8th International Fire Ecology and Management Congress

Cultivating Pyrodiversity

Association for Fire Ecology

18–22 November 2019
Loews Ventana Canyon Resort
Tucson, Arizona, USA

8th International Fire Ecology and Management Congress: Week at a Glance

Monday, 18 November: Workshops	
8 AM	Morning Workshops
Noon	Lunch
1 PM	Afternoon Workshops
5 to 8 PM	Welcome Mixer 5 to 6:30 PM: Happy Hour Food and Drink Specials (Cascade Lounge) 6:30 to 7 PM: Smokey Bear and Cognitive Dissonance in the 21st Century (Salon F)
Tuesday, 19 November	
8 AM	Opening Plenary: Cultivating Pyrodiversity among People, Places, Cultures, and Ecology (Kiva Ballroom)
10:05 AM	Break
10:30 AM	Concurrent Sessions
12:10 PM	Lunch (Pre-purchased Boxed Lunch or On Your Own) | SAFE Meeting and Student Luncheon
1:30 PM	Concurrent Sessions
3:10 PM	Break
3:40 to 5:10 PM	Fire Circles
5:30 to 7 PM	Poster Session and Exhibitor Reception (Foyer and Salon B)
7 to 9:30 PM	AFE Fire Film Festival: Double Feature Screening with Filmmakers (Kiva Ballroom) • *Elemental* • *Wilder than Wild: Fire, Forests, and the Future*
Wednesday, 20 November	
8 AM	Plenary: Fire AFEx Talks (Kiva Ballroom)
10:05 AM	Break
10:30 AM	Concurrent Sessions
12:10 PM	Lunch (Pre-purchased Boxed Lunch or On Your Own) | AFE Membership Meeting
1:30 PM	Concurrent Sessions
3:10 PM	Break
3:40 PM	Concurrent Sessions
6 to 8 PM	Awards Dinner (Kiva Ballroom)
Thursday, 21 November	
8 AM	Closing Plenary: Managing Pyrodiversity within Collaborations, Communities, and Landscapes into the Future (Kiva Ballroom)
9:50 AM	Break and Performance by the Burnette Crown Dancers, White Mountain Apache Tribe (Kiva Patio)
10:30 AM	Concurrent Sessions
12:10 PM	Lunch (Pre-purchased Boxed Lunch or On Your Own)
1:30 PM	Concurrent Sessions
3:10 PM	Break
3:40 PM	Concurrent Sessions
7:30 to 9:30 PM	AFE Fire Film Festival: *The Beauty of Blackened Spaces* (Kiva Ballroom)

Friday, 22 November: Field Trips (times vary by trip)

- Altar Valley
- Biosphere 2
- Cuenca Los Ojos, Sonora, Mexico (Overnight Trip)
- Las Cienegas and Audubon Research Ranch Field Trip
- Saguaro National Park
- Santa Catalina Mountains
- University of Arizona: Laboratory of Tree-Ring Research and Environment and Natural Resources 2 Building

Exhibit Hall Salon B	Registration Foyer	Presenter Uploading Station* Coronado
Tuesday: 9 AM to 7 PM Wednesday: 9 AM to 5 PM Thursday: 9 AM to 4 PM Exhibitor Set-up: Monday, Noon to 5 PM Exhibitor Breakdown: Thursday, 4 to 6 PM	Monday: 7 AM to 4 PM; 6 to 8 PM Tuesday: 7 AM to 4 PM Wednesday: 7:30 AM to 4 PM Thursday: 7:30 AM to 4 PM	Monday: 6 to 8 PM Tuesday: 7 to 8:30 AM; 4:30 to 5:45 PM Wednesday: 7 to 8:30 AM; 4:30 to 5:45 PM *Presentations must be uploaded at least by closing time the night before your talk.

Cover photo: The Taylor Creek Fire burns a mountainside along the Rogue River in southwest Oregon, USA, in July 2018. Photo by 2019 AFE Photo Contest Winner, Trip Jennings, Balance Media.

PROGRAM
for the

8TH INTERNATIONAL
FIRE ECOLOGY AND MANAGEMENT CONGRESS

Cultivating Pyrodiversity

Loews Ventana Canyon Resort
Tucson, Arizona, USA
18–22 November 2019

Hosted by

Association for Fire Ecology

in cooperation with the

Southwest Fire Science Consortium

Association for Fire Ecology

SOUTHWEST FIRE SCIENCE CONSORTIUM

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Karin Riley, US Forest Service
Andi Thode, Northern Arizona University

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Welcome and Introduction

The Association for Fire Ecology and the Southwest Fire Science Consortium welcome you to Tucson, Arizona, for the 8th International Fire Ecology and Management Congress! We are excited to be hosting the Fire Congress in such a special region of the United States—home to the Southwest Borderlands, Sky-Island Mountain Bioregion, the Sonoran Desert, saguaro cacti, Gila monsters, and road runners. You will find that ecological and cultural diversity abound in this area, with more than 24 original native tribal nations with unique languages, customs, and knowledge of the environment; Hispanic culture and architecture dating back to the 1600s; and vast regional culinary delights, music, and traditions. This region accordingly has an evolution of climate-driven wildfire-adapted vegetation, and likewise a progressive fire management and research community.

Collectively, we are more than 500 fire managers, researchers, educators, and students from a variety of organizations worldwide, who have come together this week to share, listen, learn, and expand our thinking about fire ecology and management. Whether your "day job" is that of a firefighter, a land manager, a scientist, an ecologist, a student, or an overall fire enthusiast, we all work in a diversity of ecosystems, objectives, worldviews, and values. Thus, no matter your background, we are all working toward AFE's long-standing mission of promoting fire ecology research, education, and management.

To that end, know that AFE is not only for our members, but it is by our members. You have a role to play, and we want to empower you to go forth and do great things! We'd love to see you at the AFE Membership Meeting, where we'll be sharing information about our first conference outside of the US, a new wildland fuels professional certification, diversity and inclusivity initiatives, and our new fire interest groups. Also take a few minutes to visit the AFE booth in the Foyer to learn more about the benefits that our members enjoy, discover how you can become more engaged, provide your suggestions to improve the organization, and purchase an awesome AFE shirt to wow your family and friends!

So get ready! This week will stimulate you intellectually, challenge you professionally, and deepen relationships with old and new colleagues and friends.

With warm regards from your Fire Congress leadership team,

Geoff Babb
Congress Chair

Christopher A. Dicus
President

Mark Kaib
Program Co-Chair

Annie Oxarart
Administrative Director

Barbara Satink Wolfson
Program Co-Chair

Congress Info: Good Stuff to Know!

Wifi. There is free access to wireless internet throughout the meeting area. Take advantage of the free wifi to post about the Fire Congress: #AFEFireCon19.

Breaks. Morning breaks are at 10 AM on Tuesday, Wednesday, and Thursday, which will include coffee, tea, juice, fruit, breakfast breads and bagels, granola bars, and yogurt. Afternoon breaks are just after 3 PM and will include coffee, iced tea, and lemonade.

Lunch. If you ordered a boxed lunch, pick it up on Kiva Patio. Make sure you have the ticket you received at registration. Otherwise, lunch is own your own. Within the hotel, lunch options include:

- Vista Barista: Grab and go salads, sandwiches, and snacks
- Canyon Café: Restaurant serving modern American cuisine with Southwestern soul
- Bill's Grill: Poolside oasis serving sandwiches, burgers, salads, and wraps

There are also restaurants in Ventana Village Shopping Center, about 2 miles away (see map at back of program). Keep in mind that lunches breaks will be 1 hour and 20 minutes long.

Nursing Mothers and Family Room. The Sonora room is a dedicated space available for nursing mothers and families to use as needed. If you need anything, please visit Registration and let us know.

CFEs and CEUs. Congress attendees can obtain Continuing Forestry Education (CFE) credits through the Society of American Foresters, and Continuing Education Units (CEU) through Society for Range Management. Visit Registration for details.

Poster Presenter Info. The Poster Session and Reception is Tuesday evening, 19 November, from 5:30 to 7 PM in the Foyer. Posters may be set up on Monday, 18 November, from 1 to 5 PM, or on Tuesday from 8 AM to 3:40 PM. Posters must be removed on Thursday no later than 6 PM; posters not removed by this time will be recycled.

Exhibitor Booth Info. Exhibitor booths will be in Salon B. Exhibitors can set up their space from noon to 5 PM on Monday and must have their space cleared by 6 PM on Thursday.

Volunteers. Report directly to your volunteer location. If you have any issues, come to Registration for assistance. Thank you for helping the Fire Congress run smoothly!

Whova

Get Whova: Our Official Event Mobile App

Whova, our mobile app, has tons of great information for you! You can easily search the program, find presentation abstracts, presenter bios, a map of the meeting space, connect to social media, post photos, and network with other conference attendees.

How to Download Whova and Join the Event

1. Go to your App store or Google Play, search for Whova, and download the free app.
2. Once downloaded, log in to Whova with your name and the email that you used to register for the conference. You should see the conference listed at the top of the home screen under "My Events."
3. If you don't see the conference listed, you can search the events for "8th International Fire Ecology and Management Congress" and the enter the invitation code "FC2019."

Presentation Loading Info. If you haven't already uploaded your talk via the online submission form, you need to upload it from a thumb drive at the Presentation Loading Station in Coronado. Please do not email it, as your message may be missed. Presentations must be uploaded before the loading station closes the day before your talk (see times on inside front cover).

Airport Transportation. We suggest using Stagecoach Express for travel to and from the airport, as we have a discounted rate for our group: $22 one way or $42 round trip. Visit afefirecongress.org/venue-travel for instructions.

Ventana Village. This nearby shopping center has restaurants and a grocery store. The hotel runs free shuttles to the village; see the front desk for details.

Congress Info: Good Stuff to Know! continued

Diversity and Inclusivity Statement

The Association for Fire Ecology respects all aspects of people including race, ethnicity, gender, sexual orientation, socio-economic background, age, religion, and ability. We seek to create a learning environment that embraces differences and diversity, in which all members of the fire community feel welcome, safe, and valued. If we can better support your needs, please visit Registration and speak with AFE staff. If you have feedback for the Diversity and Inclusivity Committee, or you want to discuss or report a non-urgent matter, you have a few options for doing so:

- Visit Registration and ask to speak with AFE staff. They can also offer a few email addresses for Diversity and Inclusivity Committee members who are willing to speak with you confidentially.
- Look for Diversity and Inclusivity Committee members wearing blue ribbons on their name tag.
- Use the comment box at the AFE exhibit booth to submit feedback (can be made anonymously).

Fireside Chats

You are welcome to gather a small group to enjoy one of the gas fire pits one evening for an informal meeting or gathering. The fire pits are located on Cascade Terrace and can be used by conference attendees on a first-come, first-serve basis.

Sustainable Event Practices

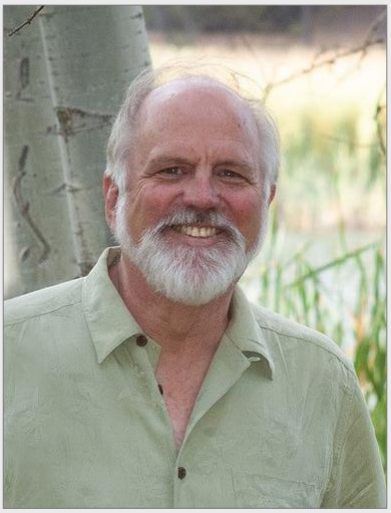
We are implementing changes to our planning, purchasing, transportation, and waste practices in an effort to make the 2019 Fire Congress more environmentally and socially responsible. Several of these actions were suggestions by past conference attendees! If you have ideas for sustainable event practices that you would like to see us implement, drop a note in the comment box at the AFE booth.

- Each attendee has received a reusable AFE name badge—please take it home and bring it to our next event. You can also return your name badge at Registration if you don't want to keep it.
- We've partnered with Klean Kanteen again! They are a great company, and we hope you get a lot of use from your AFE water bottle.
- We reduced the number of programs typically printed by 40% by asking each attendee whether they want to use the mobile app only.
- The conference tote bags are made from leftover cotton from the fabric industry.

Evaluation

Please complete the Fire Congress evaluation online at https://www.surveymonkey.com/r/FireCongress19. We truly value your input and use this information to improve future events. You will also receive an email after the Fire Congress with this survey link.

Wayne Harrison Memorial Scholarship



Wayne Harrison was a leader and innovator, working for decades in fire ecology and prescribed fire. His great love for developing and refining the prescribed fire program for Calaveras Big Trees State Park spanned several decades, and he eventually led the prescribed fire program for the California State Parks. He was instrumental in the development of the California Association for Fire Ecology (CAFE) and the subsequent transformation to the Association for Fire Ecology (AFE), designed the original fire-around-the-tree logo, and wrote the original bylaws when AFE became an official non-profit.

As a lasting contribution to the fire ecology and management community, Wayne's family partnered with AFE after his passing in June 2019 to create a student scholarship to support the academic and professional growth of students through helping fund research, management, or education projects related to wildland fire. Scholarships up to $2,500 will be awarded annually starting in 2020, with applications due January 30.

Application details are available at https://fireecology.org/harrison-scholarship, along with information for how to make a donation to this scholarship fund.

Association for Fire Ecology

Promoting Fire Ecology Research, Education, and Management

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

FIRE ECOLOGY JOURNAL

AFE's journal, *Fire Ecology*, publishes peer-reviewed articles on all ecological and management aspects relating to wildland fire. *Fire Ecology* articles are available for free online at fireecology.springeropen.com

CONFERENCES AND EVENTS

AFE hosts conferences, regional events, and international fire congresses to provide opportunities for learning and networking with professionals from a variety of agencies, organizations, universities, regions, and nations.

SAFE

The Student Association for Fire Ecology (SAFE) provides students with a forum to share research, network with others, and access wildland fire information, training, and funding opportunities. Follow the new SAFE Instagram page @s.a.f.e_national.

CERTIFICATION PROGRAMS

AFE has a Professional Wildland Fire Certification Program for ecologists, managers, and technicians, as well as an Academic Certification Program. We are developing a new Wildland Fuels Management Certification, which will be available in 2020.

AWARDS

AFE presents lifetime achievement awards to recognize significant contributions to fire ecology and management. We also present excellence awards for undergraduate and graduate students and student scholarships.

COMMITTEES

Committees help AFE work toward meeting its mission by providing leadership to our programs. We welcome new members and value the varied experiences, ideas, and motivation that new volunteers bring.

JOIN AFE TODAY

and help shape the growing profession and field of fire ecology.

Learn more at fireecology.org

Fire Congress Supporting Organizations

Thank you to the following organizations, agencies, and others that have generously contributed to the 2019 Fire Congress!

Platinum Sponsor

Southwest Fire Science Consortium

Gold Sponsor

National Advanced Fire and Resource Institute (NAFRI)

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Firefighters United for Safety, Ethics, and Ecology (FUSEE)
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Ecological Restoration Institute
Fire Learning Network
Northwest Fire Science Consortium
Northern Rockies Fire Science Network
School of Forestry, Northern Arizona University
Southern Fire Exchange
Southern Rockies Fire Science Network
University of Idaho, Master of Natural Resources Program

Exhibitors

Great Basin Fire Science Exchange
Joint Fire Science Program
National Extension Wildland Fire Initiative (NEWFI)
Oak Woodlands and Forests Fire Consortium
Spatial Informatics Group
US Fish and Wildlife Service

Donors and Fire Congress Supporters

Craig Allen, Don Falk, and Thomas Swetnam
Fire
Fire Ecology Journal, Springer Nature
International Association of Wildland Fire
Society for Ecological Restoration - Rocky Mountains
University of Arizona, Institute of the Environment
University of Arizona, School of Natural Resources and the Environment
US Forest Service, Rocky Mountain Research Station

SOUTHWEST FIRE SCIENCE CONSORTIUM

JFSP FIRE SCIENCE EXCHANGE NETWORK

THE SOUTHWEST FIRE SCIENCE CONSORTIUM

is the only regional organization focused on fire research and information dissemination across agency, administrative, and state boundaries.

What we can do for you...

Proposals - Propose an idea for new workshop or field trip.

Travel Funding - Apply for a travel grant to attend one of our events.

Working Papers - Have a topic you need current science on? Suggest a working paper.

Wildland Fire Lessons Learned Stories - Have a lesson learned or success story you want to share? Suggest a video.

Updates and Events Listings - Need access to the latest trainings, and events, or have an event to share? Follow us on Twitter, or sign up for our newsletter to keep up to date, or send us an event and we will get the word out.

A Network of Regions
The SWFSC is a part of a 15 member collaborative network of Fire Science Exchanges funded by JFSP.

Find out more...

- swfireconsortium.org
- Follow us on Twitter @SWfirescience
- Program Coordinator Barb Satink Wolfson
- Tel: 928.523.1148 barbara.wolfson@nau.edu
- Consortium PI Dr. Andi Thode
- Tel: 928.523.5457 andi.thode@nau.edu

> *"We appreciate that the leaders of the SWFSC know that simply delivering fire science to managers is not sufficient. Through videos, working papers, and fact sheets, the SWFSC has documented first-hand manager accounts of the successes they have had in implementing science-based management and the factors that have led to success."* —*Laura McCarthy, New Mexico State Forester*

Fire Congress Supporting Organizations, continued

Alaska Fire Science Consortium

akfireconsortium.uaf.edu

The Alaska Fire Science Consortium is one of 15 regional fire science exchanges supported by the Joint Fire Science Program that forms a national fire science knowledge exchange network. AFSC's primary purpose is to strengthen the links between research relevant to Alaska's fire management issues and on-the-ground application by promoting communication between managers and scientists, providing an organized fire science delivery platform, working with managers to ensure that science delivery and outreach mechanisms are practical and readily implemented, and facilitating collaborative scientist–manager research development.

Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University

Since 1946, the Arthur Temple College of Forestry and Agriculture (ATCOFA) at Stephen F. Austin State University has worked to produce society-ready professionals equipped with the skills and knowledge necessary for the ever-evolving realm of natural resource management.

Located in the piney woods of East Texas, ATCOFA consists of one of the South's top forestry schools, as well as a nationally ranked Division of Environmental Science. The college's agriculture and spatial science programs also are on the cutting edge of research and use of technology in their respective fields.

