Managers: Characterization of Resource Importance, Scarcity, and Substitutability by Resource Type Crystal Stonesifer       | 144. Flammability of Live<br>Vegetation: Combustibility<br>and Ignitability Assessment<br>Jan Christian Thomas                            |  |
| 4:35-4:55                   | Panel Discussion   | SS4. 9 The High Meadow<br>Wildfire - A Natural<br>Ignition Managed for<br>Multiple Objectives In a<br>Complex Social<br>Environment<br>Mark Rosenthal | 133. Estimating canopy<br>bulk density distribution<br>using calibrated t-LiDAR<br>indices<br>Francois Pimont                                     | 139. Water Quality Above<br>All Else: Fire Management<br>in the Greater Victoria<br>(British Columbia) Water<br>Supply Area<br>Robert Walker      | 145. Critical Examination<br>of the Haines Index and its<br>Use<br>Brian Potter   |  |
| 4:55-5:15                   |  | SS4.10 Case Study -<br>Paradise Fire, Olympic NP<br><i>Todd Rankin</i>  | 134. Effects of Stand Thinning in Modifying Crown Fire Behavior in a Black Spruce Stand in Interior Alaska Eric Miller                            | 140. NASA Fire Science and<br>Applications: Technology,<br>Satellites, Airborne Data<br>and Models<br>Amber Soja                                  | 146. Developing new references for fine dead fuel moisture in the Southeastern United States  Matt Jolly                                  |  |
| 5:15-5:20                   | Transition to Closing Session  |   |   |   |   |  |
| 5:20-5:40                   |  |   | ession (Portland Ballroom   | · ,   |   |  |
| 7:00                        | A  |   |   | / Morrison Street, Portlan  | d   |  |
| 9:00 E:00                   | Field Tele 44  | •   | April 15, 2016  | A Drocovile of Fire to the 1  | Villaments Valley   |  |
| 8:00 - 5:00<br>8:30 - 12:30 | Field Trip #1 – Bu   |   |   | e): Prescribed Fire in the V  | villamette valley   |  |
| 8:30 - 12:30                |  | Field   | l Trip #2 Columbia Helico   | oters   |   |  |



- P1. A Novel Application of Wildfire Risk Assessments in Land Management Plans- Jennifer Anderson
- **P2.** Oregon's Prescribed Fire Council: working in the future with prescribed burning and managed wildfire **John Bailey and Amanda Stamper**
- **P3.** Experimental Research of Grass Ignition by the Heated up to High Temperatures Carbon Particle-*Nikolay Baranovskiy*
- **P4.** Mathematical Simulation of Heat Transfer in Coniferous Tree at the Forest Fire Influence- *Nikolay Baranovskiy*
- **P5.** Geomonitoring of Forest Fire Danger Using GIS and Remote Sensing: Case Study for Typical Area of Tomsk Region- *Nikolay Baranovskiy*
- **P6.** Characterizing biogeographical variation in encounter rates between fire and fuel treatments in the conterminous United States- *Kevin Barnett*
- P7. Tools for Improving Fire Behavior Fuel Model Spatial Data- Kori Blankenship
- **P8.** Relationships between Firing Technique, Fuel Consumption, and Turbulence and Energy Exchange during Prescribed Fires- *Kenneth Clark*
- P9. Back to the Fire and Fire Surrogate Study for Wisdom on Fuels Treatment Longevity- Justin Crotteau
- P10. Blueprint For Survival, New Options, Skills, Procedure, For Extreme, Fast Fires -Troop Emonds
- P11. Reluctant to Simplify: Examining Assumptions about Wildland Firefighting Communication- Rebekah Fox
- P12. Two Frameworks for Post-fire Prediction of Tree Mortality Across Pyrogenic Landscapes- Michael Gallagher
- **P13.** The Available Science Assessment Project: Evaluating the Supporting Science Behind Climate Adaptation Actions for Fire and Fuels Management *Rachel M. Gregg & Whitney Reynier*
- **P14.** A GIS tool and framework for integrating White-headed woodpecker habitat models into Fire and Land Management Planning Scenarios- *Jessica Haas*
- **P15.** Development of a high-resolution (5-m) fuel model map based on LiDAR and NAIP and its application to Marin County, CA -*Hilary Hafner*
- P16. Conterminous United States LANDFIRE Analysis and Remap of the Fire Regime Group Layer Wendel Hann
- **P17.** Conterminous United States FIRE BEHAVIOR of FUELS for VEGETATION: Invest Your Knowledge in the LANDFIRE Guidebook *Wendel Hann & Lindaw Tedrow*
- P18. A Fire History of the White Cap Creek Watershed in the Selway-Bitterroot Wilderness in Idaho Valentijn Hoff
- P19. Inexpensive Smoke Sensors and Aerial Platforms for Smoke Monitoring and Model Validation -John Hom
- **P20.** The Effect of Post-Mountain Pine Beetle Salvage Treatments on Fuel loads and Fuel Moisture in Colorado Lodgepole Pine Forests -*Paul Hood*
- P21. Smoke Management Information Resources on the FRAMES Emissions and Smoke Portal -Josh Hyde
- P22. The Southwest Fire Science Consortium: An Opportunity in Fire Science and Management Chris Ives
- **P23.** Effectiveness and Longevity of Ponderosa Pine Fuels Reduction Treatments: A Legacy of Research at Lick Creek Demonstration/Research Forest in Montana, USA -*Katelynn Jenkins*
- P24. Simulation of a Prescribed Fire Event in the Jones Ecological Research Center Michael Kiefer
- **P25.** Comparative Study of Emission Factors and Mutagenicity of Red Oak and Peat Smoke from Smoldering and Flaming Combustion -**Yong Ho Kim**
- P26. Operational Maps Created from LiDAR Technology Identifying Landscape Firebreaks Vesa Leppänen
- P27. Dependence of Daysmoke modeling of smoke plume vertical profiles on updraft core number -Yongqiang Liu
- P28. Emissions Estimations and Smoke Plume Transport Analysis of the King Fire Marlin Martinez

