



SOUTHERN Fire Exchange

A JFSP Knowledge Exchange Consortium



FIRE LINES

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Learn more about our [Partners](#) and the [JFSP Knowledge Exchange Consortia](#).

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SFE Spotlight on Smoke and Fog

Happy New Year! To start our 2014 spotlight series, we'll be focusing on topics related to smoke and fog in January and February. We have great speakers lined up for our [Smoke Webinar Series](#); new fact sheets will focus on best smoke management practices and superfog; and Gary Curcio will participate in the 10 minutes with SFE interview. Check out our [Spotlight on Smoke and Fog](#) webpage for a full list of related resources and events.



Photo: David Godwin, SFE Program Coordinator

Research Highlight: Wood Smoke, Oxidative Stress, and Wildland Firefighters

Exposure to smoke is part and parcel of a firefighter's work. Therefore, it is essential to better understand the health effects of smoke exposure and to use this information to determine the safest occupational conditions for wildland fire managers. A team of researchers recently published results of a study that investigated the effect of wood smoke exposure on levels of oxidative stress in wildland firefighters. Oxidative stress is an indicator of how free radicals and other substances contained in smoke interfere with cellular metabolic processes and damage the body's cells and DNA ([click here](#) for a fairly simple description of oxidative stress).

Oxidative stress can be assessed by monitoring changes in biomarkers excreted in urine. The biomarkers (8-Oxo-dG and MDA in this study) are products of oxidation and therefore are assumed to represent overall oxidative processes in the body. To detect changes in oxidative stress, pre and post-workshift urine samples were collected from 19 firefighters before and after a series of prescribed burns conducted in Georgia during the winter burn season of 2004. The research team analyzed the relationship of these changes to the length of firefighting career, age of the firefighter, and workshift exposure to particulate matter.

Overall, the results of this study showed no significant changes in the biomarkers analyzed in the urine samples collected pre and post fires. However, when looking at only those subjects who had been firefighters for 2 years or less, significant increases in 8-oxo-dG level were found during work shifts. In contrast, there was a significant cross-shift decrease in 8-oxo-dG levels for the firefighters with more than 10 years of burning experience. A possible reason is that cumulative smoke exposure may increase the activities of antioxidant enzymes in the body, which can reduce the acute impact of smoke caused oxidative stress. Changes in both biomarkers were not associated with exposure to particulate matter. Finally, the mean level of one of the biomarkers was relatively higher than the levels found in people without regular smoke exposure, as reported in other occupational or general population studies.



Photo: Chet Buell, SFE IT Specialist

The authors conclude that "the results indicate that oxidative stress response measured as cross-shift changes in 8-oxo-dG may depend on age or the length of a firefighter's career. These results suggest the need to investigate the longer term health effects of cumulative exposure of wood smoke exposure among wildland firefighters, because increased body burden of oxidative stress is a risk factor for many diseases and is theorized to be involved in aging."

Adetona, O., Zhang, J., Hall, D. B., Wang, J., Vena, J. E., Naeher, L. P. (2013). Occupational exposure to woodsmoke and oxidative stress in wildland firefighters. *Science of the Total Environment* 449 (2013) 269–275.

Partner Spotlight: NWCG Smoke Committee (SmoC)

The SFE recently began collaborating with the National Wildfire Coordinating Group (NWCG) Smoke Committee (SmoC) to determine potential programs where our two teams can work together to address smoke-related topics and needs in the southern fire community.

SmoC works nationally with members from several agencies and organizations and focuses on supporting management and use of wildland fire, while addressing air quality regulations and smoke-related impacts to public health and safety. The Committee is in the process of updating the 2001 Smoke Management Guide, which has been a valuable resource for managers over the years.