Our mission is threefold: to maintain excellence in teaching, research, and outreach; enhance the health and vitality of the environment through sustainable management, conservation, and protection of our forest and natural resources; and enhance the production and economic viability of agricultural commodities.

Ecological Restoration Institute

https://eri.nau.edu

The Ecological Restoration Institute (ERI) is nationally recognized for mobilizing the unique assets of a university to help solve the problem of unnaturally severe wildfire and degraded forest health throughout the American West.

Fire

www.mdpi.com/journal/fire

Fire (ISSN 2571-6255) is an international peer-reviewed open access journal about the science, policy, and technology of vegetation fires and how they interact with communities and the environment, broadly defined, published quarterly online by MDPI.

Fire Learning Network

conservationgateway.org/fln

The Fire Learning Network (FLN) engages dozens of multi-agency, community-based projects to accelerate the restoration of landscapes that depend on fire to sustain native plant and animal communities. By restoring this balance, the ecological, economic and social values of the landscapes can be maintained, and the threat of catastrophic wildfire can be reduced. Collaborative planning, implementation, adaptive management, and the sharing of lessons learned are at the core of the FLN.

Great Basin Fire Science Exchange

www.greatbasinfirescience.org

The Great Basin Fire Science Exchange is one of 15 regional exchanges funded by the National Joint Fire Science Program. We provide a place for land managers and researchers to exchange fire and fuels management information, and we develop tools and events like field guides, webinars, and workshops to answer management questions.

Fire Congress Supporting Organizations, continued

FUSEE: Firefighters United for Safety, Ethics, and Ecology (FUSEE)

Firefighters United for Safety, Ethics, and Ecology (FUSEE) is a nonprofit organization promoting safe, ethical, ecological fire management. FUSEE members include current, former, and retired wildland firefighters; other fire management specialists; fire scientists and educators; forest conservationists; and other citizens who support FUSEE's vision and mission. As an independent voice in the wildland fire community, FUSEE conducts public education, media outreach, and policy advocacy in support of the new, emerging paradigm that seeks to holistically manage wildland fire for social and ecological benefits instead of simply "fighting" it across the landscape.

Inspired by Aldo Leopold's Land Ethic, FUSEE advocates a new Fire Ethic in fire management policies and practices: a thing is right when it contributes to the safety of firefighters and the public, ethical use of public resources, environmental protection of fire-affected landscapes, and ecological restoration of fire-adapted ecosystems. It is wrong when it tends otherwise.

Joint Fire Science Program

www.firescience.gov

Research supporting sound decisions

JFSP's unique role in the fire science community: JFSP provides funding for scientific studies associated with managing wildland fire, fuels, and ecosystems in response to emerging needs of managers, practitioners, and policymakers.

Active science delivery: 15 regional exchanges form JFSP's Fire Science Exchange Network. It is a national collaboration that provides the most relevant, current, wildland fire science information to stakeholders. The exchanges bring together fire managers, practitioners, and scientists to address common needs and challenges.

Partnering to leverage capacity and educate the next generation: over 150 colleges and universities have collaborated on JFSP-sponsored research projects. JFSP's capacity also extends through private and nonprofit organizations; federal agencies; and tribal, state, county, and local governments. In all, nearly 300 organizations have become partners. JFSP research projects also extend in-house capacity of other federal fire research programs. Through these partnerships, they can mobilize with universities and other affiliates in the fire science community.

National Extension Wildland Fire Initiative (NEWFI)

http://www.anrep.org/newfi/

The National Extension Wildland Fire Initiative (NEWFI) is a new initiative under the Association of Natural Resource Extension Professionals (ANREP). ANREP is a national association for Cooperative Extension Service professionals working in environmental education, fisheries, forestry, wood sciences, range, recreation, waste management, water, wildlife, energy, and related disciplines. Wildland fire issues are a pressing concern for ANREP members and the people they serve across the country. Since Cooperative Extension is tasked with meeting community needs and serves as a trusted resource, Extension plays an active role working with landowners and communities on wildland fire issues. There are many excellent research-based wildland fire resources that have been created by Extension professionals for a variety of audiences—come stop by and check them out!

Northern Rockies Fire Science Network

NRFireScience.org

Effective science communication is critical to science-informed management. With a rich history of fire research, fire and fuels managers must sort through available science; find relevant and appropriate knowledge, tools, and applications to inform management decisions;

Fire Congress Supporting Organizations, continued

and access expertise to address fire and fuels management questions. Funded by the Joint Fire Science Program (JFSP), the Northern Rockies Fire Science Network (NRFSN) is part of a national network that enhances awareness, understanding, and use of science. The NRFSN is a go-to resource for relevant, timely, and accessible information to meet the needs of federal, tribal, state, and local managers and scientists involved in fire and fuels management in the Northern Rockies. Activities include fieldtrips, workshops, webinars, syntheses, e-newsletters, and searchable online publication and webinar databases. NRFSN activities are designed to increase scientist–manager interactions and knowledge exchange to develop greater mutual understanding and application of fire and fuels science to management.

Northwest Fire Science Consortium

http://www.nwfirescience.org

The Northwest Fire Science Consortium works to accelerate the awareness, understanding, and adoption of wildland fire science. We connect managers, practitioners, scientists, and local communities and collaboratives working on fire issues on forest and range lands in Washington and Oregon.

Oak Woodlands & Forests Fire Consortium

http://www.oakfirescience.com

The Oak Woodlands & Forests Fire Consortium (OWFFC) is one of 15 fire science exchanges (Fire Science Exchange Network) funded by the Joint Fire Science Program, serving much of the Central Hardwoods Forest Region in the eastern US. The Fire Science Exchange Network's efforts are guided by principles emphasizing inclusiveness, neutrality, and innovation. The OWFFC's mission is to provide fire science information to resource managers, landowners, and the public about the use, application, and effects of fire. The fire science needs of oak ecosystems in the eastern US are primarily related to management and restoration as opposed to protection. These characteristics set a unique stage for the fire topics addressed and activities offered by the OWFFC.

School of Forestry, Northern Arizona University

https://nau.edu/forestry

The Northern Arizona University School of Forestry offers a program that is nationally regarded for its unique approach to undergraduate education. It is accredited by the Society of American Foresters, and the fire certificate track is an Association for Fire Ecology certified academic program.

The fundamental educational mission of the School of Forestry is to foster the intellectual and personal development of our students, at both the undergraduate and graduate levels. We cross traditional boundaries by applying transdisciplinary and multi-objective approaches to ecosystem studies.

Our scholarship mission is to advance knowledge in ecosystem science and management; to bring this new knowledge back to the classroom; and to transfer it to the citizens of Arizona, the Southwest, and elsewhere. Our programs leading to the Master of Forestry, Master of Science in Forestry, and Doctor of Philosophy in Forestry play a special role in carrying out our scholarship objectives.

Society for Ecological Restoration - Rocky Mountains

https://chapter.ser.org/rockymountains/

Established in 1996 as the Society for Ecological Restoration Central Rockies Chapter (CeSER), SER-Rocky Mountains (SER-RM) serves the states of Colorado and Wyoming and those interested in and working in the region. T he mission of the Chapter is to foster ecological restoration awareness, understanding, and activities among a broad spectrum of participants.

Southern Fire Exchange

http://www.southernfireexchange.org

The Southern Fire Exchange (SFE) helps to tackle America's wildland fire problems by moving science into practice. SFE bridges

the gap between the fire science and natural resource management communities so that relevant cutting-edge fire science information can be applied to address wildfire and prescribed fire challenges in the Southeast. SFE works with key partners across the region to develop innovative programs, resources, and networks that move fire science and management forward. SFE publications, quarterly workshops, monthly webinars, and events facilitate meaningful connections between fire scientists and managers that foster collaborative approaches for solving real-world problems.

As a member of the Joint Fire Science Program-funded Fire Science Exchange Network, SFE is a collaborative partnership among the University of Florida, North Carolina State University, Tall Timbers Research Station, and the US Forest Service Southern Research Station.

To sign up for the SFE newsletter or to learn more, visit: www.southernfireexchange.org

Southern Rockies Fire Science Network (SRFSN)

www.southernrockiesfirescience.org

Our network is one of the national Joint Fire Science Program fire science exchanges. We are a source for managers, scientists, policymakers, and citizens to find and share science that supports wildfire management solutions from Utah to Wyoming, Colorado, and the Black Hills. Regional challenges include smoke and air quality, fire-adapted communities, fire response, fuels management and effectiveness, landscape restoration and resilience, wildlife and feral animals, and sagebrush ecology. With over 2,000 followers and growing, the Network is the only organization in the Southern Rockies region providing wildfire science exchange services across agency, administrative, and state boundaries via online and in-person events—creating support and saving you time and effort. Stop by our booth to browse publications and information for both the Southern Rockies and the Great Plains!

Spatial Informatics Group

www.sig-gis.com

SIG provides a wide range of geospatial data development, mapping, research, and monitoring services that are integrated with a range of scientific disciplines such as ecology, forestry, risk and hazard management, climate change, natural resource economics, carbon offsets, and sustainable urban and environmental planning and management.

University of Arizona, School of Natural Resources and the Environment

https://snre.arizona.edu

SNRE is a world leader in pursuing science that informs how environmental change impacts arid and semi-arid systems and how best to adapt to environmental challenges. Our research answers important questions about how ecosystems respond under environmental or human pressures. We develop strategies to help mitigate the effects of these pressures, helping to create and maintain healthy and sustainable ecological systems.

University of Idaho, College of Natural Resources

https://www.uidaho.edu/cnr

The University of Idaho's College of Natural Resources is home to the country's first-ever Bachelor of Science degree program in Fire Ecology and Management. In the last few years, the College developed wildland fire courses to enable the launch of the country's first Master degree program in Fire Ecology and Management. The Master of Natural Resources-Fire Ecology and Management includes a diversity of online or in-person course offerings including wildland fire policy, air quality and smoke, GIS in fire, fuels management, restoration ecology, fire behavior, fire ecology, and more. Students can complete the degree entirely online, making higher education practical for current working professionals. An integrated approach to wildland fire science and management is reflected in the program, which is designed to support its graduates in career advancement. The program includes numerous faculty who are certified by the Association for Fire Ecology.

Fire Congress Exhibitor Identification Numbers

Booth	Exhibitor | Salon B
104	Alaska Fire Science Consortium
101	Firefighters United for Safety, Ethics, and Ecology (FUSEE)
200	Fire Learning Network
210	Great Basin Fire Science Exchange
100	Joint Fire Science Program
208	National Extension Wildland Fire Initiative (NEWFI)
107	Northern Arizona University, School of Forestry
102	Northern Rockies Fire Science Network
106	Northwest Fire Science Consortium
108	Oak Woodlands and Forests Fire Consortium
110	Southern Fire Exchange
111	Southern Rockies Fire Science Network
105	Southwest Fire Science Consortium
202	Spatial Informatics Group
109	University of Idaho, Master of Natural Resources Program
206	US Fish and Wildlife Service
204	US Geological Survey

Opening Plenary Session Speakers

Cultivating Pyrodiversity among People, Places, Cultures, and Ecology

Tuesday, 19 November, 8 AM, Kiva Ballroom

Welcome and Opening Speakers

Christopher Dicus, President, Association for Fire Ecology
Welcome to the 2019 Fire Congress

Leon Ben, Branch Chief, BIA
Welcome to the Southwest Borderlands

Andrea Thode, Professor, Northern Arizona University
10 Years of Innovation: The JFSP Fire Science Exchange Network

Opening Plenary Session Speaker Biographies

Maria Estrada, Associate Director Global Diversity, The Nature Conservancy

Unconscious Bias and the Challenge of Gender and Racial Balance in Fire Work

In her position at The Nature Conservancy, Maria supports teams across the organization in building strong diverse partnerships to succeed in their mission. This work involves building capacity for partnering equitably in urban and rural communities and working to bring understanding about equity and justice in environmental matters. Maria is involved locally through her volunteer work as a member of the Equity Leadership Team at the Salt Lake City School District, a Trustee at the Tracy Aviary, a board member of Action Utah, an advisor to the board of Men Healing, and a lifetime member of the Utah Women's Giving Circle. Maria is a graduate of the Education Culture and Society Department at the University of Utah, one of the top social foundation programs in the US committed to the study and pursuit of social justice in education. She received her PhD in 2009.

Citlali Cortés Montaño, Sr. Sector Coordinator, Biodiversity and Forestry, KfW Development Bank

The Plain in Flames: Communities and Fire in Mexico

Citlali has worked as a researcher in the field of ecology, management, and conservation of temperate forests for 20 years. She has been subdirector of a biosphere reserve, program officer for WWF, and technical coordinator for the TREES Program for Rainforest Alliance in Mexico. Since 2015, she has coordinated the biodiversity and forestry sector for KfW's Mexico office, where she contributes to the design and implementation of the German financial cooperation in these areas. Her interest has always been connected to community-based conservation and management of biodiversity and ecosystems. She holds a PhD in Forest Science from Northern Arizona University, a Master of Forestry from the School of Forestry and Environmental Studies at Yale, and a BSc in natural resource management from the Universidad de Guadalajara.

Opening Plenary Session Speaker Biographies, continued

Frank Lake, Research Ecologist, US Forest Service Pacific Southwest Research Station

Working with Indigenous Communities: Fire Knowledge and Cultural Burning Systems

Frank received a Bachelor of Science degree from University of California-Davis in Integrated Ecology and Culture with a minor in Native American Studies (1995), and his PhD from Oregon State University, Environmental Sciences Program (2007). His research focuses on restoration ecology and the incorporation of Indigenous knowledge into landscape restoration strategies, wildland fire, and forest management in the Pacific Northwest and northern California. His research includes wildland fire and management effects on cultural resources and tribal values. He is a fireline-qualified Resource Advisor and has worked with tribes, agencies, organizations, and Incident Management Teams on wildland fire assignments.

Fire AFEx Plenary Session

Wednesday, 20 November, 8 AM, Kiva Ballroom

Fire AFEx Plenary Session Speaker Biographies

Laura Gannon, Principal, Meridian Urban

Counting Tomorrow's Risk: A Land Use Planning-Based Assessment of Bushfire Risk in New South Wales, Australia

Laura is a leading Australian risk-based land use planning and community resilience specialist with almost 15 years of diversified industry experience across the public and private sectors. Laura specializes in the integration of natural hazard risk management into policy and strategy, with a particular emphasis on bushfire risk and resilience. Laura's approach seeks to "think differently" in reconciling the often complex challenges associated with integrating land use planning, governance, emergency management and disaster risk mitigation processes. Laura is a recognized leader in the Australian land use planning profession, awarded Australian Young Planner of the Year in 2011.

James Johnston, Research Associate, Oregon State University

A Westside Story: New Fire Histories from Super-Productive Western Oregon Douglas-fir Forests

James Johnston is a Senior Research Associate at Oregon State University College of Forestry. His research interests include fire ecology, dendroecology, restoration forestry, environmental law and policy, and collaborative governance.

Fire AFEx Plenary Session Speaker Biographies, continued

Manoj G. Kulkarni, Research Scientist, Research Centre for Plant Growth and Development, School of Life Sciences, University of KwaZulu-Natal Pietermaritzburg

Fire-Derived Smoke and Smoke-Isolated Active Biomolecules Invigorate Growth of Diverse Plant Species—A Technological Approach

Manoj G. Kulkarni is a research scientist working at Research Centre for Plant Growth and Development, University of KwaZulu-Natal Pietermaritzburg, South Africa. He is intensively studying the effects of smoke on diverse plant species and has published over 30 research articles. Manoj's main interest is to popularize smoke technology in different fields of plant science.

Steve Pyne, Emeritus Professor, Arizona State University

Welcome to the Pyrocene

Steve Pyne is the author of over 35 books, most of them on the history and management of fire. Among his recent works are *Between Two Fires: A Fire History of Contemporary America; To the Last Smoke,* a suite of nine regional reconnaissances; and a revised, second edition of *Fire: A Brief History.* He recently retired from teaching into emeritus status at Arizona State University.

Dana Skelly, Regional Fuels Program Manager, USDA Forest Service

Putting the Line in the Right Place the First Time; 2018 PNW Fuels Treatment Effectiveness

Dana began in wildland fire on an AmeriCorps NCCC crew in 1996. She has worked for three federal agencies in Eastern and Western systems and served as an early member of the NPS Fire Ecology Steering Committee. More recently, she was Deputy Fire Staff on the Malheur National Forest. Today she oversees the Forest Service fuels program for the Pacific Northwest. Dana is a member of the Joint Fire Science Governing Board. Her published works, both in her maiden name Cohen and her married name Skelly, focus on progressive and accountable fire management. Her qualifications include ICT3, RXM2, FBAN, and LTAN.

Adam Watts, Associate Research Professor, Desert Research Institute

Beyond the Paradigm of Moving beyond the Paradigm: Myths of Fire Ecology

Adam Watts is an AFE-certified Fire Ecologist and Fire Practitioner who enjoys flying drones into large fires for science. He directs the Desert Research Institute's Airborne Systems Testing for Environmental Research Laboratory and is the UAS lead for the Fire and Smoke Model Evaluation Experiment. He has been involved with AFE since 2008 and is a former SAFE co-chair and AFE Board member and officer.

Closing Plenary Session

Managing Pyrodiversity within Collaborations, Communities, and Landscapes into the Future

Thursday, 21 November, 8 AM, Kiva Ballroom

Closing Plenary Session Speaker Biographies

Raphaele Blanchi, Bushfire Research, CSIRO Land and Water

Community Adaptation to Bushfire: Moving from Regulation to Best Practice

Dr. Raphaele Blanchi is a bushfire researcher at CSIRO Land and Water. She has a background in geography, risk assessment, and land-use planning. Her principal interest lies in the understanding and approaches to reduction of risk posed by bushfire to communities and infrastructure. She has been involved in post-bushfire surveys data collection and analysis following major bushfires in Australia (including the Black Saturday fires in 2009). Her work on community safety has contributed to a better understanding of the challenges faced by community during a bushfire. This work has informed fire and emergency agencies to develop policies and formed the basis of regulatory reform.