# POSTER PRESENTATIONS

- P29. Does pre-spruce beetle outbreak history affect how outbreaks alter fuels? Nathan Mietkiewicz
- P30. Fire Emissions Inventory Systems' Organization and Costs -Helen Naughton & Kendall A. Houghton
- P31. Evaluating shortwave radiation models for fuel moisture prediction -Petter Nyman
- **P32.** Planning for fire use and containment using a predictive spatial model of landscape-driven barriers to fire spread -*Kit O'Connor*
- **P33.** Assessing Impacts of Climate Change and Human Population Growth on Forest Fire Potential in the Tropics A Case Study of the Tain II Forest Reserve in Ghana *Eric Osei-Kwarteng*
- P34. FIRESEV East: Mapping higher severity fire potential for the Eastern U.S. -Matthew Panunto
- **P35.** Post-fire Logging Produces No Lasting Impacts on Understory Vegetation in Northeastern Oregon -*David Peterson*
- P36. Evaluating CMAQ's Ability to Simulate Ozone and PM2.5 from Wildland Fire Emissions -Thomas Pierce
- P37. Summarizing wildfire development with growth statistics -Harry Podschwit
- P38. Synoptic Meteorology Associated with Large Fire Growth Episodes -Brian Potter
- P39. Effects of a British Columbia Wildfire on Soil Water Repellency -Aaren Ritchie-Bonar
- P40. Fire and Smoke Model Evaluation Experiment (FASMEE) -Roger Ottmar
- **P41.** Innovations in Post Fire Assessment and Recovery, Malheur National Forest, Canyon Creek Complex -*Dana Skelly*
- **P42.** Multi-scale analyses of wildland fire combustion processes in open-canopied forests using coupled and iteratively informed laboratory-, field-, and model-based approaches -*Nicholas Skowronski*
- **P43.** Real-Time Smoke Monitoring Using Rapid Deploy Equipment to Aid in Fire Management and Ensure Public Safety -*Mike Slate and Ricardo Cisneros*
- **P44.** Putting the "I" in Wildfire Preparedness: Insurance & NFPA Working Together on Social Change Understanding -*Michele Steinberg*
- P45. Development of Real-Time Particulate and Toxic-Gas Sensors for Firefighters -Fumiaki Takahashi
- **P46.** Communities Using Early Wildfire Detection Technology to Successfully Reduce Risk, Damage, and Losses **Brendan Kramp**
- P47. Do Fuels Treatments Promote Drought Resistance in Lassen National Park? Mike Vernon
- P48. Understory Vegetation Changes with Different Seasons and Intervals of Prescribed Burning -Harold Zald
- **P49.** Facilitating Fire Potential Depictions in Preparation and Response Decisions: Integrating Tools Online *Robert Ziel*
- **P50.** National Wildfire Coordinating Group's Smoke Committee and Recent Air Quality Regulatory Updates *Peter Lahm et al.*



#### **AWARDS LUNCHEON**

#### APRIL 13, 12:00 -1:30 PORTLAND BALLROOM 256/257

On Wednesday we will have our awards luncheon. The luncheon is included in your registration so everyone is welcome to attend. We will be presenting our newest award "Excellence in Wildland Fire Management". We will also be announcing the recipients of the "Vallette Early Career Award" and the "Ember Award for Excellence in Wildland Fire Science". We will also be announcing the recipients of the best Student Poster Awards. We have some special guests we will be recognizing for their service and support of the IAWF. It will be a great time so we hope you will join us!

#### **AFTERHOURS NETWORKING**

We have selected a location each evening for afterhours networking. Please join your fellow conference participants at the following locations:



#### MONDAY

#### **Spirit of 77**

2 minute walk from the convention center. 500 NE Martin Luther King Jr Blvd Portland, OR 97232 503-232-9977 http://www.spiritof77bar.com



#### **TUESDAY**

**Altabira City Tavern** (located on the top floor of the Hotel Eastland) 4 minute walk from the convention center 1021 NE Grand Ave. Suite 600 Portland, OR 97232 503-963-3600 http://www.altabira.com/



#### WEDNESDAY

#### **Doug Fir Restaurant and Lounge**

(13 minute walk from the convention center, streetcar also available)
830 E Burnside St,
Portland, OR 97214
503.231.9663
http://www.dougfirlounge.com



#### THURSDAY

#### **Punchbowl Social**

(Max Blue Line or Uber) 340 SW Morrison St Portland, OR 97204 503-334-0360 http://punchbowlsocial.com/portland

#### PORTLAND BLAZERS

Wednesday Evening, we've been extended an offer from Travel Portland and Portland's professional basketball team the Trail Blazers for discounted tickets to the game against the Denver Nuggets.



#### 2015-16 | PORTLAND TRAIL BLAZERS

The Portland Trail Blazers look forward to welcoming the International Association of Wildland Fire to Portland! We are pleased to offer your attendees discounted ticket prices for our game against the Denver Nuggets on Wednesday, April 13<sup>th</sup>! To book, your attendees just use the online link and promo code provided. If you'd like to take advantage of this offer or have questions please contact Alec Botts. We look forward to welcoming your group to the Moda Center!

# Portland Trail Blazers vs. Denver Nuggets

#### Wednesday, April 13th @ 7:00PM

300-Level starting @ \$13 per ticket

200-Level starting @ \$39 per ticket

100-Level starting @ \$67 per ticket

#### Website:

http://www.rosequarter.com/travelportland

Promo Code: travelportland

#### We can offer your group a variety of options, including:

- Special ticket savings available for individuals through online link and promo code, which can be easily placed on your conference website or in emails for pre-conference purchases.
- Blocks of tickets available for larger orders in advance to ensure group seating, plus the ability to gain access to group leader incentives which can include free tickets to the game!
- Hospitality Packages (meeting space/dinner/luxury suites/networking opportunities)
- Exclusive Fan Experience opportunities with private access to the court before or after the game!



Order deadline: TBD

After deadline, please call for availability

#### For more information contact:

Alec Botts 503.963.3926 alec.botts@trailblazers.com

Orders are filled on a first-come first-served basis and are subject to availability. No refunds or exchanges.



