Special Session Abstracts

Tuesday, November 28

Fire and Climate Change: Past Patterns and Future Expectations

Organizer: Jon E. Keeley

Future climate change is expected to result in global warming and variable changes in precipitation. The impact of these changes on future fire regimes is of immense interest to scientists and resource managers. This special session will address diverse aspects of this problem by experts from the U.S., Canada, Spain, and Australia.

The Southern Appalachian Wildfires of 2016

Organizer: Joseph J. O'Brien

In the Fall of 2016, extreme drought conditions coincident with autumn leaf fall in the southern Appalachians led to an outbreak of wildfires not seen in recent memory. Thousands of starts resulted in dozens of large fires in the region, including the catastrophic Sevier County wildfires with their associated loss of life and property in Gatlinburg and environs. This session reports on the early results of research on the conditions that led up the fires, the dynamics of the fires themselves and expected economic, health and ecological impacts.

Where's the Biodiversity in Fire Management?

Organizer: Dominick DellaSala

If pyrodiversity begets biodiversity, then why aren't most fire managers pro-wildland fire? Is high-severity fire a threat to biodiversity or part of the complexity of mixed severity fires? Is a large fire a catastrophe or a "re-birthing" event? What about climate change and fire severity? Should we be managing for wildland fire benefits for biodiversity or working to suppress fires for human values and safety? Are spotted owls fire avoiders or opportunists? What about the politics of fire management, does science even matter? These seminal fire science and policy questions will be covered in a provocative symposium with a focus on the biodiversity of large and mixes-severity fires, including high-severity patches, and a discussion format with an ending facilitated round-table that will spark discussion about the ecological importance of large, wildfires and how to manage for them in a human-dominated landscapes.

Engaging the Fire Before It Starts

Organizer: Christopher O'Connor and Matt Thompson

The theme of this session is the following deceptively simple tenet of risk management: get ahead of problems you are likely to face down the road. Chapter 5 of the Interagency Standards for Fire and Aviation Operations (aka the “Red Book”) codifies this idea, describing pre-season preparedness work as a key element of risk management that is critical to success when a fire starts. Pre-fire planning can provide a valuable means for building capacity within the organization, communicating hazards and opportunities with key stakeholders and partners, and sharing risks and responsibilities. The Red Book and the Forest Service Wildland Fire Risk Management Protocols both call for managers to collaboratively “predetermine” response strategies that balance protection of values at risk with firefighter and public exposure. In practice, however, the how, where, and when of strategic response is generally left to incident management teams that must make decisions under compressed time horizons, often in contexts with conflicting fire management objectives and sociopolitical pressures. In this special session we introduce a series of new conceptual and applied research methods to determine and translate optimal fire response strategies into actions that can be developed and communicated prior to the fire season. By incorporating risk-based science metrics into the pre-fire planning process, these methods are designed to reduce uncertainties, improve safety and efficiency, and align incident response actions with Land and Resource Planning objectives.

Wednesday, November 29

Fire and Climate Change: Past Patterns and Future Expectations (Cont'd)

Bark Beetle and Fire Interactions in Western North America: The Current State of Knowledge and Implications for Forest and Fire Managers

Organizer: Christopher J. Fettig

Outbreaks of native bark beetles and wildfire are two primary disturbances in western coniferous forests. Wildfires have sculpted these forests for millennia, reducing the quantity and continuity of fuels; discouraging establishment of fire-intolerant tree species; and influencing the susceptibility of forests to bark beetle outbreaks and other disturbances. In recent decades, anthropogenic-induced changes in climate and very effective fire suppression, among other factors, have resulted in substantial changes in forest conditions. As such, the extent and severity of bark beetle outbreaks and wildfires have increased, and will likely continue to do so in the future. This special session focuses on two common interactions between bark beetles and wildfire (1) the effects of fuel reduction treatments and mixed-severity wildfire on bark beetles, and (2) the effects of bark beetle outbreaks and resultant tree mortality on fuels and fire risk and severity. Speakers will review the current state of knowledge and discuss implications to forest and fire managers.