Chris Marks, Deputy Fire Management Officer, Grand Canyon National Park

Moving Forward: Developing Diverse Fire Landscapes with an Appeal for "On-Site" Integration of Fire Science and Management

Chris started his fire career in 1989 on the Routt National Forest in northwest Colorado. From 1992 through 2000, he worked on engines at Lava Beds NM, and then worked on Arrowhead and Alpine hotshot crews for seven years at Sequoia and Kings Canyon, and Rocky Mountain national parks. In 2000, he moved into the fuels management program on the Kaibab National Forest in northern Arizona, and in 2002, went back to the National Park Service in fuels and fire management at Grand Canyon National Park. Chris has been the Deputy Fire Management Officer at the Grand Canyon for past 12 years. Chris received a BS in Forest Management from Oregon State University in 1994.

Rachel Loehman, Research Landscape Ecologist, US Geological Survey

Frontiers of Fire: Profound Impacts of Climate and Fire in Ecosystems of Alaska and the Southwestern US

Dr. Rachel Loehman is a Research Landscape Ecologist with the US Geological Survey, Alaska Science Center. Her research focuses on ecological dynamics in natural and coupled human–natural systems and landscape responses to disturbance, with applications including forecasts of future fire occurrence and fire effects, modeling of climate- and disturbance-driven shifts in vegetation communities, reconstruction of millennial-scale human–environment interactions, and mitigation of impacts to ecological and archaeological resources. Dr. Loehman works in boreal and tundra ecosystems in Alaska and forests and woodlands of the Interior West and southwestern US; she is persistently intrigued by the ecological insights provided by these frontiers of fire.

Special Events

SAFE Annual Members Lunch Meeting
Tuesday, 12:30 to 1:15 PM
Kiva Ballroom

All students are welcome! Come meet other students attending the Congress, get updates from National SAFE and local chapters, and provide input on future SAFE priorities. If you RSVP'd for a free boxed lunch, please pick it up on Kiva Patio and then head into the ballroom.

Meet the Author and Book Signing
Tuesday, 5:30 to 6:30 PM
Salon B

Come meet author Stephen Pyne in the FUSEE booth where he will be signing copies of his books in the *To the Last Smoke* series. All proceeds from book sales will be donated to the Mike da Luz Memorial Student Scholarship Fund.

Poster Session and Exhibitor Reception
Tuesday, 5:30 to 7 PM
Foyer and Salon B

Join us for appetizers and a no-host bar, meet poster presenters, explore exhibit booths, and mingle with friends old and new.

AFE Awards Dinner
Wednesday, 6 to 8 PM
Kiva Ballroom

Join us as we celebrate our 2018 and 2019 award winners. We will have great food, company, and music! This event is included in your registration. Guest tickets can be purchased at Registration for $30; children 12 and under are free.

AFE Annual Members Meeting
Wednesday, 12:30 to 1:15 PM
Kiva Patio

You're invited to join us for our annual AFE members meeting! Learn from the leadership of different AFE committees about the latest developments of the Association, including transition in publishing the flagship journal—*Fire Ecology*—to Springer, new diversity and inclusivity initiatives, and development of a wildland fuels certification program. We'd also like ideas on member benefits and how best to retain and transition student (SAFE) members to active AFE members post graduation. Our Association depends on the initiative and support of our enthusiastic members and committees. This is your chance to help shape priorities for AFE going forward. If you purchased a boxed lunch, pick it up on Kiva Patio and then join the meeting (back-up weather location is Kiva Ballroom). Thanks to the University of Idaho, Master of Natural Resource Program, for sponsoring free lunches for the first 25 people who RSVP'd!

Field Trips
Friday morning
Meet in the Foyer near Registration

We have several great field trips planned! There still may be room for you to join a field trip; check at Registration. All trips will leave promptly at their posted departure time; please plan to arrive 10 minutes early.

Local Activities

There are many opportunities for fitness, nature exploration, and relaxation at Loews. If you'd like company, just use the Whova app to create a "meet-up" with other conference attendees.

- Window Walk Nature Trail: half-mile paved nature trail with signs identifying the plants and animals indigenous to the area.
- Parcourse Fitness Trail: 1.1-mile guided walk or run that offers an opportunity to explore the natural desert environment. The course runs in front of the hotel and adjacent to the Ventana Canyon Golf Courses, and includes 18 exercise stations.

The hotel also offers yoga and fitness classes, stargazing with University of Arizona Sky School, a daily guided hike, shuttles to Sabino Canyon, golf, tennis, swimming, and more! For activities to do while in Tucson, check out the Visit Tucson Official Travel Guide at www.visittucson.org/meetings/online-guides-resources

AFE Fire Film Festival

New to the Congress Program for Tucson!

The AFE Fire Film Festival is an opportunity for Fire Congress attendees to view and discuss several documentary films focused on wildland fire ecology and management. Join us for these fun and enlightening events throughout the week!

Searching for the Gold Spot: The Wild after Wildfire

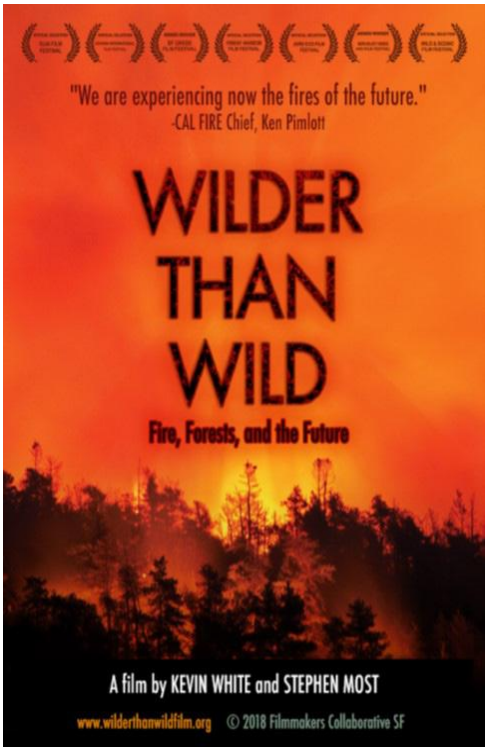
Tuesday, 2:30pm, Rincon

Join Maya Kholsa, Biologist and Poet Laureate Sonoma County, to view a short film about the rapid and amazing comeback of the wild in forests after wildfire. The story follows teams of scientists and firefighters through the Sierra Nevada, the Cascades Mountains and beyond, and shows hundreds of living, breathing reasons why our publicly owned forests need to be saved from large-scale logging projects.

Fire Circle: Filmmaking to Educate the Public about Wildfires

Tuesday, 3:40pm to 5:10pm, Rincon

This fire circle will start with filmmakers Stephen Most, Trip Jennings, and Maya Kholsa sharing clips and presenting lessons learned from public engagement. Participants will be invited to ask questions, present challenges, offer creative ideas, and explore opportunities for breaking through the dominant, negative cultural norms about fire. This fire circle seeks your ideas on how film and creative media might be deployed to educate the public about the benefits and challenges of living with fire.



Double Feature Screening with Filmmakers

Tuesday, 7pm to 9:30pm, Kiva Ballroom

Come see screenings of two new documentaries and enjoy conversations with the filmmakers and free beer courtesy of Firefighters United for Safety, Ethics, & Ecology (FUSEE)!

Elemental

Trip Jennings, Director, National Geographic and Balance Media
After the most deadly wildfire in modern history, top scientists, community leaders and firefighters must turn society's understanding of fire on its head to prevent the next disaster in an ever hotter, drier world and learn to co-exist with fire.

Wilder than Wild: Fire, Forests and the Future

Stephen Most, Producer and Writer, Filmmakers Collaborative SF
This one-hour documentary reveals how fire suppression and climate change have exposed our forests and wildland-urban landscapes to large, high-severity wildfires, and explores strategies to mitigate the impact of these fires.

The Beauty of Blackened Spaces

Thursday, 7:30pm to 9:30pm, Kiva Ballroom

Come join Fire Ecologist and Filmmaker Rick Anderson and enjoy an evening free of histograms for an exploration of some of the most innovative and beautiful depictions of fire ecology and the passionate fire keepers of the planet. We will watch four short films selected for you, with discussion to follow.

Monday, 18 November 2019: Schedule Overview

Registration
7 AM to 4 PM, and 6 to 8 PM
Foyer

Presentation Loading
6 to 8 PM
Coronado

Morning Workshops
8 AM to noon

Lunch (on your own)
Noon to 1 PM

Afternoon Workshops
1 to 5 PM

Welcome Mixer
5 to 6:30 PM
Cascade Lounge
Happy hour food and drink specials

Smokey Bear and Cognitive Dissonance in the 21st Century
6:30 to 7 PM
Salon F

Meetings

AFE Board Meeting
1 to 5 PM
Executive Boardroom

FireWorks & Fire Science Exchange Networks: Q & A
6 to 7:30 PM
Executive Boardroom

Moderator and AV Volunteer Meeting
7:15 to 7:30 PM
Salon L

FUSEE Board Meeting
8 to 10 PM
Executive Boardroom

Welcome Mixer

Join us for a meet and greet at Cascade Lounge from 5 to 6:30 PM, and then head over to the meeting area to hear an entertaining history of Smokey Bear by Tom Swetnam. Registration will be open, along with the Presentation Loading Station, so you can get all set for the week!

Smokey Bear and Cognitive Dissonance in the 21st Century
6:30 to 7 PM | Salon F
Dr. Thomas Swetnam, Regents/Emeritus Professor, University of Arizona, Laboratory of Tree-Ring Research

The 75-year-old Smokey Bear advertising campaign has been, and still is, extremely important in helping prevent destructive, human-caused wildfires. But when does advertising in the name of education become propaganda? When does a too simple message become counter-productive? We now know that fires can be both bad and good for ecosystems, but for decades Smokey said they were all bad. The origins and history of the Smokey Bear icon reflects changes in American culture over the past eight decades, but not the changes in ecological knowledge or fire management realities. Recently, the online persona of Smokey has evolved his message somewhat. I will review this history with a modest suggestion for expanding Smokey's message to embrace the duality of bad fire/good fire.

Monday, 18 November 2019: Workshops

Full Day Workshops

8 AM to 5 PM (lunch break noon to 1 PM)

Participatory GIS for Fire and Fuels Management: Theory and Methods | Salon D

Organizer: Fernando Sanchez-Trigueros

This seminar introduces the theory and methods of community engagement and Participatory GIS for decision-making in fire and fuels management planning. GIS demonstrations, applications in fire-adapted ecosystems, and case studies of collaboration between Indigenous communities, academia, and government are included.

Fire Ecology, Management, and Operations for Non-Science Professionals | Salon F

Organizers: Barbara Satink Wolfson, Leda Kobziar, Andi Thode, Carrie Dennett, Tracey Stone, Dolores Garcia, and Geoff Babb

In this workshop for media and legislative staffers, participants will learn fire history of the Southwest; fire management and operations; the policy and planning behind prescribed fire, fire use, and suppression.

Morning Workshops

8 AM to noon

FireWorks Educational Program: Hands-on Activities to Engage the Public about Wildland Fire Science | Salon G

Organizer: Ilana Abrahamson

Participants will learn several fun, hands-on activities from the FireWorks Educational Program for teaching students and the general public about wildland fire science. Activities will cover fire behavior, ecology, management, and traditional fire use.

Introduction to Fire Behavior Modeling | Salon J

Organizers: Don Helmbrecht and Joe Scott

The world of fire behavior modeling can be overwhelming. However, all fire behavior modeling systems adhere to a core set of fundamentals. This workshop reviews those fundamentals and investigates the assumptions and limitations of popular fire behavior modeling systems.

Learning the Photoload Sampling Technique: Visually Estimating Surface Fuel Loadings from Photographs for Research and Management Applications | Salon H

Organizers: Bob Keane and Rachel Loehman

In this workshop, you will learn how to use the photoload technique in the field and be given materials to teach photoload to others and to calibrate photoload visual estimates to improve accuracy. You will also be shown how to make your own photoload pictures to estimate loadings of shrub and herb species in your area.

Rapid Response Erosion Modeling for Fuels Management and Post-Fire Rehabilitation | Salon I

Organizers: Mary Ellen Miller and Richard Schwab

The need for watershed analysis and management tools has increased in recent years due to both larger and higher-severity wildfires. This workshop introduces new runoff and erosion modeling tools designed for both post-fire remediation and for spatially prioritizing fuel management projects from a watershed perspective.

R for Fire Data: Learning the Basics of Reproducible Analyses

Salon E

Organizers: Daniel Godwin and Erica Newman

This workshop will teach the R programming language for data management and visualization. The morning session is aimed at people who have never used R and would like to learn how to load and reorganize data for analyses in a reproducible way.

Afternoon Workshops

1 to 5 PM

Active Bystander: How to Intervene Skillfully When You Witness Harassment or Discrimination | Salon G

Organizer: Maria Estrada

Effective bystander skills can make a difference in changing the climate of organizations. In this workshop, people will learn and practice how to notice when something is not right in a situation, realize that skillful intervention is needed, take responsibility for doing something, and take effective action to engender change.

Exploring New Capabilities in Fuel Treatment Analysis and Modeling with STANDFIRE | Salon H

Organizer: Russ Parsons

Spatial fuels relationships, such as spacing between trees, affect fuel treatment effectiveness but are not addressed in current models. We introduce STANDFIRE—a prototype 3D fuel and fire modeling system that explores how fuel heterogeneity affects fire behavior and effects. We will demonstrate current capabilities and discuss future directions.

Exploring the Use of Drones for Forest and Fire Research and Monitoring | Salon J

Organizers: Collin Haffey, Jose Iniguez, Caleb Stotts, and Andi Thode

This workshop will introduce the use of unmanned aerial systems (drones) in forest and fire ecology research and treatment monitoring. Discussions will focus on the capabilities and limitations of using drones and structure for motions technologies to compare pre- and post-treatment images.

R for Fire Data: Creating Visualizations and Advanced Analyses

Salon E

Organizers: Daniel Godwin and Erica Newman

This session is a continuation of the morning workshop and is open to people who already know the basics of R. We will teach participants how to organize and access weather-related data, how to analyze it and present it in graphs, and how to find other resources for more specialized R analyses.

Smoke Modeling from Forest to Plume: Integrated Modeling Workshop for Smoke Management | Salon I

Organizers: Susan Prichard, Roger Ottmar, Susan O'Neill, and James Cronan

We will offer training on the Fuel and Fire Tools application to model fuel characterization of wildland fuels, the BlueSky Playground to predict smoke production and dispersion, and introduce the new Smoke Emissions Repository Application—a central repository of the latest wildland fire emissions factors.

Tuesday, 19 November 2019: Schedule Overview

Registration
7 AM to 4 PM
Foyer

Presentation Loading
7 to 8:30 AM, and 4:30 to 5:45 PM
Coronado

Opening Plenary
8 to 10:05 AM
Kiva Ballroom

Exhibit Hall
10 AM to 7 PM
Salon B

Morning Break
10:05 to 10:30 AM
Foyer

Concurrent Sessions
10:30 AM to 12:10 PM
See pages 26–27 for presentations and Whova app for abstracts

Lunch
12:10 to 1:30 PM
Pre-purchased boxed lunch or on your own

Concurrent Sessions
1:30 to 3:10 PM
See pages 28–29 for presentations and Whova app for abstracts

Afternoon Break
3:10 to 3:40 PM
Foyer

Fire Circles
3:40 to 5:10 PM
See pages 30–31 for descriptions and locations

Poster Session and Exhibitor Reception
5:30 to 7 PM
Foyer and Salon B
Join us for poster presentations, networking with exhibitors, appetizers, and no-host bar

AFE Fire Film Festival
7 to 9:30 PM
Kiva Ballroom
Double Feature Screening with Filmmakers: *Elemental* and *Wilder than Wild: Fire, Forests, and the Future*

Meetings

SAFE Meeting and Student Luncheon
12:30 to 1:15 PM
Kiva Ballroom
All students welcome!

National Park Service Fire Ecologists Meeting
3:15 PM
Executive Boardroom

Opening Plenary

Cultivating Pyrodiversity among People, Places, Cultures, and Ecology

8:00 AM Welcome to the 2019 Fire Congress
Christopher Dicus, California Polytechnic State University

8:10 AM Welcome to the Southwest Borderlands
Leon Ben, Bureau of Indian Affairs

8:20 AM 10 Years of Innovation: The JFSP Fire Science Exchange Network
Andrea Thode, Northern Arizona University

8:35 AM Unconscious Bias and the Challenge of Gender and Racial Balance in Fire Work
Maria Estrada, The Nature Conservancy

9:05 AM The Plain in Flames: Communities and Fire in Mexico
Citlali Cortés Montaño, KfW Development Bank

9:35 AM Working with Indigenous Communities: Fire Knowledge and Cultural Burning Systems
Frank Lake, US Forest Service

Tuesday, 19 November 2019: Special Sessions

ForBio Southwest: Engineering, Economics, and Ecology to Guide Forest Restoration in the Southern Rocky Mountains

Organizers: Mike Battaglia, USFS Rocky Mountain Research Station; Nate Anderson, USFS Rocky Mountain Research Station

This special session will describe the results from a large-scale research project, ForBio Southwest, which evaluates current forest operations and biomass supply chains, quantifies the financial and social benefits of displacing fossil fuels with forest-based biomass, and evaluates the changes in fire behavior, fuels, vegetation, and soil under various levels of biomass harvest in restoration treatments.

Towards a Mechanistic Understanding of Interactions between Fire and Previous Disturbances: Recent Advances and New Surprises

Organizers: Brian Buma, Integrative Biology, University of Colorado; Jeffery Cannon, Forest and Rangeland Stewardship, Colorado State University

Forest disturbances such as fire, insect outbreaks, and windthrow occur upon a mosaic of previously disturbed ecosystems and an increasingly changing climate. This session will bring together field, manipulative, and modeling scientists to present, discuss, and bridge knowledge gaps related to new and emerging mechanisms and feedbacks of disturbance interactions.

Fuel and Wind as Determinants of Fire Spread: Externalities Versus Complex Feedback—When and Where?