Workshop #1 - Fuel and Fire Tools (FFT)—An application for Wildland Fuel and Fire Management

**Planning** 

Instructors: Susan Prichard, Research Scientist, School of Environmental and Forest Sciences, University of

Washington and Roger Ottmar, Research Forester, Pacific Wildland Fire Sciences Laboratory,

**US Forest Service** 

The Fire and Environmental Research Applications team (FERA) of the Pacific Wildland Fire Sciences Laboratory has developed the Fuel and Fire Tools (FFT) application. FFT has integrated a suite of five fuel and fire management products that will be demonstrated at this workshop. The suite of tools includes the Fuel Characteristics Classification System (FCCS), Digital Photo Series, Consume, piled fuel biomass and emissions calculator, and the Fire Emissions Production Simulator (FEPS).

The FFT allow users to build and characterize fuel beds, assess potential fire hazard and surface fire behavior, and estimate the amount of fuel consumed and emissions produced if burned during a wildland fire. The workshop will provide background information on the individual tools and demonstrate how to use FFT through several exercises.

Workshop #2 - Fire Behavior Fuel Model Guidebook - LANDFIRE: Invest your knowledge in FBFM calibration rules for the conterminous US

Instructors: Wendel J. Hann, PhD, Landscape Fire Ecologist, University of Idaho, Wildland Fire RD&A; Linda Tedrow,

MS, Research Fire Scientist, University of Idaho, Wildland Fire RD&A; Henry Bastian and/or Frank Fay,

LANDFIRE Business Leads, DOI and US USDA Forest Service

Participants enhance LANDFIRE's rules for mapping fuel models resulting in improved fire behavior predictions for vegetation of the Conterminous United States. Instructors and participants interactively evaluate and improve content of a draft guidebook. Guidebook content blends the maps and descriptions of vegetation and fuel characteristics with fuel model rules and expected fire behavior. Participants integrate their knowledge of the diversity of relationships between fire behavior, fuel model rules, and vegetation and fuel characteristics to assist instructors in enhancing local to national confidence in fuel model and fire behavior mapping.

## Workshop #3 - Accessing Fire Weather Information: A Tutorial on Using the MesoWest/Synoptic API Web Services

Instructors: Joshua Clark, Developer, University of Utah and Joe Young, Developer, University of Utah

MesoWest software to access, archive, and disseminate environmental information relevant to fire professionals in the United States and Canada has been extensively updated recently (see http://mesowest.org). MesoWest has been providing access to weather information for fire weather applications for nearly two decades. Over 40 million observations are added and archived each day from over 40,000 locations, including observations from permanent and temporary deployments of Remote Automated Weather Stations (RAWS). While the legacy map, graphical, and tabular interface software (MesoWest, http://mesowest.utah.edu , and ROMAN, http://raws.wrh.noaa.gov) continue to be used extensively by fire weather professionals, these were designed by necessity as "one size fits all" tools to meet common needs of operational, commercial, academic, and public users.

The MesoWest development team at the University of Utah is now collaborating with software developers at Synoptic Data to expand access to environmental information around the world. To simplify access to both recent and archived data, the MesoWest/Synoptic Application Programming Interface (API) is now available to allow users to develop their own customized queries to obtain the environmental information of interest to them. Fire professionals can access observations in the vicinity of specific wildfires, obtain alerts when conditions change in selected areas, or design their own fire weather monitoring tools.

#### Workshop #5 - Introduction to the BehavePlus fire modeling system

Instructors:

Faith Ann Heinsch, Physical Scientist, USDA Forest Service; LaWen Hollingsworth, Fire Behavior Specialist, USDA Forest Service; and Greg Dillon, Spatial Fire Analyst, USDA Forest Service

The BehavePlus fire modeling system is the successor to BEHAVE, which was first available for field application in 1984. It is an appropriate tool for many fire management applications including prescribed fire planning, fuel model testing, assessing fuel hazard, and projecting the behavior of an ongoing fire. BehavePlus can be effectively used to learn about specific fire models (such as transition to crown fire) that are included in spatial modeling systems where relationships are not as readily apparent.

BehavePlus includes models for surface and crown fire spread and intensity, crown fire type, safety zone size, size and shape of a point source fire, containment requirements, spotting distance, scorch height, tree mortality, probability of ignition, and fine dead fuel moisture. The program help system includes a description of the many input and output variables. That information is also available in a single reference document with many internal links. This interactive workshop provides an introduction to BehavePlus for new users, helping them determine if it meets their needs. Workshop attendees will learn how to use the program through interactive, hands-on exercises that will allow them to explore many basic features of BehavePlus. Attendees bringing their own computers will benefit the most from this workshop.

## Workshop #7 - How to generate, interpret and apply landscape-scale hazard and risk assessment results

Instructors:

Joe H. Scott, Wildfire Science Consultant, Pyrologix LLC; Julie Gilbertson-Day, Wildfire GIS Analyst, Pyrologix LLC and James Menakis, Fire Ecologist, USDA Forest Service

The wildland fire risk assessment process has been utilized at multiple scales to address different land management questions by USDA Forest Service, Department of Interior land management agencies, and state agencies. While most land managers consider the wildland fire risk assessment a product that is used strictly by fire and fuel specialists, the actual use of the assessment has much greater application for land and resource planning and implementation. This workshop is targeted for resource managers to develop a better understanding of the wildland fire risk assessment processes and how it can be used in resource management decisions and planning.

This workshop will first introduce managers to the wildland fire risk assessment concept and methodology for developing an assessment. Second, it will demonstrate the application of the wildland fire risk assessment at multiple scales (national to local) focusing on resource management issues. And third, it will show the benefits of incorporating the wildland fire risk assessment into land management plans and forest plan revisions. By the end of the workshop resource managers will have a solid understanding of how to accomplish a wildland fire risk assessment and why it's directly important to their land management planning and implementation.

A landscape-level wildfire hazard assessment entails four main steps. First, we identify the study area, fire occurrence areas (FOAs) and fire modeling landscape area required to assess hazard for the specific land management unit under assessment. Next we summarize historical wildfire occurrence within the FOAs to ensure that sufficient fire occurrence data exist within each FOA, and then summarize historical fire weather within each FOA. Armed with knowledge of historical weather, we can now acquire, critique, update and edit fuel and vegetation data (from the LANDFIRE program, for example). This step produces an up-to-date fuelscape for use in simulation models that generate detailed spatial information on wildfire likelihood and intensity, as well as other fire behavior variables such as type of fire, crown fraction burned, flame length, etc.