The Science and Implementation of the Integrated Rangeland Fire Management Strategy

Organizer: Doug Havlina

The Integrated Rangeland Fire Management Strategy (IRFMS) was called for in the January, 2015 Secretarial Order 3336 (Rangeland Fire Prevention, Management, and Restoration). The IRFMS outlines short, mid, and long-term actions which contribute to conservation of the sagebrush-steppe biome through improved rangeland fire management. Specific strategies relate to changes in fire management, development of a coordinated science plan, improvement in invasive plant control, and cross-cutting collaboration. In a series of three tracks, this Special Session showcases progress-to-date in implementing these components of the IRFMS. Tracks I and II present the central, foundational science which has been developed to support implementation of the strategy. Presentations include the Conservation and Restoration Strategy, Resistance and Resilience concepts, and modeling wildfire trends. Track III presents field-based examples of implementing the IRFMS, including topics on adjusting fire operations, cross-boundary partnerships, wildfire rehabilitation, and collaboration with state game and fish agencies. Session outcomes will include exposure to science syntheses, assessment tools, on-going efforts, and cooperative efforts related to the IRMFS.

Restoring Fire Integrity: A New Paradigm Arises from the Ashes

Organizer: Cecil Frost

The future of biodiversity on Earth, sometimes hazily perceived by the conservation community, seems increasingly to be thought of as a dichotomization of remaining natural lands into either of two categories; either Production, to meet human wants and needs, or Working Landscapes—also called multifunctional landscapes—in which people make a living from the land while preserving what they can in the way of natural values. Only a fraction of terrestrial biodiversity has a chance of surviving into the future in such a world. In reality, within the next six decades we face the Great Triage: a sorting of nearly all remaining lands on the planet into three domains: 1) cities and the Production Landscapes that support them; 2) Working Landscapes and 3) Restoration: lands committed to maintaining fire integrity for sustaining their full complement of natural diversity of birds, plants and animals. Other than a widespread peppering of variously-sized projects around the planet, restoration as a global movement is dead in the water. This impasse results from broad confusion, even in the conservation community, between Preservation and Restoration. The Century of Preservation is now a chapter in history. Simple preservation, as embodied in the philosophy that created our National Parks, Wilderness Areas and private preserves was a wonderful idea. The great idea was flawed, however, by two fatal quirks. First was the determined misapprehension that we must exclude fire to protect nature. The second anomaly came when the inclusion of livestock grazing was mandated as a political necessity for passage of the Wilderness Act of 1964. We are nearing rock bottom with the old paradigm. The intention of this session is to begin setting the stage for a flowering of restoration of Fire Integrity over the next ten to twenty years and beyond. As the rate of species extinctions increases the nation will come to its senses and regain the will to restore fire integrity to habitats for species diversity. We need to be ready with a new plan. Now is the time to lay the groundwork.

Prescribed Burn Associations: Landowners Effectively Applying Fire to the Land
Organizer: John Weir
This session will provide information about what a prescribed burn association is, what it can do for landowners, agencies and the community, along with how to form one in your area. Speakers will be experts that have worked with forming numerous PBAs, along with landowners that are current members of PBAs. Burn associations took hold in the Great Plains in the late 1990's, with currently over 60 in seven states. The PBA concept is spreading across the country with new ones being formed in other regions. Following the speakers a fire circle will convene to provide more information and discuss first-hand the pro's and con's of PBA formation, organization and keeping one going.

Exploring Past & Future Roles of the Cooperative Extension Service in U.S. Fire Education
Organizer: Sharon Gamble
As communication and education experts, with established trust in communities, Cooperative Extension is well-positioned to educate diverse audiences on an array of fire issue topics across the U.S. Following the destructive 1998 Florida wildfire season, a major Cooperative Extension effort was made to educate the public and build collaborations between government agencies, non-government agencies and fire practitioners regarding the role of fire in the landscape. Specialized educational opportunities were developed to reach multiple target audiences. One example was the wildland fire "toolkit," created and distributed to all Florida Counties. It contained fact sheets, training guides, informational signs, presentations, and more, and was successful in educating the public about the role of fire. However, since that time, and similar to many areas nationwide, interest in fire has waned since the immediate threat of wildfire has subsided. Since the 19 year absence of major wildfires in Florida, collaborations and much institutional knowledge have been lost due to retirements, and funding reductions have resulted in lost or outdated materials. Fluctuating weather patterns periodically create droughty conditions across much of the southeastern U.S., which, combined with expanding wildland-urban interface developments, result in increasingly destructive wildfires such as the 2016 Appalachian and Texas fires. As the south is a naturally fire-prone landscape, a comprehensive fire education strategy is needed at all community levels to maintain human safety and fire safe, resilient landscapes, even during the years between major wildfire events. Cooperative Extension can play an important role in implementing this strategy. This session will identify resources and develop opportunities across states to increase Extension's role in fire programming. The discussions will greatly benefit from having both Extension staff and fire scientists and managers in the session.