Organizers: Jon E. Keeley, US Geological Survey, Sequoia National Park, USA; Ross Bradstock, Director of Centre for Environmental Risk Management, University of Wollongong, Australia

In recent years, an explosion of large catastrophic wildfires has afflicted many parts of the world. Appropriate response requires an understanding of factors driving these fires and it is clear that some fires differ in the factors playing a dominant role. Here we seek to explore how fuel-dominated fires differ from wind-dominated fires, which appear to differ in geographical distribution, past land management, ignition sources, seasonal timing, and appropriate management responses.

Fire in the Last Frontier: 21st Century Fire Patterns, Behavior, and Pyroecology of North American Boreal Forests and Tundra

Organizer: Rachel Loehman, US Geological Survey, Alaska Science Center

In boreal and tundra ecosystems of North America, the accelerating presence of climate-driven changes in wildfire patterns is associated with altered ecosystems and feedbacks to future wildfire activity. This session includes studies on shifting wildfire patterns, impacts to ecosystems and future fire risk, and new approaches for predicting fire activity.

Fire Severity and Ecosystem Response

Organizer: Matthew Hurteau, University of New Mexico; Joseph Crockett, University of New Mexico

The interaction of wildfire and climate change is compounding a legacy of past management and altering the way wildfire interacts with ecosystems. The goal of this session is to present research on the effects of fire severity on a wide array of ecosystem responses, for a diversity of systems.

Cultivating Pyrodiversity through Outreach and Education: Partnerships with Cooperative Extension

Organizer: Susie Kocher, University of California Cooperative Extension Central Sierra

Pyrodiversity should be cultivated across multiple landownerships, including private lands. Currently, the role of Cooperative Extension in outreach and education about wildland fire is expanding across ownerships. This session will focus on wildland fire programs by Extension personnel from land grant universities and partnerships with fire practitioners, agencies, and organizations.

Restor(y)ing Indigenous Fires: Modern Applications and Practices

Organizer: Don L. Hankins, California State University-Chico, and California Indian Water Commission

Indigenous peoples have stewarded the landscape with fire since time immemorial yet struggle to retain sovereign rights to maintain such today. This session features global examples of Indigenous fire stewardship, and implications for broader societies and opportunities within wildland fire management.

Tuesday, 19 November — 10:30 AM to 12:10 PM, Concurrent Sessions

	Salon D	Salon E	Salon F	Salon G	Salon H
	Human Dimensions and Social Systems 1	**Fire in the Last Frontier: 21st Century Fire Patterns, Behavior, and Pyroecology of North American Boreal Forests and Tundra**	**Fire Severity and Ecosystem Response**	**ForBio Southwest: Engineering, Economics, and Ecology to Guide Forest Restoration in the Southern Rocky Mountains**	**Fuel and Wind as Determinants of Fire Spread: Externalities versus Complex Feedback – When and Where?**
	Moderator: Laura Gannon	**Special Session Organizer: Rachel Loehman**	**Special Session Organizers: Matthew Hurteau and Joseph Crockett**	**Special Session Organizers: Mike Battaglia and Nathaniel Anderson**	**Special Session Organizers: Jon E. Keeley and Ross Bradstock**
10:30 AM	Fostering knowledge diversity to manage wildfire in a dynamic ecocultural landscape **Kelsey Copes-Gerbitz**	Sensitivity of boreal forest fire regimes to climate and vegetation variability in North America **Adam M. Young**	Why the term "mixed-severity" is not helpful for describing fires or fire regimes **Brandon Collins**	ForBio Southwest: bioenergy and biofuels integration to support sustainable forest restoration **Nathaniel Anderson**	21st century California wildfires: fuel-dominated vs. wind-dominated fires **Jon E. Keeley**
10:50 AM	Science, management, and implementation of forest restoration concepts: what works? **Hannah Brown**	Changing patterns of wildfire activity in the northwestern Canadian boreal forest **Ellen Whitman**	What does severity mean for the below-ground ecosystem? Investigating patterns in soil nutrient pools and dynamics across gradients of burn severity **Jessica Miesel**	Marginal costs for biomass utilization as compared to other treatments of small-diameter stems **Beth Dodson**	Global thresholds in dryness and area burned: what do they tell us about top down and bottom up determinants of fire regimes? **Ross Bradstock**
11:10 AM	Does engagement with a boundary organization improve interactions and foster knowledge coproduction between scientists and managers? A case study of the Southwest Fire Science Consortium **Kerry E. Grimm**	Using paleoecology to highlight causes and consequences of fires in boreal ecosystems **Cecile Remy**	Quantifying the physical controls on post-wildfire vegetation establishment in the southwestern US **Joseph Crockett**	Quantifying economic benefits of human health from using woody biomass harvested in restoration treatments to generate electricity **McKenna Hedgepeth**	Patterns and drivers of fire progression in California's recent fire storms **Yufang Jin**
11:30 AM	Teaching wildland fire science to students, educators, and the public **Ilana Abrahamson**	Short-interval repeat fires alter successional pathways within Alaskan boreal forests **Rachel Loehman**	Effects of large, severe fires on spotted owls in the Sierra Nevada **Gavin M. Jones**	Effects of woody biomass harvest from forest restoration treatments on fuels and potential fire behavior in the Southwest **Graham Worley-Hood**	Meteorological analysis and observations associated with extreme fire behavior during the 2018 Camp Fire **Craig B. Clements**
11:50 AM	Impact assessment tools for fire outreach programs **Melissa M. Kreye**	Impacts of increasing wildfire severity on the long-term carbon dynamics of Alaskan boreal forests **Michelle C. Mack**	Effects of compound disturbances on vegetation patterns in a ponderosa pine forest **Sharon M. Hood**	ForBio Southwest: summary of key findings and next steps **Mike Battaglia**	The role of antecedent climate in large fuel-driven and wind-driven wildfire in California **Dan Cayan**
12:10 PM	**Lunch**				

Tuesday, 19 November 10:30 AM to 12:10 PM, Concurrent Sessions

	Salon I	Salon J	Salon K	Salon L
	Towards a Mechanistic Understanding of Interactions between Fire and Previous Disturbances: Recent Advances and New Surprises	**Resilience and Conservation 1**	**Landscape-Level Fire Management 1**	**Ecology 1**
	Special Session Organizers: Brian Buma and Jeffrey Cannon	**Moderator: Tyler Refsland**	**Moderator: Kea Rutherford**	**Moderator: Brian Oswald**
10:30 AM	Propagule delivery into burned patches following short-interval fires: a synthesis across taxon, system, and dispersal mode **Nathan S. Gill**	Rethinking resilience to wildfire **David McWethy**	Assessing scarcity to inform acquisition decisions for national suppression resources **Crystal Stonesifer**	Recent bark beetle outbreaks and subsequent wildfire severity in mixed-conifer forests of the Sierra Nevada, California, USA **Rebecca B. Wayman**
10:50 AM	Continued repeat burning in the boreal causes continued ecosystem transformation **Katherine Hayes**	Vegetation-mediated feedbacks on forest fire regime promote resilience to high fire frequencies in a fire-sensitive landscape of the interior Rockies **Cameron E. Naficy**	Prescribed fire force multiplier: increasing capacity for fire on the land **Sam Berry**	The ecological effects of bark beetles, wildfires, and their interactions in Rocky Mountain subalpine forests **Zoe Schapira**
11:10 AM	The role of buffering effects in compounded disturbances from wind and prescribed fire **Jeffery B. Cannon**	Restoration treatment effects on post-fire vegetation recovery and diversity in north-central Washington, USA **David W. Peterson**	Implementing collaborative planning programs to generate fire-adapted communities in the western US **Fermín J. Alcasena Urdíroz**	Spruce–fir recruitment and growth following high-severity fires and insect outbreaks in southern Arizona **Ann Lynch**
11:30 AM	Quantifying interactions between wildfire, prior mountain pine beetle outbreak and harvest on forest aboveground biomass from bi-temporal LiDAR **Ryan McCarley**	Are forests dominated by epicormic resprouters resilient to repeated high-severity fires? **Luke Collins**	Fire awareness, prevention, and preparation: fire in your future **Daniel M. Leavell**	Different fire severities result in distinct soil microbial community trajectories **Sam Fox**
11:50 AM	Fire following fire: can wildfire make forests more resilient to another fire? **Carolyn H. Sieg**	Modeling fire behavior, fuel consumption, and smoke emissions across a range of fuels treatments **Stacy A. Drury**	Rethinking our wildland fire management focus on forested lands **Michele Crist**	Does fire severity matter? Post-fire vegetation and fungal community regeneration in a fire-prone landscape **Hannah Etchells**
12:10 PM	**Lunch**			

Tuesday, 19 November — 1:30 to 3:10 PM, Concurrent Sessions

	Salon D	Salon E	Salon F	Salon G	Salon H
	Cultivating Pyrodiversity through Outreach and Education: Partnerships with Cooperative Extension	**Fire in the Last Frontier: 21st Century Fire Patterns, Behavior, and Pyroecology of North American Boreal Forests and Tundra**	**Fire Severity and Ecosystem Response**	**Restor(y)ing Indigenous Fires: Modern Applications and Practices**	**Fuel and Wind as Determinants of Fire Spread: Externalities versus Complex Feedback – When and Where?**
	Organizer: Susie Kocher	**Special Session Organizer: Rachel Loehman**	**Special Session Organizers: Matthew Hurteau and Joseph Crockett**	**Special Session Organizer: Don L. Hankins**	**Special Session Organizers: Jon E. Keeley and Ross Bradstock**
1:30 PM	The expanding role of cooperative extension in wildland fire: the National Extension Wildland Fire Initiative **Jennifer E. Fawcett**	The footprint of fire in the Alaskan boreal forest: a GIS analysis of "repeat" fire patterns **Jennifer L. Hrobak**	Quantifying the influence of fire probability on post-fire vegetation development in the southwestern US **Alisa Keyser**	Since time immemorial: living with fire as the law of the land **Don Hankins**	Factors affecting structure loss during recent California wildfires **Alexandra D. Syphard**
1:50 PM	Cooperative extension fire programs and partnerships in the Southeast United States **Laurel Kays**	Disturbance-driven shifts on the Kenai Peninsula, 1974–2016 **Carson A. Baughman**	Changes in forest dynamics 15 years after a wildfire in a mountainous ecotone, Arizona, USA **Mike Stoddard**	Indigenous burning enhances basketry material and supports cultural revitalization in northwest California **Tony Marks-Block**	Fire, wind, water: fire patterns in south-eastern Australia **Trent Penman**
2:10 PM	Best practices for engaging partners and increasing capacity: lessons learned from the JFSP Northwest Fire Science Consortium and Oregon State University extension partnership **Janean Creighton**	The good, the bad, and the ugly: re-evaluating satellite-derived fire severity metrics in boreal ecosystems **Sean Parks**	Active and passive post-fire restoration under changing environmental conditions in California, USA **Derek Young**	Fire and feathers: cultural considerations of birds for season of burn in the Klamath–Siskiyou Bioregion, USA **Frank K. Lake**	Patterns and trends in the factors that influence fire behavior in Sierra Nevada forests **John Williams**
2:30 PM	Fire Adapted Community Learning Network: opportunities for extension educators **Christopher Jones**	Multi-decadal patterns of vegetation succession after tundra fire on the Yukon–Kuskokwim Delta, Alaska **Lisa Saperstein**	Forest composition shifts following large wildfires in the Northern Rockies **Camille S. Stevens-Rumann**	Learning from each other: integrating indigenous knowledge and practices with scientific research in Venezuela, Brazil, and Guyana **Bibiana Alejandra Bilbao**	The role of atmospheric stability indices on extreme wildfire growth events in western Canada **Mike Flannigan**
2:50 PM	Using strategic communications to enhance demand for prescribed fire on private forestlands **Jesse Kreye**	Effects of fire in southern boreal and northern temperate forests of British Columbia, Canada **Sybille Haeussler**	Future vegetation trajectories driven by climate change and fire in the upper Rio Grande watershed **Cecile Remy**	Discussion	The role of atmospheric and local wildfire dynamics in extreme wildfire development **Jason Sharples**
3:10 PM	**Break**				

Tuesday, 19 November — 1:30 to 3:10 PM, Concurrent Sessions

	Salon I	Salon J	Salon K	Salon L
	Towards a Mechanistic Understanding of Interactions between Fire and Previous Disturbances: Recent Advances and New Surprises	**Resilience and Conservation 2**	**Landscape-Level Fire Management 2**	**Ecology 2**
	Special Session Organizers: Brian Buma and Jeffrey Cannon	**Moderator: Alina Cansler**	**Moderator: James Johnson**	**Moderator: Anne Ganteaume**
1:30 PM	Rates of short-interval fires increasing across the US West **Brian Buma**	Complex and variable avian responses to post-fire salvage logging support the conclusion that salvage is largely detrimental to biodiversity **Brent Campos**	Fire severity and forest management alters reburn potential in mesic mixed conifer forests **Lisa M. Ellsworth**	Pyrodiversity: impacts of a megafire on woody plant diversity in an Arizona Sky Island **Andrew M. Barton**
1:50 PM	Forest management under uncertainty: the influence of management versus climate change and disturbance in the Lake Tahoe Basin **Charles Maxwell**	Community-based fire effects monitoring: a case study from Payne's Creek National Park, Belize **Rick Anderson**	Past forest change, patterns of post-fire tree regeneration and potential for fire-initiated forest loss at a dry forest ecotone **Lucas Harris**	Seasonality of fire behavior and plant community response in the southern Appalachian Mountains **Matthew C. Vaughan**
2:10 PM	Negative feedbacks among multiple disturbances in north-central Minnesota **Melissa Lucash**	Impacts of forest restoration treatments on pollinator communities within the Colorado Front Range **Ryleigh Gelles**	Variable trajectories of Southwest ponderosa pine forests following high-severity fire **Jose Iniguez**	Effects of burning and thinning treatments on oak and maple stem density **Emily M. Booth**
2:30 PM	Exploring complex interactions among humans and fire regimes in US forested landscapes using the spatial ecosystem model FireBGCv2 **Robert E. Keane**	Evaluating change in bird communities from wildfire in the Arizona Sky Islands **Jamie S. Sanderlin**	Comparing the long-term effects of amplified fire and fuel management disturbance on a mixed-owner landscape in central Oregon **Ana Barros**	Big idea fire effects research in large experimental fires: balancing challenges with opportunities **J. Morgan Varner**
2:50 PM	Discussion	If pyrodiversity begets biodiversity, then why aren't we managing for it? **Dominick A. DellaSala**	Multiple wildfires with minimal consequences: low-severity wildfire effects on West Texas piñon–juniper woodlands **Helen M. Poulos**	Strengthening fire effects perspectives: a role for plant–soil feedbacks **Katherine E. A. Wood**
3:10 PM	**Break**			

Tuesday, 19 November, 3:40 to 5:10 PM: Fire Circles

Fire Circles provide an opportunity to advance important wildland fire science and management issues through discussions, working groups, or round tables. Fire Circles are open to all attendees, so pick a topic of interest and head on in.

Strengthening Partnerships with Cooperative Extension: Identifying Barriers and Opportunities | Salon D

Organizers: Jennifer Fawcett, North Carolina State University; Susie Kocher, University of California Cooperative Extension; and Jesse Kreye, Pennsylvania State University

This interactive fire circle will include discussion and exercises among participants to gather information on potential partnerships with Cooperative Extension. We will discuss the opportunities and barriers to developing partnerships on fire outreach and education. This information will be used to increase partnerships and develop a Journal of Extension article.

Fire Science Co-Production: A Roundtable Discussion on Best Practices and Lessons Learned from Multiple Disciplines | Salon E

Organizers: Molly Hunter, University of Arizona / Joint Fire Science Program; and Alison Meadow, Research Scientist, University of Arizona

Interested in doing fire science co-production? Whether you are new to co-production or well versed in the practice, join us for a discussion on best practices and lessons learned from multiple disciplines on establishing and maintaining science co-production programs.

Smoke: Challenges and Opportunities for Wildland Fire | Salon F

Organizers: Peter Lahm, USDA Forest Service; Dave Mueller, BLM; Susan O'Neill, USFS; and Linda Chappell, USFS

Recent EPA guidance and state efforts provide opportunities for prescribed fire. This Circle allows for discussion of smoke challenges experienced in the field. Input will help NWCG's Smoke Committee target useful products to support field needs. Strategies will be discussed to collectively build knowledge about approaches to smoke challenges.

Restor(y)ing Indigenous Fires: Modern Applications and Practices | Salon G

Organizer: Don L. Hankins, California State University, Chico, and California Indian Water Commission

Indigenous peoples have stewarded the landscape with fire since time immemorial yet struggle to retain sovereign rights to maintain such today. This discussion will focus on sharing global examples of Indigenous fire stewardship, and implications for broader societies and opportunities within wildland fire management.

Prescribed Fire Councils of the Central and Southern Rockies | Salon H

Organizers: Gloria Edwards, Southern Rockies Fire Science Network; Mike Babler, Colorado Prescribed Fire Council; Derek Scasta, Wyoming Prescribed Fire Council; Jennifer Hansen, Utah Prescribed Fire Council; Mike Caggiano, Colorado Forest Restoration Institute; and Daniel Godwin, Forest Stewards Guild

Prescribed Fire Councils now exist throughout the Central and Southern Rockies regions. These PFC's vary in capability and scope, but all are working to expand the effectiveness of prescribed fire on the ground. Attend this Fire Circle to identify issues and ways to develop support for Southern Rockies Rx fire!

Tuesday, 19 November, 3:40 to 5:10 PM: Fire Circles, continued

Demystifying Resilience to Wildfire | Salon J

Organizers: Carol Miller, US Forest Service, Aldo Leopold Wilderness Research Institute; Anne Black, US Forest Service, Rocky Mountain Research Station

What do we mean when we talk about "resilience to wildfire?" The term resilience can be used differently across disciplines and is often ill-defined, thus creating challenges in applying the concept. Participants will be guided through a collaborative and interactive exercise that clarifies resilience concepts for application to fire-prone landscapes.