#### Workshop #9 - Getting more "Good Fire" on the Ground Across North America

Instructors:

Johnny Stowe, Heritage Preserve Manager, SC Department of Natural Resources USA; Steve Miller, Land Management Bureau Chief, St. John's Water Management District (FL, USA); and Morgan Varner, Professor, Virginia Tech USA; Chair, Coalition of Prescribed Fire Councils, Amanda Stamper, Fire Management Officer, The Nature Conservancy

Southeastern North America (SErn) has made huge strides in restoring the culture of Rxd burning in the last two decades, including not only (1) gathering buy-in from a broad array of supporters (including the public and practitioners, as well as in the policy-arena) and (2) getting more good fire "on-the-ground" — but efforts to implement the SErn model to other parts of the continent — in particular the western U.S. — have been relatively unproductive. This lack-of-success appears to center in part on the diametric pattern of land ownership in these areas (mostly private in the SE and mostly public in the West) and associated policy and landscape features, as well as cultural and other human dimension factors. So the SErn model, while helpful to continental (and global) efforts to get more land burned under prescription, is not the key to success. We will provide an interactive forum to discuss the socio-ecological differences and concomitant challenges of these regions with the aim of developing region-specific yet parallel paradigms for the SErn and western regions of the continent. The North American Coalition of Prescribed Fire Councils provides a overarching umbrella to connect ideas emanating from this workshop with the key people who can develop them further and carry them forward. We envision this workshop stimulating discussion that would informally carry through the conference, culminating in a gathering toward the end of the week to weave together ideas.

## Workshop #10 - Linking Fire Behavior, Fire Effects, and Weather Systems in Prescribed Fire Planning

Instructors: LaWen Hollingsworth, Fire Behavior Specialist, USDA Forest Service; Matt Jolly, Research Ecologist, USDA

Forest Service; Duncan Lutes, Fire Ecologist, USDA Forest Service; Faith Ann Heinsch, Physical Scientist,

USDA Forest Service and LaWen Hollingsworth, Fire Behavior Specialist, USDA Forest Service.

The Missoula Fire Sciences Lab has developed several computer programs that can be used in prescribed fire planning to evaluate fire behavior, fire effects, and suitable weather scenarios for burning. The BehavePlus fire modeling system is often used to develop fire behavior scenarios for prescribed fire. FireFamilyPlus can be used to evaluate historical weather to determine the potential for burn windows. The First Order Fire Effects Model (FOFEM) can be used to evaluate potential fire effects, such as fuel consumption smoke production and tree mortality. Integrating results from multiple systems allows managers to develop burn plans will accomplish the objectives and identify the associated parameters for potential burn windows.

Interactive, hands-on exercises will allow attendees to explore the features of these systems using a sample prescribed burn plan. Time will be allowed for questions regarding the use of these systems in prescribed fire planning. Attendees bringing their own computers will benefit the most from this workshop.

## Workshop #11 - The Future of Fire and Fuels Management: Adapting Fuels Treatments in a Changing Climate

**Partners:** USDOI The Northwest Climate Science Center, EcoAdapt, OSU Institute for Natural Resources, in coordination with the NW Fire Science Consortium and Northern Rockies Fire Science Network.

This workshop culminates the Available Science Assessment Project (ASAP), sponsored by the Dept. of Interior's Northwest Climate Science Center (NWCSC), through which we are evaluating the science behind fire and fuels management actions under climate change, with a focus on prescribed fire. This project focused on WA, OR, ID and western MT forests, but findings may be more broadly applicable.

The upcoming workshop will build on interviews with fire managers who manage resources under shifting fire regimes, a systematic mapping of relevant literature, and an earlier science review panel discussion of the state of science behind prescribed fire use under changing climate conditions. We are now bringing managers and scientists together for broader discussions regarding fuels management in the context of climate change in order to:

- Document and synthesize social and expert knowledge of how fuels management is being adapted in response to shifts in climate and fire regimes;
- Explore opportunities for further integration of scientific research and climate-informed management;
- Discuss agency plans and priorities for managing fire (with specific reference to the role of prescribed fire) under future climate conditions;
- Describe the intended management application of desired future research and products on fire and fuels management;
- Develop partnerships between fire experts and forest/fire managers to ensure future research is addressing specific management needs; and
- Help refine the NW CSC Science Agenda in the area of fire regimes and climate change.

The workshop will consist of a mix of formal presentations by scientists and managers and small and/or large group discussion sessions. Information gathered from this meeting will help focus the NWCSC's future calls for fire-related research, and stimulate the possibility of drafting an OpEd piece for peer-reviewed journals, such as Fire Ecology.

## Workshop #12 - Fuels Treatment Effectiveness: Joint Fire Science Workshop for Current Research, Preliminary Results and Implications

(For JFSP PI's, by invitation)

#### Sponsored by Joint Fire Science Program

From 2012 – 2015 JFSP has, through five funding opportunity notices, funded 27 research projects focused on multiple aspects of fuels treatment effectiveness. In 2014 OWF partnered with JFSP to fund 5 research projects. The majority of these projects are currently in progress. This workshop is targeted towards these researchers and is intended to provide a forum to share interim results, identify opportunities for continued or future collaboration and to identify future research needs. This will be a "working workshop" for researchers with active research. Participants will be invited to participate by JFSP and OWF.

#### Workshop Objectives:

- Share interim results on fuels treatment effectiveness research with funding organizations and between researchers
- Identify opportunities for collaboration on on-going research projects
- Identify future fuels treatment effectiveness research needs
- Facilitate coordination between researchers and fire science exchange network principal investigators and coordinators in preparation for dissemination of research results.