SmoC has worked with the University of Idaho and FRAMES to develop the [Emissions and Smoke Portal](#), which includes the following helpful resources:

- * Smoke Management and Air Quality for Land Managers: An Online Training Resource – A tutorial providing an overview of air quality regulations and smoke management. You can complete the four lessons at any time for free, with each lesson taking about 30 minutes to complete. Using a combination of conventional readings, interactive figures, and supporting case studies, the tutorial intends to help users understand impacts of smoke, air quality regulations, smoke management, and effective collaboration and communication.
- * Smokepedia – An interactive, online glossary for smoke and air quality terms.
- * Case Studies – Examples of smoke management situations, how they were addressed, and the lessons learned from these events.
- * Air Quality Library – PDF links to air quality guides and helpful website links.
- * Archived Presentations – Multiple presentations on smoke and air quality topics, recorded during a series of workshops conducted in 2008-2009.
- * Public Perceptions of Smoke – Access a number of articles, webinars, and a photographic guide related to public perceptions and tolerance of smoke.



SmoC was established in 2007 as an interagency effort to develop effective, consistent, and efficient strategies and guidance for addressing smoke within agency fire and fuels programs.

UPCOMING EVENTS

Visit the [SFE Calendar](#) and the [JFSP Calendar](#) to learn more about upcoming workshops, training, webinars, field trips, demonstrations, and other professional development opportunities. To add an event to our calendar, send the event information to sfe@ifas.ufl.edu.

Webinars

[A Dataset for the Evaluation of Smoke Models](#)
January 14, 3pm EST

[Prescribed Fire Smoke Management Lessons](#)
January 16, 1pm EST

[National Fire Protection Association: Creating Fire Adapted Communities](#)
January 16, 2pm EST

[LANDFIRE in the South](#)
January 22, 1pm EST

[Evaluation and Improvement of Smoke Plume Rise Models](#)
February 19, 3pm EST

[Introduction to VSmoke](#)
February 20, 1pm EST

[Integrated Smoke Management Curriculum](#)
February 27, 1pm EST

[Predicting Local Smoke Dispersion](#)
April 9, 3pm EST

[MTBS Applications in the South](#)
March 12, 2pm EST

Workshops

[Strategies and Treatments to Maintain or Restore Longleaf Pine Forests](#)
February 9, 2014
Orlando, Florida

[Ignition Planning and Prescribed Fire Techniques for Wildlife](#)
May 5-8, 2014
Jacksonville, Florida

Conferences

[Southeastern Society of American Foresters Annual Meeting](#)
January 26-28, 2014
Panama City Beach, Florida

[Society for Range Management: 67th Annual Meeting](#)
February 8-13, 2014
Orlando, Florida

[Fire Ecology of the Northeast: Restoring Native and Cultural Ecosystems](#)
February 20-22, 2014
New Haven, Connecticut

[Wildland Urban Interface Conference](#)
March 17-19, 2014
Reno, Nevada

[8th Annual Wildland Fire Litigation Conference](#)
April 25-27, 2014
Monterey, California

[Large Wildland Fires: Social, Political, & Ecological Effects](#)
May 19-23, 2014
Missoula, Montana

Look for the SFE Booth at the Exhibit!

Prescribed Fire Smoke Management Questions?

There's an App for That

By Jennifer Evans, Prescribed Fire Extension Assistant, North Carolina State University, SFE Partner and Contributor

The [Prescribed Fire Smoke Management Pocket Guide](#) (SMPG) provides best smoke management practices at your fingertips. Since this is a web-based application, it can be used on a mobile device or a personal computer. The intent of the SMPG is to provide a prescribed fire smoke management reference for anyone conducting prescribed burning, including private landowners, forestry consultants, agency personnel, or other land managers. The SMPG is similar to the National Wildfire Coordinating Group's Incident Response Pocket Guide (IRPG) in that it provides a collection of best practices that have evolved over time, but with a specific focus on smoke management for prescribed fire.