How to Use Social Media to Motivate Stakeholders | Salon K

Organizer: Anthony Lee Small, Fedwriters–Joint Fire Science Program

One of the challenges in running an organization is motivating stakeholders to do what you want them to do. Whether it's a critical investor, a team of employees, or a key customer, you have to be able to convince stakeholders that your organization is worth supporting. Motivation often comes down to knowing your audience, having a plan, and communicating your desires clearly in a way that makes it easy for stakeholders to support you.

Strengthening Fire Effects Perspectives: A Role for Plant–Soil Feedbacks | Salon L

Organizer: Katherine Wood, Michigan State University; and Andrew Vander Yacht, Michigan State University

Research and researchers within fire science and plant–soil feedback (PSF) are currently disparate groups with little focus on the interactions between the disciplines. We propose a discussion to advance fire effects and PSF research, specifically perspectives on current knowledge gaps, methodological limitations, and future research directions in connecting the sub-disciplines.

Filmmaking to Educate the Public about Wildfires | Rincon

Organizers: Stephen Most, Filmmaker; Trip Jennings, National Geographic; and Maya Kholsa, Biologist and Poet Laureate Sonoma County

This Fire Circle will start with each presenter sharing clips and presenting lessons learned from public engagement. Participants will be invited to ask questions, present challenges, offer creative ideas, and explore opportunities for breaking through the dominant, negative cultural norms about fire. This Fire Circle seeks your ideas on how film and creative media might be deployed to educate the public about the benefits and challenges of living with fire.

Tuesday, 19 November, 5:30 to 7 PM: Poster Presentations and Reception

The Poster Session and Reception will be held in the Foyer. Come talk with poster presenters, network with exhibitors, and enjoy appetizers and a no-host bar. All abstracts and presenter bios are available on the Whova mobile app.

#	Presenter	TITLE
		Adaptive Management
1	Kevin Barrett	*Effects of collaborative restoration and adaptive management on forest structure and composition in the Colorado Front Range*
2	Linda M. Chappell	*Collaboration facilitates pyrodiversity: a Fishlake National Forest story OR a pathway forward*
3	Paul Steblein	*Current and future fire science at the US Geological Survey*
		Ecology
4	Lisa Patrick Bentley	*Exploring interactions among disease, fuel loads and fire severity in northern California oak woodlands*
5	Joseph Bogart	*Multiple disturbances on headwater streams: how repeat fires and floods affect stream recovery*
6	Tara Durboraw	*Effect of fire on Mexican spotted owl (*Strix occidentalis lucida*) habitat*
7	Graham S. Frank	*Comparing early-successional biodiversity between clearcutting and wildfire: initial results from the Klamath–Siskiyou region of southwest Oregon*
8	Wade M. Gibson	*Eighty-two years of plant functional type, composition, and cover changes in an Arizona interior chaparral community*
9	Natalia Hamilton	*Interactions between invasive grass and wildfires*
10	Darcy H. Hammond	*Gradient vs. patch landscape models: characterizing burn severity patterns and their relation to post-fire recovery*
11	Alexander Howe	*Quantifying burn severity heterogeneity using the 2017 Brianhead Fire as a case study*
12	Lane Johnson	*Restoration silviculture for fire-dependent pine woodlands in the Great Lakes Region*
13	Jesse S. Lewis	*Wildlife habitat use in response to fire severity in the White Mountains of Arizona*
14	Maxwell Odland	*Effects of repeated prescribed fire and thinning on understory diversity in Sierra Nevada mixed conifer forests*
15	Leo O'Neill	*Fire and pandora moth: a timeless relationship?*
16	Adrian Poloni	*Forty years of* Heteroabsion occidentale *root disease and fuel loads in California fir forests*
17	Charlotte Reemts	*Avian diversity increases after wildfires in a desert sky-island forest ecosystem*
18	William E. Rogers	*Grass species morphology and phenology affect belowground bud banks and resprouting responses in burned semi-arid Texas savanna*
19	Gary White	*Does loblolly, shortleaf, and longleaf pine hybridization result in fire resilience with future climate change in East Texas?*
20	Jill M. Young	*Disturbance and climate driven vegetation type-conversion in western North American landscapes: perceptions of researchers and natural resource managers toward an emerging ecological concern*
		Fire Behavior
21	Jade Buckley	*Canopy bulk density estimates of open-grown and closed canopy Scots pines (*Pinus sylvestris*) in the Netherlands*
22	Jessica Miesel	*The Fire Behavior Assessment Team—integrated fuels, fire behavior, and fire effects monitoring on active wildfires*
23	Mike Tiller	*Flammability comparisons of sea buckthorn (*Hippophae rhamnoides*) in the Netherlands to East Texas and southern California shrub species*
24	David R. Weise	*A new way to predict emission factors—a compositional data approach*
		Fire Regimes
25	Seth Bogle	*Monitoring Trends in Burn Severity 1984–2017*
26	Brian Tolk	*LANDFIRE disturbance: annual mapping of nationwide landscape change*
27	Robin Innes	*Wyoming big sagebrush fire history, fire ecology, and postfire recovery dynamics in the Fire Effects Information System (FEIS)*
28	Scott Markwith	*Mixed conifer regeneration after successive large mixed-severity wildfires in the Sierra Nevada, CA*
29	Joseph M. Marschall	*Pursuit of pre-Columbian fire regimes in Pennsylvania*
30	Laura Platt	*Disturbance patterns and stand structure from reconstructed fire severity and history: lessons from moist mixed-conifer forests in the Blue Mountains of northeast Oregon*
31	Michael Stambaugh	*Wave of fire: New World colonization and settlement influences on fire regimes across the eastern US*
32	Giovanna Tomat-Kelly	*Invasive grass increases fuel loading and reduces seedling emergence*
33	Colleen Sutheimer	*Fire in forested peatlands of the upper Great Lakes: reconstructing the past to protect the future*
		Fuels Management
34	Maureen C. Kennedy	*Influence of wildland fuel biomass on uncertainty in wildfire emissions prediction*
35	Peter Lahm	*New NWCG Smoke Committee product: The Smoke, Roadways and Safety Guide*
36	David Mueller	*NWCG SmoC Committee*

Tuesday, 19 November, 5:30 to 7 PM: Poster Presentations and Reception, continued

#	Presenter	TITLE
		Human Dimensions and Social Systems
37	Lily Jane Clarke	*"Wildfire events made my community stronger": how wildfire might catalyze community resilience in the western United States*
38	Collin Haffey	*Hot & dry: using podcasts to deliver science and policy information to new audiences*
39	Brian Oswald	*US–Dutch Collaborative Fuel Loading Assessment: 2012–2019*
40	Scott Sprague	*Us and them examining the cultural perceptions of interagency and private wildland firefighters*
		Landscape-Level Fire Management
41	Michael Daugherty	*Mapping Mexican spotted owl occupancy in relation to burn severity*
42	Alison E. Dean	*Strategic monitoring for fireshed management*
43	Brenda Lundberg	*LANDFIRE Remap: reference data*
44	Matthew Reilly	*Incorporating delayed mortality into burn severity mapping: the Rim Fire case study*
45	Pete R. Robichaud	*Mapping disturbance and recovery with WorldView-2 imagery in salvage logged areas of the 2013 Rim Fire*
46	Jamela Thompson	*Fuel treatment and wildfire interactions in Utah*
47	Jordan Winkenbach	*Oak recruitment following a fire-free interval on the Cumberland Plateau, KY*
		Resilience
48	Mark Kreider	*Landscape and micro-scale factors interact to influence post-fire aspen seedling regeneration*
49	David W. Peterson	*The Entiat Experimental Forest: evaluating short- and long-term effects of wildfire on water quality and quantity and forest recovery*
50	Katarina Warnick	*Changes in forest structure in ponderosa pine-dominated ecosystems following restoration treatments*
51	Jesse Wooten	*Rewriting the forest: predicting ecosystem transitions following wildfires*
		Restoration
52	Marin Chambers	*Collaborative forest landscape restoration monitoring results following mechanical and prescribed burning treatments on the Uncompahgre National Forest, CO*
53	Skye Greenler	*Too hot, too cold, or just right: can managing wildfire for resource benefits restore historical fire conditions?*
54	Corey Gucker	*Biology, ecology, and use of forbs in post-fire restoration*
55	Marc Meyer	*A framework for restoring post-fire landscapes in California's national forests*
56	Jessica Miesel	*Training the next generation of fire professionals to bridge research-management communities*
57	Jamie Woolet	*Belowground drivers of prescribed fire impacts on vegetation in restored prairies*
		Risk Management
58	Teresa Brennan-Kane	*Long-term trends and regional variation in wildfire causes and number of acres burned across the United States national forest system over the past century*
59	Denyse Dawe	*Balancing infrastructure protection and woodland caribou (*Rangifer tarandus*) habitat conservation using burn probability modelling*
60	Peter Lahm	*Coalition of Prescribed Fire Councils: progress and projects*
61	Harry Podschwit	*Climate change and fire severity in East Cascades*
		Technological Innovations
62	Caden Chamberlain	*Comparisons of LiDAR- and field-derived estimates of crown base height and canopy bulk density in ponderosa pine forests in northern Arizona*
63	Jessie M. Dodge	*Effects of scale on remotely assessing burn severity in a ponderosa pine forest*
64	Sarah A. Lewis	*Using multi-temporal high-resolution imagery to monitor post-wildfire salvage logging: relating time, ground cover, and erosion*
65	Louise Loudermilk	*Linking complex fuel dynamics with forest ecosystem modeling*
66	Susan M. O'Neill	*Wildland fire smoke modeling and visualization tools for land managers*
67	J. Kevin Hiers	*Rx Fire Modeling Initiative: a focus on linkages*
		Wildland–Urban Interface
68	Luis Daniel Olivares Martínez	*Fire distribution inside avocado-land*
69	Alessandra M. Zambrano	*Will the Oakland Hills burn again: how present fuel conditions compare to the 1991 Tunnel Fire conditions*
70	Christopher A. Dicus	*Wildland–urban interface module: California Fire Science Consortium*

Wednesday, 20 November 2019: Overview

Registration
7 AM to 4 PM
Foyer

Presentation Loading
7 to 8:30 AM, and 4:30 to 6 PM
Coronado

Exhibit Hall
8 AM to 4 PM
Salon B

Plenary: Fire AFEx Talks
8 to 10:05 AM
Kiva Ballroom

Morning Break
10:05 to 10:30 AM
Foyer

Concurrent Sessions
10:30 AM to 12:10 PM
See pages 36–37 for presentations; Whova app for abstracts

Lunch
12:10 to 1:30 PM
Pre-purchased boxed lunch or on your own

Concurrent Sessions
1:30 to 3:10 PM
See pages 38–39 for presentations; Whova app for abstracts

Afternoon Break
3:10 to 3:40 PM
Foyer

Concurrent Sessions
3:40 to 5:20 PM
See pages 40–41 for presentations; Whova app for abstracts

Awards Dinner
6 to 8 PM
Kiva Ballroom

Meetings

USGS Meeting
7 to 8 AM
Executive Boardroom

AFE Annual Membership Meeting
12:30 to 1:15 PM
Kiva Patio
All are welcome!

ANREP National Extension Wildland Fire Initiative
12:30 to 1:30 PM
Executive Boardroom

Exploration of Opportunities for Synthesis and Meta-Analysis of Historical Pattern and Process Studies in Fire-Prone Landscapes of the PNW
12:15 PM
Rincon

Plenary: Fire AFEx Talks

8:00 AM Welcome Back and Announcements
MC: Zachary Prusak, The Nature Conservancy

8:05 AM Counting Tomorrow's Risk: A Land Use Planning-Based Assessment of Bushfire Risk in New South Wales, Australia
Laura Gannon, Meridian Urban

8:25 AM A Westside Story: New Fire Histories from Super-productive Western Oregon Douglas-fir Forests
James Johnston, Oregon State University

8:45 AM Fire-Derived Smoke and Smoke-Isolated Active Biomolecules Invigorate Growth of Diverse Plant Species: A Technological Approach
Manoj G Kulkarni, University of KwaZulu-Natal Pietermaritzburg

9:05 AM Welcome to the Pyrocene
Steve Pyne, Arizona State University

9:25 AM Putting the Line in the Right Place the First Time: 2018 PNW Fuels Treatment Effectiveness
Dana Skelly, US Forest Service

9:45 AM Beyond the Paradigm of Moving beyond the Paradigm: Myths of Fire Ecology
Adam Watts, Desert Research Institute

Awards Dinner

Please join us to celebrate our 2018 and 2019 AFE Award Winners! This event is included in registration; guest tickets can be purchased at Registration. We look forward to your company at this fun event, which will be hosted by Mark Kaib—Fire Congress program chair, AFE board member, and recently retired from the USFWS.

6 TO 7 PM Buffet Dinner and Music
7 TO 8 PM Awards Program

- Welcome
- Recognition of 2019 Professional Certification Recipients
- Student Awards
  - Student Poster Winners
  - Mike da Luz Scholarship
  - Komarek Graduate Student Excellence Award
- 2018 Lifetime Achievement Awards
- 2019 Lifetime Achievement Awards

The Policy Landscape of Wildfire and Fuels Management in the United States

Organizer: Lauren McCain, Defenders of Wildlife

US government leaders have responded to increasingly expensive, destructive, and deadly wildfires with legislation and other policies. Is decision-making in Washington achieving community safety, ecosystem resilience, local economic security, natural resource conservation, and additional stated objectives? This panel explores how the changing policy landscape is affecting land management and stakeholders.

Fire Regimes and Species Diversity in the American Southwest and Adjacent Regions of Mexico

Organizer: Hugh D. Safford, USDA Forest Service

Fire regimes have major influences on ecological communities, and acute changes in disturbance regimes can have major consequences for ecosystems and biota. This symposium examines the links between fire regimes and biodiversity in southwestern US and northern Mexican ecosystems.

Understanding the Use of Fire Disturbance in Ecosystem Process Modeling and Forest Change Predictions

Organizers: Tirtha Banerjee, University of California, Irvine; Rod Linn, Los Alamos National Lab; Kevin Hiers, Tall Timbers Research Station and Land Conservancy

We invite experimental and modeling studies on the spatiotemporally multiscale nature of fire disturbance in forest ecosystems as well as compound effects such as insect mortality, change of runoff volume and quality, response to wind regimes, as well as effects of long-term climatic shifts and effects of forest management activities.

Restoring Structure and Pattern to Frequent Fire Forests in the Western US: Moving from Historical Data to Implementation and Outcomes

Organizers: Eric Knapp, USFS Pacific Southwest Research Station; Mike Battaglia, USFS Rocky Mountain Research Station

Conifer-dominated forests of the western US shaped by frequent fire were generally highly heterogeneous, a structure that not only promoted biodiversity but was resilient to wildfire. In this session, we highlight new developments and initial outcomes from studies using historical stand data to guide thinning.

Manipulation of Vegetation for Livestock and Wildlife Using Prescribed Fires in Texas and Northern Mexico

Organizer: Silverio Ávila, Texas A&M University-Kingsville (CKWRI)

This special session will share results from studies conducted in Texas and Mexico, with topics related to the use of fire for the improvement of rangelands for livestock and wildlife, including seasonal burning comparison of coastal prairies, deer habitat improvement, and forage quality improvements.

A Global Synthesis of Pyrodiversity and Biodiversity Relationships: Implications for Effective Fire Management

Organizers: Katherine Giljohann, The University of Melbourne; Luke Kelly, The University of Melbourne; Trent Penman, The University of Melbourne; Alan York, The University of Melbourne

The relationship between fire regimes and biodiversity is complex, with many knowledge gaps. Experts from the US, Australia, Spain, and Brazil will address the role of interactions, multiple mechanisms, refuges, legacies, feedbacks, and novel regimes on pyrodiversity–biodiversity relationships, followed by a discussion of implications and insights for management.

The Evolving Wildfire Risk Governance System

Organizer: Benjamin Gray, University of Montana; Maureen Essen, USFS Rocky Mountain Research Station

Realizing the vision of the Cohesive Wildland Fire Management Strategy requires changes to the fragmented wildfire governance system. Diverse actors must balance different priorities, risk tolerances, policy preferences, data interpretations, and other concerns as they work across ecological, jurisdictional, and normative boundaries to build collaborative relationships.

Bridging the Gap: Lessons from the First Ten Years of the JFSP Fire Science Exchange Network

Organizer: David R. Godwin, University of Florida

The Fire Science Exchange Network was started 10 years ago by the Joint Fire Science Program to connect relevant and timely fire science information with natural resource and wildland fire managers. Since that time, the unique exchanges have developed innovative boundary-spanning programs that tackle regional fire management challenges.