Funding wildland fire research and distributing results to support sound policy and management decisions

#### Your Program at work: recently completed research includes—

- Determination of the Effects of Heating Mechanisms and Moisture Content on Ignition of Live Fuels
- A New Time Series Remote Sensing Approach to Mapping Fine Fuels in Sonoran Desert Ecosystems
- Quantifying the Effectiveness and Longevity of Wildland Fire as a Fuel Treatment
- Fuel Loads, Invasive Species, and Post-Fire and Post-Mastication Succession in Chaparral Shrublands
- American Fire History, 1960-2010

**Fire Science Exchange Network** — Accelerating awareness, understanding, and adoption of wildland fire science information

#### **Connect and learn through**

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# BURNING FOR BLOOMS, BUTTERFLIES, BIRDS (AND BOUQUETS): PRESCRIBED FIRE IN THE WILLAMETTE VALLEY Friday, April 15 - 8:00 am - 5:00 pm

Meet the bus in front of the Oregon Convention Center on MLK Ave.

This field trip will leave from the Oregon Convention Center (OCC) at 8:00 am and travel to the following stops throughout the day; Nature Conservancy's Kingston Prairie and Baskett Butte Preserves; Baskett Slough National Wildlife Refuge; private lands; and will end with a visit to a local winery to sample some of the north Willamette Valley's finest bouquets. The bus will return to OCC around 5:00 pm.

Restoring fire's important role in the ecology of Willamette Valley prairies, savanna, and woodlands has become a focus of restoration and conservation in recent years with the listings of species such as Fender's blue butterfly, Streaked horned lark, and Kincaid's lupine as threatened or endangered under the Endangered Species Act. Over 1000 acres are being burned annually to restore and maintain habitat and other ecological conditions necessary for the conservation of these and other culturally important, rare and native, threatened and endangered, plants and animals. On this field trip, we will be looking at fire effects from Fall 2015 prescribed burning in prairie and oak savanna managed by The Nature Conservancy, US Fish and Wildlife Service, and private lands enrolled in the Partners for Fish and Wildlife and Natural Resource Conservation Service Wetland Reserve Programs.

The cost of the field trip is \$55/person and includes transportation, lunch, snacks, water and wine tasting at Firesteed Winery.



## Field Trip #2 COLUMBIA HELICOPTERS Friday, April 15 - 8:30 am - 12:30 pm

*Meet the bus in front of the Oregon Convention Center on MLK Ave.* SPONSORED BY



Tour the facilities of Columbia Helicopters to get an up close and personal look at the nations fleet of heavy helicopters that are used in aerial firefighting. Participants will be able to get valuable knowledge on accessories (buckets, tanks, etc.) that are currently used by helicopters on fires and get up close with many of the helicopters that could be on a fire and is using a helicopter resource.

Columbia Helicopters will invite other operators who currently work on fires to participate as well as Simplex, a local vendor who builds fire tanks for most helicopters and SEI, a vendor who provides the Bambi Bucket.

Industry experts will be available to answer any questions.

The tour will leave the Oregon Convention Center at 8:30 am and return around 12:30 pm. Columbia Helicopters is located at the Aurora Airport, 10 miles South of Portland, Oregon.

The cost of the field trip is \$10 and includes transportation.





## Association for Fire Ecology www.fireecology.org

The Association for Fire Ecology is an organization of professionals dedicated to improving the knowledge and use of fire in land management through science and education.

Our vision for the Association for Fire Ecology is that its membership of respected professionals from around the world together play a key role in wildland fire and fire ecology research, education, management, and policy, to enhance our knowledge and management of fire as a fundamental ecological process.

The Association for Fire Ecology and its members share the following common beliefs:

- Fire is a critical ecological process in many ecosystems throughout the world.
- Land management goals often reflect plant communities with a past history of repeated fire events, however, fire regimes have been significantly altered on many landscapes, which may threaten native plant and animal assemblages, resulting in uncharacteristic ecological consequences.
- Plant communities, species composition, and soils have been significantly altered on many landscapes, causing change in the fire regime.
- Cultural burning has historically been part of the fire regime in many areas of the world.
- Restoring and maintaining native plant and animal assemblages and appropriate fire regimes is desired, although it is recognized that this may not always be possible.
- Science and education are critical in helping us understand ecological patterns and processes, how land management has affected fire regimes, and how vegetation and fire regimes can be restored.
- Science should inform both policy and land management decisions that affect fire regimes.



## Bushfire & Natural Hazards CRC http://www.bnhcrc.com.au

The Bushfire and Natural Hazards Cooperative Research Centre draws together all of Australia and New Zealand's fire and emergency service authorities, land management agencies, as well as non-government organisations and leading experts across a range of scientific fields to explore the causes, consequences and mitigation of natural disasters.

The CRC was launched at Parliament House Canberra by the Minister for Justice, the Hon Michael Keenan, MP, on 10 December 2013. The Minister said the Bushfire and Natural Hazards CRC acknowledged the ongoing impacts of natural hazards upon communities, emergency service providers, governments, agriculture and other industries.

In announcing the Australian Government commitment to the CRC in February 2013, then Prime Minister Julia Gillard said the new centre would build on the work of the Bushfire CRC and expand the research into natural hazards.

The Bushfire and Natural Hazards CRC is funded for eight years with \$47 million from the Australian Government's Cooperative Research Centres Program. The remainder funds - cash and in-kind - comes from partner agencies, government organisations and research institutions from all states and territories and New Zealand.

The Bushfire and Natural Hazards CRC is an incorporated not-for-profit public company limited by guarantee. It is managed through a small central office co-located with the Australasian Fire and Emergency Service Authorities Council in East Melbourne, with staff also based in Adelaide, Darwin and Canberra. It has a skills-based Board of Directors elected by its Members. The Board is chaired by an independent Director.



### Columbia Helicopters

Columbia Helicopters began using helicopters to fight fire in the later 1960s, using a Sikorsky S-61 and bucket to support fire fighters on the ground. Over the years, the company has moved to larger, heavier-lifting helicopters, and has modernized their firefighting technology as well.

For decades, Columbia Helicopters fought wildland fire successfully with buckets slung below the company's fleet of red and white helicopters. Most recently, the company has deployed to fires using SEI Torrentula Bambi Buckets equipped with the PowerFill system. These buckets contain four high volume pumps that allow the pilot to fill the bucket in sources as shallow as 18-inches. Because the buckets are slung approximately 200-feet below the helicopter, pilots can fill from tree-lined streams or ponds, or other water sources with limited access. The system includes a foam reservoir tank in the back of the aircraft for deployment of short-term retardant, and the pilots can also fill the buckets from long-term retardant stations.