The SMPG gives you access to

- * Best smoke management guidelines with associated resources and information,
- * A fuel calculator to determine the available fuel load on your burn unit,
- * Smoke-related fact sheets,
- * Numerous associated resources such as fire weather and smoke screening tools, and
- * Smokepedia, the online smoke and air quality glossary developed by the NWCG Smoke Committee (SmoC) and the University of Idaho.

The information in this pocket guide was compiled by the Southeast Regional Partnership for Planning and Sustainability (SERPPAS) Prescribed Fire Work Group and the Coalition of Prescribed Fire Councils and was developed into a mobile application through the technical expertise of the Office of the Secretary of Defense.

Want this web-app to look and feel more “app-like” so that you can easily navigate to it later? On your mobile device, go to smokeapp.serppas.org. Click the “share” button (this button/icon is on the browser menu of your mobile device), and then click “Add to Home Screen.” An SMPG icon will then appear! Let us know how you like the app by e-mailing jlevans3@nesu.edu.

INFORMATION YOU CAN USE: SMOKE AND FOG WEBINARS, FACT SHEETS, AND MORE

Webinars

Make sure to mark your calendar for these upcoming smoke-related webinars.

Southern Fire Exchange Webinar Series on Smoke and Emissions

Prescribed Fire Smoke Management Lessons

January 16, 1pm to 2pm EST

Dale Wade, retired US Forest Service scientist, will discuss issues related to smoke management and planning during prescribed fire operations in southern ecosystems.

Introduction to VS smoke

February 20, 1pm to 2pm EST

Dr. Scott Goodrick, US Forest Service Research Meteorologist, will introduce and discuss the use and application of the VS smoke model.

Integrated Smoke Management Curriculum

February 27, 1pm to 2pm EST

Jennifer Evans, NC State University Prescribed Fire Extension Assistant, will discuss a train-the-trainer smoke management curriculum for teaching prescribed burners about smoke management.

Monthly Webinar Series, hosted by the Wildland Fire Lessons Learned Center

A Dataset for the Evaluation of Smoke Models: Emissions, Plume Rise, and Dispersion

January 14, 3pm to 4pm EST

Shawn Urbanski will present an overview of data with measurements of smoke emissions, plume rise, and dispersion for eight wildfires in the western United States and prescribed fires in California, Idaho, and North Carolina.

Evaluation and Improvement of Smoke Plume Rise Models

February 19, 3pm to 4pm EST

Yong Liu will share information regarding a 2008-2011 JFSP project to evaluate and improve smoke plume rise models.

Predicting Local Smoke Dispersion During Low-Intensity Wildland Fires in Forested Environments

April 9, 3pm to 4pm EST

Warren Heilman will provide a summary of a JFSP study on meteorological and air-quality monitoring and modeling of low-intensity prescribed fires in the New Jersey Pine Barrens.

In addition, the following archived webinars from SFE and some of our partners feature excellent presentations on wildland fire smoke and emissions.

Using Smoke Prediction Models for Prescribed Burning Planning

Daniel Stratton introduces the major characteristics of emission and smoke models such as the Fire Emission Production Simulator (FEPS), HYSPLIT, BlueSky, and VS smoke.

Making Sense of Wildland Smoke

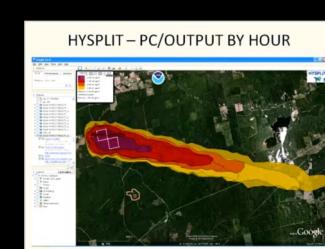
Gary Curcio, Kari Fleegel, and Warren Heilman highlight a range of current perspectives, activities, developments, and emerging issues concerning smoke from wildland fires.

On the Causes and Movement of Smoke-Induced Fog

Gary Achtemeier presents information about predicting the occurrence and transport of smoke-induced dense fog (superfog).

Validation of Fuel Consumption Models for Smoke Management Planning in the Eastern US

Roger Ottmar and Susan Prichard present fuel consumption data collected from prescribed fires in different fuelbed types in the Southeast, Northeast, and North Central states.