Wednesday, 20 November 10:30 AM to 12:10 PM, Concurrent Sessions

	Salon D	Salon E	Salon F	Salon G	Salon H
	The Policy Landscape of Wildfire and Fuels Management in the United States	**Fire in the Last Frontier: 21st Century Fire Patterns, Behavior, and Pyroecology of North American Boreal Forests and Tundra**	**Burned Area Rehabilitation and Restoration 1**	**Fire Regimes and Species Diversity in the American Southwest and Adjacent Regions of Mexico**	**Fire Behavior**
	Special Session Organizer: Lauren McCain	**Special Session Organizer: Rachel Loehman**	**Moderator: Kerry Metlen**	**Special Session Organizer: Hugh D. Safford**	**Moderator: Qingqing Xu**
10:30 AM	A view across the US wildfire and fuels management policy landscape: framing the context, trends, and diverse interests **Peter Nelson**	Why is Alaska's "firescape" so sensitive to warming climate and what are possible management strategies to cope with the changing fire regime? **Randi Jandt**	Interpreting nuanced outcomes of a spring prescribed burn in a Sierra Nevada mixed conifer ecosystem in the Southern Cascades of California **Don Hankins**	Introduction **Hugh D. Safford**	Test of a moisture extinction model under conditions of no slope and calm wind **Carmen Awad**
10:50 AM	The Trump Administration on forest health and wildfire **Lauren McCain**	Keep it in the ground: managing fire for climate mitigation **Carly Phillips**	Effects of fire intensity on resprouting woody species **Heath D. Starns**	Mexican forest species and fire regimes are of increasing relevance to the southwestern US as climate warms **Peter Fulé**	Modeling shrub consumption in prescribed fire **Melissa Jaffe**
11:10 AM	Finally fixing wildfire funding: the end of fire borrowing and potential gains for forest resilience and community security **Ryan Richards**	Fire deficit increases the wildfire risk around communities in the Canadian boreal forest **Marc Parisien**	Comparing re-introducing fire with cutting an encroaching conifer for conservation of an imperiled shrub–steppe over extended time periods **Jon Bates**	The fire severity × plant species diversity relationship is hump-shaped in Sierra Nevada yellow pine and mixed conifer forests **JonahMaria Weeks**	Comprehensive open-source development of next-generation wildfire models for grid resiliency **David Saah**
11:30 AM	Conflict and coherence in Forest Service fire and land management policy **Courtney Schultz**	Fire self-regulation in the North American boreal forest and the implications for fire management in Alaska **Xanthe Walker**	High-severity wildfire reduces richness and alters composition of ectomycorrhizal fungi in ponderosa pine forest **M. Fabiola Pulido-Chavez**	Understory plant species diversity is not degraded by high-severity burning in Colorado dry conifer forests **Paula Fornwalt**	Whys and hows of large wildfires: wind-driven, plume-driven, and fire phenomena **Janice L. Coen**
11:50 AM	Trends in state–federal partnerships: good neighbor authority and shared stewardship **Tyson Bertone-Riggs**	Discussion		High-severity fire accelerates shifts towards a southern-xeric understory community: evidence from dry mixed-conifer forests in California and Colorado **Jens Stevens**	
12:10 PM	**Lunch**				

Wednesday, 20 November — 10:30 AM to 12:10 PM, Concurrent Sessions

	Salon I	Salon J	Salon K	Salon L
	Understanding the Use of Fire Disturbance in Ecosystem Process Modeling and Forest Change Predictions	**Restoring Structure and Pattern to Frequent Fire Forests in the Western US: Moving from Historical Data to Implementation and Outcomes**	**Manipulation of Vegetation for Livestock and Wildlife Using Prescribed Fires in Texas and Northern Mexico**	**A Global Synthesis of Pyrodiversity and Biodiversity Relationships: Implications for Effective Fire Management**
	Special Session Organizers: Tirtha Banerjee, Rod Linn, and Kevin Hiers	**Special Session Organizers: Eric Knapp and Mike Battaglia**	**Special Session Organizer: Silverio Ávila**	**Special Session Organizers: Katherine Giljohann, Luke Kelly, Trent Penman, and Alan York**
10:30 AM	The role of stand age and pre-treatments on prescribed fires' influence on species composition in Sierra Nevada mixed conifer forests **Robert York**	Session Introduction **Eric Knapp and Mike Battaglia**	Using prescribed fire to maximize above- and belowground diversity for livestock and wildlife **Morgan Treadwell**	Towards a global synthesis of pyrodiversity and biodiversity relationships **Luke Kelly**
10:50 AM	Characterizing the coupled carbon–water-energy relations for Coastal Plains forests during and after fire disturbances in the southeast US **Lauren E. L. Lowman**	The principles and silvicultural challenges to restoring heterogeneity in fire-dependent forests **Malcolm North**	Season of burn effects on forage production and composition of gulf cordgrass communities **J. Silverio Avila-Sanchez**	Interaction flexibility and pyrodiversity increase pollinator population resistance **Lauren C. Ponisio**
11:10 AM	Statistical fire modeling and multi-scale scenario analysis and assessment **LeRoy Westerling**	Using reference conditions to restore ecological function in frequent-fire forests of Oregon and Washington. Lessons learned and forward progress **Derek Churchill**	Patch burn–grazing in South Texas coastal gulf cordgrass communities **Rebecca Zerlin**	Interpreting contrasting pyrodiversity effects under a common framework: functional heterogeneity and global patterns of land use change impacts on biodiversity **Lluís Brotons**
11:30 AM	Scaling ecological resilience **Donald Falk**	Concepts and foundation of free selection **Theresa Jain**	Fire as a tool to improve Mexican and USA grasslands for wildlife and livestock production **Carlos Villalobos**	Pyric herbivory: the role of the fire–grazing interaction in pyrodiversity **Samuel D. Fuhlendorf**
11:50 AM	Impacts of fuel moisture and fuel treatment on wildland fire behavior **Tirtha Banerjee**	Using digital prescriptions to create variable structure and pattern in designation by prescription project areas **Neil Chapman**	Fuel: grazing or burning? A rancher's perspective **Brian Treadwell**	You can't always get what you want, but if you try sometimes you get what you need **Trent Penman**
12:10 PM	**Lunch**			

Wednesday, 20 November — 1:30 to 3:10 PM, Concurrent Sessions

	Salon D	Salon E	Salon F	Salon G	Salon H
	Human Dimensions and Social Systems 2	**Climate Change 1**	**Burned Area Rehabilitation and Restoration 2**	**Fire Regimes and Species Diversity in the American Southwest and Adjacent Regions of Mexico**	**Fuels Management 1**
	Moderator: Morgan Treadwell	**Moderator: Andrew Barton**	**Moderator: Helen Poulos**	**Special Session Organizer: Hugh D. Safford**	**Moderator: Birgit Peterson**
1:30 PM	Is Forest Service roadless management creating divergent fire regimes? **James Johnston**	Understanding components to establish framework for convergent approach to wildfire mitigation **Moji Sadegh**	Effects of landscape-scale forest restoration on landscape-scale wildfire behavior in the Jemez Mountains of New Mexico **Steve Bassett**	Patterns of post-fire diversity and regeneration in subalpine forests of California **Emily Brodie**	Prescribed fire and the Green New Deal: capitalizing the restoration economy **Daniel Godwin**
1:50 PM	Addressing the personnel, public, and organizational risks of smoke **Peter Lahm**	Climate relationships with increasing wildfire in the southwestern US from 1984 to 2015 **Stephanie Mueller**	The importance of long-term studies for quantifying forest restoration effects and temporal dynamics: an example from warm/dry mixed-conifer in southwestern Colorado **Julie Korb**	Compound disturbance effects on species richness, beta-diversity, and compositional turnover in an early seral landscape **Matthew Reilly**	A missing link? Fuel moisture–soil moisture interaction **Ekaterina Rakhmatulina**
2:10 PM	Smoke impacts on communities and HEPA Filter Loan Program **Sam Berry**	Examining southern California wildfire using a stochastic large-fire simulation model **Alex W. Dye**	Are managed wildfires moving forest structure towards the historic range of variability? A comparison of landscape metrics across northern Arizona **Jonathon Donager**	Repeated fires reduce plant diversity in low-elevation Wyoming big sagebrush ecosystems (1984–2014) **Adam L. Mahood**	Living with fire—lessons learned from a grassland savanna in central Africa and how it relates to fire management in the United States **James Menakis**
2:30 PM		Large-scale forest restoration stabilizes carbon under climate change in southwest United States **Marcos Robles**	Time to burn: phenology products and tools are a piece of the pyrodiversity puzzle **Theresa Crimmins**	Nexus between biodiversity and ecosystem resilience in fire-prone shrublands **Jon E. Keeley**	Can landscape fuel treatments enhance both protection and resource management objectives? **Joe H. Scott**
2:50 PM		Assessment of methods and results of carbon emissions from three North Carolina peat wildfires **Robert A. Mickler**	Pyrotopia **Cecil Frost**	Altered fire regimes cause lichen diversity losses **Jesse Miller**	Selecting important fuels for biomass emissions research **Adam Watts**
3:10 PM	**Break**				

Wednesday, 20 November — 1:30 to 3:10 PM, Concurrent Sessions

	Salon I	Salon J	Salon K	Salon L
	Understanding the Use of Fire Disturbance in Ecosystem Process Modeling and Forest Change Predictions	**Restoring Structure and Pattern to Frequent Fire Forests in the Western US: Moving from Historical Data to Implementation and Outcomes**	**The Evolving Wildfire Risk Governance System**	**A Global Synthesis of Pyrodiversity and Biodiversity Relationships: Implications for Effective Fire Management**
	Special Session Organizers: Tirtha Banerjee, Rod Linn, and Kevin Hiers	**Special Session Organizers: Eric Knapp and Mike Battaglia**	**Special Session Organizers: Maureen Essen and Benjamin Gray**	**Special Session Organizers: Katherine Giljohann, Luke Kelly, Trent Penman, and Alan York**
1:30 PM	Wildfire impacts on water and carbon cycles in California's Sierra Nevada **Qin Ma**	Restoring stand-level pattern and structure with the ICO app: improving effectiveness and efficiency **Sean Jeronimo**	Fostering collective action to manage wildfire risk across property boundaries in the western USA **Susan Charnley**	Multiple mechanisms underlie the pyrodiversity–biodiversity relationship in California birds **Morgan Tingley**
1:50 PM	Using numerical modeling to investigate the influences of disturbances of fire behavior **Rodman Linn**	First-entry low and moderate burn severity wildfires create resilient heterogenous forest structures **Van R. Kane**	Fire modeling and analytics: from research to decision **Kit O'Connor**	Global novel fire regimes in the Anthropocene **Andrea Duane**
2:10 PM	Incorporating effects of small-scale topography and vegetation heterogeneity on wildland fire in Earth System Models **Alex Jonko**	Historical and modern pyric mediation of fine-scale structure in a Sierran mixed-conifer forest **Justin Ziegler**	Wildfire risk governance across different political and ecological contexts **Benjamin J. Gray**	Using simulated HRV as a means to promote biodiversity in natural resource management using landscape modeling **Robert E. Keane**
2:30 PM	Increasing concurrence of wildfire drivers doubles megafire critical danger days in southern California **Moji Sadegh**	Variable thinning to restore fire-created pattern in the Sierra Nevada: implementation and initial outcomes **Eric Knapp**	Collective action to address wildfire at the county level: a case study of the Kittitas County Fire Adapted Communities Coalition **Catrin Edgeley**	Fire refuges in Mediterranean landscapes: understanding their role for animal populations and protecting them from salvage logging **Pere Pons**
2:50 PM	Quaking aspen regeneration: assessing individual and synergistic effects between conifer thinning intensity and burning **Chad M. Hoffman**	Restoring heterogeneity: a comparison of variable density thinning and historical reference conditions in the central Sierra Nevada **Alexis Bernal**	Discussion	Panel Discussion **Alan York and Kate Giljohann**
3:10 PM	**Break**			

Wednesday, 20 November — 3:40 to 5:20 PM, Concurrent Sessions

	Salon D	Salon E	Salon F	Salon G	Salon H
	Bridging the Gap: Lessons from the First Ten Years of the JFSP Fire Science Exchange Network	**Climate Change 2**	**Burned Area Rehabilitation and Restoration 3**	**Fire Regimes and Species Diversity in the American Southwest and Adjacent Regions of Mexico**	**Fuels Management 2**
	Special Session Organizer: David R. Godwin	**Moderator: Andrew Barton**	**Moderator: Michelle Mack**	**Special Session Organizer: Hugh D. Safford**	**Moderator: Liz van Wagtendonk**
3:40 PM	Introduction and history of the Fire Science Exchange Network **Ed Brunson**	Evaluating ecological resilience across wildfire suppression levels under climate and fuel treatment scenarios using landscape simulation modeling **Robert E. Keane**	Spatial and temporal dynamics of seeded plant communities after wildfire in sagebrush steppe **Beth Newingham**	Sierra Nevada wildfire and flying vertebrates: implications for changing fire regimes on bat and bird communities **Brent Campos**	Potential changes in fuels and shrub cover at Great Smoky Mountains National Park from 2003 to 2019 **Adam Coates**
4 PM	Models and examples of FSEN science co-production **Andrea Thode**	Quantifying avoided wildfire emissions from significant wildfires **Thomas Buchholz**	Patterns of seed dispersal from remnant sagebrush islands post fire **Cara Applestein**	Do changing fire regimes influence small mammal diversity in Sierra Nevada forests? **Susan Roberts**	Historical requests and occurrence of weather conditions for prescribed fires in Chelan County, Washington State, USA: an analysis to support increased fire use **Colton Miller**
4:20 PM	Bridging the gap takes a long-term perspective: lessons from climate change in Alaska **Sarah F. Trainor and Alison D. York**	Streamflow is resilient to landscape-scale wildfires in the Lower Colorado River Basin **Marcos Robles**	Postfire moss colonization in severely burned forests of the western United States **Henry S. Grover**	The effects of fire diversity on plant and pollinator communities **Lauren C. Ponisio**	Forest stand and site characteristics influence fuel consumption in repeat prescribed burns **Jacob Levine**
4:40 PM	Success stories from investments in fire science and communication **David Godwin**		Post-fire vegetation monitoring system using Google Earth Engine **John Dilger**	"It depends": the importance of a nuanced understanding of fire effects on wildlife species **Sarah Sawyer**	Vegetation recovery after seasonal burning of juniper slash **Jon Bates**
5 PM	Strategies and new ideas for connecting fire science and natural resource management **Panel Discussion**		Post-fire resistance to increasing vapor pressure deficits in Western montane conifers **Emma Williams**	Discussion	Effects of postfire management on dead woody fuel dynamics and stand structure in a severely burned mixed-conifer forest, in eastern Washington State, USA **Morris C. Johnson**
6 PM	**Evening Activities: Awards Dinner in Kiva Ballroom**				

Wednesday, 20 November — 3:40 to 5:20 PM, Concurrent Sessions

	Salon I	Salon J	Salon K	Salon L
	Understanding the Use of Fire Disturbance in Ecosystem Process Modeling and Forest Change Predictions	**Restoring Structure and Pattern to Frequent Fire Forests in the Western US: Moving from Historical Data to Implementation and Outcomes**	**The Evolving Wildfire Risk Governance System**	**Managing Fire for Multiple Objectives and Risk Management 1**
	Special Session Organizers: Tirtha Banerjee, Rod Linn, and Kevin Hiers	**Special Session Organizers: Eric Knapp and Mike Battaglia**	**Special Session Organizers: Maureen Essen and Benjamin Gray**	**Moderator: Kelsey Copes-Gerbitz**
3:40 PM	Fuel structure's impact on wild land fire entrainment— a computational study **Marlin J. Holmes**	Fine-scale fire patterns mediate forest structure in frequent-fire ecosystems **Scott Ritter**	Boundary-spanning for collective action: managing wildfire risk to watersheds **Emily-Jane Davis**	Suffering resource benefit: a review of Wildland Fire Decision Support System (WFDSS) content **Mike Beasley**
4 PM	Effects of fuel type on pyrogenic terpenoid emissions and air quality predictions **Christos Stamatis**	Comparing the tree spatial patterns derived from various treatments in Black Hills ponderosa pine forests **Mike Battaglia**	Governing firesheds: co-managing the new era of wildfire in the US **Branda L. Nowell**	Management applications of resource objective wildfires in forests of Grand Canyon National Park, USA **John Paul Roccaforte**
4:20 PM	A landscape model of variable social–ecological fire regimes **Robert Scheller**	Variability in mixed conifer forest structure changes understory light environments **Jeffery B. Cannon**	When and how is fire risk mitigation a collective action problem? And what are the implications? **Sarah McCaffrey**	Where wildfire and active fuels management meet: the Riggs and Lonely fires **Doug Sprouse**
4:40 PM	Modeling repeated prescribed fire disturbances in a longleaf pine ecosystem using the mechanistic Fire Disturbance and Response Model **Adam Atchley**	Neighborhood effects on individual tree growth and understory production in ponderosa pine forests of the Southwest **Andrew Sánchez Meador**	Discussion **Maureen Essen**	Effects of policy change on wildland fire management strategies: evidence for a paradigm shift in the western US? **Jesse Young**
5 PM	Understanding management relevance of fire disturbance in ecosystem process models **J. Kevin Hiers**	Panel Discussion	Questions and Discussion	Ecological fire management: bridging the fire science/management gap in philosophy and practice **Timothy Ingalsbee**
6 PM	**Evening Activities: Awards Dinner in Kiva Ballroom**			

Thursday, 21 November 2019: Overview

Registration
7 AM to 4 PM
Foyer

Closing Plenary
8 to 10 AM
Kiva Ballroom

Exhibit Hall
8 AM to 4 PM
Salon B

Morning Break
9:50 to 10:30 AM
Kiva Patio

Concurrent Sessions
10:30 AM to 12:10 PM
See pages 44–45 for presentations; Whova app for abstracts

Lunch
12:10 to 1:30 PM
Pre-purchased boxed lunch or on your own

Concurrent Sessions
1:30 to 3:10 PM
See pages 46–47 for presentations; Whova app for abstracts

Afternoon Break
3:10 to 3:40 PM
Foyer

Concurrent Sessions
3:40 to 5:20 PM
See pages 48–49 for presentations; Whova app for abstracts

AFE Fire Film Festival
7:30 to 9:30 PM
Kiva Ballroom
The Beauty of Blackened Spaces, with Fire Ecologist and Filmmaker Rick Anderson

Meetings

Pyrodiversity–Biodiversity Special Session
12:15 PM
Executive Ballroom

***Fire Ecology Journal*, Associate Editors' Meeting**
12:15 to 1:15 PM
Salon F

All-State Prescribed Fire Council Meet Up
12:30 to 1:30 PM
Rincon
Open to anyone affiliated with a Prescribed Fire Council

North American Tree-Ring Fire-Scar Synthesis
5:20 PM
Rincon

FUSEE Member Meeting–New Members Welcome!
5:30 PM
Executive Ballroom

Closing Plenary

Managing Pyrodiversity within Collaborations, Communities, and Landscapes into the Future

8:00 AM Welcome Back and Announcements

8:10 AM Community Adaptation to Bushfire: Moving from Regulation to Best Practice
Raphaele Blanchi, CSIRO Land and Water

8:40 AM Moving Forward: Developing Diverse Fire Landscapes with an Appeal for "On-Site" Integration of Fire Science and Management
Chris Marks, Grand Canyon National Park

9:10 AM Frontiers of Fire: Profound Impacts of Climate and Fire in Ecosystems of Alaska and the Southwestern US
Rachel Loehman, US Geological Survey

9:40 AM Closing Remarks

Join us at 9:50 AM on the Kiva Patio for a special morning break with a performance by the Burnette Crown Dancers, White Mountain Apache Tribe.