Most recently, Columbia Helicopters worked with Simplex Aerospace of Oregon to develop internal tanks for Columbia's fleet of CH-47D Chinook helicopters. The use of internal tanks will now permit the company to fight fires in the urban interface. These 2,800-gallon tanks slip in and out of the Chinook with relative ease, providing versatility on the fire lines. The tanks are filled from a 12-foot snorkel pump that the pilot lowers into a water source or into a long-term retardant batch plant. The tank system also includes a foam reservoir, allowing the pilots to inject short-term retardant into the tank as it flies to the fire.



## Commonwealth Scientific and Industrial Research Organisation (CSIRO)

http://www.csiro.au/en

Australia's leading multidisciplinary research organisation, with more than 5000 talented people working out of 55 centres in Australia and internationally. We play a vital role in enhancing collaboration within the Australian national innovation system, and as a trusted advisor to government, industry and the community.

The Science and Industry Research Act 1949 defines our purpose and the functions we undertake for the benefit of Australia:

- To carry out scientific research for any of the following purposes:
- Assisting Australian industry;
- Furthering the interests of the Australian community;
- Contributing to the achievement of Australian national objectives or the performance of the national and international responsibilities of the Commonwealth; and
- Any other purpose determined by the Minister;
- To encourage or facilitate the application or utilisation of the results of such research.

Our secondary functions include international scientific liaison, training of research workers, publication of research results, technology transfer of other research, provision of scientific services and dissemination of information about science and technology.

We're committed to building connections with the best partners in Australia and the world to complement our science capability and accelerate the delivery of the benefits of our research. We are a trusted scientific advisor and collaborate extensively with government, universities and industry.



## Dragonslayers www.dragonslayers.com

Dragonslayers.com does two specific things:

First we consolidated and advanced the traditional wildfire hand tools. They are stronger, wider, longer, more versatile, safer and by far much more effective. These were engineered so that each fire fighter can have their own tool that breaks down and lays flat for mobilization to an incident with their own personal gear. One Universal handle and a Magnum Pulaski, and a Troop Tool weighs 7 lbs. So versatile and responsive is this simple set of tools is that it allows each fire fighter to have a stand upright better angled McLeod scraping tool, an angled shovel for digging and throwing dirt, a better mop-up stand erect tool, a safety staff for negotiating



#### **Envirovision Solutions**

#### www.evsusa.biz

ForestWatch® is a wildfire detection and monitoring system integrating real world data into a powerful decision support and emergency management system that can significantly reduce the time between fire ignition, discovery and dispatch. ForestWatch® software enables an interface with highly programmable "off the shelf" cameras capable of pan, tilt, and up to 36X optical zoom, in automatic and fully manual modes, providing panoramic color images, geo-referencing, and smoke detection yielding real time fire intelligence. Night time detection, utilizing near-infrared, provides for 24/7 protection. Camera footage is date and time stamped and archived for investigations and after action reviews. Integrated geo-referencing pinpoints fire start locations and displays latitude, longitude, distance and bearing on the image, utilizing standard ESRI GIS compatibility. ForestWatch® Online provides web access to near real time and stored images allowing fire mangers to view new fire starts or ongoing incidents.



#### FRAMES – Fire Research and Management Exchange System www.frames.gov

FRAMES strives to provide a convenient, systematic exchange of information and technology within the wildland fire research and management community. Developed by the University of Idaho in collaboration with the USFS Rocky Mountain Research Station, FRAMES includes a searchable online database of wildland fire-related documents, tools, videos, projects, and data; Collaboration Space for user groups; Online Training and Certifications developed by NWCG, NAFRI, WFMRDA, LANDFIRE, and the University of Idaho; the FRAMES Emissions & Smoke Portal with educational materials on air quality and smoke management developed by the NWCG Smoke Committee (SmoC) and the University of Idaho; and Archived Webinars from JFSP Regional Consortia, IAWF, and the Wildland Fire Lessons Learned Center. FRAMES is located in the Department of Forest, Rangeland, and Fire Sciences in the University of Idaho College of Natural Resources in Moscow, Idaho.



#### Heli-Fire Support

#### www.helifiresupport.com

Heli-Fire Support is an industry leader in services that provide experience with Tanks, Gels, Trucks. Heli-Fire Support services include:

- Mobile Self supporting Dip Sites 2x 11,000 gallon tanks
- Mobile Heil Gel Plants for Helicopter and SEATS
- Ground Application Service
- Heli Engine Minimal Impaxt Suppression Pumps
- Thermal Gel Distributor

Our Goal is to provide very safe and effective dip sites with quality personnel and equipment in a timely manner that is cost effective and with minimal impact to the environment.



## Insight Robotics www.insightrobotics.com

Insight Robotics is the leading solutions provider for managing risks to natural resources and critical infrastructure. Our innovations include the first automated wildfire detection system capable of spotting a single tree on fire up to 5 km away and an aerial survey solution for precise mapping and pinpointing of risk areas across large land areas.

The Insight Robotics Wildfire Detection System arms operations teams with real-time alerts complete with critical data, pinpoint coordinates, 3D maps and images of emerging wildfires so that they have the insights they need to effectively allocate firefighting resources and quickly plan a targeted first attack. The system is capable of detecting fires 24 hours a day, without the need for human monitoring, and is equally effective at night and in all visibility conditions. By tackling wildfire risk head on, forestry and firefighting staff can reduce costs and save lives and property.

Insight Robotics solutions have detected 100% of wildfires within line of sight in their respective coverage zones to date in projects across Asia, North America and Africa. The company was voted IBM Global Entrepreneur of the Year and Best for the Environment by B Corp in 2015. The company also was ranked #4 for robotics in Fast Company's "Most Innovative Companies of 2016".



## International Association of Wildland Fire www.iawfonline.org

The International Association of Wildland Fire (IAWF) was formed in 1990 as an international professional membership association focusing on all aspects of wildland fire. For 25 years IAWF has grown from its fledgling early years to being the foremost global member focused association spanning 30+ countries.