Learn the basics of several smoke models by watching Daniel Stratton's webinar, archived on the Forestry Webinar Portal.

Fact Sheets

Two new SFE fact sheets are being developed and will be posted on our website soon. One fact sheet provides managers with a quick summary of key points from the Basic Smoke Management Practices Guide, developed by the US Forest Service and the Natural Resource Conservation Service in 2011. The other fact sheet presents the current state-of-the-science on predicting superfog formation, compiled from a series of talks at the recent IAWF International Smoke Symposium.

In addition, the SFE has short fact sheets available on smoke topics ranging from health effects to using smoke models.

Detailed Point Weather Forecasts

Explains the short, easy steps for accessing 48-hour detailed forecasts through the NOAA Fire Weather website.

Predicting Smoke Movement: User-Friendly Computer Models

Introduces the primary models that can be used for most prescribed fire in the South, such as Simple Smoke Screening, VS smoke, and HYSPLIT.

Smoke Prediction with VS smoke

Provides a brief overview of this model, its applicability and limitations, and describes model inputs and outputs.

Situational Awareness: Nighttime Smoke and Fog on Prescribed Burns

Summarizes many of the factors related to nighttime smoke and fog that should be considered when making smoke management decisions.

Health Effects of Wildland Fire Smoke

Describes smoke pollutants and summarizes five studies that have documented health effects of wildland fire smoke.

Workshop Summary

Tall Timbers Research Station and Land Conservancy organized a workshop in 2012 to focus on particulate matter emission factors for wildland fires and priorities for future research. To share information on this important topic with the broader fire community, the Wildland Fire PM Emission Factor Workshop Summary synthesizes the key ideas presented and discussed by workshop participants.

NEWS AND REMINDERS

LONGLEAF WORKSHOP AT SRM MEETING

The Rangeland Technology and Equipment Council is hosting a workshop titled *Strategies and Treatments to Maintain or Restore Longleaf Pine Forests* on February 9, 2014 at the Society for Range Management Annual Meeting in Orlando, FL. Sponsored by the SFE, this workshop will discuss the use of fire or fire surrogates to maintain/enhance existing forests and techniques, equipment, and native plant materials to restore degraded or former forest areas. Interaction and sharing lessons learned will be integrated into this half-day workshop.

CALL FOR ABSTRACTS: 3RD CANADA WILDLAND FIRE CONFERENCE

The Wildland Fire Canada Program Committee is [currently accepting abstracts for the 2014 conference](#), which will be held October 7-9, 2014 in Halifax, Nova Scotia. The deadline for abstracts is April 15, 2014.

FIRE EFFECTS ON AMPHIBIANS AND REPTILES VIDEOS

[Videos of the eight presentations](#) given during the "Effects of Wildland Fire and Fire Management on Amphibians and Reptiles Symposium" at The Wildlife Society Annual Conference are now available for viewing online.

RXCADRE

A recent [Joint Fire Science Program Fire Science Digest](#) focuses on the collaborative RxCADRE project, which is helping to advance fire behavior and fire effects model development by collecting data on prescribed burns in the Southeast.

NPS FIRE PLAN OPEN FOR COMMENT

The National Park Service recently released their [2014-2019 Wildland Fire Strategic Plan](#) and invites public comments on the plan until January 15.

FIRESCIENCE.GOV

Join [JFSP's FireScience.gov email list](#) and receive weekly announcements with fire science and management news.

BACKYARDS AND BEYOND PRESENTATIONS AVAILABLE

Many of the presentations from the [Backyards and Beyond Wildfire Education Conference](#) are available online.

NRCS CONSERVATION STEWARDSHIP PROGRAM

Funds are available for conservation activities on private or tribal agricultural or nonindustrial forest lands. Details are available on the [NRCS website](#) and the application deadline has been extended to February 7, 2014.