Historical and Contemporary Pyrodiversity in Fire-prone Forest Ecosystems: Relevance to Future Climate and Wildfire Adaptation

Organizer: Keala Hagmann, Applegate Forestry LLC and University of Washington

As we better understand climatic trends, we're faced with determining which landscape configurations of vegetation and fuels will support evolving ecosystems and our expectations for them. A broader understanding of spatio-temporal interactions between climate, vegetation, and topography informs recommendations for wildfire and climate adaptation in the 21st century.

Burned Area Emergency Response

Organizer: Richard Schwab, National Park Service

The Burned Area Emergency Response (BAER) session will examine the science behind post-fire emergency stabilization and rehabilitation treatments. Researchers will be presenting their findings for this field of study. Session topics include: Assessing Post-Fire Values at Risk, Post-Fire Runoff/Erosion Prediction, BAER Treatment Effectiveness, BAER Monitoring Techniques, and BAER Lessons Learned.

Effectiveness of Fire and Fuel Treatments to Promote Resilience to Drought

Organizers: Jeffrey Kane, Humboldt State University; Sharon Hood, USFS Rocky Mountain Research Station

This special session will share the latest scientific findings that evaluate the effectiveness of fire and fuels treatments to promote resistance and resilience to drought across a wide range of ecosystems and perspectives.

Southwest FireCLIME: A Research Partnership Evaluating Fire–Climate Change Dynamics and Management Implications in the Southwest

Organizer: Andi Thode, Northern Arizona University School of Forestry

The FireCLIME team will share a series of five brief talks on the results of their multi-year research partnership addressing future fire–climate dynamics in the southwestern US. Presentations include science synthesis and modeling outputs, as well as new decision-making tools for managers.

The Unique Considerations for Prescribed Fire Research and Application

Organizer: Courtney Schultz, Colorado State University

We explore how the context of prescribed fire is distinct from that of wildland fire. Bringing together social and biophysical scientists, we discuss: governance strategies that support application of prescribed fire; considerations for modeling and measurement of prescribed fire behavior and effects; and research and science communication priorities.

Unmanned Aircraft in Fire Research and Management

Organizer: Adam Watts, Desert Research Institute

As unmanned aircraft become more affordable, they are increasingly being employed as tools for fire research and management. This special session will provide both an overview for those new to UAS and in-depth presentations on specific uses of UAS in fire science during the past few years.

The Many Dimensions of Transboundary Wildfire

Organizer: Kit O'Connor, USFS Rocky Mountain Research Station; Chris Dunn, Oregon State University

Federal, state, and municipal policies toward wildfire management have not kept pace with the increasing size and complexity of wildfires. A new emphasis on shared stewardship and understanding that fire should be managed at landscape and not ownership scales is pushing the fire community to re-assess planning and incident management.

The Burning Fire Within: Local Prescribed Fire Initiatives for Landscape-Level Change

Organizer: Ryan Wilbur, University of Wyoming

A collaborative social movement has emerged focused on addressing the many social concerns surrounding the utilization of prescribed fire as a management tool. We will talk about local initiatives (e.g., Prescribed Burn Associations) that aim to address those concerns to ensure that fire remains a viable management option for future generations.

Thursday, 21 November 10:30 AM to 12:10 PM, Concurrent Sessions

	Salon D	Salon E	Salon F	Salon G	Salon H
	Technological Innovations	**Historical and Contemporary Pyrodiversity in Fire-prone Forest Ecosystems: Relevance to Future Climate and Wildfire Adaptation**	**Burned Area Emergency Response**	**Fire Regimes 1**	**Effectiveness of Fire and Fuel Treatments to Promote Resilience to Drought**
	Moderator: Carly Phillips	**Special Session Organizer: Keala Hagmann**	**Special Session Organizer: Richard Schwab**	**Moderator: Kevin Robertson**	**Special Session Organizers: Jeffrey Kane and Sharon Hood**
10:30 AM	FASMEE Western Wildfire Campaign: modeled, ground, and LiDAR based estimates of fuel consumption **Andrew T. Hudak**	Importance of nonforest and preforest to regional landscape resilience and resistance in the Intermountain West **Paul Hessburg**	Beyond the horizon: WEPPcloud—PEP, Postfire Erosion Prediction management tool **Peter Robichaud**	Upside down fire: learning the lessons of cooperative fire management in Australia **Cuong Tran**	Management can mitigate the risk from extreme fire weather in an upland pine–wetland forest matrix in the southeastern US **Matthew Hurteau**
10:50 AM	Integrating vegetation structure metrics into burn severity mapping **Birgit Peterson**	Drivers of historical landscape variability in mixed-conifer forest structure under pre-suppression fire regimes **Jens Stevens**	Burn severity mapping to support emergency response efforts **Kurtis Nelson**	Fire activity on the Colombian tropical dry forest: an environmental and social perspective **Marcelo Villa-Piñeros**	Resilience of Sandhills grassland to wildfire during drought **Jack Arterburn**
11:10 AM	Mapping the large fires perimeter from aggregation of MODIS and VIIRS active fires in Mexico **Carlos Ivan Briones-Herrera**	Resilience mechanisms and variability of fire regime space in historical dry mixed-conifer forests **Cameron E. Naficy**	Effects of post-fire salvage logging on runoff and erosion **Joe Wagenbrenner**	Hyperfrequent fire: do we know how low fire intervals can go? **Michael Stambaugh**	Fuel treatments as a means for mitigating fire-catalyzed forest change **Kimberley Davis**
11:30 AM	Using Landsat images to assess the burn severity of reburned areas within Grand Canyon National Park **Josh Picotte**	The untold story of frequent mixed-severity fire in Pacific Douglas-fir forests **Andrew Gregory Merschel**	Facilitating the use of process based hydrology models for burned area rehabilitation and fuels management using the Rapid Response Erosion Database **Mary Ellen Miller**	Projecting future fire regimes and watershed dynamics requires coupling fire spread with ecohydrology **Maureen C. Kennedy**	Competition amplifies drought stress in forests across broad climatic and compositional gradients **Mike Battaglia**
11:50 AM	Evaluating the temporal change in ash cover after the 2018 Mesa Fire, Idaho **Sarah A. Lewis**	Multi-proxy records document substantially altered ecosystems in central and southcentral Oregon **Keala Hagmann**	Improving local post-fire debris-flow preparedness: three timescales for reducing public risk **Dennis Staley**	The missing fire: quantifying human exclusion of wildfire in Pacific Northwest forests, USA **Ryan Haugo**	
12:10 PM	**Lunch**				

Thursday, 21 November — 10:30 AM to 12:10 PM, Concurrent Sessions

	Salon I	Salon J	Salon K	Salon L
	Southwest FireCLIME: A Research Partnership Evaluating Fire–Climate Change Dynamics and Management Implications in the Southwest	**The Unique Considerations for Prescribed Fire Research and Application**	**Ecology 3**	**Managing Fire for Multiple Objectives and Risk Management 2**
	Special Session Organizer: Andrea Thode	**Special Session Organizer: Courtney Schultz**	**Moderator: Max Odland**	**Moderator: Jay Lininger**
10:30 AM	Southwest FireCLIME project overview **Andrea Thode**	Policy approaches for increasing application of prescribed fire on federal lands **Courtney Schultz**	Pine species distributions and adaptations to fire regimes in the Madrean Sky Islands of the US and Mexico **Sandra L. Haire**	Complex multi-jurisdictional fires: understanding and mitigating perceptions of risk transfer **Branda L. Nowell**
10:50 AM	Drivers of fire and vegetation in the southwestern United States **Larissa Yocom**	Line officer views of barriers to increased use of fire on Forest Service lands **Sarah McCaffrey**	Aspect preferences of pyrogenic pine stands and their implications for understanding fire regimes in the southern Appalachian Mountains **Charles Lafon**	Landscape risk mitigation in an era of big change **Daniel M. Leavell**
11:10 AM	The FireCLIME VA: applying a rapid and flexible system for assessing ecosystem vulnerability to climate–fire interactions to national forests **Megan M. Friggens**	Prescribed fire: how does it span boundaries for more effective co-management of wildfire risk? **Emily-Jane Davis**	How fire type and season influence tree and understory structure and composition **Joe Fontaine**	Our new reality: wildfire prevention and mitigation, suppression, and hazardous fuel reduction in the wake of Hurricane Michael **Brian J. Camposano**
11:30 AM	Using landscape simulation models to inform management in an uncertain future **Will Flatley**	Building a prescribed fire program on the Colorado Front Range: the role of landowner engagement **Katie McGrath**	Shifts in recruitment in forests with changing disturbance regimes and climate reveal trends in community functional tolerance **Laura Marshall**	New developments for the Forest Fire Danger System of Mexico **Daniel Vega-Nieva**
11:50 AM	Adaptation strategies for climate and fire in the Southwest **Martha Sample**	Interagency collaboration and tribal leadership support prescribed fire expansion while understaffing constrains burning in northern California **Tony Marks-Block**	Can recurring wildfires provoke type conversion in mixed-conifer forests? **Deborah G. Nemens**	How much does it cost to save a life or a house: the comparative cost-effectiveness of using alternative prescribed burning strategies for risk mitigation? **Ross Bradstock**
12:10 PM	**Lunch**			

Thursday, 21 November 1:30 to 3:10 PM, Concurrent Sessions

	Salon D	Salon E	Salon F	Salon G	Salon H
	Unmanned Aircraft in Fire Research and Management	**Historical and Contemporary Pyrodiversity in Fire-Prone Forest Ecosystems: Relevance to Future Climate and Wildfire Adaptation**	**Resilience and Conservation 3**	**Fire Regimes 2**	**Effectiveness of Fire and Fuel Treatments to Promote Resilience to Drought**
	Special Session Organizer: Adam Watts	**Special Session Organizer: Keala Hagmann**	**Moderator: Jimmy Dodson**	**Moderator: Robert E. Keane**	**Special Session Organizers: Jeffrey Kane and Sharon Hood**
1:30 PM	Unmanned aircraft systems (UAS) for data collection at the Fire and Smoke Model Evaluation Experiment (FASMEE) **Adam Watts**	Forest structure and pattern vary by climate and landform across active-fire landscapes in the montane Sierra Nevada **Sean Jeronimo**	Disjunct and decoupled? The persistence of a locally endemic, fire-sensitive conifer species in a historically frequent-fire landscape **Will Downing**	Tree-ring fire history in a sagebrush landscape: Rio Grande del Norte National Monument, New Mexico **Manuel Lopez**	Sixty years of fire manipulation in the Missouri Ozarks reveals climate-dependent effects of repeat burns on forest growth **Tyler Refsland**
1:50 PM	Accessing the life of smoke: using unmanned aircraft systems (sUAS) to sample viable microorganisms and environmental covariates during wildland fires **Leda N. Kobziar**	Do past burn mosaics contribute to resilient landscapes? Lessons from recent large wildfires and simulation studies in the interior Pacific Northwest **Susan Prichard**	Patch fires promote regeneration of longleaf pine in pine savannas **Kevin M. Robertson**	Diverse human fingerprints on fire histories from northern New Mexico montane forests: time- and place-specific patterns since 1600 CE **Craig D. Allen**	An assessment of how competition has modified drought stress across ponderosa pine forests **Steve Voelker**
2:10 PM	Small UAS for fire weather and fire behavior monitoring in the wildland fire environment **Matthew Brewer**	Are wildfires restoring landscapes? **Derek Churchill**	Contingent resistance in longleaf pine (*Pinus palustris*) growth and defense 10 years following smoldering fires **Andrew Slack**	Modern area burned in a historical perspective in two Southwest wilderness areas **Calvin Farris**	Does prescribed fire promote resistance to extended drought in low-elevation forests of the Sierra Nevada, California? **Phil van Mantgem**
2:30 PM	Deriving fire behavior metrics from UAS imagery **Russ Parsons**	An evaluation of landscape-scale fire-induced change in Washington State, USA **Liz van Wagtendonk**	Fire-dependent longleaf pine forests are resilient to hurricane-induced flooding **Charlotte Reemts**	Modern area burned in a historical context in the Jemez Mountains, New Mexico **Ellis Margolis**	Effects of thinning on tree resistance to drought- and bark beetle-associated mortality in a Sierra Nevada mixed-conifer forest **Alexis Bernal**
2:50 PM	Connecting fuels, fire behavior, and fire effects at the Sycan Marsh, Oregon **Russ Parsons**	Expansive high-severity and rapidly repeated wildfires limit forest recovery in the central Cascade Range **Sebastian Busby**		A synthesis of historical fire regimes in the southwestern United States **Chris Guiterman**	Long-term effectiveness of prescribed fire season on tree resistance in a western US pine **Jeff Kane**
3:10 PM	**Break**				

Thursday, 21 November — 1:30 to 3:10 PM, Concurrent Sessions

	Salon I	Salon J	Salon K	Salon L
	The Many Dimensions of Transboundary Wildfire	**The Unique Considerations for Prescribed Fire Research and Application**	**Ecology 4**	**Landscape-Level Fire Management 3**
	Special Session Organizers: Kit O'Connor and Christopher J. Dunn	**Special Session Organizer: Courtney Schultz**	**Moderator: Cara Applestein**	**Moderator: Marcelo Villa-Piñeros**
1:30 PM	Quantifying fire management complexity based on biophysical setting, fire potential, and jurisdictional diversity in the American West **Christopher J. Dunn**	Optimizing treatment placement and expanding prescribed fire use minimizes ecosystem carbon losses and high-severity fire risk **Matthew Hurteau**	Relative importance of drivers of burn severity in eastern Washington **Jonathan Kane**	Modeling and mapping fire density with geographically weighted regression in Mexico **Norma Angélica Monjarás-Vega**
1:50 PM	Tripped by the simplest thing: how the way we talk can divide or unite **Anne Black**	Capturing prescribed fire behavior with fire–atmosphere models **Rodman Linn**	A novel niche: the invasive annual grass *Ventenata dubia* and relationships to wildfire, environment, and community factors in the Inland Northwest **Claire Tortorelli**	Using Climate Landscape Response (CLaRe) metrics to inform fire risk in semiarid forests **Cynthia S. A. Wallace**
2:10 PM	Approaches to cross-boundary wildfire risk governance **Maureen Essen**	Myths to mechanisms: how co-production can move fire management from folktales to fact based **Joseph J. O'Brien**	Landscape position amplifies effects of novel short-interval stand-replacing fires on postfire tree establishment in subalpine conifer forests **Tyler Hoecker**	A regional perspective on land use, climate, and recent wildfire trends in the Madrean Sky Islands of United States and Mexico **Miguel Villarreal**
2:30 PM	Getting on the same page: wildfire risk assessment on multi-ownership, multi-priority landscapes **Jessica R. Haas**	The Prescribed Fire Science Consortium: a model for coproduction **J. Kevin Hiers**	Beyond time since fire: spatial measures of fire regime drive mammal distributions in a fire-prone ecosystem **Katharine Senior**	LANDFIRE Remap: vegetation mapping methods and products **Daryn Dockter**
2:50 PM	Discussion	Discussion	Can fire affect carbon exchange at the ecosystem level (NEE) in a tropical savanna? **Juliana Teixeira**	LANDFIRE Remap: Landsat image processing improvements and innovations **Brian Tolk**
3:10 PM	**Break**			

Thursday, 21 November — 3:40 to 5:20 PM, Concurrent Sessions

	Salon D	Salon E	Salon F	Salon G	Salon H
	Wildland–Urban Interface	**Historical and Contemporary Pyrodiversity in Fire-Prone Forest Ecosystems: Relevance to Future Climate and Wildfire Adaptation**	**Adaptive Management**	**Fire Regimes 3**	**Effectiveness of Fire and Fuel Treatments to Promote Resilience to Drought**
	Moderator: Heath Starns	**Special Session Organizer: Keala Hagmann**	**Moderator: Charlotte Reemts**	**Moderator: Matthew Vaughan**	**Special Session Organizers: Jeffrey Kane and Sharon Hood**
3:40 PM	Patterns of home loss, land use, urban penetration in wildfire disasters: is it time to rethink the definition of the wildland–urban interface? **Michael Caggiano**	Contemporary wildfire effects on structural variation and landscape diversity in the Pacific Northwest: uncertainties and trade-offs for restoring resistance and resilience **Matthew Reilly**	Volunteer fire departments in times of change **Daniel M. Leavell**	Controls on severity of large wildfires in California **Qingqing Xu**	Stand- and tree-level effects of thinning and prescribed burning on tree growth responses to extreme drought in a Sierra Nevada mixed-conifer forest, California, USA **Harold S. J. Zald**
4 PM	Does plant flammability vary according to terpene content throughout the year? **Anne Ganteaume**	Does drought increase tree mortality independent of fire intensity? **C. Alina Cansler**	With increasing abundance of nonnative graminoids along a resource and disturbance gradient, native species diversity declines in a semidesert grassland in southern Arizona, USA **Emily Yurcich**	Spatial variability of historical fires across a red pine–oak landscape, Pennsylvania, USA **Joseph M. Marschall**	Forest density-reduction treatments, stand structural characteristics, and climate mediate drought-induced tree mortality in forests of the Sierra Nevada, USA **Becky Estes**
4:20 PM	A spatial analysis of factors influencing structure loss and survival resulting from the 2018 Camp Fire in Paradise, California **Austin Troy**	Clarifying the short- versus long-term impact of climate change on fire **Sean Parks**	Adaptive management in action: evaluating fuel treatment effectiveness with field-based monitoring and fire modeling **Kat Morici**	Risks to obligate seeder forests under climate change and future fire regimes **Sarah McColl-Gausden**	Thinning and prescribed fire enhance carbon fixation and growth under climatic stress **Sharon M. Hood**
4:40 PM	Housing-unit exposure to wildfire in the South Coast of California **Joe H. Scott**	Summary and Panel Discussion		Fire regimes of ponderosa pine ecosystems in Colorado: a systematic review and meta-analysis **Shawn T. McKinney**	Panel Discussion
5 PM	A holistic framework to sustainably manage the wildland–urban interface **Christopher A. Dicus**	Summary and Panel Discussion		Contrasting fire regimes within a semi-arid landscape in southwest Australia **Eddie Van Etten**	Panel Discussion
7:30 PM	**Evening Activities: *The Beauty of Blackened Spaces* with Filmmaker Rick Anderson, Kiva Ballroom**				