IAWF is uniquely positioned as an independent organization whose membership includes experts in all aspects of wildland fire. IAWF independence and breadth of global membership expertise allows it to offer a neutral forum for the consideration of important, at times contentious, wildland fire issues.



#### **International Fire Relief Mission**

www.ifrm2007.com

The International Fire Relief Mission is a 501(c)(3) nonprofit corporation that provides humanitarian aid to fire and EMS first responders in developing countries by recycling serviceable fire fighting and EMS equipment. IFRM dispatches teams to the receiving countries to demonstrate and provide the necessary information to safely and effectively use the donated gear. Founded by retired firefighters and medics in 2007, IFRM is propelled by monetary, equipment and in-kind donations from corporate partners and individuals; its field staff is all-volunteer. IFRM maximizes its donors' gifts by operating with a 98% efficiency rating, as measured by the Charity Navigators and the Better Business Bureau. The International Fire Relief Mission is firefighters helping firefighters.



#### Joint Fire Science Program

http://www.firescience.gov/

The Joint Fire Science Program funds scientific research on wildland fire and distributes results to help policymakers, fire managers, and practitioners make sound decisions, by:

- providing credible research tailored to the needs of fire and fuel managers
- engaging and listening to clients and then developing focused, strategic lines of new research responsive to those needs
- soliciting proposals from scientists who compete for funding through a rigorous peerreview process designed to ensure the best projects are funded
- focusing on science delivery when research is completed with a suite of communication tools to ensure that managers are aware of, understand, and can use the information to make sound decisions and implement projects

The Joint Fire Science Program is uniquely positioned to tailor wildland fire research in response to the emerging needs of policymakers and fire managers. An annual cycle of proposal solicitation, review, and funding ensures timely response to evolving conditions. Research projects complement and build on other federal research programs, such as those in the Forest Service Forest and Rangeland Research Stations, U.S. Geological Survey, and National Fire Plan. Synthesis of research findings and targeted delivery to managers are essential components of the Program.

More than 90 colleges and universities have collaborated on and partnered with JFSP sponsored research projects. By engaging master's and doctoral candidates in these projects, we are training the next generation of resource managers and scientists. This collaboration extends to private, non-profit organizations and tribal, state, county, and local governments as well. In all, nearly 200 organizations have become partners in JFSP-sponsored research.



#### **Kestrel Weather & Environmental Meters**

www.kestrelinstruments.com

At Nielsen-Kellerman, we've been researching, designing, manufacturing and distributing our Kestrel Weather & Environmental Meters for 15 years. NK's team of experts and engineers are determined to make the most accurate and reliable handheld weather devices available. We are continuously dedicated to researching ways to improve the Kestrel line and create new products to meet our customers' needs. Every Kestrel meter offers patented features, certified accuracy and are Rugged (drop tested to MIL-STD-810G standards) and waterproof (sealed to IP67 standards). They are designed, built and tested entirely in the USA, and backed by an industry-leading 5 year warranty.





## NFPA www.firewise.org • www.fireadapted.org

To save lives and property from wildfire, the National Fire Protection Association's (NFPA) Firewise® Program teaches people how to adapt to living with wildfire, encourages neighbors to work together and take action to prevent losses. We all have a role to play in protecting ourselves and each other from the risk of wildfire. Firewise is a key component of the Fire Adapted Communities initiative – a collaborative approach that connects all those who play a role in wildfire education, planning and action with comprehensive resources to help reduce risk. The program provides access to training resources, online learning center, print and audiovisual materials.



#### National Cohesive Strategy http://www.forestsandrangelands.gov/strategy@US\_Wildfire

The National Cohesive Wildland Fire Management Strategy is a strategic push to work collaboratively among all stakeholders and across all landscapes, using best science, to make meaningful progress towards Resilient Landscapes, Fire Adapted Communities, Safe & Effective Wildfire Response. The result of larger and more destructive fires that have led to increasing costs to lives, natural resources, communities, economies, and fighting fires, Congress called for a Cohesive Strategy in the 2009 FLAME Act. No one agency or organization can act alone to resolve these issues. It is only through "working better together" that we can achieve real change on the landscape level. Through an "all hands, all lands" approach, the Cohesive Strategy is providing the framework for collaborative success towards each of the three tenets above. The vision of the Cohesive Strategy is to safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a nation, to live with wildland fire.



## National Fallen Firefighters Foundation www.firehero.org

The United States Congress created the NFFF to lead a nationwide effort to remember America's fallen firefighters. Since 1992, the non-profit foundation has developed and expanded programs to honor fallen fire heroes and assist their families and coworkers. The NFFF offers assistance through the Survivors Network, conferences and workshops. The Foundation also provides college scholarships for spouses, partners, children and step children to help them fulfill dreams that may otherwise need to be abandoned.

The NFFF also works closely with the fire service to help prevent and reduce line-of- duty deaths and injuries. For more information on the Foundation and its programs contact us at 301-447-1365 or visit www.firehero.org.



## Northern Rockies Fire Science Network <a href="http://nrfirescience.org">http://nrfirescience.org</a>

Effective science communication is critical to science-informed management. Because a long and rich history of fire research exists and contemporary fire research continues, fire and fuels managers are overwhelmed by the available scientific information. Sponsored by the Joint Fire Science Program (JFSP), the Northern Rockies Fire Science Network (NRFSN) is part of a national knowledge exchange network that focuses on fire science delivery and application between research and management. Now in its fourth year, the NRFSN has become a goto resource for reliable, relevant, and timely information to meet the needs of managers and scientists involved in fire and fuels management in Rocky Mountain forests of Idaho, Montana, eastern Washington, and northwestern Wyoming.

The NRFSN conducts a variety of activities to enhance communication, strengthen collaborations, synthesize science, and increase science application to critical fire management challenges. These activities include fieldtrips, workshops, science reviews, science briefs, e-newsletters, and online databases with publications and webinar and video recordings. The NRFSN also identifies and communicates regional research priorities to scientists and the JFSP. Our goal is that these activities increase scientist-manager interactions and result in greater mutual understanding and application of wildland fire science to management.

You can learn more at our website http://nrfirescience.org and by visiting our both in the exhibitor hall. We are always interested in feedback and welcome the chance to discuss your ideas for future NRFSN activities and products.