Thursday, November 30

Bark Beetle and Fire Interactions in Western North America: The Current State of Knowledge and Implications for Forest and Fire Managers (Cont'd)

Faces Within the Fire: Toward an Inclusive Culture
Organizer: Lisa M. Ganio and Carrie Spradlin
Fire management is a complex issue, involving climate change, fuel accumulations, funding, urban expansion, and dynamic social and cultural values. Managers and researchers strive to address fire in ways that best integrate needs across these challenges but it is intuitive to approach problems and find our solutions based on individual professional experience, cultural context, values, and priorities. Fire management and research findings may be more widely accepted and supported when questions are approached from multiple viewpoints, incorporating more diverse perspectives and a broader suite of solutions. In this special session, we present and discuss examples of opportunities and challenges that occur when diverse perspectives are incorporated into fire management and science. We focus on topics such as personal perspective, leadership, communication, and pathways towards creating a diverse workforce to tackle a multifaceted issue. Through this session, we hope to emphasize the positive aspects of moving toward a more inclusive and dynamic fire culture. We expect our discussion panel and subsequent fire circle to identify issues that extend beyond gender that impact inclusivity and diversity in fire management and science.

Monitoring Vegetation Recovery a Decade Post-Fire in Five Western North American Ecosystems
Organizer: Andrew T. Hudak
Mixed severity wildfires burn large areas in western North America forest ecosystems in most years and this is expected to continue or increase with climate change. However, little is understood about vegetation recovery and fuel conditions a decade or more post-fire, which exceeds the duration of most fire effects studies. We re-measured field sites

established at 15 wildfires 7-15 years ago in five western U.S. ecosystems distributed across eight states (AK, CA, CO, ID, MT, OR, SD, WA). We supplemented existing field sites with additional ones in order to populate landscape stratifications conditioned on burn severity classifications by the Monitoring Trends in Burn Severity (MTBS) Project. We compared field measures of vegetation cover, plant species diversity, tree regeneration, and fuel conditions to remotely sensed trajectories of vegetation recovery extracted from Landsat satellite image time series using the Landsat Trends in Disturbance and Recovery (LandTrendr) change analysis tool. Presentations in this special session will focus on aspects of longer-term vegetation recovery than have been typically studied on the ground or remotely.

The Fire Science Sandbox: Who Provides What Science Support on Wildland Fire?

Organizer: Paul Steblein

Wildland fire issues are comprised of prescribed fire and wildfire, and many interrelated factors. Scientific research is fundamental to addressing wildland fire issues because the resulting knowledge provides key insight into the complexity, cost, risk, and changes associated with the beneficial and negative impacts of fire. Fire managers, resource managers, policy makers, organizations, and the public obtain fire related science research support from a variety of sources, including internal federal fire research programs and extramural research programs that fund federal, university, and other organizational scientists. We propose a two-session approach to first identify who provides what science support on wildland fire and how these entities work together and complement each other, and second, the types and consequent value of funded collaborative research.