Thursday, 21 November — 3:40 to 5:20 PM, Concurrent Sessions

	Salon I	Salon J	Salon K	Salon L
	The Many Dimensions of Transboundary Wildfire	**The Burning Fire within: Local Prescribed Fire Initiatives for Landscape-Level Change**	**Ecology 5**	**Landscape-Level Fire Management 4**
	Special Session Organizers: Kit O'Connor and Christopher J. Dunn	**Special Session Organizer: Ryan Wilbur**	**Moderator: Emily M. Booth**	**Moderator: Alison York**
3:40 PM	Predicting fire line effectiveness with machine learning **Dennis W. Hallema**	Embers at the community campfire: participant aspirations and motivations towards forming the Wyoming Prescribed Fire Council **Ryan Wilbur**	Post-fire tree establishment in tropical montane mixed-conifer forests in central Mexico **Jesús Eduardo Sáenz-Ceja**	Sustainable fire management and carbon sequestration in Kafue National Park, Zambia, through collaborative fire management exchanges: a case study **McRee Anderson**
4 PM	Community wildfire exposure from national forests of the western US: archetypes of cross-boundary wildfire risk **Max Nielsen-Pincus**	Heuristics and fire: decision-making processes and prescribed fire implementation in the Southern Great Plains **J. Kelly Hoffman**	Dozer line post-fire plant community recovery **Hannah Weinberger**	50 years of fire-moderated vegetation change: long-term monitoring of prescribed fire in the Sierra Nevada, Kings Canyon National Park **Anthony C. Caprio**
4:20 PM	Integrating forest management for greater fire suppression effectiveness and better ecological outcomes: Rogue Basin, Oregon **Kerry Metlen**	Establishing acceptance and utilization of prescribed fire in Texas **Morgan Treadwell**	Site and climate influences on annual height growth of natural ponderosa pine regeneration following three wildfires **Darcy H. Hammond**	Land tenure and wildfire in the Pacific Northwest **Ana Barros**
4:40 PM	Thinking outside the ownership box: pyrome-scale strategic wildfire risk planning **Kit O'Connor**	Goals for and barriers to the use of prescribed fire by private landowners in California **Susie Kocher**	Rethinking fire-adapted species in an altered fire regime **Carmen Tubbesing**	
5 PM	Policy processes for improving strategic fire risk management on federal forestlands **Courtney Schultz and Michelle Ferguson**	Discussion	Modelling post-fire tree mortality: can Random Forest improve discrimination of imbalanced data? **Tim M. Shearman**	
7:30 PM	**Evening Activities: *The Beauty of Blackened Spaces* with Filmmaker Rick Anderson, Kiva Ballroom**			

Friday, 22 November: Field Trips

Field trip participants should meet in the Foyer near Registration, 10 minutes before their trip's departure time. Thanks to our field trip sponsors—the National Advanced Fire and Resource Institute (NAFRI), University of Arizona, and Northern Arizona University—for helping reduce the cost of field trips for all participants!

Altar Valley

Field trip leader: Nathan Barrett, Buenos Aires National Wildlife Refuge
Departure time: 8:15 AM
Estimated return time: 5 PM

A tour to the International Border with Mexico, southwest of Tucson, will introduce you to a working landscape of Sonoran Desert grassland and Sky Island ecosystems where fire management has been a major theme since the late 1970s and early 1980s. The desires to manage mesquite and woody vegetation encroachment and to return fire to this landscape were the major themes for the Fish and Wildlife Service Fire Management on the Buenos Aires NWR.

The resource benefits that come from active fire use and management have been demonstrated within the valley at the Buenos Aires National Wildlife Refuge (BANWR) for over 30 years. These projects meet a number of Service goals including reduction of hazardous fuels, maintaining habitat critical to masked bobwhite quail and other threatened and endangered species, and assisting US Customs and Border Patrol by reducing vegetation that hinders or obscures agent operations. This tour will feature three stops along the southern boundary of BANWR and includes the effects of a natural fire from 2018, a prescribed fire from 2019, and fuel reduction projects, as well as a planned prescribed fire unit (2020).

Join us to learn how BANWR is working on building a sustainable natural resource conservation program using fire while collaborating with our federal partners, given climate trends characterized by dry warm winters. You might also consider putting your binoculars in your pack to be ready for the many birds and other wildlife you may see along the way!

Biosphere 2

Departure time: 8:30 AM
Estimated return time: 12:30 PM

Tour one of the world's unique facilities dedicated to the research and understanding of global scientific issues. The Biosphere 2 facility serves as a laboratory for controlled scientific studies, an arena for scientific discovery and discussion, and a far-reaching provider of public education. On this hour-long tour, you will be guided through the Rainforest, walk across the Ocean overlook, explore the Coastal Fog Desert, and travel through the underground technosphere, descending into one of the amazing "lungs"—an engineering marvel—that helped moderate air pressure in the sealed Biosphere 2 environment.

Santa Catalina Mountains

Field trip leader: Dr. Don Falk, University of Arizona
Departure time: 8:45 AM
Estimated return time: 5 PM

The Santa Catalina Mountains represent a classic example of a southern Arizona Sky Island. Rising in elevation to over 9,000 feet, the forested summit is a vivid ecological contrast to the desert valley 7,000 feet below. The mountains of this region, also called the Madrean Archipelago, lie between the southern end of the Rocky Mountains and the northern end of the Sierra Madre Mountains in Mexico, and share many plant and animal species with both ranges, as well as the Chihuahuan and Sonoran deserts to the east and west. As you drive up the Catalina Mountains through several life zones, you will see why these mountains are hotspots for biodiversity. The Catalina Mountains have also experienced many destructive fires in recent years, including the 2002 Bullock Fire and the 2003 Aspen Fire. Collectively, these two fires burned over much of the forested area of the range and destroyed many structures in the community of Summerhaven near the base of Mount Lemmon. On this tour, you will learn how the mountain ecosystems are recovering from these fires and what managers and community members are doing to restore fire-adapted forests while protecting residents from the threat of wildfire.

Cuenca Los Ojos, Sonora, Mexico (Overnight Trip)

Field trip leader: Dr. Diego Perez-Salicrup, National Autonomous University of Mexico

Departure time: 9:30 AM Friday,

Estimated return time: 8 PM Saturday

Visit the US–Mexico border region to learn about current fire management challenges and how the historical differences in fire management have shaped current ecosystems in the US and Mexico. This will be a two-day trip. We will depart from Tucson on Friday morning and experience the Sky Islands in southern Arizona in the Coronado National Memorial, where managers will discuss unique challenges of managing fire along the international border. We will spend the night in Sierra Vista (on your own, see details). Early Saturday morning, we will cross the US–Mexican border in the town of Naco and drive into Cuenca Los Ojos, where recent prescribed burns have been conducted, but more importantly, where there was not an effective fire suppression policy during the 20th century. We will be joined by personnel from CONAFOR who are in charge of fire management at the national level in Mexico.

Las Cienegas and Audubon Research Ranch

Field trip leader: Dr. Zach Jones, Southwestern Oklahoma State University

Departure time: 8 AM

Estimated return time: 5 PM

This one-day field trip will visit Las Cienegas National Conservation Area (NCA) and the Audubon Research Ranch located within the rolling grasslands and woodlands of southern Arizona. Las Cienegas NCA, managed by the Bureau of Land Management, is a lush riparian corridor that burned in the 2017 Sawmill Fire. Discussions at this stop will focus on the impacts of this fire on the riparian resource as well as the monitoring work before and after the fire. The second stop of the field trip will visit Audubon Research Ranch, which is surrounded by rolling grasslands and Madrean oak woodlands that burned as part of the 2006 Ryan Fire. The two sites will allow participants to contrast both short- and long-term impacts of fire on southern Arizona landscapes. In addition to the valuable information, this field trip will allow visitors to enjoy the beautiful vistas of the desert seas, rolling oak woodlands, and surrounding sky-island mountains.

Saguaro National Park

Field trip leader: Perry Grissom, Saguaro National Park

Departure time: 8 AM

Estimated return time: 5 PM

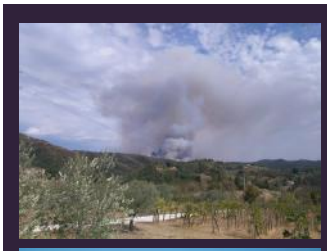
Experience the Sonoran Desert up close and learn about management of fire and invasive species with Saguaro National Park leaders on this day-long hike in the Rincon Mountains, which rise abruptly from the Sonoran Desert to an elevation of 8,432 feet. Managers face unique fire management challenges in this landscape, trying to limit fire spread fueled by invasive grasses in the lower-elevation desert community while maintaining an active and historically significant fire management program in the upper-elevation fire-adapted forest communities. The hike is approximately 6 miles roundtrip on an easy- to moderate-difficulty trail, with a lunch break at Bridal Wreath Falls. The trail winds through Sonoran Desert and desert grassland vegetation types, where managers will point out the impacts of non-native plants on the fire regime of the Sonoran Desert. Participants will also be able to see the impacts of past fires in higher-elevation, fire-adapted vegetation types of the Rincon Mountains.

University of Arizona: Laboratory of Tree-Ring Research and Environment and Natural Resources 2 Building

Departure time: 9:15 AM

Estimated return time: 1:30 PM

The University of Arizona, founded in 1885, is home to historic contributions to the field of fire science and continues to play a leading role in natural resources science, management, and extension in the region. This half-day trip includes a tour of the Laboratory of Tree-Ring Research, where the science of dendrochronology was invented over 80 years ago. Scientists at this lab have changed our understanding of the role of fire in ecosystems by studying the history of fires in tree-rings throughout the world and continue to be leaders in the fields of dendroclimatolgy and dendroecology. The trip also includes a tour of the new LEED platinum-certified Environment and Natural Resources 2 Building, which is a testament to the university's commitment to environmental sustainability and interdisciplinary research in earth sciences, environmental sciences, and natural resources. The tour will culminate with lunch in the building's "slot canyon."



Fire ecology across boundaries: Connecting Science and Management

October 20-23, 2020

Florence, Italy

The Association for Fire Ecology and Pau Costa Foundation are partnering with Regione Toscana and University of Florence to host a conference in Europe for diverse stakeholders involved in wildfire management. Save the date and join us in Florence for workshops, plenary and concurrent presentations, and field trips.

For more information visit fireacrossboundaries.org

Association for Fire Ecology

PAU COSTA FOUNDATION

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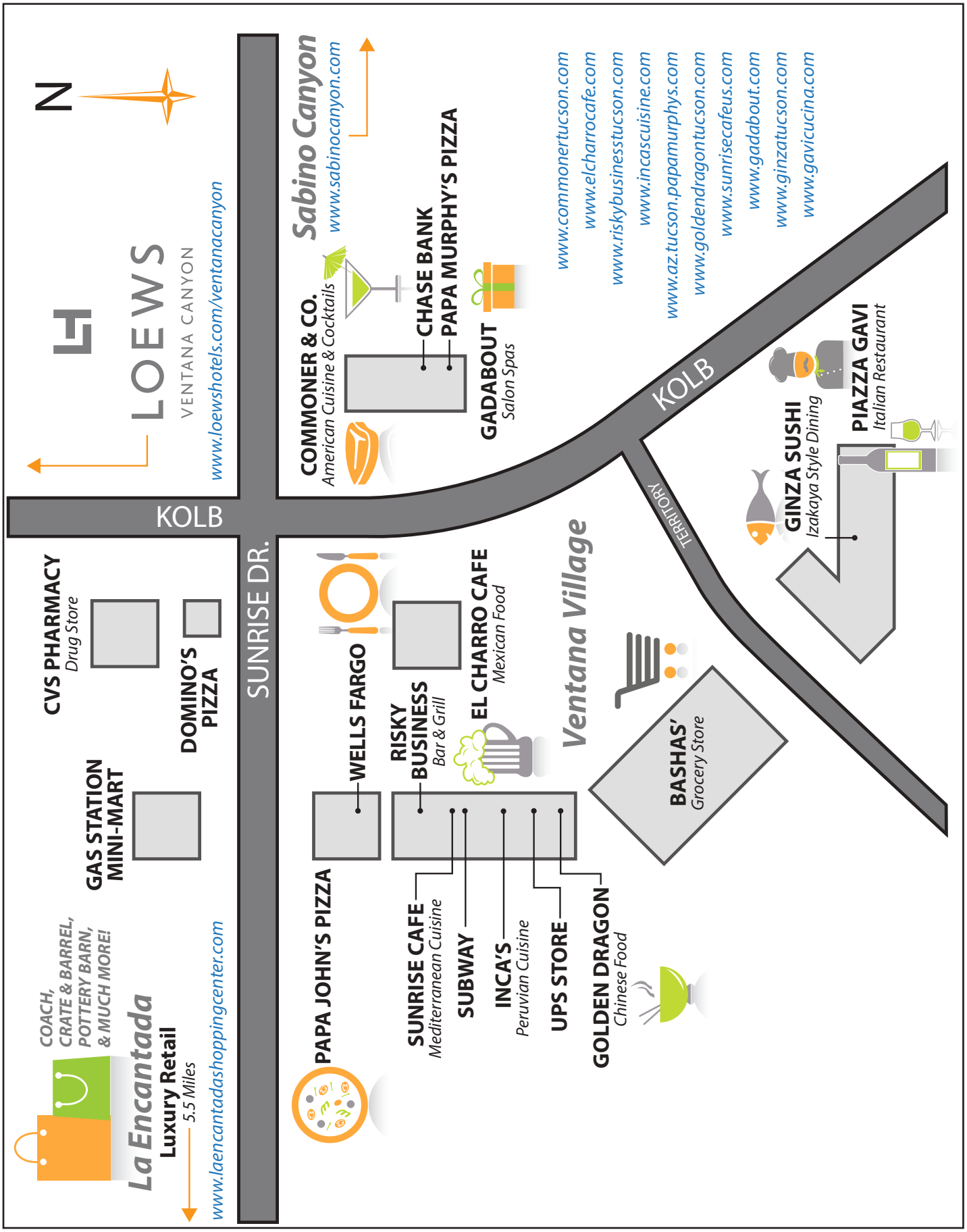
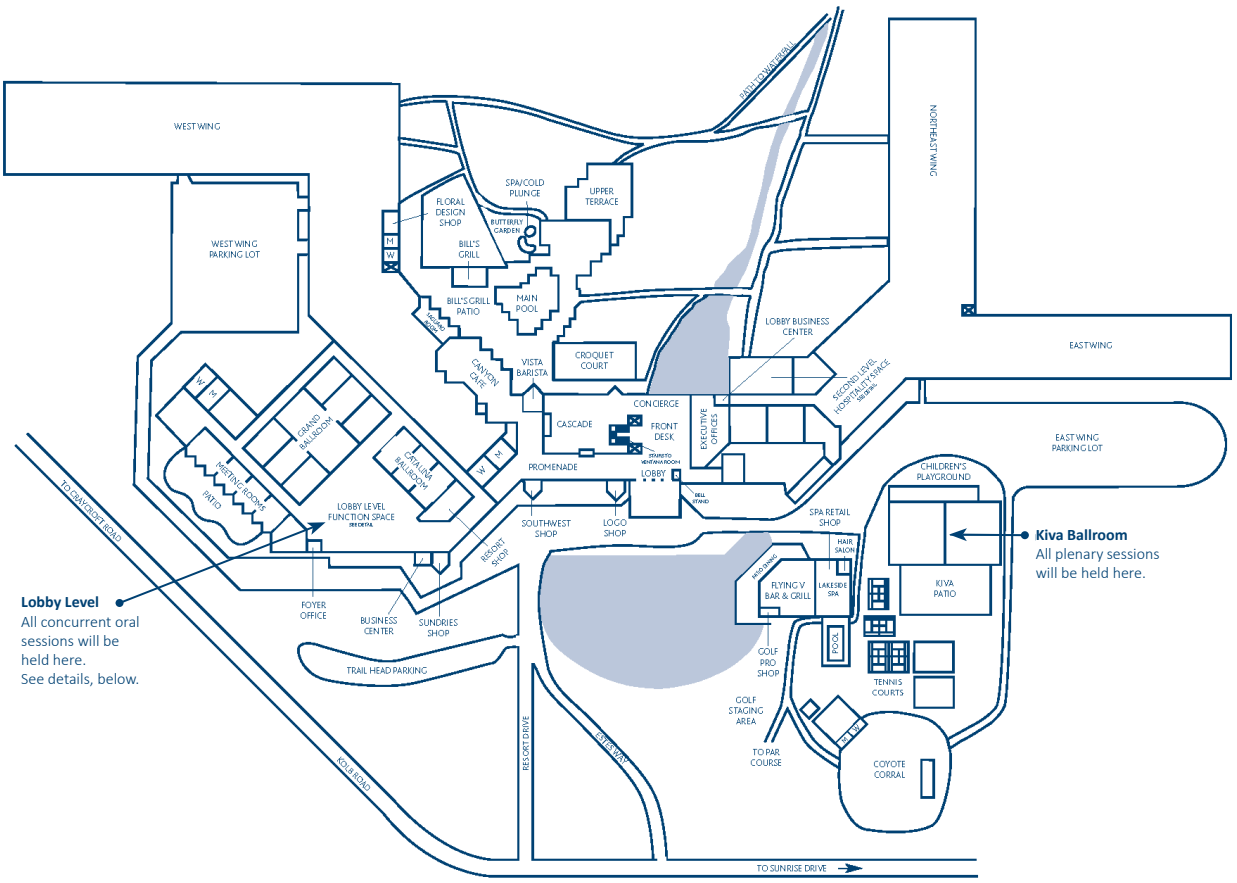
DAGRI DIPARTIMENTO DI SCIENZE E TECNOLOGIE AGRARIE, ALIMENTARI, AMBIENTALI E FORESTALI

REGIONE TOSCANA

Map of Ventana Village



Floorplans for Loews Ventana Canyon Resort



PROPERTY OVERVIEW

LOBBY LEVEL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