#### **Oregon State University**

www.nwfirescience.org

The Northwest Fire Science Consortium is part of a national network of consortia established by the Joint Fire Science Program to accelerate the awareness, understanding, and adoption of wildland fire science information by federal, tribal, state, local, and private stakeholders in Oregon and Washington. Our mission is to build bridges and collaboration between fire and land managers and scientists in the region.



#### **PHOS-Chek (Mobile App Sponsor)**

www.phos-chek.com

For over 50 years PHOS-CHeK has provided the world's leading chemical solutions for management of wildland and structural fires. PHOS-CHeK Long-Term Fire Retardants, Class A & B Foams, Gels, and Fuel Gelling Agents are the safest, most effective and environmentally friendly fire chemicals available and are fully qualified by the USDA Forest Service. PHOS-CHeK Fire Retardants are available in powder and liquid form.

MVP-Fx is the "flagship" all-phosphate retardant. This new formulation is highly visible on the fuel and in the air when dropped and is widely used in the airtanker industry. Our 259F is another formulation which is the only fire retardant that is helicopter fixed-tank qualified by the USFS.

PHOS-CHeK has several Class A foam formulations with WD 881 being the premier product. It is highly concentrated providing superior foaming capability for all applications and is the most cost effective product on the market.

We offer two Gels: PHOS-CHeK INSUL-8 and PHOS-CHeK Aquagel-K, These use super absorbant polymer technology to thicken water. Thickened water stays where you put it, even on vertical surfaces, making nearly all of the water used available to stop fire. Phos-Chek INSUL-8 is a liquid concentrate that can be deployed from ground equipment or aircraft. It can be mixed on demand and makes superior gel at low use rates.

Phos-Chek Aquagel-K is a dry powder that is ideal for batch mixing and is targeted toward aerial application.

Flash 21 is the premier fuel gelling agent used for prescribed burning. Flash 21 is now the product of choice to be used with aerial ignition devices such as Helitorchs, flame throwers, terra-torches and blivet applications.

For our new Home Defense Program, the same long-term fire retardant, without the red dye, is now available in ¾ gallon jugs of concentrate and 5 gallon buckets of ready to use retardant, giving individuals the power to protect their own property and belongings long before a wildfire threat is imminent.



#### Scotty FIREFIGHTER

www.scottyfire.com

Manufacturer of Forestry Hand Pumps & Backpacks, Foam Eductors, "Through-the-Pump" Foam Proportioners, "Foam-Fast" Cartridge Applicators, Portable Foam Systems, Air-Aspirating Foam Nozzles, Fog Nozzles, Spanner Wrenches, Shut-Offs, 3-Way Valves, Connectors. A Division of Scott Plastics Ltd., British Columbia, CANADA.



## SimTable www.simtable.com

Simtable provides digital sandtables to the wildfire and emergency management communities. Combining existing GIS data with next generation agent-based modeling and ambient computing SimTable provides a straightforward easy to use approach in incident response and training. Interactive simulations and realtime maps can be distributed across the web and mobile devices.

Simtable is based in Santa Fe, New Mexico. Current research and development includes LiveTexture which coordinates mobile, aerial and social media videos and photos into one 3D texture of an ongoing incident.



#### SweatHawg www.sweathawg.com

Hard Hat Sweatbands stop dripping sweat.

Durable and easily washable, each has a cushy double layer of ultra-absorbent fabric that absorbs ten times its weight in water! Revolutionary absorbency is sewn into aggressively wicking fabrics that disperse, evaporate and cool. Our hard hat sweathand is a major addition to hard hat comfort and safety.

Known best by construction workers and wildland firefighters, these are made for all who wear hard hats, bump hats, welding helmets and face shields, who need to keep sweat from dripping in their eyes for comfort and safety. Easily folds around the brow band in most hard hats to manage excess perspiration. Very comfortable. Machine washable. OSHA Compliant. Made in USA. Bulk discounts available.



#### **TAGSMYTH LLC**

www.tagsmyth.com

TAGSMYTH, a wholly owned subsidiary of IMSAR LLC, was initially founded to solve a problem in the livestock industry where cattle would get lost or go missing. Since its inception, TAGSMYTH has developed solutions for tracking and monitoring assets and personnel. TAGSMYTH believes that knowing where something is, and where something has been is the foundation of successfully fulfilling most responsibilities. Together with it's parent company IMSAR, they have developed a system which utilizes radio frequency and radar for wildland fire fighting that allows emergency service personnel to know the location of the fire edge and team members. TAGSMYTH is a team of technology experts with the dedication and the know-how to solve complex and challenging responsibilities.



#### Technosylva http://technosylva.com/

Solutions for Wildfire Protection Planning & Operational Response from San Diego (CA). Technosylva has developed the only specific wildfire management tools in the market, used in agencies since 1997.

FIRESPONSE: Unique Decision Support System for Wildland firefighting from the dispatching to the incident management, available in desktop, web and mobile platforms.

WILDFIRE ANALYST: the ultimate tool for analyzing real-time Wildfire Behaviour.

Our team has a rich legacy in conducting fuels mapping, fire behaviour analysis and wildfire risk assessments, focused on integrating analysis results into usable applications to support fire professionals for protection and mitigation planning, as well as response and suppression.



#### **US Forest Service Fire Science Research**

http://www.fs.fed.us/rmrs/science-program-areas/fire-fuel-and-smoke http://www.firelab.org http://www.fs.fed.us/pnw/fera

http://www.fs.fed.us/pnw/fera http://www.airfire.org

The U.S. Forest Service conducts fundamental and applied research in wildland fire. The U.S. Forest Service Fire Science Research booth showcases wildland fire research conducted by the U.S. Forest Service, with contributions primarily from the Pacific Northwest Research Station's Pacific Wildland Fire Sciences Lab, the Rocky Mountain Research Station's Fire, Fuel, and Smoke Science Program, and the Washington Office's Research and Development. Materials on active fire science research as well as historical documents are available. The U.S. Forest Service educates and mentors future fire science managers and provides tours, curriculum, teacher workshops, and presentations to increase the public's understanding of the science of wildland fire. Educational materials are also available at the booth.