Session 1: Panel presentation and discussion on the Federal Fire Science Sandbox. Participants will describe what science support their agencies or organizations provide to stakeholders - both the end user and research communities, important characteristics of their programs that distinguishes each of them from others, and the nature of their collaboration with other science funders and providers. One block of five speakers (20 minutes each) will include the following:

- U.S. Geological Survey Fire Science
- U.S. Forest Service Fire Science
- Joint Fire Science Program
- Department of Defense's Environmental Research and Demonstration Programs (SERDP/ESTCP)
- Overview and Discussion on Coordination/Collaboration on fire science with other federal, academic, and organization partners, and its value to addressing wildland fire challenges

Session 2: General session theme on examples and importance of collaborative fire science Invite abstracts to be submitted from participants that present fire science that was collaboratively undertaken with partners from across fire science and management sources. Presenters should summarize the research and partners, what was learned from the study, and why the research benefitted from collaboration. Collaborations can involve the entities from Session 1 or other partnerships.

Fire Management in the Southwest: Moving Toward Resource Benefit

Organizer: Barbara Satink Wolfson

Across the Southwest, naturally ignited fires are beginning to take a more natural role than they have in recent history. Changes to federal wildland fire management guidance in 2009 provided greater flexibility to use naturally ignited wildfire as a tool for achieving multiple resource objectives. At the same time, agencies, non-profit organizations and even private landowners are embracing fire as a desirable land management treatment. For example, with significant pre-planning and the "right" set of conditions, the U.S. Forest Service Southwestern Region reported nearly 200,000 acres of wildfire managed with "naturally ignited wildfire..." Though terminology is inconsistent, the number of acres burned annually by some version of naturally ignited wildfire has increased dramatically since 2001, when it was just over 8,000 acres. Although an ebb and flow of the number of acres can occur under this category because of weather conditions, policy guidance and administrative support can affect the amount of risk accepted by individual managers and line officers and hence the acres burned by naturally ignited wildfire. Each land management agency or organization works within their own community to build understanding and support for wildfire as a natural process. Private landowners also seek to include fire in their management and are more often being consulted and brought into landscape scale projects. When the pre-determined set of conditions present themselves, fire managers in the

Southwest appear to be basing their decision to manage fire for resource benefit on fire science and the needs of the landscape. This session will explore both the conditions that allow for the expanded use of naturally ignited wildfire as a tool for achieving multiple resource objectives as well as the impacts.

Fire's Role in Restoration of Wildlife, Ecosystem Resilience and Services

Organizer: Mark Kaib

This session will showcase fire science and management collaborations, working to restore fire-adapted ecosystems, to recover Threatened, Endangered, and Candidate wildlife species and their habitats. The widespread exclusion of fire from many fire-adapted ecosystems has resulted in profound ecological affects, the decline of many species, and resulted in Threatened and Endangered populations of keystone and charismatic wildlife species. This Special Session will provide success stories of partnerships between fire science researchers and fire managers in their efforts to restore the ecological role of fire, strategic management of wildfire and prescribed fire for ecological benefits, and efforts to enhance critical wildlife species habitats and to prevent their extinction.

GRIN: Stoking the Flames tor the Next Generation of Fire Scientists

Organizer: Jeff Kane

The Graduate Research Innovation (GRIN) competitive grant program is run by Joint Fire Science Program with input from reviewers organized by Association for Fire Ecology Education Committee that was started in 2010. This program has been highly successful in providing students with the experience of putting proposals together, receiving professional feedback, participating in the peer review process, and in funding strong fire science. This special session will highlight the GRIN program, past and on-going GRIN supported student research, and close with a panel discussion on the future needs and direction of the program. Past GRIN recipients will also include brief summaries on how the grant program helped them to develop their skills as fire scientists and to obtaining and succeeding in their current positions. In conjunction with this special session, an interactive fire circle will be held that is centered on providing interested students with guidance in writing a successful GRIN proposal.

Prescribed Fire Science: An Interdisciplinary Focus on Fire We Use

Organizer: J. Kevin Hiers

What is prescribed fire science and why is it a relevant discipline? Wildland fire science has historically focused primarily on wildfires. With limited research for guidance, managers still rely on prescribed fire, particularly those in the eastern and southern US to burn 12-13 million acres annually. In the absence of science, experience and intuition have guided much of these efforts. However, changes in fuels, weather and the social environment can create novel conditions that push managers beyond their frames of reference creating risk and uncertainty. Also, since managers and society in general have growing concerns over the effects of prescribed fire on air quality, the use of fire in an expanding wildland-urban interface, and the impact of changing climate on the ability to apply fire, we argue that there is a critical need for an interdisciplinary research program focused on prescribed fire. We also argue that research focused on prescribed fire comprises a unique intersection of fire behavior, fire ecology, and the fire environment, and that its application will be extremely relevant for wildfire science. This session presents recent advances and ideas for the future of prescribed fire science, and lays out a plan for robust research-management partnerships linking both applied and basic questions.