The Southern Fire Exchange is funded through the Joint Fire Science Program, in agreement with the United States Forest Service, Southern Research Station. This institution is an equal opportunity provider.

VIRTUAL SMOKE SYMPOSIUM STILL AVAILABLE

The International Smoke Symposium was held October 21-24, 2013 at University of Maryland University College. The symposium explored the complex policy and science issues, discussed different management strategies, and identified knowledge gaps within the field of smoke science. Presentations from the symposium are available for online viewing through registering for the [virtual conference](#). This option is still available, and registrants will have access to the presentations through October 2014.

POSITION PAPER DISCUSSES FIRE'S CRITICAL ROLE IN ECOSYSTEM MANAGEMENT

In September, in response to recent controversial conclusions drawn from smoke emissions research, the Association for Fire Ecology, International Association of Wildland Fire, Tall Timbers Research Station, and the Nature Conservancy released a collaborative position paper that argues for the critical importance of prescribed fire in maintaining and restoring North American ecosystems, reducing the severity of wildfires, mitigating wildfire carbon releases, and protecting communities. [Click here](#) to read the full paper, co-authored by Southern Fire Exchange members.

"While cessation of prescribed burning may seem appealing in the short term as a means of curbing carbon emissions and improving air quality, this perspective lacks long-term vision and ecological understanding."

— Interagency Prescribed Fire Position Paper

FALL 2013 FIELD TOURS A HUGE SUCCESS

Starting in September, the Southern Fire Exchange kicked off a busy fall season of field tours designed to facilitate experiential fire science learning for managers, researchers, consultants, students, and private landowners. Our season started September 12th with an outstanding tour by the Nature Conservancy of Georgia and the Chattahoochee Fall Line Conservation Partnership (CFLCP) on the Blackjack Crossing Tract near Columbus, Georgia. The Georgia Forestry Commission provided transportation for participants to see longleaf pine understory restoration experiments, a rare wetland habitat, and a sand pine removal project. The following week in central Florida the Nature Conservancy of Florida and the Central Florida Prescribed Fire Council hosted two field tours of the TNC Tiger Creek Preserve. Participants had a unique swamp buggy tour of the preserve and were able to learn about the successes and challenges of restoring ecosystems along the Lake Wales Ridge. On October 29th, the Southern Fire Exchange partnered with the University of Florida Conserved Ecosystems Outreach and Research program (CFEOR) and the St. Johns River Water Management District for a tour of the Julington-Durbin Preserve near Jacksonville, Florida. Participants had the opportunity to discuss prescribed fire and ecosystem restoration strategies in the heart of the wildland-urban interface. On October 30th, the Joseph W. Jones Center welcomed a Southern Fire Exchange field tour and provided a rare opportunity for participants to tour the 29,000 acre Ichauway plantation. The staff of the Jones Center provided a comprehensive tour of prescribed fire, ecological forestry, and experimental research programs underway on the beautiful property. Finally, on November 19th the Southern Fire Exchange presented at a prescribed fire workshop and field tour hosted by the CFLCP and the Nature Conservancy of Georgia. Participants in the workshop learned about TNC longleaf pine ecosystem restoration techniques and efforts on properties affiliated with the Fort Benning Army Compatible Use Buffer program (ACUB).

These workshops provided the opportunity for well over 160 participants to get into the field this fall to network and learn about wildland fire science and natural resource management techniques. The feedback received from these workshops was overwhelmingly positive and we will be working to facilitate another series of field tours next year. If you know of a great site for a field tour let us know (contactus@southernfireexchange.org)!



Left to Right: Dr. Steve Jack, Conservation Ecologist, sharing information on the field tour at the Joseph W. Jones Center; participants getting ready for the swamp buggy tour at TNC's Tiger Creek Preserve; participants at one of the stops on Julington-Durbin Preserve field tour near Jacksonville, Florida. Photos: David Godwin, SFE Program Coordinator.