Friday, December 1

Quantifying Responder Exposure to Improve Large-fire Response Decisions

Organizer: Christopher Dunn

The complexity of the fire environment has increased dramatically in recent decades because of historical management strategies, a changing climate, and expanding wildland urban interface. As the fire management system looks to new strategies to achieve more desirable outcomes, risks associated with the core work of operational fire response continue to result in avoidable injuries and fatalities to wildfire responders. The Chief of the US Forest Service emphasized the need to strengthen the agencies' commitment to "implement strategies and tactics that commit responders only to operations where and when they can be successful, and under conditions where important values actually at risk are protected with the least exposure necessary while maintaining relationships with the people we serve". Improving strategic and tactical response decisions that balance protection of values at risk with firefighter safety requires enhanced provision of information on the quality and quantity of firefighter exposure that alternative courses of action

would incur. This special session would focus on emerging methods for spatially mapping and quantifying hazards directly affecting responders across space and time. Integrating these spatial data layers into a responder exposure index would support risk-risk tradeoff decisions. However, developing and applying an integrated exposure index is going to be challenging so we hope to engage directly with leading experts and practitioners in wildland fire that have gathered at the Fire Congress. This discussion would commence in a structured "Interactive Fire Circle" after the special session presentations.

Connecting Direct and Indirect Measures of Soil Heating to First- and Second-Order Fire Effects Using Wildfire, Prescribed Fire, and Laboratory Investigations

Organizer: Jessica Miesel

Soil heating patterns during wildfire and prescribed fire are notoriously variable and poorly characterized and yet profoundly affect post-fire ecosystem processes and vegetation recovery. This special session will bring together diverse disciplines to exchange emerging knowledge from research and monitoring studies investigating first- and second-order effects of fire on ecosystems. All presentations in this session will include either direct measurements or indirect estimates (i.e., indicators such as soil burn severity) of the soil heating process. Presentations addressing first-order fire effects may focus on the physics, instrumentation, measurement and modeling of the soil heating process, including measurements of soil drying and gas transfer, duff consumption, ash deposition, and volatilization of chemical elements. Presentations addressing second-order fire effects may focus on the soil, seedbank and vegetation response, including nutrient dynamics, microbial community composition and activity rates, hydrological impacts, or plant community response. The session will include studies of wildfire, prescribed fire and/or laboratory investigations that explore measured or modeled results over the short or long term across a wide range of fire-prone ecosystem types.

Fire Trek: The Next Generation

Organizer: Timothy Ingalsbee

This specially selected panel of speakers will showcase some of the research works-in-progress of fire ecology and management students from across the country. Students represent the next generation of professional fire scientists, educators, and managers, and their research projects often reflect the topics of leading scientific controversies and management challenges. These 20-minute oral presentations will provide a "sneak preview" of some of the emerging issues and innovative approaches to fire ecology research and management that these future professionals hope to contribute to the wildland fire community. Indeed, student researchers aim to boldly go where no fire ecologists have gone before!

America's Longleaf Restoration Initiative – A Collaborative Success Story to Restore the Great Southern Forest

Organizer: Randy Tate

The America's Longleaf Restoration Initiative (ALRI) is a collaborative effort of multiple public and private sector partners that actively supports range-wide efforts to restore and conserve longleaf pine ecosystems. The ALRI has set an ambitious goal of restoring 8 million acres of longleaf habitat across the southeast by 2025, which will require nearly doubling our prescribed fire operations over the next 8 years on public and private lands. Many state and local partnerships have sprung up across the range of longleaf to address this need. ALRI has made great strides since its inception in 2009, and this session seeks to highlight the collaborative successes to-date and challenges to come in order to accomplish landscape scale longleaf pine restoration for the long run.